The Usual Suspects Win the Readers’ Choice Awards!

The question isn’t who won, but rather why do they win and how do they do it.

And the Winners are...

PIDs on Your Smart Phone? Maybe.
Data Processing Escapes the Enclosure

EXCLUSIVE TO THE WEB
Simulation for Clean Technology
New Ideas for Multivariable Controllers

JANUARY 2012
Drop-in IPC replacements fit – no matter how you configure it

Phoenix Contact Valueline Industrial PC

- Fits your rugged, reliability requirements
- Fits your budget
- Fits your existing cut-out
- Fits your industry application

Go configure! Customize our high-quality, drop-in replacement IPC® to fit your application (12 to 19 inches). Then, upgrade our 2-year warranty to a 5-year warranty by including Phoenix Contact’s recommended power supply and surge protection with your purchase.

To learn more about Valueline Industrial PC’s perfect fit, contact us at 1-800-322-3225 or visit www.phoenixcontact.com/perfectfit

*Compatible with 15-inch and 17-inch Pro-face® and Rockwell Automation® models.
Economical Air Flow Switch

- Air Velocity Range up to 10,000 FPM (50.8 m/sec)
- 2% Full Scale Accuracy
- Two Sensor Probe Configurations (Fixed and Remote)
- Hot Wire Air Velocity Sensor Design
- Adjustable High and Low Alarm Set-Points
- Two SPST Alarm Contact Closures with Red LED Indicators
- Used in HVAC Monitoring, Exhaust/Ventilation Hoods

Visit omega.com/fst1000

Low Cost Flow Switches

FSW301 Series
Starts at $156

Visit omega.com/fs200_series

ELC Programmable Logic Controllers and Modules

ELC-PLC Series
Starts at $202

Visit omega.com/elc_plc

Integrated Stepper Drives/Motors

STM Series
Starts at $375

Visit omega.com/stm_series
Operator Effectiveness: In order to keep your plant running safely and at its optimum level, your operators need to be equipped to recognize abnormal situations and handle them through effective decision making. Advanced alarm management, easy navigation to plant-wide actionable information, dogged attention to human factors in the control room, and integrated training simulation will elevate your operators’ performance to new heights. That's the Power of Integration.

Join the conversation at www.processautomationinsights.com
FEAT URES

COV E R S T ORY

32 / 20th Annual Readers’ Choice Awards

Who are the darlings of the industry? A lot of familiar faces appear again and again. Find out how. by Keith Larson and Walt Boyes

PLCS AND PACS

45 / PID on Your Smartphone? Maybe

Moore’s Law and the Internet of Things are driving the convergence of embedded controllers. by Walt Boyes

INDUSTRIAL COMPUTERS

50 / Data Processing Escapes the Enclosure

Computing for process control has moved above and beyond its old laptops and desktops. So how can you protect such far-flung data processing? by Jim Montague

WEB EXCLUSIVES

Simulating the Next Generation of Clean Energy Technologies www.controlglobal.com/articles/2012/cleanenergy.html

New Ideas for Multivariable Controllers www.controlglobal.com/articles/2012/newideas4MVC.html
More than 100,000 customers in every industry around the globe trust Endress+Hauser to make their processes safe, efficient and repeatable. Just like a puzzle, many pieces must come together at the right time and place to manufacture a product profitably. Endress+Hauser understands there is a world of difference between a good fit and a perfect fit for your critical process measurement needs. This is evidenced by the hundreds of thousands of instruments we deliver every year worldwide – the widest range available from any one supplier. When you need support with planning, engineering, project management, automation, or just need help with a difficult process, Endress+Hauser is the partner you can depend on.
DEPARTMENTS

9 / Editor’s Page
Some Standards Committees Work—and Work Well
Not every standards effort is a waste of time—ISA100.15, for example.

13 / On the Web
Fresh Starts on Greener Grass
Chances for job do-overs abound at ControlGlobal.com.

15 / Feedback
Readers talk VFDs and plant safety.

16 / Lessons Learned
Scraping the Bottom of the Natural Gas Barrel
A primer on fracking.

21 / On the Bus
Want Open Standards? Work at It
Users say they want open standards. The only way they’ll get them is to insist.

22 / In Process
Management changes at Invensys; the complex IT/operations relationship; King Engineering is sold and more.

31 / Resources
Online information about drives and motor controls.

55 / Technically Speaking
Hooking Up the Plant and the Enterprise
How one process control operation did it.

56 / Roundup
All the latest flow instrumentation is in these pages.

59 / Products
Start the new year with a stroll through these pages to trick out your operations.

63 / Ask the Expert
Our experts give advice on unplugging pressure transmitters.

65 / Control Talk
Gas Chromatographs Rule!
McMillan and Weiner explore the virtues of this analyzer workhorse.

67 / Ad Index
Check these pages.

68 / Control Report
Shared Documents Boost Valve Project
BP uses Microsoft’s SharePoint to collaborate and complete a massive valve project on time.
The Productivity3000 programmable controller can get your big job done easier and cheaper. The $599 CPU with 50Mb memory supports large programs, complete with tagname database and program documentation stored onboard. The huge (100,000+) I/O capacity gives you plenty of room to plan and expand. And the CPU’s seven communication ports make integrating a large system easier than you can imagine.

Download the free programming software and check it out!

Think big but pay small!

The Productivity3000 programmable controller can get your big job done easier and cheaper. The $599 CPU with 50Mb memory supports large programs, complete with tagname database and program documentation stored onboard. The huge (100,000+) I/O capacity gives you plenty of room to plan and expand. And the CPU’s seven communication ports make integrating a large system easier than you can imagine.

Download the free programming software and check it out!
Some Standards Committees Work – and Work Well

ISA100 continues to be the poster child for dysfunctional standards committees. The ISA100.12 WirelessHART convergence task group has issued its report. It identified three different paths to convergence between the two standards, but committee infighting prevented the group from issuing a recommendation. In fact, the mere publication of the committee report was bitterly fought by the ISA100.11a faction to the point of a literal screaming, yelling, table-pounding temper tantrum. At this writing, it appears that the ballot to release the report narrowly failed, and the ISA100.11a faction has prevailed in its continuing efforts to make the protocol a separate and non-interoperable standard.

The fundamental takeaway is that end users who want to wirelessly enable their plant field devices will have the same difficult choice that has delayed implementation of fieldbus technology: Which standard to choose? The safest answer is “none of them.”

But, once in a while, even a blind dog finds a truffle, and sometimes standards committees do what they are supposed to with little or no dysfunction. That’s what happened on Dec. 1, when the Fieldbus Foundation made public the results of ISA100.15’s work on backhauls. Called “Foundation for Remote Operations Management [ROM],” this fascinating architecture enables the use of a single fieldbus (based on Foundation HSE) that can integrate wired and wireless standard protocols and provide bidirectional communication to any of the integrated devices. The system demonstrated had Wireless HART, ISA100.11a, wired HART and Foundation fieldbus H1 devices all communicating to the DCS or SCADA system and interoperating on the same network.

Foundation for ROM is a great idea and a great achievement for ISA100.15. The only question right now is whether vendors will embrace the concept. If you like the idea and want to be able to use Foundation for ROM, call your vendor and ask for it, loudly.

For years, there have been two major methods of describing devices for fieldbuses. EDDL has been used primarily in Profinet devices, with some spillover into the HART regime. When the FDT Group, the HART Communication Foundation, the Profinet Nutzerorganization (PNO or PI), the OPC Foundation and the Fieldbus Foundation issued a statement that they were working on a means to converge the two methods, most everybody yawned.

Ah, but some standards committees actually work, and work well. Achim Laubenstein of ABB has guided the FDI Cooperation LLC to the point where it has nearly succeeded in the task of creating a converged standard for EDDL and FDT/DTM. In December, FDI standardization began in IEC SC65E/WG7, and the first draft of the FDI specification was published. By the end of 2012, Laubenstein believes that the move to a single device driver for all field devices will have been completed, and the IEC will have adopted FDI as a standard.

Why are the FDI Cooperation and the ISA100.15/Foundation fieldbus endeavors so important? Because, unlike the ISA100.12/ISA100.11a debacle, these groups are movements toward single, unified standards for basic system architectures of automation and control systems. We no longer have the “luxury” of having to write multiple drivers for multiple vendors’ devices or multiple APIs to allow one communications protocol to talk to another.

None of these efforts is going to put cash to the bottom line—they need to be done one time. When was the last time you looked at the standard for duplex and fourplex convenience electrical receptacles? There is just one. One time and done.

When was the last time you looked at the standard for duplex and fourplex convenience electrical receptacles?
LabVIEW makes me better because I can deliver multiple projects on time, on spec, and on budget.

Name
Hector Guajardo Betancourt, Certified LabVIEW Architect

Job Title
Automated Test and Control Engineer

Area of Expertise
Manufacturing Test

LabVIEW Helped Me
Reduce test time by more than 10X

Latest Project
Building a vision-based inspection system for washing machine drums

>> Find out how LabVIEW can make you better at ni.com/labview/better

800 453 6202

©2011 National Instruments. All rights reserved. LabVIEW, National Instruments, NI, and ni.com are trademarks of National Instruments. Other product and company names listed are trademarks or trade names of their respective companies. 01197
Every day, hour and moment offers a chance to try something new and make improvements, but the New Year is still the most popular time to make resolutions—and Controlglobal.com can help them stick.

For example, many process control engineers may want to use post-holiday slack time to check on job opportunities, while their supervisors might want to see who’s available to fill some slots. Accessible via our website’s “jobs” tab, Control Connection is a career resource for process automation professionals, which includes a smorgasbord of more than 2500 job listings and almost 300 resumes. This section allows job seekers to view jobs, post resumes anonymously and create alerts to help manage their searches. Likewise, it also allows employers to post jobs, find recruiting tools and set up an account to organize their own searches.

