

40 Years of Innovation

2015 HONEYWELL USERS GROUP AMERICAS

A Special Report from the the Editors of

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CONTROL

Trends & Technology

The background of the slide is a complex, abstract pattern of light blue and white geometric shapes, including hexagons, squares, and lines, creating a network-like or circuit-like appearance. The shapes are interconnected, suggesting a digital or technological theme.

A CLEAR VISION FOR TOUGH TIMES

Honeywell and its users are meeting today's challenging economic climate with sophisticated strategy, technology and services.

By Paul Studebaker, editor in chief, Control

Few events of any kind survive for 40 years, but on June 22 in San Antonio 1,200 attendees from 34 countries, representing 302 companies in 47 industries, paused for a moment to celebrate the 40th anniversary of the Honeywell Users Group (HUG) conference, the longest running event of its kind in the industrial automation business.

Then they got down to business. "Since Q4 of last year, since oil prices have changed, capital investments have been reduced," said Vimal Kapur, president, Honeywell Process Solutions (HPS). Investments were up about 20% in 2010 and 2011, and remained flat through 2014, but so far 2015 is down about 12%. Operational expense spending is also off. "We are highly sensitive to this and understand the business challenges," Kapur said. "Different experts offer different future scenarios, but for now and for the foreseeable future, we are in a challenging time when it's harder to justify investment and spending is reduced."

At the same time, half of plants are more than 30 years old, and the baby boomers who built, ran and maintained them are "retiring very quickly," Kapur said. "With older plants and loss of talent, technology must play a larger role."

The open systems of past decades are reaching obsolescence, and operating systems such as Windows XP are no longer being supported, which is causing disruption. "Cyber attacks are increasing," Kapur said. "They say there are two kinds of plants: ones that have been attacked, and ones that don't know they've been attacked. Every day I hear of another incident. The intensity is rising dramatically."

Environmental compliance calls for ever more monitoring and reporting. "We must do it, but it's hard to see the ROI," Kapur said.

"Safety remains our highest priority, but progress is plateauing," Kapur said. "For all industries combined, we're down to about 3.5 incidents per 100 full-time workers, but we've stuck there since 2009. How can we break through to lower levels?"



"Different experts offer different future scenarios, but for now and for the foreseeable future, we are in a challenging time when it's harder to justify investment, and capital spending is reduced." Vimal Kapur, president, Honeywell Process Solutions at HUG 2015.

Owner/operators, Kapur said, are specifically challenged to do more with less, operate safely and in compliance, leverage technology to stay relevant and manage the rising skills gap. Kapur described how Honeywell is helping operators meet those challenges with strategies, technologies and services.

First, Honeywell will expand the role of the distributed control system (DCS). “Historically, we created islands of automation in the DCS, PLC (programmable logic controller) and electrical systems. It’s been productive, but complex beneath the covers,” Kapur said. Now, the DCS has become a focal point of all control functions, taking on the functionality of PLC, alarm, safety, power management, historian, turbine control and more. Having a single system and user leverages scarce resources, and a single platform leveraging standards does more with less.

Second, cloud computing is becoming a standard part of HPS automation projects, with a logarithmic increase in the number of virtual machines in the HPS cloud over the past two years. Using virtualization simplifies the factory acceptance test (FAT), and using cloud tools to provide configuration data directly to transmitters can reduce configuration and setup cost as much as 60%, Kapur said. “For one or 100 instruments, it’s OK. For thousands, it’s a big deal.”

The cloud also is facilitating training, offering higher flexibility and accelerating availability of operator training services (OTS). Kapur said, “The cloud is real; it’s not just a Powerpoint slide. Adopt it or be left behind.”

Third, while process safety management has always depended on detecting unsafe situations, preventing them from causing an incident or accident and protecting people from any consequences, “We must push those principles to raise the level of safety performance,” Kapur said. He asked attendees to look to technology for ways to improve safety and to share use cases. “More can be done to make safety a more rigorous solution,” he said.

Fourth, for cybersecurity, Honeywell has created a team of specialists who can do audits, identify vulnerabilities and

recommend solutions. But cybersecurity requires constant monitoring, so consider using a cybersecurity dashboard, “a step toward enabling a much higher level of proactivity by identifying cyber threats before it’s too late,” Kapur said.

Fifth, standardization holds great promise for reducing cost and time to production by allowing pre-engineering of control systems. For example, shipping an engineered gas skid with controls already installed takes automation off the critical path and reduces the time to first gas by six months. HPS is working with sister company UOP to apply the same approach to large process units, such as for aromatics or naphtha, using standard schematics, master tags and interfaces.


Sixth, Honeywell continues to expand and refine its field device products to offer a complete line of smart instrumentation that can be preconfigured and use the cloud for fast auto-commissioning, and that have full auto-alerts and diagnostics to enable predictive maintenance.

Seventh, OPC UA is becoming the key to leveraging the Industrial Internet of Things (IIoT). “We see two kinds of things—the ones connected to the DCS and everything else,” Kapur said. “OPC UA provides standard communications for everything else. There’s something big here that we all need to think about.”

Eighth, Kapur told attendees their existing investments are not fully leveraged. “Point solutions are solving specific issues, but those issues are not aligned with objectives like safety, efficiency and optimization,” he said. “Bring point solutions together through dashboards and workflows to make your existing investments work harder.”

Ninth, expansion of mobility is changing workflows and the responsibilities of individuals. The way we work will change dramatically in ways we are only beginning to see and imagine.

Tenth, Honeywell is driving more outcome-based solutions in services. For example, if uptime is what you need, that becomes the definition of the solution, rather than a specific product or service. “Outcome-based contracts broaden the scope and let us bring our full range of capabilities to bear,” Kapur said.



In summary, Kapur said, as you deal with the challenges to do more with less, operate safely and in compliance, leverage technology and manage the skills gap, think about tools and methods to make technology a resource.

“We live in a world of apps that make tasks easy and simple, so you expect a similar ease when working with Honeywell,” Kapur said. “We have taken it seriously that not only great products, but also great service will differentiate us. So we will continue to improve with your feedback, so we continue to solve the right problems.”

TECHNOLOGY TRANSFORMING PROCESS AUTOMATION

Tech overview highlights smart data, reduced project and migration risk, and more intelligent instrumentation.

By Jim Montague, executive editor, Control

Sometimes past experience is the best tool for successfully handling future challenges.

Sure, it's important to know the details of the Internet of Things (IoT), cloud computing, smart interfaces and other cutting-edge technologies. But expertise in process control and automation is what gives users, integrators and their suppliers the insight and perseverance to precisely apply these latest components and software. This is how Honeywell Process Solutions (HPS) helps users secure the best possible production data, improve decisions, optimize applications and continue to drive profitability.

"This is a transformative time in process controls, rivaling the open process systems introduced in the early 1990s," said Bruce Calder, new CTO and vice president of HPS, in the "Honeywell Technology Overview and New Innovations" session on the opening day of Honeywell User Group (HUG) Americas 2015, June 22 in San Antonio, Texas. "Today, the words are cloud, big data, predictive analytics and IoT, but this situation is similar to when Honeywell pioneered and invented the DCS in the early 1970s. For instance, our Experion PKS integrates input from many sources, which is what big data and the cloud aim to do, and our Matrikon OPC solution gives us the world's leading contender for enabling IoT in the process industries. And all these devices are producing lots more data, so the question for everyone is how to manage it.

"This is all part of the digital transformation that Honeywell has been leading for years. So Experion and our Orion interfaces enable IoT because they collect and coordinate vast amounts of data, turn it into actionable information and turn process operators into profit operators. At the same time, Honeywell enables customers to retain their intellectual property assets as they modernize and do it safely, reliably and efficiently."

SMART DATA FOR BETTER DECISIONS

The first technology talk, "The Power of Digital Transformation and Smart Operations,"



"Today, the words are cloud, big data, predictive analytics and IoT...This is all part of the digital transformation that Honeywell has been leading for years." Bruce Calder, new CTO and vice president, Honeywell Process Solutions, on the opening day of Honeywell User Group (HUG) Americas 2015, June 22 in San Antonio, Texas.

featured Rohan McAdam, HS engineering fellow, and Mike Brown, HPS process application consultant, who showed how Honeywell solutions can help users analyze today's huge data volumes and extract intelligence for the best possible decisions.

"Today, the words are cloud, big data, predictive analytics and IoT...This is all part of the digital transformation that Honeywell has been leading for years." Bruce Calder, new CTO and vice president, Honeywell Process Solutions, on the opening day of Honeywell User Group (HUG) Americas 2015, June 22 in San Antonio, Texas.