A quick scan of the almost 1900 engineering-related jobs available in December revealed a bunch of cool-sounding positions, including:

- SIS controls engineer in Bellingham, Wa.
- Wastewater treatment plant lead operator in Fort Meade, Md.,
- Senior process piping design specialist in Houston,
- Manufacturing/process engineer in Springfield, Mass.,
- Oil and gas upstream project manager in Anchorage, Alaska, and
- Senior project controls professional in Calgary, Alberta.

In addition, Control Connection has an Editorial Bytes career resource center with many articles, including results of Control’s salary surveys, where to seek training, economic trends and other job-related information. This page also leads to a Training & Certification Center, which lists more than two dozen online or in-person training courses in process instrumentation from Endress+Hauser; network connectivity from Matrikon OPC; vibration from Meggitt Sensing Systems; and Profinet from PI North America.

One of the best recent articles in the Editorial Bytes section is “How’s Your Fieldbus Resume” by contributing editor John Rezabek, who described many of the skills that process control engineers need for today’s available jobs and also detailed the qualifications that employers should request. It’s located at www.controlglobal.com/articles/2009/AutomationResume0910.html.

Likewise, “Show Me the Money, Part 1” by Greg McMillan and Stan Weiner stresses that engineers must quantify the financial benefits of process control to preserve their jobs. It can be read at www.controlglobal.com/articles/2009/Money0911.html.
Market proven for decades, Magnetrol® Mechanical Level Switches are esteemed for their toughness, reliability, and prolonged operating life. For nearly 80 years, our level switches have been at work in thousands of the toughest industrial applications worldwide. In the most critical of these, MAGNETROL Mechanical Level Switches are positioned as the last line of defense because they’ll do the job.

Our offering of Mechanical Level Switches ranges from top-mounting float or displacer designs to external cages built to ASME and NACE standards.

Common switch applications include:

- Sumps
- Storage Vessels
- Seal Pots
- Boiler Low Water Cutoff
- Gas/Oil Separators
- Feedwater Heaters
- Flash Tanks
- Condensate Drip Pots
- Scrubbers

When you decide that your best option (and value) in level switches is a mechanical one, then MAGNETROL has the solution you’re looking for. Visit us at magnetrol.com to review our extensive line of float- and displacer-based switches.
More About VFDs

I enjoyed reading “Pursuing Sustainability With VFDs,” (Control, Sept. 2011, p. 75, www.controlglobal.com/articles/2011/pursuing-sustainability-with-vfds.html). However, I think Dick Caro could have done a better job of explaining why flow control with a VSD on a pump is for the most part linear.

He stated, “A few correspondents argued that since the head changes at different flow rates due to pipe friction, a real installation could not be exactly linear. However, the controlled variable—flow rate—is linear.” This implies that flow rate is independent of pressure drop, and it isn’t. That’s how a flow control valve works with a constant-speed pump, changing the pressure drop to modify the flow.

But the Pump Affinity Laws also state that the head a pump develops is proportional to the speed squared. And, as luck would have it, per the D’Arcy-Weisbach Equation, the friction loss in piping with turbulent flow is proportional to the velocity squared. So if you have a piping system where the pressure drop is proportional to the velocity squared (no fixed pressure drops, turbulent flow, etc.) you are in luck. Your control is perfectly linear. Rarely is installation could not be exactly linear. However, the controlled variable—flow rate—is linear.” This implies that flow rate is independent of pressure drop, and it isn’t. That’s how a flow control valve works with a constant-speed pump, changing the pressure drop to modify the flow.

So Dick’s statement that the VSD imparts linear flow control is correct, but only for very specific installations where most of the pressure drop is due to turbulent flow in piping, which is true of most common chemical industrial piping installations. Due consideration should be given to any nonlinearity if you want the best control. But even having said that, there are changes in pressure drop that are totally unrelated to flow.

I enjoyed reading “Pursuing Sustainability With VFDs,” (Control, Sept. 2011, p. 75, www.controlglobal.com/articles/2011/pursuing-sustainability-with-vfds.html). However, I think Dick Caro could have done a better job of explaining why flow control with a VSD on a pump is for the most part linear.

He stated, “A few correspondents argued that since the head changes at different flow rates due to pipe friction, a real installation could not be exactly linear. However, the controlled variable—flow rate—is linear.” This implies that flow rate is independent of pressure drop, and it isn’t. That’s how a flow control valve works with a constant-speed pump, changing the pressure drop to modify the flow.

But the Pump Affinity Laws also state that the head a pump develops is proportional to the speed squared. And, as luck would have it, per the D’Arcy-Weisbach Equation, the friction loss in piping with turbulent flow is proportional to the velocity squared. So if you have a piping system where the pressure drop is proportional to the velocity squared (no fixed pressure drops, turbulent flow, etc.) you are in luck. Your control is perfectly linear. Rarely is installation could not be exactly linear. However, the controlled variable—flow rate—is linear.” This implies that flow rate is independent of pressure drop, and it isn’t. That’s how a flow control valve works with a constant-speed pump, changing the pressure drop to modify the flow.

So Dick’s statement that the VSD imparts linear flow control is correct, but only for very specific installations where most of the pressure drop is due to turbulent flow in piping, which is true of most common chemical industrial piping installations. Due consideration should be given to any nonlinearity if you want the best control. But even having said that, there are changes in pressure drop that are totally unrelated to flow. There is a learning curve in safety and accident prevention.

It’s interesting that this relatively new industry (wind power) is experiencing a learning curve in safety and accident prevention. [Editor’s note: The writer is referring to this story that appeared in the U.K. newspaper, The Telegraph, on Dec. 11, 2011: http://tinyurl.com/7l242m6.]

Something that seems clean also seems safe. At Dow, we used to paint everything eggshell white because it made the plant look safe.

Don’t get me wrong. Dow was one of the best places I have ever worked, and they really took safety seriously. I only wish that other companies would follow their lead. But we still had terrible accidents from time to time. Usually there was an accident when someone was not paying attention. In addition, there were usually three problems that were overlooked. Any one of them would have prevented the accident. However, anything mechanical or electrical deserves respect, especially the larger it gets. The number of accidents is beyond reasonable.

What is wrong with management and engineering professionals in our automation and control business? Sometimes we as engineers and automation professionals need to say no! Are we building things to code, or are we building things to last and be safe?

I am beginning to believe most of those in charge don’t have a clue about what they are doing. We all want to go home to dinner with our families after a good day’s work. We never think that when we say goodbye in the morning we may never see our loved ones again, do we?

Safety First?
Safety and loss prevention is one of my passions. Have you ever seen or known someone get killed in an industrial accident? Well, I have. I was 25 years old, and it has haunted me for 37 years.

It’s interesting that this relatively new industry (wind power) is experiencing a learning curve in safety and accident prevention. [Editor’s note: The writer is referring to this story that appeared in the U.K. newspaper, The Telegraph, on Dec. 11, 2011: http://tinyurl.com/7l242m6.]

Something that seems clean also seems safe. At Dow, we used to paint everything eggshell white because it made the plant look safe.

Don’t get me wrong. Dow was one of the best places I have ever worked, and they really took safety seriously. I only wish that other companies would follow their lead. But we still had terrible accidents from time to time. Usually there was an accident when someone was not paying attention. In addition, there were usually three problems that were overlooked. Any one of them would have prevented the accident. However, anything mechanical or electrical deserves respect, especially the larger it gets. The number of accidents is beyond reasonable.

What is wrong with management and engineering professionals in our automation and control business? Sometimes we as engineers and automation professionals need to say no! Are we building things to code, or are we building things to last and be safe?

I am beginning to believe most of those in charge don’t have a clue about what they are doing. We all want to go home to dinner with our families after a good day’s work. We never think that when we say goodbye in the morning we may never see our loved ones again, do we?

Safety First?
Safety and loss prevention is one of my passions. Have you ever seen or known someone get killed in an industrial accident? Well, I have. I was 25 years old, and it has haunted me for 37 years.

It’s interesting that this relatively new industry (wind power) is experiencing a learning curve in safety and accident prevention. [Editor’s note: The writer is referring to this story that appeared in the U.K. newspaper, The Telegraph, on Dec. 11, 2011: http://tinyurl.com/7l242m6.]

Something that seems clean also seems safe. At Dow, we used to paint everything eggshell white because it made the plant look safe.

Don’t get me wrong. Dow was one of the best places I have ever worked, and they really took safety seriously. I only wish that other companies would follow their lead. But we still had terrible accidents from time to time. Usually there was an accident when someone was not paying attention. In addition, there were usually three problems that were overlooked. Any one of them would have prevented the accident. However, anything mechanical or electrical deserves respect, especially the larger it gets. The number of accidents is beyond reasonable.

What is wrong with management and engineering professionals in our automation and control business? Sometimes we as engineers and automation professionals need to say no! Are we building things to code, or are we building things to last and be safe?

I am beginning to believe most of those in charge don’t have a clue about what they are doing. We all want to go home to dinner with our families after a good day’s work. We never think that when we say goodbye in the morning we may never see our loved ones again, do we?
Scraping of the Bottom of the Barrel — Fracking

In the United States, natural gas (NG) is the source of about 25% of the total energy consumption, and shale gas is the source of about 20% of the NG consumed. During the next years, hydraulic fracturing, or “fracking,” to produce NG will continue to rise, and will increase from today’s 20% to about 45% of American consumption by 2035. To date, just in Pennsylvania, there are some 4000 fracking wells in operation, and their number nationwide is projected to approach 100,000 within a few decades. The size of American recoverable shale gas deposits is debated. Until 2011, industry estimated the Marcellus Reserves (from Virginia to New York state) to be over 400 trillion cubic feet (tcf), while this year the U.S. Geological Survey reduced that estimate to 84 tcf.

The Process

Many of the natural gas wells in the United States use fracking to produce gas at economic rates. Large trucks, blenders, tanks and multistage pumps are used to inject millions of gallons of water at pressures of up to 20,000 psig into these wells that can be drilled to the depths up to 20,000 feet. Hydraulic fracturing can be performed in vertical or horizontal wells. In horizontal drilling, the terminal drill-hole is completed as a “lateral” that extends 1500 to 5000 feet parallel with the shale layer, while vertical wells extend only 50 ft to 300 ft into it. Horizontal drilling also reduces surface disruptions, as fewer wells are required.

After drilling the well, high-pressure liquids are injected into the shale rock or coal beds (Figure 1). When the “down-hole” pressure exceeds the fracture strength of the rock, it cracks, and the fracture fluid (FF) travels farther into the rock, extending the crack. After cracks are formed, they have to be kept open. Proppants are solid particulates, such as grains of silica sand, resin-coated sand or harder materials such as ceramics. They serve to prevent the reclosing of the fractures when the injection phase is completed.

In the FF, sometimes, naturally radioactive minerals are also used in order to help to measure the depth of the fractures along the wellbore. Ninety-nine percent of the FF is usually water, while the rest consists of chemical additives used to protect the well and improve its operation. Initially, the injected FF is acidic to increase permeability. This phase is followed by injecting FF-containing proppants with gradually increased size solids, and the operation is completed by flushing the well with water.

When the fracking phase is over, most of the FF and drill cuttings are processed for reuse, trucked away, treated on-site before being released into the environment or stored on-site either in large tanks or in “frack ponds” that are several acres in size. Since these ponds are on the surface, and their wastewater can contaminate ground waters, wells and rivers, these ponds are sealed with plastic lining. Usually 30% to 40% of the FF can not be removed from the underground fractures and stays down in the shale, creating small and often toxic lakes.

During the removal of the FF, large amounts of NG, including methane, escape from the well or dissolve in the FF and enter the frack pond. After the removal of as much FF as possible, the actual production starts, and the drilling equipment is moved to drill another well.

Arguments Pro and Con

Some representatives of the gas industry and some politicians believe that the amount of recoverable fracking gas could meet the American energy needs for a century or more, while opponents argue that the NG that is recoverable will be exhausted in a few decades. Proponents argue that fracking creates jobs and reduces energy imports, while opponents argue that these jobs are temporary, and more permanent jobs could be created if the same investment was made in renewable energy. Industry representatives also argue that NG is inexpensive, while opponents say that the cost would be much higher if the value...
Whenever I get erratic temperature readings I have to guess whether it’s a maintenance concern or an actual process issue. If only I had the ability to distinguish valid measurement data from false readings, then I could avoid unnecessary shutdowns.

YOU CAN DO THAT

ROSEMOUNT® Always make the right move. Sometimes you need to guess whether you need to shut down a process or simply swap out a sensor. With Emerson’s new Measurement Validation diagnostic, you can make the distinction, avoiding the cost and risk associated with unnecessary shutdowns. By predicting on-scale failures you can increase plant safety and productivity. Learn more at www.rosemount.com/848T. It’s your move.
of the water used, reduced real estate values, increased mortgage costs, expenses associated with health effects, the cost of wastewater treatment and legal expenses were included.

The gas industry advertises NG as the cleanest fossil fuel. Opponents claim that during the lifetime of a well, 3% to 8% of the produced methane is leaked into the atmosphere and, because methane is such a potent greenhouse gas, the greenhouse-gas footprint of NG is worse than that of coal or oil. The tradeoff is that, while the burning of NG releases fewer allergy- and cancer-causing solids and other pollutants than coal, the released methane contributes several times more greenhouse gases.

Proponents argue that the forces generated by fracking are insufficient to cause earthquakes, even when applied to unstable geological formations. Opponents point to the tremors and small earthquakes that have already been caused and to the potential damage to buildings. Last year, nine quakes occurred, unclamping ancient faults (geophones) near the Mahoning River in Ohio and others were reported in Arkansas and Colorado.

Proponents also argue that the drilling of wells should not affect the real estate values and should not invalidate mortgages. Opponents argue that this is a new industry, and its costs of operation will change if, in the future, businesses are required to compensate the landowners for water contamination or damage to livestock and crops. They also point to cases such as the Ohio bank warning the state’s lawmakers in September 2011 that if the borrowers do not obtain the consent of the bank before signing drilling leases, they will be violating the terms of their mortgage.

Environmental and Health Concerns

In 2005, Congress passed legislation prohibiting the federal government from regulating fracking under the Safe Drinking Water Act. This federal legislation is still in effect; therefore, companies do not have to disclose what chemicals they are putting into the ground, although some states, such as Wyoming, do require it. It is generally not known which company is using what chemicals, but in general the following are used: heavy metals, salts (bromides, chlorides), acetone, radionuclides (strontium, barium), arsenic and volatile substances (methane, benzene, alcohol, toluene, phenol, ethylene glycol). These substances can enter the ground waters from leaking plastic transfer piping or due to damage to plastic liners of the frac ponds.

The industry claims that fracking and water contamination has never been definitely linked. Yet, in a 2011 report, MIT scientists found that “there is evidence of natural gas migration into freshwater zones in some areas, most likely as a result of substandard well completion practices by a few operators. Also, there are additional environmental challenges, particularly the effective disposal of fracture fluids.

According to the industry, the harmful effects of fracking are no worse than those of conventional drilling. Opponents point to environmental effects, including the contamination of water supplies, air pollution, migration of gases and fracturing chemicals to the surface or the potential mishandling of toxic waste. They point to cases in Pennsylvania, where farmhouses and homes were abandoned because of animals dying, people getting blisters, dizziness, nosebleeds, etc. from the toxic and carcinogenic chemicals (New York Times Magazine, Jan. 20, 2011) and the class action lawsuits by landowners in Pennsylvania, Oklahoma, Texas, Wyoming and Virginia (New York Times Dec. 2 and Dec. 9, 2011).

The National Academy of Sciences determined in 2011 that groundwater contains much higher concentrations of methane near fracking wells, causing potential explosion hazards. In Dimock, Penn., 13 water wells were contaminated with methane, and Cabot Oil & Gas had to compensate residents financially and construct a pipeline to bring in clean water to the town. Elsewhere the landowners had to install water purifiers or drink bottled water. In Pennsylvania, the fracking fluid at 116 of 179 deep gas wells contained materials with high levels of radiation, and in March 2010, Congress directed the EPA to examine claims of water pollution related to hydraulic fracturing.

Béla Lipták, PE, is the editor of the Instrument Engineers’ Handbook.
AMETEK has the best solution for your critical alarm management needs. Perfect for utility and industrial operations, SERNET captures and differentiates alarms in the blink of an eye. No software is needed; everything’s embedded. The web browser-based graphic display provides easy-to-view alarm status in your control room or office and has built-in tools for sorting and filtering alarms for quick diagnosis of the root cause. Instant alarm notifications can be sent by e-mail to Blackberry, iPhone and other mobile devices.

Each box offers 48 digital inputs, and up to 25 boxes can be networked together to display up to 1,200 alarms on a single web browser! Each SERNET box can store up to 40,000 events in chronological order, for long-term analysis or downloading into CSV formats.

See how much better an alarm system can really be.

Visit ametekpower.com
Gaining Trust Comes With Consistency And Proven Reliability

As a market leader of solutions for hazardous areas, Pepperl+Fuchs has built trust and confidence into every element of our product portfolio. With over 60 years of hazardous location and intrinsic safety protection experience we’ve established ourselves as a trusted partner in the process industry.

Our versatile isolated barriers for DIN rail and termination board applications together with our cost-effective zener diode barriers have made us the world’s leading supplier of intrinsic safety barriers.

With a global sales and support organization, we are able to provide any plant with an adaptable range of interface and network products for advanced process control.

For intrinsically safe solutions, go to: www.pepperl-fuchs.us
Want Open Standards? Work at It

Recently, Jason Hiner’s “Tech Sanity Check” blog in TechRepublic listed five of the things we will miss most from Steve Jobs. One of Jobs’ maxims was, “You can’t just ask customers what they want and then try to give it to them. By the time you get it built, they’ll want something new.” Certainly, in the world of mass-marketeted consumer techno-gadgets, Job’s penchant for delivering what we want before we knew we wanted it was remarkable. And by delivering a slick, functional and coveted gadget for which customers are happy to pay a steep premium, Apple has been able to maintain the most closed and controlled of operating systems and applications.

I have little doubt that the leaders of our automation supplier community and their shareholders would love to have a moment of Jobs-like genius. Closed, controlled and proprietary means not only can you develop, deploy and market your products cheaper, faster and easier, but also your customers have to come to you for everything. What supplier wouldn’t prefer this to the chaos and competition of the Windows or Android world? But as consumers, we know why we like this much more open, chaotic and competitive model: It means “freedom to choose” and better deals for us.

End users’ desire for open standards and easy, secure integration is at odds with our supplier community’s objective to defeat their competition and make the most income for their shareholders.