"Experion and Orion's graphics are just the tip of the iceberg because they also coordinate multiple information sources and even incorporate DCS limits into the console," explained McAdam. "This lets users know where their process should be without having to consult multiple sources, but now we've just added Operator Touch Panel (OTP) to give users a rich, intuitive and direct interaction with their interfaces.

"Similarly, our Orion Collaboration Station combines DCS, business network and people so they can share data, view remote individuals and jointly collaborate on troubleshooting, planning and optimization tasks. We're also addressing users' mobility needs, providing the connectivity needed to get the right information to the right people at the right time and giving users real-time information outside the control room."

Brown reported that HPS' Intuition Executive also manages KPIs for production, safety, quality and efficiency, so users can secure more of the information they need to take action. However, now they're collaborating across their organizations' enterprise. "Previously, users had to put data in central internal repositories, but Intuition Executive deploys a plant-semantic data model, which allows them to build models of their facility and its operations; connect directly to individual assets, people and data sources; and go to them and extract the information they need, but still leave those sources in place. This is the easiest and most effective way to get this data, which users can then compare to targets."

Reliance Industries Ltd. operates many refineries and plants, so it needed to connect about 40 base-level information systems and thousands of plant-specific dashboards when it recently sought to improve overall operating performance, Brown said. These systems contained production, maintenance, inventory and health and safety data from their applications and facilities. Reliance implemented HPS real-time or near real-time performance management software; learned immediately how its plants' present operating performance were meeting targets; and addressed problems, launched corrective actions and changed work practices much faster.

"We have by far the most comprehensive set of solutions for smart applications, and we have the best domain expertise for allowing users to deploy solutions for accessing their whole applications," added Brown.

In fact, HPS has enhanced its well-known DynAMo alarm management software, added operations management capabilities and rechristened it as the DynAMo Alarm and Operations Management Suite. Along with alert and alarm functions, DynAMo now can integrate operations logbooks, shift operation instructions, operation monitoring information and other useful content, and provide it outside the control room. "The operations monitoring section can deliver to an entire operations team and show how an application's performance is acting against limits to achieve safer and more profitable operations," explained Brown.

Rohan reported that UniSim Operator Competency Suite software has been similarly enhanced for richer, more realistic training. Brown added that UniSim now has curriculum and tutor additions to help students learn required competencies.

REDUCE RISK WHILE EVOLVING

The second technology talk, "System Evolution and Reducing Project or Client Risk," was presented by Paul McLaughlin, HPS chief development engineer, Steve McGeorge, HPS global project marketing director for projects and automation solutions, and Ziad Kaakani, HPS technology director for lifecycle solutions and services.

“Honeywell balances the technology of the past with that of the future and uses both to create a unified solution,” said McLaughlin. “We’ve never left customers stranded and we never will, but that’s not enough because we also have to keep moving forward and continue innovating. There’s no rip-and-replace and no reengineering intellectual property. We’re just taking old technologies and refreshing them with new capabilities.”

This is the philosophy that HPS employs to integrate and unify Experion PKS with new solutions, such as its Enhanced, High-Performance Process Management (EHPPM) software, Lean Execution for Automation Projects (LEAP) initiative, C300 controllers and other solutions. As a result, Experion’s controllers are learning to connect directly with integrated electrical devices (IEDs), so they no longer need to use an electrical control system.

To reduce missed deadlines and cost overruns on greenfield projects, McLaughlin reported that HPS deploys LEAP, which decouples many automation tasks from the physical construction. Installation, integration, configuration and testing tasks that used to be done in sequence can now be done in parallel, which saves huge amounts of time and takes much of the risk out of doing them onsite and closer to deadline.

LEAP also is combining HPS and UOP’s expertise to build new, pre-engineered Experion templates for key process units.

McLaughlin added that LEAP principles also can be used for migrating existing applications because HPS and integrators can use cloud-based computing for offline database migrations. LEAP also helps developers create equipment templates for updating their SCADA applications. “LEAP is not all or nothing,” explained McLaughlin. “Users can employ as much cloud-based engineering, virtualization or Universal I/O as they require. LEAP for SCADA can help reduce commissioning time and provide visibility into earlier well applications, for example, and then let them easily add more wells.”

Coping with multiple wells and multiple pads at those wells is enabled by HPS’ new RTU 2020, which can run at up to 75 °C,

maintains a lower power budget, has onboard HART I/O and will soon add expansion I/O to cover even more wells and pads.

To keep its customers and their solutions secure, Kaakani reported that, “Honeywell has the broadest solutions to protect people, applications, facilities and the environment. We design all our products with security in mind, and all of them go through threat-modeling exercises. Our security architects test their entry points so they’ll be immune to hackers.”

HPS has just launched its Industrial Cyber Security Risk Manager software, which is a front-end dashboard to help users determine how at-risk their applications and facilities are for cyber security vulnerabilities. “This is a very intuitive, easy-to-use solution that shows risks and the action options that users can take,” added Kaakani. “It has easily-understood notifications, alerts and warnings, and doesn’t require users to be experts to manage their security risks.”

On the scanning side, McGeorge reported that ZipLine is a newly launched scanning and measurement device for paper and plastic film inspection. It’s more cost-effective than Honeywell’s traditional QCS inspection systems, and it’s also about 90% smaller, which means it can ship on one pallet. It can scan at 400 millimeters per second and up to 10 meters across, and can perform nuclear gauging, x-ray and infrared differential scanning.

INSTRUMENTATION GROWS MORE INTELLIGENT

The third technology talk, “Smart Instrumentation and Smarter Integration,” was delivered by Martin Bragg, HPS CTO for engineered field solutions, and Phil Ng, HPS senior product manager for process measurement and control.

“We believe that control systems are only as good as the data in them, and today’s users are looking for real-time analytics and dynamic control so they can secure accurate and reliable data, send it fast and achieve maximum utilization and minimum maintenance,” said Bragg.

They highlighted simple, high-accuracy SmartLine transmitters from HPS, including new SmartLine pressure transmitters that have

achieved 0.035% accuracy and 80-millisecond response times, and have modular components that can be plugged onto the transmitter to ease repairs. Modules include the display, terminal board, communications and pushbuttons. SmartLine is adding radar level gauges and has just released a guided-wave radar (GWR) version.

“Modular components mean that repairs that used to require eight hours of downtime now only need one hour of downtime,” added Bragg.

THIS IS THE DAWNING OF THE 'AGE OF IIOT'

Constructing an Industrial Internet of Things makes sense when you have good reasons and the right technologies

By Paul Studebaker, editor in chief, Control

As the age of automation reaches popular culture, predictions vary—will the robots work for us, or will they own us? But whatever form the future takes, it's going to be highly profitable. The value of the Internet of Things (IoT) to businesses of all kinds is expected to exceed \$1.9 trillion over the next decade, with a good portion coming from the industrial sector, the Industrial IoT (IIoT).

Spoiled by the ease of using their smart phones and apps, many might think the IIoT is simple: I am connected, therefore I can do amazing things. "Not so fast," said Darek Kominek, senior product marketing manager, Matrikon, to attendees of the session, "How Digital Transformation Enables Smart Operations and Enterprise Optimization."

"To make IIoT information useful, we must be able to put it and its context in a common language, analyze it and feed it to someone who can use it to do something," said Kominek, "And you don't want to send everything to everybody. Along the way, you need firewalls and security."

The IIoT involves Big Data. "Being in process control, you're used to historians, and that's a lot of data," Kominek said. "But the more information you have, the more conclusions you can draw. Big Data is even more than you're used to."

That Big Data needs big analysis, which is best done with the power of cloud computing, Kominek said. "A cloud is a communal area where information can be stored, analyzed and shared among various entities, from within your organization to supply chain, equipment, service and customer companies, to coordinate and optimize how a business runs," Kominek said. "There are hundreds of different types of clouds, both public and private."

"IoT is reshaping the world around us. We've all been living and breathing it with our smart devices, and now we're bringing it into the industrial world," said Tom Burke, president and executive director, OPC Foundation.

Processed information comes back to the factory floor to empower the workforce, often through "cognitive augmentation," Kominek said. "It doesn't replace the experts



"IoT is reshaping the world around us. We've all been living and breathing it with our smart devices, and now we're bringing it into the industrial world." Tom Burke, president and executive director, OPC Foundation, at Honeywell User Group (HUG) 2015 in San Antonio, Texas.

on the ground; it gives them the information and insights they need to be more effective.”

The IIoT empowers digital business applications that allow companies to work together on common problems and better serve their customers, and the availability of specialized, analyzed information is giving rise to a smart workforce. To support the variety of applications, the information must be delivered with context so it can be understood and used in a variety of ways by a variety of people.