Last month, the Fieldbus Foundation (FF) unveiled working prototypes of its newest standard, “Foundation for ROM.” ROM, “remote operations management,” encompasses everything from SCADA to wireless to remote I/O to a new secure backhaul specification developed in concert with the ISA100.15 wireless backhaul subcommittee and the ISA99 specification for automation security. The prototypes—one each from Smar, Stahl and APAC—were interconnected with a wireless 802.11n and wired Fieldbus HSE backhaul, integrating Foundation fieldbus H1, wired HART, WirelessHART, ISA 100.11a wireless, and simple, discrete I/O. Not only does Foundation for ROM allow the competing wireless mesh networks of ISA 100.11a and WirelessHART to be integrated, but it also provides a standard mapping mechanism for all these diverse providers to standard fieldbus function blocks, supporting its standard scaling, status and fault state propagation. If I were integrating traditional remote I/O, a brownfield site with a mix of wired smart devices and simplex devices, or an unmanned wellhead/industrial gas skid, Foundation for ROM has the goods to make it the specified solution. But—we not only need production-quality ROM platforms such the prototypes created by Smar, Stahl and APAC, we also need our favorite host systems to support it.

Our supplier community differs from the mass-market consumer market served by Apple and its competitors in this way: Apple’s leadership and staff are all end users of the products they create, and they go home each day to more end users of their products. This makes for a pretty tight feedback loop and ample data to anticipate future needs and appetites. Our supplier community creates a lot of amazing products, but they really need us to understand how we use them. We typically don’t buy something until one of our peers has vetted it. None of the current leaders in our field got there without a lot of input—and sometimes pain—from their pioneering customers.

Most of our suppliers already have solutions for the applications addressed by Foundation for ROM. But nearly all are proprietary, and all of them can be found lacking in scope, security, openness and/or uniformity.

Could it be customers who provide the “Steve Jobs” sort of spark that results in game-changing innovations in our field? It’s end user vision and persistence that’s powered much of the Foundation for ROM and corresponding ISA 100.15 backhaul specifications. End users have to insist their favorite suppliers support open, interoperable solutions, or we’ll remain saddled with the closed, proprietary ones.
Mike Caliel Is New Invensys CEO
He replaces Sudipta Bhattacharya on New Year’s Day

In mid-December, Invensys plc announced the appointment of Michael Caliel as president and CEO of Invensys Operations Management beginning on Jan. 1, 2012.

Caliel was previously with Invensys from 1993 to 2006, lastly as chief executive of Invensys Process Systems, the largest of the predecessor companies that were brought together to form Invensys Operations Management in early 2009. He has over 25 years experience in the industry, and was until recently CEO of Integrated Electrical Services Inc.

He is taking over from Sudipta Bhattacharya, who joined Invensys in 2007 as president of the Wonderware Software division, and has been the leader of Invensys Operations Management since February 2009. Bhattacharya will take up a new role outside Invensys.

In the meantime, he will be working with Caliel to ensure a smooth transition of responsibilities within the division, and will also be assisting on group business development in the Middle East and Asia.

Wayne Edmunds, the chief executive of Invensys plc, commented: “I am delighted to welcome Mike back to Invensys into a role which is very familiar to him. He has first-class experience in the industries in which the division operates—our customers as well as our products and technologies. His enthusiasm and drive will now be directed to building on the division’s strong market positions.

“I would like to thank Sudipta for his tremendous efforts over the past four years, where we have continually shown double digit growth at Wonderware and then at Invensys Operations Management, and wish him every success in the future. Invensys Operations Management has shown strong growth since its formation, and Sudipta has built an excellent management team to take the business forward under Mike’s leadership.”

Caliel said that he is excited to return to Invensys and take the helm at the Operations Management division.

“I have many friends at Invensys and have first-hand knowledge of the talented people who are in place around the world making a positive impact on Invensys customers,” said Caliel. “I’m looking forward to reconnecting with customers, partners and others in the industry as we continue building on the success of Invensys Operations Management, and executing against the strong strategy we have in place.”

Relations Between Operations and IT Get More Complicated

According to a survey of 134 individuals in critical infrastructure companies charged with responsibility for managing security, compliance and/or operations in industrial automation environments, conducted by security solution and services provider Industrial Defender (www.industrialdefender.com), the relations between operations and IT are complicated and will become more so in the future. The survey included those in the oil and
Release 5 is here!!

Release 5 adds enhancements for the...

- Integration of Device Diagnostics
- Integration of subsystems
- Integration of Information, such as Key Performance indicators modular procedure automation, process monitoring and control, at the HMI for operations
gas, water, chemical and electric/gas utilities, government, manufacturing, pharmaceuticals and transportation.

According to the survey, this increasing complication springs from a number of factors. First, 73% of those surveyed expect to see either significant or moderate increases in connectivity between industrial endpoints and corporate IT infrastructure over the next three to five years. Meanwhile, the industrial infrastructure itself is growing more complex—at least in the eyes of the slightly more than 50% of those surveyed who expect the number of industrial endpoints to increase by 50% or more over the next three to five years.

Answers to questions regarding the growth of connectivity reflect another of the basic causes of complexity: the diverging opinions of the corporate and operation staffs. Thirty-three percent of the corporate respondents expect the growth in industrial endpoints will be more than 150%, while only 12% of those in the industrial control environment felt the same way. Corporate respondents also expect more connectivity between their corporate and control networks than do their operation colleagues.

Another disconnect that complicates the environment is the divergence of on-paper responsibilities and day-to-day activities. Industrial operations professionals have seen their responsibilities regarding security and compliance broaden over the last few years, but there is a clear gap between responsibility and the amount of time devoted to these activities. Of those surveyed, 66% have either “primary” or “significant” responsibility for managing security within automation environments, 57% for managing compliance/audits and 55% for operational management. But 72% admit to spending less than 25% of their time per month managing security.

Good News, Bad News

The good news is that there is a significant overlap between managing security, compliance and operations. Many of the activities and procedures required for monitoring critical systems’ health and performance, alarm management, data and asset management, tracking changes and managing incidents and problems are the same for all three areas. The bad news is that a majority of the respondents feel they could be doing much better at managing all these areas—especially if they are working in a multi-vendor environment with
assets from multiple suppliers. For example, only a third of respondents report having a “moderately strong” ability to monitor critical system health and performance, while more than 70% say they have a poor to moderate ability to gain a unified view of their operations. While nearly 90% felt that managing incidents and problems was “extremely” or “very” important to security and operation management, and 74% felt the same way about compliance and audits, only a quarter said their operations currently have a “very” or “extremely strong” ability to manage problems across a diverse asset base.

Brian Ahern, CEO of Industrial Defender, suggests that the solution to this growing complexity is to take advantage of that overlap. “Let’s not try to justify investments in security and compliance. Rather than going at it that way, address the challenge of addressing the operational inefficiencies associated with a complex environment. If you can talk about gaining efficiencies there, security and compliance can become a byproduct of that investment. If you can get a solid understanding of real-time asset activity and state data, it puts you in a better position to manage. A unified approach to managing and protecting the infrastructure will justify investment in intelligent endpoints.”

ARC Sees Moderate Growth Ahead, Especially in Asia

ARC Advisory Group (www.arcweb.com) sees improving numbers in both the automation space in general and fieldbus businesses in particular in the next year, with the strongest growth taking place in Asia. According to reports issued last month, based on the growth in incoming orders for new project business seen throughout the year, the research firm expects a rebound to healthy growth for automation shipments to many of the “hot” developing countries for 2011. It also expects many of the developed regions to rebound back to moderate health in 2011 as many suppliers have seen their aftermarket business come back on line. “Consequently, ARC feels the global automation markets are on track to return to pre-recession shipment levels in 2011,” according to ARC senior analyst David Clayton.

ARC also predicts that the worldwide market for fieldbus solutions in...
the process industries is expected to
grow at an above average compounded annual growth rate (CAGR) for the
next five years. As the lifecycle benefits
of fieldbus solutions become more ap-
parent, fieldbus has become more ac-
cepted in a wider range of industries and by greater numbers of end users.

**Strongest Growth in Asia**
The global automation index saw a
sizeable jump in Q4 2010, generating
a value of 198; a 12-point increase over
the Q3 2010 value of 186. The index
continued to grow in Q1 2011, regist-
ering a value of 205; a seven point in-
crease from Q4 10. Although the global
index is still expanding, it is growing at
a decreasing rate and only one regional
index—Asia—witnessed growth in Q1
2011. This decreasing growth rate in
the global index is the result of stagn-
ant first quarter growth in the U.S.
index, a significant decrease in the Eu-
ropean index, and strong growth in the
Japanese index because first quarter
growth was strong in Japan before the
March 11 earthquake and tsunami.

The growth from Q1 2010 to Q1
2011 is nearly 20% in the global and
U.S. indices, 21% in the Asian index, and
14% in the European index. Even
though these numbers are encour-
aging, the double digit YoY growth rates are more heavily influenced by
the weak 2010 results than the strong
showing in Q1 2011.

But the global manufacturing econ-
omy is not out of the woods yet. Al-
though it seems on track to return to
pre-recession shipment levels in 2011,
risks remain. High oil prices due to
growing demand from emerging na-
tions and continuing political turmoil
in the Middle East could upset growth.
U.S. unemployment rates continue to
be a deterring factor, as does the Euro-
pean debt crisis.

Due to the numerous risks still pres-
ent and the lag between orders and fi-
nal shipment for new project business,
short-term prospects for the market
range widely by region and industry.
While most sectors are expected to ex-
perience positive growth over the fore-
cast period, growth in the oil and gas
and electric power markets will drive
the overall market growth positively in
2011 and beyond.