Kominek identified three major challenges for those who would embrace the IIoT:

- Legacy systems—Users must migrate or add digital information with new communications and integration;
- Industry vertical silos—Each industry has its own way of structuring and labeling data that needs to come together for analysis and use;
- Security—A variety of protocols and sources need to be connected, yet secure.

OPC UA TO THE RESCUE

“IIoT technology is being defined and funded by many global entities, including governments,” said Tom Burke, president and executive director, OPC Foundation. In Europe, the initiative to improve smarter automation efficiently and effectively through standardization is called “Industrie 4.0.” in China, it’s “Made in China 2025,” and in the United States, it’s spearheaded by the Industrial Internet Consortium (IIC). “Industrie 4.0 chose OPC UA to connect and integrate things with automation systems and with the cloud,” Burke said. By enabling communications among disparate protocols, devices, controllers and systems, OPC UA provides open data connectivity, preserves data context and ensures security.

“OPC UA can be used on any hardware platforms, from bare metal with no operating system on up, and on any operating

system—Windows, Linux, Android, iOS,” said Kominek. “It meets the requirements for open standards and transfers data between standards and protocols.”

OPC UA preserves context by providing a customizable information structure that different devices can populate in their own way. The device manufacturer can predefine what is available in its device, and when it’s plugged in, OPC UA will load its model and provide its information in a common structure. “It’s a step closer to truly plug-and-play,” Kominek said.

“OPC UA provides data security from the ground up, based on the latest security standards, in layers with encryption that move with the technology,” Kominek said. “As hackers get more sophisticated, OPC gets better.”

Honeywell is on the OPC Foundation board of directors, and “Matrikon is committed to open systems,” Burke said. “They understand the value.” Other examples of OPC UA adoption include the oil and gas industry group MDIS, to define objects and standardization among oil companies and automation vendors for subsea operations; Oracle, as a reference architecture for a gateway solution between devices and the cloud; Microsoft, for bringing device data into its Azure cloud; utilities, for bringing smart meter data to the cloud; and SAP, to monitor electrical load balance, implement demand response and control wastewater valves.

“IoT is reshaping the world around us,” Burke said. “We’ve all been living and breathing this with our smart devices, and now we’re bringing it into the industrial world.”

‘CONTINUOUS EVOLUTION’ TO THE INDUSTRIAL IOT

The Industrial Internet of Things (IIoT) isn't a one-size-fits-all proposition. Domain expertise, selective application needed to reap benefits, manage risks.

By Keith Larson

For 40 years now, Honeywell Process Solutions (HPS) has built its process automation business on the core value of “continuous evolution,” the company’s pledge to provide its users with a path forward to the latest technology while preserving past investments in intellectual property. But what happens when continuous evolution runs headlong into disruptive technology such as that represented by the Industrial Internet of Things (IIoT)?

According to the HPS experts convened for a panel discussion this week at Honeywell Users Group Americas in San Antonio, continuous evolution may be just what the process industries need to explore and digest the new possibilities afforded by the IIoT. “The IIoT is evolving itself,” said Bruce Calder, HPS chief technology officer. “It’s a matter of finding balance.”

Indeed, the company’s customers need time, and they need to find “the right way to deploy and prudent way to apply” these new technologies, added Paul McLaughlin, HPS chief development engineer.

“Industry has to examine the use cases for IIoT.” Honeywell’s Paul McLaughlin on the very different needs of pipelines, refineries and auto-makers.

In some ways, the easier connectivity, the smarter and more powerful devices, as well as the essentially unlimited storage and compute capabilities afforded by the cloud represent only the latest wave of disruptive innovation, comparable to the transition of distributed control systems (DCSs) to open systems technology in the 1990s. Continuous evolution helped Honeywell’s customers over that technology hump too.

“Industry has to examine the use cases for IIoT,” said McLaughlin. “Pipelines are different from refineries, which in turn are different from discrete factories. Users have to decide what is important and why they should consider sending data to the cloud. And those data flows can’t perturb the core mission of the automation system.”

Cloud-based applications will certainly play an increased role, the panelists agreed, but process industry users are looking for the flexibility to use an as-needed mix of



**“Industry has to examine the use cases for IIoT.”
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on-premise solutions and private clouds too. “The IIoT typically represents a heterogeneous, multi-vendor environment,” noted Andrew Duca, chief architect, advanced solutions, for HPS. “That’s a big difference between IIoT and traditional distributed control system architecture,” he said.

Meanwhile, the panelists agreed that the network protocols and integration standards such as OPC Unified Architecture that are indigenous to the plant floor will play an important role for some years to come. “One of the big questions is ‘What will be the lingua franca of the IIoT?’” McLaughlin said. “We believe it will be OPC UA.” Other IoT protocols such as DDS and MQTT will complement OPC UA at the gateway-to-cloud level, he added.

A key differentiator for Honeywell Process Solutions and what it can offer its customers is depth and breadth of domain expertise, including device connectivity, said Mike Brown, HPS process applications consultant. Indeed, Honeywell understands process industry applications and is well-positioned to build the analytics that will unlock the meaning hidden in all that new, big data that is on its way.

The Industrial Internet of Things offers significant opportunities, but holds challenges too. Honeywell Process Solutions, through its philosophy of continuous evolution, has a proven track record of helping its customers manage them both.

UNIFORMANCE IS MUCH MORE THAN A HISTORIAN

Honeywell Process Solutions' capable historian solution surpasses traditional tasks to aid in the quest for digital intelligence.

By Jim Montague

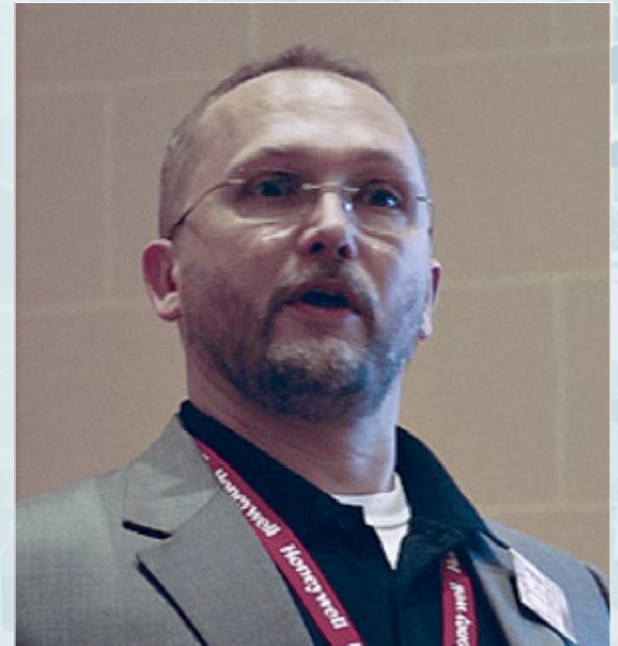
Most of today's users are overwhelmed by paperwork, voluminous reports and all kinds of data overload, as well as disparate systems and equipment that aren't able to connect and communicate with each other. Luckily, just when it seems like there's no help in sight, one brave historian technology is stepping up to lend a hand. In fact, several Uniformance solutions from Honeywell Process Solutions (HPS) have been updated and enhanced, overrunning their former job descriptions and helping users coordinate all their data in real-time or close to it, to make faster and more profitable decisions.

"The main question is how to speed up data analysis, to get revenue in and losses out," says Jan Pingel, HPS product director for Uniformance. "The current state is that most users have multiple, isolated data sources, islands of automation, and isolated and duplicated analysis tools."

Pingel presented "Expanding Uniformance—Driving Digital Intelligence Through Unified Data, Analytics and Visualization" on the opening day of Honeywell User Group (HUG) Americas 2015, June 22 in San Antonio, Texas.

"Uniformance now delivers real-time digital intelligence through unified data, analytics and visualization. This enables it to be the backbone for the Internet of Things (IoT) and puts data in Big Data." Jan Pingel, HPS product director for Uniformance on the opening day of Honeywell User Group (HUG) Americas 2015, June 22 in San Antonio, Texas.

"What users need and want is real-time data intelligence, visualization of that information anytime and anyplace, and the ability to get the right data and aggregated KPIs at the right time to the right people. They want the ability to predict and detect issues proactively; standardized and consistent metrics across their organization; to organize and navigate within an asset context; troubleshoot and isolate issues quickly for faster decision-making; capture knowledge and deploy best practices; and continuous improvement."



"Uniformance now delivers real-time digital intelligence through unified data, analytics and visualization. This enables it to be the backbone for the Internet of Things (IoT) and puts data in Big Data." Jan Pingel, HPS product director for Uniformance on the opening day of Honeywell User Group (HUG) Americas 2015, June 22 in San Antonio, Texas.