Trends in the fieldbus markets re-
fect the same dynamics. The great-
est growth will come from the emerg-
ing markets of China and India. With
a CAGR of over 24%, Asia will be the
fieldbus growth engine, similar to that
of the process automation industry.
Latin America is expected to ex-
perience the next highest growth rate of
over 10%; however, the region still ac-
counts for just a small percentage of
the total fieldbus market. The devel-
oped regions are expected to have less
than average growth, particularly in
North America. However, as suppliers
develop improved retrofit fieldbus solu-
tions and end users continue with mi-
gration projects, ARC expects fieldbus
will be implemented more rapidly in
these regions.

**Surprising Lessons**
The ARC fieldbus study, “Fieldbus
Solutions for the Process Industries
Worldwide Outlook” by senior analyst
Kevin Crisafulli, also reveals some sur-
prising lessons for end users who have
implemented fieldbus solutions. “The
primary value proposition of fieldbus
was initially thought to be reduced wir-
ing, simplification of and reduction of
installation, and reduced commission-
ing costs,” says Crisafulli. “However, to
the contrary, end users reveal that they
are actually realizing greater benefits
on the operational expenditure side of
their processes from quality improve-
ments because of bi-directional digital
communication and improved process
efficiency due to linked intelligent de-
vices capable of remote diagnostics.”

Good asset management solutions
also appear to be an essential part of
the value proposition of a fieldbus de-
ployment. Remote diagnostics and
maintenance capabilities continue to
be primary selection criteria for those
that purchase fieldbus control systems.

Crisafulli’s report says that success-
ful suppliers must emphasize their
strengths in this area as a means to dif-
ferentiate themselves from their com-
petition. This point is important now
more than ever as end users continue
to decrease their engineering and
maintenance departments.

The report also suggests that there
is a dichotomy in operations between
“as built” and “as designed.” Users may
have a vision of their ideal implementa-
tion, but in actuality, most do not fully
utilize the asset management capabili-
ties of fieldbus when used in conjunc-
tion with a process asset management
(PAM) application. The reality is many
users are still spending too much time
focusing on the initial cost of a proj-
et and reductions in capital spending
than on the process improvements and
operating expense reductions that can
be achieved by coupling PAM applica-
tions and fieldbus solutions.

**Marsh Bellofram Buys King Engineering**
The Marsh Bellofram Group (www.
marshbellofram.com) has acquired the
product line assets of King Engineer-
ing Corp. of Ann Arbor, Mich.

Founded in 1937, King Engineering
(www.king-gage.com) is the manufac-
turer of King-Gage liquid level mea-
surement and inventory tank gauging
systems, including related air filtration
components for new installations, up-
grades and retrofits of storage or pro-
cessing vessels. The company’s product
portfolio includes electronic pressure
transmitters and sanitary level sensors
to meet 3-A standards for clean-in-
place applications, as well as graphic
tank level indicators, digital processors
and single- and multiple-tank oper-
ator interfaces, further supporting PLC
and/or LAN protocols. Market sectors
Your Project Starts Here

The new 2012 Allied Catalog helps you get the job done.

- Over 12,000 New Products
- 300+ World-class Suppliers
- Expanded Connectors and Industrial Automation Offering
- Extensive Test & Measurement Solutions

Order the Catalog today @ alliedelec.com/2012catalog
supported by King Engineering products include food and beverage, personal care, pharmaceutical, cosmetics, chemical processing, and specialized areas of the marine industry.

Under the terms of the acquisition, King Engineering manufacturing operations have been moved from Ann Arbor to Marsh Bellofram global corporate headquarters in Newell, W.V. Both standard and custom products will continue to be offered under the King-Gage brand, with customer service and sales support also transferred to Newell.

Joe Colletti, Jr., president of Marsh Bellofram says, “Our recent acquisition allows Marsh Bellofram to further expand our breadth of product technologies, while offering existing King Engineering customers even greater support. We look forward to continuing the investments in R&D and manufacturing that have allowed King-Gage products to succeed under its prior ownership, and more comprehensively supporting the needs of our valued customer base.”

Fieldbus Foundation Unveils Foundation for ROM

The Fieldbus Foundation (www.fieldbus.org) unveiled its Foundation for Remote Operations Management (ROM) solution at a media event held Dec. 1 at the Fieldbus Center at Lee College in Baytown, Texas.

The Foundation for ROM initiative is intended to develop a unified digital infrastructure for asset management in remote applications ranging from tank farms and terminals to pipelines, offshore platforms and even original equipment manufacturer (OEM) skids.

The technology enables fieldbus connectivity to remote I/O and the leading industrial wireless protocols, including WirelessHART and ISA 100.11a. It provides an interface to these wireless technologies and uses Electronic Device Description Language (EDDL) and function blocks to ensure interoperability with Foundation for ROM devices.

Fieldbus Foundation’s global marketing manager, Larry O’Brien, says, “Foundation for ROM is important because it is the first example of being able to integrate ISA 100.11a,
WirelessHART, wired HART and wired H1 protocols into a single standard environment. More importantly, it is one that does not sacrifice diagnostic capabilities of the existing wireless devices. Instead, we map these capabilities into our block structure to provide a standard environment for data management, quality and more, eliminating solutions which are highly customized and much more costly to maintain throughout the plant lifecycle.”

O’Brien added, “Remote operations management is one of the fastest growing segments of the process automation business. However, it is also caught up in the turbulence of business challenges, technological change, personnel issues and the need for operational excellence.

“With Foundation for ROM, industrial operations can implement a true predictive and proactive maintenance strategy for remote assets that could not previously support one. Data from devices on multiple networks, both wired and wireless, are tightly integrated into the Foundation fieldbus infrastructure, providing a single environment for management of diagnostic data, alarms and alerts, data quality, control in the field capability and object-oriented block structure.”

Open Specifications
Within the Foundation automation architecture, the H1 (31.25 kbit/s) and HSE (100 Mbit/s) fieldbus networks provide a distributed function block capability, with HSE serving as a larger pipeline with increased speed and throughput. The Foundation for ROM solution expands these capabilities by establishing open, non-proprietary specifications for an interface to wireless field device networks, a wired HSE backhaul and a wireless HSE backhaul integrating various wireless sensor networks such as WiFi, satellite, cellular, etc. As part of this solution, Foundation for ROM provides a way to bring large concentrations of discrete and analog field I/O back to the control room using HSE communication. This is key to improved integration of critical functional areas, including machinery health monitoring, safety interlocks, fire and gas detection systems, and video surveillance.

Dozens of Supporters

Linear Technology Buys Dust Networks
Linear Technology Corporation, a manufacturer of high-performance analog integrated circuits, has announced the acquisition of Dust Networks, Inc., a provider of low-power wireless sensor network (WSN) technology. The acquisition of Dust Networks, based in Hayward, Calif., will enable Linear to offer a complete high-performance wireless sensor networking solution.

Dust Networks’ low-power wireless sensor network technology extends Linear’s product portfolio into key growth areas in industrial process control, data acquisition and energy harvesting. Dust Networks’ ultra-low-power wireless systems complements Linear’s analog and digital sensor interface ICs and energy-harvesting power management products in applications where measurement of physical parameters has traditionally been impractical or impossible.

With the growing importance of machine-to-machine communications, low-power wireless sensing is an emerging solution for many end-markets, including industrial process control, building automation and data center energy management.

“Smart Dust” was first conceived by Dr. Kris Pister, founder and chief technologist of Dust Networks, as a simple way to deploy intelligent wireless sensors. Dust Networks pioneered SmartMesh networks that comprise a self-forming mesh of nodes, or “motes,” which collect and relay data, and a network manager that monitors and manages network performance and sends data to the host application. This technology is now the basis for a number of seminal networking standards.

Dust Networks’ technology combines low-power, standards-based radio technology, time diversity, frequency diversity and physical diversity to assure reliability, scalability, wire-free power source flexibility and ease-of-use. All motes in a SmartMesh network are designed to run on batteries for years, allowing the ultimate flexibility in placing sensors exactly where they need to go with low-cost “peel and stick” installations.

Terms of the transaction were not disclosed. Although there will be some transaction-related costs, Dust’s ongoing results are not expected to be material in the short term to Linear’s financial statements.
VEGA, a leader in level measurement technology, offers the VEGAMAG series of magnetic level indicators for visual indication on standard and complex liquid level applications in many industries. Paired with a guided wave or non-contact radar, the system provides a continuous signal directly to the control room.

The VEGAMAG magnetic level indicator series supplies the following benefits:

- Provide redundancy through visual indication and guided wave radar
- Resistant to extreme process conditions with robust material options
- Suitable for long measuring spans with a lighter weight single chamber model

www.vega-americas.com
americas@vega.com
1-800-FOR-LEVEL
Every month, Control’s editors take a specific product area, collect all the latest, significant tools we can find, and present them here to make your job easier. If you know of any tools and resources we didn’t include, send them to wboyes@putman.net, and we’ll add them to the website.

ALL ABOUT DRIVES
Danfoss VLT Drives has a number of educational resources available through its website at www.danfoss-drives.com. These include an online diagnostics tool (http://tinyurl.com/cq-p3l3m) for the VLT 2800, VLT 5000, VLT 6000 and VLT 8000 drives, and a collection of lessons on adjustable frequency drives for the industrial market (http://tinyurl.com/2b3gz4t) and variable frequency drives for HVAC and water and wastewater markets (http://tinyurl.com/chxovdb). A free 150-page downloadable document called “Facts Worth Knowing about Frequency Converters” (http://tinyurl.com/ykh-tusf) is available that provides an introduction to the work and build-up of a frequency converter and the AC motors connected to it.