Consequently, Pingel reported, HPS has developed and is launching “the new face of Uniformance,” which affects all of its four main solutions, including:

- Uniformance KPI that defines, tracks, analyzes and improves KPIs for effective performance management;
- Uniformance Asset Sentinel that monitors plant performance and equipment health with powerful analytics;
- Uniformance PHD that captures and stores real-time process and event data across the enterprise;
- Uniformance Insight that visualizes process conditions and investigates events from any web browser.
- “Uniformance now delivers real-time digital intelligence through unified data, analytics and visualization,” explained Pingel. “This enables it to be the backbone for the Internet of Things (IoT) and puts data in Big Data.”
- Pingel added that overall improvements to Uniformance include adding advanced asset-based calculation capability and KPI visualization. This means that:
- Uniformance KPI’s new features include the ability to connect to any Honeywell or third-party applications; visualize and analyze KPIs to get insights; track thousands of KPIs to grow with users’ businesses and retain histories for years; obtain alerts when a KPI violates a limit; and access KPIs and related information on mobile devices.

- Uniformance Asset Sentinel’s new features include an advanced calculation engine for scheduled and on-data changes, template calculations, embedded performance models, and UniSim and Thermo software. It also has event detection for rules engine and notification functions, as well as visualization and reporting via asset dashboards, trends, reports graphics and displays.
- Uniformance PHD’s new features include an enterprise historian; scalability to millions of tags for years of history; a consolidated event journal to correlate events with process history; premier integration with Experion; and tag sync function for Experion and OPC.
- Uniformance Insight’s new features include graphics and flexible ad-hoc trends; availability from a PC or in the field from a tablet PC; support for Uniformance PHD and third-party historians and data sources; a thin-client application that requires no installation on user devices; and easy workspace layout management.

“In summary, the new enhanced Uniformance suite is adding new and powerful visualization; strong asset modeling and templates; and new advanced analyses, including asset-based analysis with powerful new libraries, KPI analysis and visualization, and event detection and notification,” added Pingel. “It’s fully integrated to provide superior interaction and collaboration.”

IT'S TIME TO IMPROVE AUTOMATION IN GAS AND OIL

ARC says the current oil and gas market is a good climate for spending on projects that drive out cost, increase utilization and improve operational performance.

By Jim Montague, executive editor, Control

It might seem illogical to invest in improvements during lean times, but spending on repairs, renovations and new capabilities when business is down and production is slow makes better long-term sense than trying to revamp when business is good and production is running at full capacity.

For instance, natural gas and oil prices have been depressed for the past couple of years, and the resulting impact is being felt in the process automation markets. Many show flat or little growth for 2015-16, while some are declining, according to ARC Advisory Group. However, ARC projects that present economic conditions will have only short-term impacts, and adds that price pressures are forcing process owner-operators to invest in integrated automation solutions that drive out costs, increase asset utilization and improve operational performance.

“There’s definitely short-term pain, but there also are opportunities to be seized,” said Tim Shea, senior analyst at ARC. “Natural gas has been trading at about \$3 per million BTUs, and unconventional sources are becoming the new normal. In 2014, proven reserves were about 6,972.5 trillion cubic feet (tcf) worldwide and about 422 tcf in North America. However, shale gas developments outside North America are still years away due to a lack of domain expertise and technology, infrastructure. So, the long-term need for LNG in China, India and other developing regions will drive demand for natural gas up along with prices. As a result, LNG export projects in the U.S. are being built to help meet this long-term demand from overseas for natural gas as primary fuel.”

Shea presented “Automation’s Role in Shaping the Future of Unconventional Gas Markets” at the 2015 Honeywell User Group Americas symposium, June 23 in San Antonio, Texas.

“Rig counts have been dropping but production has been increasing due to investments in automation and innovation.” Tim Shea, senior analyst, ARC at the 2015 Honeywell User Group Americas symposium.



“Rig counts have been dropping but production has been increasing due to investments in automation and innovation.” Tim Shea, senior analyst, ARC at the 2015 Honeywell User Group Americas symposium.

“Although rig counts have been dropping, production has been increasing due to investments in automation and innovation,” explained Shea. “Cheaper feedstock prices are also spurring development of U.S. methanol plants and fertilizer plants, which generates increased demand for natural gas.”

Despite available opportunities, Shea reported that horizontal drilling and hydraulic fracturing still face some difficult technical, environmental and market challenges. “Critical issues are cost containment, production optimization and water management/logistics,” explained Shea. “There’s also competition from increasing gas projects in the Middle East and North Africa regions to enable domestic power generation and switch to CO₂ injection. Sour gas projects are also happening in Middle East, which is creating H₂S challenges and the need for advanced leak detection technologies.

“In addition, enhanced oil recovery (EOR) methods are critical. Its primary methods of water and methane gas injection are workhorses, but new technologies are coming online. Also, CO₂ injection, chemical injections and advanced polymers are being leveraged to increase recovery rates, and help meet green objectives.”

Faced with all these economic and technical challenges, Shea reported it’s crucial for owner-operators to invest in process control and automation solutions. Fortunately, control and automation is an extremely good investment. “Automation is usually 1% or less of a typical process industry project spend, but it can have a huge influence, and generate 15-30% worth of positive impact on that application’s operations,” stated Shea. “The fact is there’s not more easy oil. New projects are getting more complex, more remote, and need more skilled staff, and so they also need more investment in control and automation. There’s a lot of useful automation and control technology available, but it’s actually harder to make the culture and work-practice changes needed to adopt those new technologies.”

Shea adds that particularly useful process control and automation devices that make the best investments include:

- Multivariable transmitters (MVTs), which measure multiple sensor inputs, save money and space, and reduce process penetrations. MVTs are using Ethernet and wireless protocols to further extend their usefulness and return on investment.
- Smart sensors and field devices provide views into operations, but they’re also networking with the Industrial Internet of Things (IIoT) to report to enterprise systems, and performing self and remote diagnostics to increase their value to users.
- Multiphase flowmeters (MPFMs) are experiencing robust adoption, and are helping users with separators replacement, reservoir management, real-time well testing and monitoring, production allocation and optimization, flow assurance, artificial-lift optimization and fiscal monitoring.
- Leak detectors (LDs) are increasing because they mitigate risk, and while software-based versions now make up the majority of their market, either type is only as good as the quality of their sensors and data.
- Artificial-lift optimization is growing because 90% of oil and gas wells need some kind of artificial lifting. These devices include electric submersible pumps, reciprocating rod pumps, progressive cavity pumps and plunger pumps. Multi-phase pumping is also growing as unconventional wells produce more associated oil, gas and natural gas-based liquids.

Upstream and midstream gas and oil are driving future of the industry,” added Shea. “Growth is slowing down for 2015, but recovery is on horizon. There’s a lot of room for improvement in automation in this industry—much of it will be driven by the lack of qualified personnel. Oil and gas is changing the way we look at automation across all industry segments. The challenge is: are you leveraging automation to the fullest? If not, why not and where?”

EVOLVING RESPONSE BEATS MUTATING CYBER THREATS

Dynamic cooperative response by suppliers and users can mitigate cyber threats and attacks

By Jim Montague, executive editor, Control

Cybersecurity threats and attacks are always mutating, so protective measures must be equally vigilant and adaptive. Luckily, process manufacturers and other industrial organizations have many partners, such as Honeywell Process Solutions (HPS) and Intel, who can help them coordinate protection of their systems.

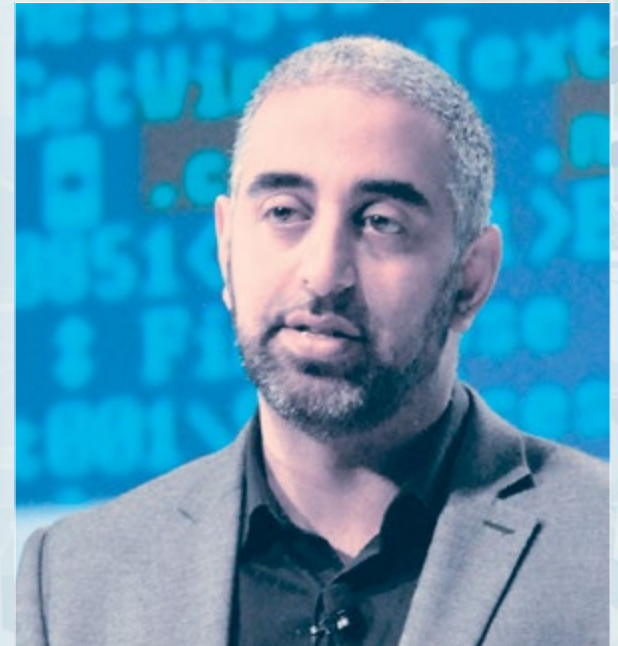
A living example of this cooperation on cybersecurity was delivered by Raj Samani, CTO for Intel Security's Europe, Middle East and Africa division, and Eric Knapp, director of cybersecurity solutions and technology for HPS. They presented "Botnets and Zombies—Managing Risk in a World of Uncertainty."