ONLINE COURSES
Siemens offers online tutorials on the basics of motors and controls and power distribution. The motors and controls courses cover the basics of AC drives and motors, control components, motor control centers, DC drives and PLCs. The power distribution courses cover the basics of busways, circuit breakers, load centers, low-voltage switch gears, power monitoring, safety switches, surge protectors and more. The direct link to the courses is http://sea.siemens.com/step/default.html.

SHAFT GROUNDING AND YOUR VFD
This white paper, “Shaft Grounding—Fulfilling the Promise of Variable Frequency Drives,” explains the causes of certain problems experienced with VFDs and how shaft grounding can solve them. The direct link is at www.controlglobal.com/whitepapers/2009/011.html.

DRIVE VIDEOS
Learn Automation Direct is a tutorial website covering a variety of automation products. Among its tutorials, videos, white papers and PDFs is a four-part video series on selecting the right AC drive. The same page contains links to other tutorial pages, including those containing overviews of both AC and DC motors. The direct link is at http://learn.automationdirect.com/drives-motors.html.

TUTORIALS AND VIDEOS
Galil offers a selection of videos and tutorials on motion control and drive topics, including tuning servo systems, system design, I/O control, software, motion controllers, motors and drives, and Ethernet and motion control. The page also has links to live training and online classes. The direct link is at www.galilmc.com/learning/tutorials.php.

APPS FOR ENERGY SAVINGS
A new tool from Rockwell Automation helps users to calculate potential savings derived from variable frequency drives to power pumps and fans right from their mobile devices. They can use the online energy savings calculator (www.rockwellenergycalc.com/) or download the free mobile application to their iPad, iPhone, Blackberry or Android systems. With this new tool, users can compare conventional methods, such as valves for pump control and dampers for fan control, to variable frequency drives and see estimated cost savings of installing an Allen-Bradley PowerFlex drive. Users can enter the minimum pump or flow percentages, annual operating hours, cost per kilowatt and other information about their own factory, or use the sample data provided by Rockwell Automation built into the tool.
The question isn’t who won, but rather why do they win and how do they do it.

by Keith Larson and Walt Boyes

Welcome to the 20th Annual Control Readers’ Choice Awards. It seems to us to be fascinating that we’ve made it with this award survey for 20 years. We are pleased with the response of readers and vendors, and we know how important this survey has become because we get the phone calls. We’ve surveyed our readers and we are pleased to present the collective opinion of over 1000 automation professionals on over 100 process automation technologies.

The survey continues to have, as we noted last year, a North American bias, but the number of responses from outside North America continues to grow. As we have for the past several years, we surveyed not only the print magazine’s readers, but also subscribers to our digital media outlets: email newsletters, webinars, podcasts and all of the other media you can find at ControlGlobal.com.

Why is this survey important?
This survey and the resulting Readers’ Choice Awards are the only completely unaided brand preference survey in the process automation industries.

As always, we pulled a random sample of end users from our databases, and we asked them, in a series of unaided (they have to write in the names—no preselected choices in dropdown boxes) surveys for their selections among all the solution providers they regularly work with.

This means that Control’s staff has to make sure that all the various ways to name an ABB or a Rockwell or an Emerson product are counted correctly. This is time consuming and requires significant knowledge of the history of the industry. Did you know that there are over 17 different ways to list what is now an ABB product, for example? One of the things this indicates is the persistence of original brands in the minds of the end users, even after name-changes, acquisitions, and the passage of time.

Since this is a private survey, we have control over the responses, and we take great care to make sure that the survey is reasonable and accurate.

What You’re Going to See
For the fourth year, we’ve broken out control platform awards by discipline, and also by industry vertical. Each category represents end-user selections in the six basic process control disciplines (see Table 1: “Overall ‘Best in Control’ Winners by Application Type”): Continuous Regulatory Control, Batch Process Automation, Safety/Emergency Shutdown, Sequential Logic, Continuous Sheet/Web Monitoring and
And the Winners are...

Table I. “Best in Control” Readers’ Choice Awards by Process Automation Discipline

<table>
<thead>
<tr>
<th>Continuous Regulatory Control</th>
<th>Batch Process Automation</th>
<th>Continuous Sheet/Web Monitoring &amp; Control</th>
<th>Safety/Emergency Shutdown</th>
<th>Sequential Logic Control</th>
<th>Supervisory Control &amp; Data Acquisition</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Schneider</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table II. “Best in Control” Readers’ Choice Awards by Process Automation Discipline and Industry

<table>
<thead>
<tr>
<th>Batch Process Automation</th>
<th>Chemicals Manufacturing</th>
<th>Electric Power Generation</th>
<th>Food &amp; Beverage Manufacturing</th>
<th>Metals, Minerals &amp; Mining</th>
<th>Oil &amp; Gas Extraction</th>
</tr>
</thead>
</table>

|-------------------------------|---------------------------|---------------------------|---------------------|---------------------|---------------------|

<table>
<thead>
<tr>
<th>Continuous Sheet/ Web Monitoring &amp; Control</th>
<th>Honeywell Process Solutions</th>
<th>—</th>
<th>—</th>
<th>ABB</th>
<th>—</th>
</tr>
</thead>
</table>

|---------------------------|-------------------------------|-------------------------------|---------------------|---------------------|---------------------|

<table>
<thead>
<tr>
<th>Sequential Logic Control</th>
<th>Emerson Process Management</th>
<th>Emerson Process Management</th>
<th>Rockwell Automation</th>
<th>Rockwell Automation</th>
<th>Rockwell Automation</th>
</tr>
</thead>
</table>

|----------------------------------------|-----------------------------|-----------------------------|---------------------|---------------------|---------------------|

<table>
<thead>
<tr>
<th>Petroleum Refining</th>
<th>Pharmaceuticals &amp; Life Sciences</th>
<th>Plastics &amp; Rubber Manufacturing</th>
<th>Pulp &amp; Paper Manufacturing</th>
<th>Water &amp; Wastewater Processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerson Process Management</td>
<td>Emerson Process Management</td>
<td>Emerson Process Management</td>
<td>ABB</td>
<td>ABB</td>
</tr>
</tbody>
</table>

|-------------------------------|-----------------------------|-----------------------------|-------------------------------|-----|---------------------|

<table>
<thead>
<tr>
<th>Continuous Sheet/ Web Monitoring &amp; Control</th>
<th>—</th>
<th>—</th>
<th>Honeywell Process Solutions</th>
<th>Honeywell Process Solutions</th>
<th>—</th>
</tr>
</thead>
</table>

|---------------------------|-------------------------------|-----------------------------|---------------------|-----------------|-----------------|

<table>
<thead>
<tr>
<th>Sequential Logic Control</th>
<th>Rockwell Automation</th>
<th>Rockwell Automation</th>
<th>Rockwell Automation</th>
<th>Rockwell Automation</th>
<th>Rockwell Automation</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Supervisory Control &amp; Data Acquisition</th>
<th>Invensys Operations Management</th>
<th>Emerson Process Management</th>
<th>Honeywell Process Solutions</th>
<th>Honeywell Process Solutions</th>
<th>Rockwell Automation</th>
</tr>
</thead>
</table>

Control, and Supervisory Control and Data Acquisition (SCADA). We have broken out the awards by the 10 industry verticals (see Table 2, “Best in Control” Winners by Application Type and Industry) that we serve: Chemicals Manufacturing, Electric Power Generation, Food and Beverage Manufacturing; Metals, Minerals and Mining; Oil and Gas Extraction; Petroleum Refining; Pharmaceuticals and Life Sciences; Plastics and Rubber Manufacturing; Pulp and Paper; and Water/Wastewater.

You will see, if you compare the current results to the 2011 Readers’ Choice Awards (www.controlglobal.com/articles/2011/2011RCA.html) that there has been very little change. ABB moved into the lead in Pulp and Paper; Rockwell and Emerson flip-flopped position in Water/Wastewater, and other small changes.

### Why Do They Win?

Too much should not be read into absolute position on these lists. To be mentioned in these Readers’ Choice Awards at all, regardless of final position, means that the solution provider has not only consistently provided exceptionally fine quality products and services, but has demonstrated these capabilities to a large number of very loyal end-user customers. These are the suppliers who have consistently demonstrated excellence in customer service and responsiveness, and they all deserve congratulations for their efforts.

Branding, which is really what the Control Readers’ Choice Awards are about, is made up of several components. One, as we’ve said, is “walking the walk.” But high quality marketing and the concomitant sales effort by knowledgeable staff make up a very large component of the strength of these suppliers’ brands.

We get asked fairly regularly how to “win” the RCAs. The answer, which the person asking the question generally isn’t happy with, is to spend lots of time and money providing outstanding service to a large end-user base, and communicating what you’re doing to the largest market you can. Sure, we’d like to sell more ads, but the fact remains that if you don’t market your product, and provide outstanding service to your customers, you’re hiding yourself and your light under the proverbial bushel basket. So that’s how the usual suspects “win” the RCAs every year.
When pumps go down, so does my production. To see which pumps are in danger, I need real-time monitoring. But how can I afford the upgrade?

With low-cost implementation and easy integration, Emerson Pump Health Monitoring means big savings now and in the long run. Our real-time predictive technology tells you what to pay attention to and when, so you stop wasting time, money and manpower. Automated asset monitoring also helps you avoid risks to operation, safety and environment, thereby increasing the reliability of your refinery. And with the advantage of Smart Wireless, installation is quick and painless. See how to unleash your plant’s and your people’s potential at EmersonProcess.com/PumpHealth

The Emerson logo is a trademark and a service mark of Emerson Electric Co. © 2012 Emerson Electric Co.
The Soft Side of Process Automation

These suppliers (Table 3) have consistently demonstrated expertise in software development and execution—and in providing applications expertise and high-quality customer service. Obviously, since this is a brand preference survey, the top awards usually go to the larger suppliers, but note the presence of smaller suppliers like PAS, TiPS, Kepware, Mathworks and Mynah Technologies. Good branding and the strength of a supplier’s brand doesn’t just reside with the major suppliers.

Seeing What’s Going on Here

Operators have to be able to see what is going on in their processes, and they need highly effective and highly reliable ways to do that. The companies on this list (Table 4) are highly competent at hardware design and manufacturing, and many of them have been doing what they are being recognized for a very long time. Emerson, GE, Honeywell, Yokogawa, Invensys Operations Management and Rockwell Automation each have over 100 years’ experience in effectively communicating process conditions to operators.
Don’t let visual indication be your weakest link.

Orion magnetic level indicators are built tough for the world’s most intense environments and applications.

visit www.orioninstruments.com for more information

Schedule a visit to our new state-of-the-art manufacturing facility
Connecting the Dots

We shouldn’t forget that for the devices and software to be useful, somebody has to provide the information infrastructure. In Table 5, you’ll see the essential infrastructure players. There’s not much difference from last year in the basic categories here, except in the Wireless Infrastructure category where the responses mirror the survey done in our August 2011 issue: Emerson Process Management, Phoenix Contact, and Siemens Industry are all purveyors of devices that use the IEC62591-WirelessHART standard. Cisco, of course, owns the 802.11 space for networking. The only ISA100.11a supplier that made the list is Honeywell Process Solutions.

|---------------------|---------------------|---------------------|-------------------------------|-------------------------------|---------------------|------------------|----------------|

In 1995, WAGO launched the first modular rack-less, industrial I/O system, changing the way the game is played.

ETHERNET 2.0 – WAGO’s next generation Ethernet logic controllers have done it again! Three new game changing platforms featuring redundant networking, switched networking, or removable memory provide...

- **60% more control and maintenance budget** – without sacrificing performance or support
- **1,000 instructions in 235 µs** – with high speed processing power
- **Up to 5x smaller** – put more in the same enclosure or just use smaller enclosures

**It’s your move!**

Go to [www.wago.us/gamechanger.htm](http://www.wago.us/gamechanger.htm) discover which platform is your game changer, and develop your game plan with free coffee from WAGO.
Keeping the Process Flowing

Table 6 shows the recognized masters of the flowmeter. From Coriolis to Open Channel, these vendors have the expertise to ease the deceptively simple process of specifying, designing and operating a flow measurement system. The recurrence of company names like Brooks Instrument and Badger Meter that have long and storied pasts shows just how important longevity and applications expertise gained from that longevity actually are. Of course, Endress+Hauser and Emerson Process Management dominate this category, because they are the number one and number two, respectively, suppliers of field instrumentation. There are other smaller companies, though, who shine, like Hoffer Controls, Sierra Instruments and Magnetrol.

Table 7 shows that, although Emerson Process Management and Endress+Hauser again dominate the category, there are other, smaller companies who shine too. Companies like Krohne, Vega, Magnetrol and its subsidiary Orion Instruments, ISE Magtech, MTS, and others continue to make the list because their design, manufacturing and above all application expertise continue to demonstrate what we said last year was “sheer bloody competence.” End-users respect competence more than anything, especially at 3 a.m. when there’s been a failure.

Leveling the Field

Level measurement continues to be one of the most difficult of the basic measurements necessary to operate process plants, even though it is certainly the oldest measurement of this type known to us—as we’ve noted before, the oldest existing level meter is the Nilometer in Egypt, which is well over 2000 years old, and may be far older as a technology. Table 7 shows that, although Emerson Process Management and Endress+Hauser again dominate the category, there are other smaller companies who shine too. Companies like Krohne, Vega, Magnetrol and its subsidiary Orion Instruments, ISE Magtech, MTS, and others continue to make the list because their design, manufacturing and above all application expertise continue to demonstrate what we said last year was “sheer bloody competence.” End-users respect competence more than anything, especially at 3 a.m. when there’s been a failure.
For decades, ABB variable speed drives and Baldor motors have set the standard for quality, reliability and energy savings. Now, industrial customers in the U.S. can buy these products and receive expert support from a single source. Call 479-646-4711 to locate the district office nearest you.

Two trusted names. One local source for sales and support. Only from ABB and Baldor.

baldor.com

- Local Sales & Support
- Energy Efficiency
- Industrial Motors & Drives
- Unmatched Customer Service

©2011 Baldor Electric Company
READERS CHOICE AWARDS

The Heat is On, and the Pressure Too

As always, Emerson Process Management won every category in Table 8, except Infrared Temperature and Infrared Imaging, both of which were captured by Fluke Raytek/Ircon, a division of Danaher. Smaller companies made the list in their niches, like JMS Southeast, Pyromation, BBP Sensors, and Omega Engineering (which was recently sold to Spectris, the large U.K.-based instrumentation supplier). Moore Industries, Micron and FLIR also made the list.

Analyze This!

Process analyzers continue to proliferate throughout the process industries. Both online and at-line analyzers are being used much more often for quality and performance. In Table 9, we present the top honors for online process analyzers. ABB continued its streak, winning four of the seven categories in this group. Yokogawa also made a strong showing, as did Emerson Process Management. Smaller companies like Draeger Safety, K Patents and others continued to show that you don’t have to be huge to be well-branded. You just have to both talk the talk, and walk the walk.

### Pressure Transmitter
- Emerson Process Management
- Yokogawa
- Endress+Hauser
- Honeywell Process Solutions
- Siemens Industry
- ABB

### Thermocouple
- Emerson Process Management
- Omega Engineering
- Pyromation
- JMS Southeast
- Endress+Hauser
- BBP Sensors

### Resistance Temperature Detector
- Emerson Process Management
- Fluke Raytek/Ircon
- JMS Southeast
- Pyromation
- BBP Sensors
- Omega Engineering

### Infrared Temperature Sensor
- Fluke Raytek/Ircon
- Mikron Infrared
- Omega Engineering

### Infrared Imaging/Thermography
- Fluke Raytek/Ircon

### Temperature Transmitter
- Emerson Process Management
- Yokogawa
- Endress+Hauser
- ABB
- JMS Southeast
- Moore Industries

### Ambient Gas Analyzer
- MSA
- ABB
- Draeger Safety
- Scott Safety

### Density/Concentration Analyzer
- Emerson Process Management
- Yokogawa
- Endress+Hauser
- JMS Southeast
- Pyromation
- Omega Engineering

### Humidity/Moisture Analyzer
- Yokogawa
- Vaisala
- GE Measurement & Control Solutions
- Emerson Process Management
- JMS Southeast
- ABB

### pH/ORP/Conductivity Analyzer
- Emerson Process Management
- Mikron Infrared
- JMS Southeast
- ABB
- Flach
- Mettler Toledo

### Process Chromatograph
- Yokogawa
- ABB
- Emerson Process Management
- Siemens Industry

### Process Spectrometer
- ABB
- Yokogawa
- Siemens Industry
- Emerson Process Management

### Stack Gas/Emissions Analyzer
- ABB
- Yokogawa
- Emerson Process Management
- Sick Maihak
- Teledyne Analytical Instruments
- Siemens Industry
The Essential Elements

All the control systems in the world won’t work if the final control elements aren’t properly designed, installed and above all, working. Generally, this means a valve, drive and motor combination of some kind. Table 10 shows this year’s results in these categories. As always, Emerson Process Management’s Fisher Valve division took the control valve category, with mentions of Flowserve, GE Masonelain and Metso Automation. The same companies took the pneumatic valve actuator category, too. In the electric actuator category, Rotork reprises its top ranking from last year, while Beck joined the list. Metso Automation, Emerson Industrial Automation and Flowserve won the on/off valve category.

In electric motor drives, Rockwell Automation took the category, followed by ABB, Siemens Industry, Schneider Electric, Toshiba and Baldor Electric (a division of ABB). Baldor also took the electric motor category, which certainly reflects the North American bias of these awards. Second was Siemens Industry, which after over 100 years of manufacturing motors, has finally decided to trade name the product: Simotics.

### Control Valve
1. Emerson Process Management
2. Flowserve
3. Dresser Masonelain
4. Metso Automation

### Electric Valve Actuator
1. Rotork Controls
2. Emerson Process Management
3. Flowserve
4. Auma Actuators
5. Beck

### Pneumatic Valve Actuator
1. Emerson Process Management
2. Flowserve
3. Metso Automation
4. Dresser Masonelain

### On/Off Valve
1. Metso Automation
2. Emerson Industrial Automation
3. Flowserve

### Electric Motor Drive
1. Rockwell Automation
2. ABB
3. Siemens Industry
4. Schneider Electric
5. Toshiba
6. Baldor Electric

### Electric Motor
1. Baldor Electric
2. Siemens Industry
3. GE Energy
4. ABB
5. Emerson Electric/U.S. Motors (now Nidec)
6. WEG Electric
7. Toshiba
8. SEW-Eurodrive

### Data Acquisition System
1. Rockwell Automation
2. Invensys Operations Management
3. Emerson Process Management
4. Canary Labs
5. Olsisoft
6. Siemens Industry
7. Yokogawa
8. Honeywell Process Solutions

### Enclosure
1. Pentair Technical Products
2. Rittal
3. Hammond Manufacturing
4. Schneider Electric
5. Saginaw Control & Engineering

### Purge System
1. Pepperl+Fuchs/Bebco

### Portable Calibrator
1. Fluke
2. Emerson Process Management
3. GE Druck
4. Beamex
5. Martel / Beta

### Remote Terminal Unit
1. Rockwell Automation
2. Emerson Process Management
3. Schneider Electric
4. ABB
5. Honeywell Process Solutions

### Instrument Fittings
1. Swagelok
2. Parker-Hannifin
3. Hoke

### Vibration Instrumentation
1. Emerson Process Management
2. SKF
3. Shinkawa

### Weighing System/Load Cell
1. Mettler Toledo
2. Hardy Instruments
3. Vishay BLH
4. Rice Lake Weighing Systems
5. Thermo Scientific

Outstanding in the Field

In Table 11, we list the other indispensable systems and devices that process automation technologists need and use—but don’t fit in any other logical group we’ve discussed so far. These include “data acquisition,” without which no control system works, but which appears to mean different things to different users. There are enclosures, fittings, calibrators, Remote Terminal Units (RTUs) for SCADA systems, purge systems, vibration instrumentation, and last but certainly not least, weighing systems and load cells. This year, Rockwell, as usual, took data acquisition and remote terminal units. Hoke joined the instrument fittings category, while SKF and Shinkawa joined the vibration instrumentation group. Pepperl+Fuchs/Bebco was all alone this year in the purge system category.