Their coordinated response on cybersecurity is good news because not only are cyber threats, malware and attacks evolving and multiplying, but the criminals that launch them are growing increasingly sophisticated, elusive and well-funded, Samani said. "In the past 12 to 18 months, Intel Security worked with several law-enforcement agencies to eliminate the criminal infrastructure responsible for the Beebone botnet," Samani said. Traditional enforcement is no longer viable in these situations because, even though Beebone was completely taken down in April 2015, there were still about 12,000 systems infected by it. That number has since swelled to 36,000. At first, most were thought to be in the U.S., but then even more infected systems were found in Europe, the Middle East, South America and Southeast Asia, notably Iran, Peru, Indonesia, Vietnam and several former Soviet republics.

MUTATIONS 35 TIMES A DAY

"These attacks and threats can infect and obfuscate at will across the world and stay a step ahead of law enforcement. That's what we're up against." Raj Samani, CTO for Intel Security's EMEA division, on the scope of the cyber threats companies face.

"In the past, malware like the Zeus Trojan sent 20-millisecond post requests every 53 seconds, so it was easy to see when a computer had been infected," explained Samani. "Beebone W32/Worm-AAEH, on the other hand, was constantly modifying itself about



"These attacks and threats can infect and obfuscate at will across the world and stay a step ahead of law enforcement. That's what we're up against." Raj Samani, CTO for Intel Security's EMEA division, on the scope of the cyber threats companies face.

35 times every day.” The worm had been running since 2009, so had six years to infect PCs worldwide, usually via removable drives. “Its aim is to avoid detection, and it was clever enough to actively block efforts to clean it,” Samani said.

Consequently, Beebone was not easy to crack. But Intel Security worked with the FBI, the U.S. Dept. of Justice, Europol and the Dutch National High Tech Crime Unit. Samani reported that Intel created successive domain generation algorithms (DGAs) to understand patterns in Beebone’s changing message destinations; learned it was sending data to a series of time-checking websites; seized these domains and created a “botnet sinkhole” to divert some Beebone traffic into a secure infrastructure; and secured authorization from European authorities to shut down the sites’ physical locations.

“The reality of cyber threats is usually very different from even experts’ perceptions. We thought there were far fewer infected devices than there were,” said Samani. “These attacks and threats can infect and obfuscate at will across the world and stay a step ahead of law enforcement. That’s what we’re up against.” Intel worked with the U.S. Dept. of Homeland Security and the U.S. Computer Emergency Readiness Team to develop Beebone remediation tools and made them available to everyone on those websites. However, less than 3% of those that could use it to clean their systems actually did so, Samani said. “This is another challenge.

“In the past 12 months, there have been more takedowns, but the criminal infrastructure is fighting back hard. In fact, anyone can become a cyber criminal by using freely available tools or by engaging hacking as a service. There are about 20 to 30 cyber crime organization available for hire.”

ACTIVE DEFENSE REQUIRED

To combat these cyber threats and attacks, prescriptive solutions aren’t enough because the threats are dynamic and mutate so quickly, added Honeywell’s Knapp. “This is why a risk-based approach to cybersecurity is so important. You have to first

identify what’s important to you and monitor what’s going on in your applications and systems, so you can be as dynamic in your protection as your adversary.”

Samani echoed this sentiment, noting that cyber threats actually provide many opportunities to manage and mitigate risk and bring them down to acceptable levels. “Three years ago, I was in the Middle East at a digitally controlled oilfield that had remote management of its offshore facilities. They were eliminating gaps between IT and operational technology (OT), and this meant they could do more remote maintenance instead of sending individuals out to do it. All kinds of brownfield and greenfield plants are automating response in these ways, and this can be very useful.”

Knapp added that HPS demonstrated remote substation monitoring about three years ago, and that this solution can address threats mostly automatically. “Cybersecurity used to mean less communication, but this solution shows it may actually mean more communication,” said Knapp.

To manage risk and bring cyber threats down to acceptable levels, Samani added that HPS and Intel still advise users to adopt defense-in-depth strategies, use blacklisting and whitelisting tools, and implement sandbox technologies to improve their security. “The first step is to create a baseline and enforce it,” added Samani. “Then establish a whitelist. The oil field I visited used network filtering and segmentation, as well as blacklisting and whitelisting.”

“Intel is also adding hardware attestation right down to the silicon and operating systems to help detect advanced threats,” Samani said. “We’re also working on active-management technology to integrate cybersecurity right down the stack.”

BRAZILIAN STUDENTS WIN UNISIM CHALLENGE

University of Sao Paulo project shows how to remove toxic compounds from contaminated water

Two Brazilian chemical engineering students who used simulation software to show how pollutants can be removed from contaminated water have been named the winners of Honeywell Process Solution's (HPS) annual UniSim Design Challenge. The students were recognized during the company's annual customer symposium for the Americas held this week in San Antonio, Texas.

Mariana Kaori Kobayashi Cunha from the University of Sao Paulo Polytechnic School and Herbert Senzano Lopes from the Federal University of Rio Grande do Norte designed a solution to treat water used in oil and gas exploration and production for different reuses, including human consumption. The pair worked on the project with Professor Galo Carrillo Le Roux of the University of Sao Paulo Polytechnic School.

Brazilian chemical engineering students Mariana Kaori Kobayashi Cunha (left) and Herbert Senzano Lopes (right) were congratulated by Andy D'Amelio, Americas sales leader for Honeywell Process Solutions.

"Environmental preservation and regulatory compliance are very important to our customers, and this year's winning project shows how UniSim technology can help solve serious problems for the process automation industry," said Ali Raza, vice president of the Advanced Solutions business for HPS. "Creating cleaner, more sustainable exploration and production processes, while maintaining high performance levels and low energy consumption, is essential to the future of this industry."

Kobayashi and Lopes presented the winning entry this week during the Honeywell Users Group (HUG) Americas Symposium, the company's largest gathering of customers in the process manufacturing industries. Lopes was also named the winner of the 2014 UniSim Design Challenge for his project on pipeline flare gas being reused to generate electricity.

With UniSim Design R430, Kobayashi, Lopes and Le Roux determined how to treat water contaminated with toxic compounds—such as benzene, toluene, ethylbenzene and xylenes (BTEX)—through a clean process using oxygen in the air and energy



Brazilian chemical engineering students Mariana Kaori Kobayashi Cunha (left) and Herbert Senzano Lopes (right) were congratulated by Andy D'Amelio, Americas sales leader for Honeywell Process Solutions.

generated by production processes. Using a supercritical water reactor (SCWR), the toxic compounds were converted to make the water safe again for humans and the environment.

The UniSim Design Challenge allows engineering students to propose solutions to real-world problems facing process manufacturers with Honeywell's UniSim Design Suite software, which is used to design and model processes in production facilities around the world.

"In Brazil, we have a growing number of onshore and offshore petroleum exploration fields that produce many barrels of contaminated water each day. That was the driving force behind

this project," Kobayashi said. "Using the UniSim Design software, we were able to effectively solve one of the largest environmental issues in the upstream sector."

UniSim Design Suite provides an interactive process model that allows engineers to create steady-state and dynamic models and is used extensively for plant design, performance monitoring, troubleshooting, operational improvement, business planning and asset management around the world. UniSim Design models may be leveraged into advanced training and optimization solutions provided by the UniSim Operations, UniSim Optimization and UniSim Competency suite.

Solutions

The background of the slide is a complex, abstract pattern of light blue and white geometric shapes, including hexagons, squares, and lines, creating a network-like or circuit-like appearance. The shapes are interconnected, suggesting a digital or technological theme.

HONEYWELL AND INTEL TEAM UP TO SECURE CRITICAL INFRASTRUCTURE

First offerings include Application Whitelisting, Enterprise Security Manager and Next Generation Firewall.

By Paul Studebaker, editor in chief, Control

The growing threat of cyber attacks against industrial targets is a major global concern, according to a global survey on cybersecurity conducted by Ipsos Public Affairs in September 2014 on behalf of Honeywell Process Solutions (HPS). Two-thirds of those surveyed thought that the oil and gas, chemicals and power industries were particularly vulnerable to cyber attacks.

At the 2015 Honeywell User Group (HUG) Americas symposium in San Antonio, Texas, HPS and Intel Security announced they will collaborate to help bolster protection of critical industrial infrastructure and the Industrial Internet of Things (IIoT). Intel Security's McAfee technologies will be integrated with Honeywell's Industrial Cyber Security Solutions, providing Honeywell customers with enhanced security software to protect their control systems from malware and misuse.

The HPS Industrial Cyber Security Solutions group has a dedicated global team of industrial cybersecurity experts who provide products, services and technologies to help protect industrial automation and control systems against cyber threats. The collaboration between Intel Security and HPS is to combine the latest advances in cybersecurity technology with Honeywell's industrial process domain knowledge to provide tailored security solutions for the industrial environment.

"The threat of cyber attacks on industrial and critical infrastructure targets is growing rapidly, and our customers are demanding effective cyber security to assist them in protecting their assets and people." Jeff Zindel, global business leader, Honeywell Industrial Cyber Security Solutions.

"The threat of cyber attacks on industrial and critical infrastructure targets is growing rapidly, and our customers are demanding effective cybersecurity to assist them in protecting their assets and people. Working with Intel Security expands our capabilities to enhance the availability, reliability and safety of customers' industrial control systems and plant operations," said Jeff Zindel, global business leader, HPS Industrial Cyber Security Solutions group. "Our collaboration with Intel Security will enable integrated,



"The threat of cyber attacks on industrial and critical infrastructure targets is growing rapidly, and our customers are demanding effective cyber security to assist them in protecting their assets and people." Jeff Zindel, global business leader, Honeywell Industrial Cyber Security Solutions.

validated solutions for our industrial process customers to more rapidly deploy and better protect their investment. This approach is critical to enable the productivity potential of Honeywell automation solutions and the Industrial Internet of Things.”

Initially, Honeywell will qualify Intel Security’s Application Whitelisting and Device Control with its own proprietary cybersecurity for its Experion Process Knowledge System, providing a fully vetted and qualified solution designed to increase security without sacrificing reliability. Honeywell is also offering Intel Security’s Enterprise Security Manager (ESM) and Next Generation Firewall to its customers. The products will be supported by Honeywell’s Industrial Cyber Security Risk Manager, which provides a continuous evaluation of cybersecurity risks within industrial environments. McAfee Application Whitelisting maintains system integrity by allowing only authorized code to run. McAfee Device Control allows users to specify and categorize what data can and cannot be transferred to various plug-in devices. The Honeywell qualification of Intel Security’s Application Whitelisting and Device Control is a tangible result of this strategic relationship.

“As Intel, we’ve taken a journey over the past 12 years to protect industrial facilities,” said David Hatchell, director, critical infrastructure, Intel Security. “Our IT/OT infrastructure—network segmentation, firewalls, ESM—have all been customized to the industrial space. But it’s not enough to just hand a product to Honeywell. We have to work together with the control engineers. Application Whitelisting and Device Control is the first result of that collaboration.”

The benefits from the integration include:

- Tested, proven and validated protection for the Experion Process Knowledge System from known and unknown malware threats;
- Consistent protection for both connected and air-gapped systems with no additional need for signature updates;
- Change policy enforcement so that system changes are made according to authorized policy and process;
- Integrated management and analysis of cyber security risk using Honeywell Industrial Cyber Security Risk Manager;
- Appropriate for isolated systems within industrial control systems, this solution is designed to work without having access to the Internet or any other network.

“The systems we rely on each and every day to get clean water at our taps and keep the lights on require secure solutions. Protecting our critical infrastructure and the emerging IIoT from cyber threats is a priority, and the collaboration of two industry leaders will go a long way toward that goal,” said Raj Samani, vice president and chief technology officer, Intel Security. “Technologies in the IIoT space have a tremendous amount of potential, and we can’t let security concerns undermine that; instead, security has to enable the growth of IIoT, and that’s what our engagement with Honeywell will do.”

FREERPORT LNG CHOOSES HONEYWELL FOR EXPANSION

Southeast Texas project to boost capacity by 14 million tons

Process automation and security systems from Honeywell Process Solutions (HPS) will help Freeport LNG Development L.P. to expand its southeast Texas liquefied natural gas (LNG) terminal into a world-class liquefaction and export operation.

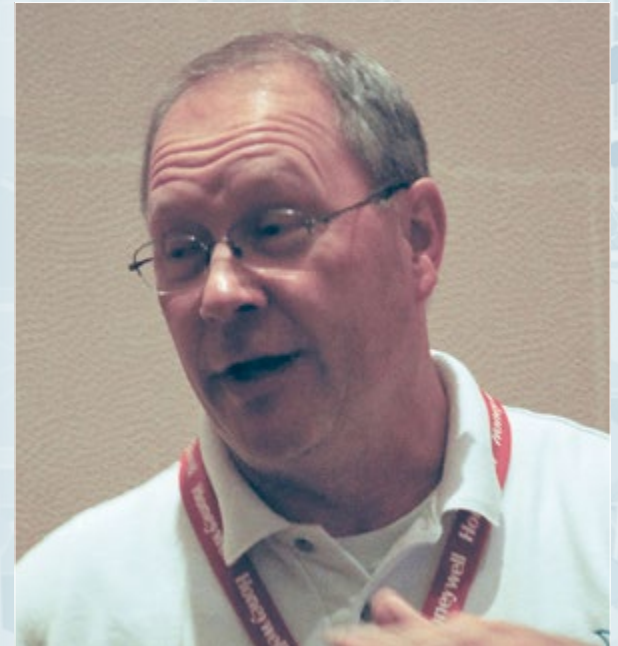
With startup expected in 2018, this expansion will give Freeport LNG 13.9 million tons a year of export capacity. Freeport LNG's is one of 10 new or expanded import or export LNG terminals that have been approved by the U.S. Federal Energy Regulatory Commission.

HPS will be the integrated main automation contractor (I-MAC) for the expansion project. In this role, HPS will be responsible for designing, delivering and installing the automation, instrumentation, controls, and safety and security systems. The unified approach will be critical in helping the project meet operational and business readiness goals on Day 1 of startup.

"Such a significant expansion of our business requires us to leverage our strategic partners to ensure we develop the safest, most efficient world-class asset." Michael Smith, chairman and CEO of Freeport LNG, on the company's selection of Honeywell Process Solutions as main automation contractor for its latest terminal expansion project.

"The expanded I-MAC capabilities that Honeywell brings to this project—and specifically our new LEAP project services—will help Freeport LNG start up this terminal expansion faster and within budget," said Pieter Krynauw, vice president for HPS's Projects and Automation Solutions business. "Honeywell's latest technologies, project delivery capabilities and expert services will create a highly integrated infrastructure to boost the plant's profitability."

The terminal, located on Quintana Island near Freeport, Texas, will build three new processing units, or trains, as part of a more than \$13-billion expansion, adding gas pretreatment and liquefaction capabilities. Honeywell will supply its automation and control expertise and a unique approach to project consulting and execution to



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support Freeport LNG's move to exporting LNG in the wake of newly exploited domestic natural gas resources.

"Such a significant expansion of our business requires us to leverage our strategic partners to ensure we develop the safest, most efficient world-class asset," said Michael Smith, chairman and chief executive officer of Freeport LNG.

Honeywell will go beyond the traditional main automation contractor role to include a broader scope of products, services and consulting capabilities that add value over the entire project and operating lifecycle of the venture.

Specific key deliverables include a number of Honeywell's innovative and patented technologies including LEAP, Honeywell's lean project execution services, Experion PKS Orion with Distributed Systems Architecture (DSA), Experion Security Integrator, Fault Tolerant Ethernet (FTE), Universal process and safety I/O, virtualization, advanced control, Safety Manager, fire and gas systems, OneWireless Network, Digital Video Manager (DVM), UniSim operator training simulator, advanced alarm management software and PHD data historian.

By leveraging these integrated solutions, Honeywell will reduce risks and minimize potential schedule delays for both Freeport LNG and its engineering, procurement and construction (EPC) contractor during the facility expansion's startup. Honeywell has partnered with principals at Freeport LNG for almost a decade to drive supply chain optimization aimed at achieving production and cargo deliveries that meet or exceed Freeport LNG's annual delivery plan.

Honeywell offers a broad range of technologies for natural gas production, processing and transportation. Its UOP business provides technology, modular equipment and advanced materials to remove impurities from natural gas so it can be transported by pipeline or as liquefied natural gas (LNG), and to recover valuable natural gas liquids. HPS provides advanced automation, monitoring, safety and security systems for the entire gas supply chain to help operators increase plant reliability and efficiency while reducing costs and risk.

EXXONMOBIL AUTOMATES PROCEDURES, REAPS BENEFITS

The company's downstream engineering office uses Honeywell's Procedural Operations solution to improve margins, reduce workloads at its refineries and chemical plants.

By Jim Montague, executive editor, Control

Consistency is not the strong suit of humans. That's why written records and instructions are so important, and why their digital and automated counterparts are so crucial, especially in maintaining, optimizing and ensuring quality in process operations.

The folks at ExxonMobil's Downstream Central Engineering Office know this lesson well: They support global deployments of automated procedures using Honeywell Process Solutions' Procedural Operations software—or "Proc Ops"—across multiple business units. At its refineries and chemical plants, automated procedures deliver consistent procedure execution with reduced console operator workload, and can help improve business performance by reducing transition losses and increasing the amount of time units spend at optimum feed rate.

"Proc Ops is an integrated set of functions embedded in Honeywell's Experion PKS control system to facilitate execution of operating procedures. It can work in tandem with existing TDC 3000 hardware and software," said Rose Thomas, senior engineering associate in the downstream office at ExxonMobil Research and Engineering Co. "Proc Ops helps our operating teams execute procedures consistently and efficiently, allows manual and automated steps to be combined into semi-automatic steps for console operators, and facilitates development of effective operator interfaces to start, monitor and end procedure execution. It also reduces application development and sustainment efforts because its modularity facilitates development of structured automated procedures, such as sequential control modules (SCMs) and recipe control modules (RCMs). And its graphical block models are easier than programming with TDC 3000 CL code."

Thomas presented "Automated Procedures Using Procedural Operations" this week at the 2015 Honeywell User Group Americas meeting in San Antonio, Texas.



"Before automated procedure implementation, our sites had margin loss due to product downgrades during grade transitions, limited repeatability of each grade transition and units away from optimum feed rate longer than necessary." ExxonMobil's Rose Thomas on the company's profitable implementation of Honeywell's Procedural Operations solution

PICK PROCEDURES, GAIN BENEFITS

“Before automated procedure implementation, our sites had margin loss due to product downgrades during grade transitions, limited repeatability of each grade transition and units away from optimum feed rate longer than necessary.” ExxonMobil’s Rose Thomas on the company’s profitable implementation of Honeywell’s Procedural Operations solution

To decide which process applications and procedures to automate, Thomas reported that potential users must weigh several factors, including frequency of execution (from several years to every shift); degree of console interaction from in the field to the console itself; number of steps (from few to many); parallel activities (from few to many); consequence of error (from small to great); and fidelity of procedure documents (from guidelines to specific details).

“Experienced operators have the knowledge they need in their heads, so existing procedures become more like guidelines,” explained Thomas. “When we talk to our sites, we can improve our procedures and quality by getting to their level of detail, and we can retain that veteran knowledge in our procedures.”

While incorrect execution of procedures can potentially cause operational incidents and inefficiencies, Thomas reported that automated procedures facilitate consistency by addressing differences among operators and/or shifts, and by standardizing responses to abnormal situations, which often aren’t included in written procedure documentation.

Retention of procedure execution know-how also is facilitated by establishing processes for effective knowledge capture, retention and transfer based on best operational and procedural practices. Further, procedures themselves can be improved by establishing the best, validated site for comparison to future executions, and by leveraging a proven, assured, structured platform to manage and implement procedural improvements.

Thomas added that ExxonMobil’s refineries and chemical plants gain several primary benefits from adopting automated Proc Ops,

including better margins in its grade transitions and feed-rate changes, reduced workloads for console operators and other staff, improved ability to address abnormal situations during execution, and reduced variability in procedure execution performance.

CONSISTENCY YIELDS PROFITABILITY

“Before automated procedure implementation, our sites had margin loss due to product downgrades during grade transitions, limited repeatability of each grade transition and units away from optimum feed rate longer than necessary,” added Thomas.

“After adding automated procedures, they reduced automatic feed rates, effectively managed parallel and time-sensitive process actions and increased service factors for multivariable advanced control applications.”

On the workload side, ExxonMobil’s console operators are typically responsible for about seven units, such as reactors or distillation applications, and handle about two or three grade transitions per week on each unit. “Before automating procedures, executing grade transitions was a large part of the operators’ workload. It was difficult to convey current procedure status during shift handover, and there were many process alarms and operator changes to maintain levels,” explained Thomas. “After automating procedures, operator workload related to grade transition execution was reduced, and they could redirect their focus to higher-value tasks. They also improved shift handover with an interactive operator interface that explicitly displays current procedure status. And they reduced process alarms and operator changes to maintain levels.”

Likewise, before automating procedures, ExxonMobil’s operators had to manually detect abnormal conditions during execution and make corrective responses. However, their responses to abnormal situations often weren’t fully documented in their procedures, so they had to rely on operators’ training and experience, which reduced the likelihood of timely corrective response in stressful or high-workload situations. “After automated procedures were

adopted, operators could automatically detect abnormal conditions and automatically interrupt procedure steps,” added Thomas. “They can also automatically implement corrective actions or hand-off to other operators, and confirm their corrective actions are completed, allowing them to proceed.”

Automated Proc Ops has even helped ExxonMobil handle abnormal situations during automatic feed-rate reductions. “The main focus used to be handling rate reduction activities in response to alarm floods,” said Thomas. “Automated procedures let operators be available to other units in the scope of their consoles and focus on handling rate reduction impacts in other

units. Automated procedures mean units can continue running at reduced feed rates, and they give us more ramp options for feed-rate reductions.”

Finally, before automated procedures, each ExxonMobil site wrote and updated many procedures independently. There was limited sharing of best practices and application designs, so procedure execution performance varied among sites. “Automated procedures have reduced variability in our procedure execution performance, and we now have common, high-level application design, which facilitates application sustainment and the capture of long-term benefits across multiple sites.”

THE END OF AN ERA: DUPONT'S LAST PANEL BOARD

Honeywell Process Solutions' Bulk Build and HMIWeb prove their mettle as effective tools for DCS configuration.

By Paul Studebaker, editor in chief, Control

Migrating seven DCS systems in the past five years has given Nicholas Sands, CAP, PE, ISA Fellow and Manufacturing Fellow at DuPont, plenty of insight into how the right tools can save time and money, and allow a control engineer to focus on control strategy instead of configuration.

But first, a safety moment. "In this plant, which handles chlorine, everything can kill you," Sands told attendees of his 2015 Honeywell Users Group (HUG) Americas session today in San Antonio, Texas. He wasn't allowed to give us any details about the process or product, but he told us, "To do maintenance, you must shutdown completely, bypass all the valves and purge everything."

Sands' last panel board was on a unit built with pneumatic controls and migrated to single-loop controllers in 1986 with a hardwired safety instrumented system (SIS). "There are 128 interlocks that will shut the unit down," he said. "We had to swap the tubes on the valves to force the valves open for purge." The upgrade included designing bypasses that are keylock-controlled, timed, indicated on the control system, documented in the procedures and tested. "Bypassing valves has led to accidents that have starred in incident investigation videos: Phillips Pasadena in 1989, Formosa Illiopolis in 2004. My job is to make sure you don't see DuPont 2015."

"That's dozens or hundreds of parameters I don't have to enter by hand." DuPont's Nick Sands on how DCS configuration tools can help control engineers streamline and error-proof system development tasks.

The upgrade was to a C300 controller, Experion Station HMI and Safety Manager SIS. The migration was made significantly faster, easier and less costly by using Bulk Build for configuration and HMIWeb Solution Pack to build the displays.

But first, "Installation issues almost made us cancel the installation," Sands said. "The contractor installed the cabinets with top entries and wireways and, in the process, they put aluminum shavings all over the place. Since Honeywell couldn't tell when a piece of aluminum might fall into a circuit somewhere, they couldn't warranty it as it



"That's dozens or hundreds of parameters I don't have to enter by hand." DuPont's Nick Sands on how DCS configuration tools can help control engineers streamline and error-proof system development tasks.

was, they helped us strip it out and rebuild it in situ. The migration was completed on schedule with a full warranty.”

BULK UP FOR FASTER CONFIGURATION

Sands’ team has been using Bulk Build for seven or eight years, “You can create a control module, make a Bulk Build file with a click, pick and change parameters using Excel or Access, and Bulk Build makes modules you can copy and paste in,” he said. The Bulk Build tab configures all the parameters that change, and the Connections tab configures the connections to other modules.

The key is to minimize the number of templates, called typicals, by using a consistent group of function blocks. This project used 350 control modules with 3,955 function blocks, 157 C300 I/O and 681 connections between modules. Sands said, “We did it with one Excel file. It’s pretty powerful.”

The configuration was tested on-site using SIMC300. “It’s wonderful,” Sands said. “We tested the control strategies against dynamic simulation and found some things that were wrong – were cross-linked. We were able to see and fix those.”

Using Bulk Build lets control engineers focus on control strategy instead of configuration. “I don’t enter parameters or connection names,” Sands said. “That’s dozens or hundreds of parameters I don’t have to enter by hand. That really reduces the cost of configuration; we didn’t need an integrator for this project.”

It also improves the consistency of integration and eases support, said Sands. “Everything is accurate; everything looks exactly the same so it’s easy to understand for those who come after you.”

RATIONALIZE HMIS

To build the operator interface, Sands’ team used HMIWeb Solution Pack with Experion Station shape library. “This saves us a tremendous amount of work by not having to maintain our own

shape library,” Sands said. “They don’t do everything I need them to do, but they’re 90% there.”

The team referenced the emerging ISA-101 standard, which Sands said will be available in a month or two. “ISA 101.01, HMIs for Process Systems, has a lifecycle we tried to follow for the project,” he said. The standard says how to manage, build and maintain displays. It’s a work standard, not prescriptive.

HMIWeb is a philosophy, a style guide and a tool kit focused on what you are trying to achieve, not what color to use. The philosophy emphasizes ergonomics and performance. Users can take shapes from Solution Pack, modify them to suite their requirements and keep them in the toolkit for use in the HMI. “In this case, all the Solution Pack shapes we used were modified, so normally, no one goes to the Solution Pack library, they can select only from the toolkit,” Sands said. “If they need something that’s not there, we have a discussion before we make anything different.”

Important HMI activities include console design, task analysis, display design and training. For this project, console design was simple. Task analysis was not. “What goes on in what display? It’s very important, and we spent a lot of time on this,” Sands said. “It’s not fast or easy, but it was very worthwhile on this project.” Display designs included six Level 3 screens and 30 more-detailed screens at Level 4.

Training required 12 to 20 hours to take the operator through every button and every faceplate, including startup and shutdown with dynamic simulation. “The operators were amazed to be able to actually see how the process works, where before, many of the valves had been hidden in the interlocks,” Sands said. “It greatly enhanced their understanding of the process, and the visualization made it much easier for them to learn it. To them, it was much more than a new interface. They saw it as changing everything—and they asked us what took us so long.”

EXXONMOBIL TAKES ON ELECTRICAL INTEGRATION

The company's latest effort to simplify and streamline capital project execution

By Keith Larson, group publisher, Control

ExxonMobil made waves across the process automation industry by championing the concept of configurable input/output (I/O) sub-systems to reduce project execution risk, a methodology that has since been adopted across industry. Now Sandy Vasser and his team of electrical and instrumentation engineers at ExxonMobil Development Company have taken up the cause of electrical integration to further simplify capital project execution and help to bring the company's often multi-billion-dollar efforts in on time and on schedule.

"We continue to challenge everyone on things that we can continue to improve," Vasser said in his keynote address to the 2015 Honeywell Users Group Americas conference today in San Antonio. The automation group has made terrific strides toward taking their work off the critical project path, Vasser said. "Now we're challenging the electrical group to do the same."

"We're completely eliminating the ECMS." ExxonMobil's Sandy Vasser on the company's drive to bring process automation and electrical controls functionality into a single unified system.

Electrical energy is a vital input to process manufacturing operations, often secondary only to raw materials. And, just as the flow of process fluids through pipes, valves and vessels typically is controlled by a dedicated process automation system, the flow of electrons through transformers, circuit breakers and motors is the traditional domain of a dedicated electrical control and monitoring system (ECMS). Historically, both types of systems work largely independently to ensure safe, uninterrupted production. Indeed, the differing dynamics of electrical and process phenomena has led over the years to the development of parallel systems, suppliers and support organizations for each type of system.

But for ExxonMobil, those days are gone. "We're completely eliminating the ECMS," Vassar said, noting that a modern distributed control system (DCS) can readily take on electrical control and monitoring tasks. "We need to take full advantage of the



"We're completely eliminating the ECMS."
ExxonMobil's Sandy Vasser on the company's drive to bring process automation and electrical controls functionality into a single unified system.

power available in our systems today,” Vasser said. Further, control systems that speak IEC 61850, the language of intelligent electronic devices (IEDs), allow fiberoptic network connectivity to banks of low-voltage motor control centers, eliminating the need for traditional hardwired interlocks.

Like configurable I/O before it, electrical integration satisfies ExxonMobil’s drive to adopt new technologies and work processes that are SCERT: simple, capital-efficient, robust and

timeless, according to Vasser. The company also is applying this philosophy to its capital project procurement processes, replacing the traditional specification development and bidding process with pre-selected, standardized equipment that can be ordered by part number or customized through data sheet parameters, whenever possible. “The project team will create data sheets, not specifications,” Vasser said, “and we’ll do this at each level of the electrical infrastructure.”

RELIANCE DRIVES CULTURE CHANGE WITH A DIGITAL REVOLUTION

The huge Indian textile, refining and soon-to-be telecom provider streamlines from 500 legacy systems at 120 plants to just 35 standardized applications—and transforms its workplace environment at the same time.

By Jim Montague, executive editor, Control

Everyone knows to keep it simple, but it's rare that any simplification project is as gigantic as Reliance Industries Ltd.'s recent effort to update and standardize many of the legacy process automation and other systems at six major sites containing 120 refining and petrochemical plants.

The 35-year-old, \$62-billion firm started in textile milling and integrated vertically over the years into polyester polymer fibers, petrochemicals, refining, oil and gas and retail. Now, this December, it's poised to become one of India's biggest 4G providers. The company operates probably the world's largest refining and petrochemical production complex in Jamnagar, India. Its vision is to reach \$150 billion in annual revenues in the next five years and become a global Fortune 50 and most-admired company.

"We view automation as a competitive advantage, but how could we use it to help make the transformation we needed?" said Rahul Chaturvedi, senior vice president and CIO of the hydrocarbons division at Reliance. "We see smart operations as putting panel operators and other users in control of the ecosystem around them by providing visibility and access to situations that require action."

"Usually, people drive implementation of new processes and systems, but we turned that upside down this time, and the technology enabled and drove our culture change." Rahul Chaturvedi, senior vice president and CIO of the hydrocarbons division at Reliance, at the 2015 Honeywell User Group (HUG) conference in San Antonio, Texas.

Chaturvedi presented "Establishing a Performance-Base Culture: How Digital Transformation Enables Smart Operations and Enterprise Optimization" on the third day of Honeywell User Group Americas 2015 in San Antonio, Texas.

Chaturvedi added that visibility and access for smart operations means breaking through traditional organizational silos of operational functions within plants and between different facilities. "Becoming future-ready also means we need to do reverse mentoring, to learn from our 20-year-olds and show millennials that we have a good place for them to work," added Chaturvedi. "Usually people drive implementation of



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Reliance worked with Honeywell Process Solutions, developing its Manufacturing Information Intelligence System (MIIS) to eliminate as many manual systems as possible and to go fully digital in functional areas such as operations, maintenance, reliability and safety. Other MIIS objectives were improved enterprise connectivity, increased real-time analytics and enhanced collaboration by oil and gas and chemical staffs that historically didn't interact much or exchange best practices.

“We and Honeywell went to all six sites and 120 plants over about six months and found they had about 500 legacy systems,” explained Chaturvedi. “Next, we developed a reference architecture, which showed we could update with just 35 standard operations applications for product movement, blending, historian, alarming and other functions. Then we identified the areas most in need of digital transformation, including material transfers in health, safety, environmental and fire (HSEF) areas, manufacturing operations, reliability engineering and maintenance (REAM), and other automation and energy applications. Management agreed to our spend; we enlisted everyone, especially our panel-level operators; took about two-and-a-half years to implement the 35 applications; and finished in 2013.”

Chaturvedi added that its MIIS project also allowed it to implement other common controls and historian equipment,

establish better network connectivity, put generated data into the right contexts for the best analysis, and enable better decisions and actions. “This lets each users see the performance and context they need, which improved operations management and operator competency,” said Chaturvedi. “We even integrated some Honeywell, GE, Invensys and AspenTech solutions that didn't want to talk to each other. We also improved connections between the 120 plants, our headquarters and Centers of Excellence (CoEs) that focus in 14 to 15 technical disciplines. This allowed the polypropylene CoE to get data from its applicable plants and applications, and let the crude oil CoE get its data from the right refineries, etc. They can also drill down to more detailed applications and equipment and collaborate much more easily.

“Likewise, our process engineering department can use a process monitoring engine built into MIIS, and if KPIs aren't performing right, then they can drill down even to plant schematics if needed, and find and fix what's out of range. Previously, equipment monitoring and performance information was on spreadsheets what were published once per month, but now we can use tools like Honeywell's Uniformance Asset Sentinel software to check performance once per hour and then make adjustments on the fly.

“We've realized that our digital and cultural transformation isn't a destination, but is really an everlasting journey. We're even going to put our MIIS on mobile devices in the next couple of months.”