We want to offer our congratulations to everyone who made the list, whether they were listed first or not. We believe that this Award listing accurately reflects the brand preferences of end-users in the process industries, and every company that is listed here is a real winner.
Why migrate to SIMATIC PCS 7?

Siemens has the expertise to maintain your APACS+ and PCS 7 systems, minimizing risk during your modernization.

Integrating PCS 7 with APACS+ provides you with enhanced alarm management, the latest cyber security, and integrated asset management. See other PCS 7 benefits and possibilities for your process by visiting us online at www.usa.siemens.com/apacs2020.
“The increasing power and miniaturization of chips coupled with mass production and low cost means everyone’s iPhone will soon have an ‘app’ for PID control or ladder logic,” says Control columnist and super end user, John Rezabek. It is already happening in the suddenly burgeoning home automation industry.

Everywhere you look, the embedded controller is with us. It lives in your washing machine, your refrigerator, your slow cooker and your toaster. It lives in your heating and air conditioning system, and it lives in PLCs, PACs and in the controllers that are part of your DCS.

More likely than not, embedded controllers will soon be arriving at your water meter, gas meter and electric meter. The “smart grid” is essentially a grid made up of networked embedded controllers that can control the flow of electricity using a mechanism called demand-response.

This convergence is an essential part of the Internet of Things—an Internet in which these embedded controllers,
whether they are in a PLC or a PAC or a DCS controller, or your washing machine, share information with each other instantaneously on a 24/7 basis. Embedded controllers are becoming smaller, faster and more powerful because of Moore’s Law, which states that data density doubles approximately every 18 months. The network itself is becoming as important as the devices, as Ming-Chin Wu, president of Advantech’s Industrial Automation Group (www.advantech.com), noted at the Advantech World Partner Conference in October of 2011.

Tom Edwards, senior technical advisor at Opto 22 (www.opto22.com) agrees. “PACs offered the bonus of having PC-based and embedded control features built in. One such feature is native communications capability to business systems.”

Edwards goes on to say, “As part of their core functionality, PACs natively speak a host of popular application level industrial protocols, such as Modbus, Modbus/TCP, Profibus and EtherNet/IP. PACs have traditionally had PC-like connectivity to the enterprise, and are capable of communicating using standard network interfaces and protocols,

PROTECT PUMPS

DRY RUNNING • CAVITATION • BEARING FAILURE • OVERLOAD

MONITOR PUMP POWER
- Best Sensitivity
- Digital Display

TWO ADJUSTABLE SET POINTS
- Relay Outputs
- Adjustable Delay Timers

4-20 MILLIAMP ANALOG OUTPUT

COMPACT EASY MOUNTING
Only 3.25” x 6.25” x 2”
- Starter Door • Panel
- Raceway • Wall

UNIQUE RANGE FINDER SENSOR
- Works on Wide-range of Motors
- Simplifies Installation

call now for your free 30-day trial 888-600-3247
such as wired Ethernet, WiFi, TCP/IP, OPC, FTP and SMTP.”

**The Convergence of Controllers Isn’t New Either.**

“Convergence of devices,” says ARC Advisory Group’s (www.arcweb.com) Craig Resnick, “led ARC to introduce the programmable automation controller (PAC) concept in 2002, driven by the integration of multiple control disciplines, such as process, logic, motion, etc., onto a single common platform, as well as the need for PC functionality to run on a reliable, rugged, durable PLC-style form factor.”

Since Resnick coined the term in 2001, the number of PACs in the manufacturing industries has exploded. The design of most PLCs, for that matter, has come to resemble that of a PAC, with a real-time kernel and conventional PLC-type programming, as well as the use of function blocks and C++ programming capability. It has gotten to the point where, unless you really look at the hardware architecture, it is difficult to determine whether you are using a PLC in the traditional sense, a PAC or an embedded PC running control software. It is easier to tell by the form factor what a controller is supposed to be. If it is a DIN-rail-mounted device, with modular I/O and networking, it is a programmable controller, whether it is designed to be a PLC or a PAC. If it is part of the backplane of an industrial-grade HMI display, it is an “industrial computer.” The actual circuitry and hardware may be identical, but it’s just presented in a different form factor.

Resnick goes on to say, “Technology will lead PAC platforms to different footprints and architectures in the future, which will consist of smaller, less expensive and more standardized hardware that will homogenize the controller type.”

One of the other trends driving this convergence is the flattening of the Purdue manufacturing model from seven layers to three or four (Figure 3). There is the field device level, the controller/control system layer and the operations/enterprise layer.

As Tom Edwards noted, the innate ability of embedded controllers, PACs and even some high-end PLCs to speak those standard enterprise protocols, such as Modbus and Ethernet/IP, has made it much easier to get data from the plant floor to the enterprise, and vice versa. As Invensys’ Dr. Peter Martin
Russ Agrusa (www.iconics.com) have been saying for years, this means that it may be possible to control a manufacturing company based on business rules and not just on process rules.

"Future PACs," ARC's Resnick says, "will have control intelligence along with production management software embedded into the platform or device, with data and information processed and stored at the platform or device level. PACs will communicate this data and information to other PACs, platforms, devices, HMIs and 'private clouds' for backup, as well as to the enterprise via a combination of wired and wireless networking technologies."

Convergence of these devices is interesting, but what can you do with it? Opto22's Edwards says, "We've also seen convergence in terms of the types of applications in which PACs, PLCs and embedded control are used. From their beginnings, PACs were designed to perform a variety of functions, whereas the PLC's ancestry is closely rooted in discrete control."

So it isn't just ladder logic anymore. But the convergence has pulled the PLC along too. Edwards notes, "Among other features, the faster, smarter processors found in modern PLCs make them suitable for the added domains in which PACs and embedded computers operate. These include process control, motion control and data acquisition. So, although PACs' more organic origins for use in multiple domains make them an extremely efficient, well-designed, multi-disciplinary controller, the much broader range of inputs now accepted by modern PLCs help make them just as well-suited for process and other applications as they are for discrete control."

Edwards continues, "In addition to expanded communications capabilities and a wider cross section of potential applications, the latest generation of PLCs and PACs now boast several other features previously associated more with PC-based or embedded control. These include the use of Intel-based processors, onboard flash memory, removable memory in the form of microSD cards and an easier-to-understand file system."

Most PLCs, PACs and embedded controllers are equipped with native USB communications capability as well, making it possible to use USB memory sticks to program or take data from the device. (Of course, this has a dark side, as we saw in 2010 with the Stuxnet virus, which used a "candy drop" USB stick to get inside..."
the security perimeter of an Iranian nuclear facility.)

As a significant indicator of what this convergence means, ISA recently established a Building Automation Division. Similar devices are being used in both process and building controls as energy management becomes an integral part of process control. For several years now, ABB, Siemens and Schneider Electric have been discussing the convergence of power control and process control in manufacturing plants, which can only occur because the devices used in each application area are, or can be, the same.

Resnick says that this will have a significant effect on the way control solutions are specified and rated. “Solution performance competitive differentiation will be based on the functional software capabilities and IP, as well as the wired/wireless network’s speed, security, accessibility and adherence to open standards, rather than the hardware that is processing the software and networking technology.”

How soon will we be using the same controllers to run our plants and turn our lights on and off? The capability exists now and is becoming greater all the time.

But Rezabek points out, “fitness for purpose still wins the day. Maybe my iPhone-based PLC is great for flushing the toilets in the truckstop, or even Christmas light animations on my front lawn (It can play iTunes at the same time!), but the large process industries put extraordinary demands on process controls.”

Rezabek goes on, “Even in our preferred suppliers’ DCS systems, unforeseen ‘features’ crop up, especially in the portion that’s running under common PC operating systems. It can literally take years to run all the bugs into a corner and squash them. The stakes are high—my operations manager says he can justify a $10,000 ultrasonic flowmeter just to improve his odds of choosing the optimum pump to shut down for maintenance.

“It’s not just the computing power to invert matrices or solve complex logic and display it all in gorgeous graphics,” Rezabek concluded, “It’s knowing that it won’t do what we don’t want it to do, ever, over the course of months and years of 24/7/365 production.”

So while convergence of devices, networks and protocols is clearly the way the future shapes up, it will, as usual, take longer to penetrate the process industries.”

Walt Boyes is Control’s editor-in-chief.
Industrial Computers, Part 2

Data Processing Escapes the Enclosure

Whether it happens on a cloud-based service, virtualized server or plain old wireless, Internet or Ethernet, it’s clear that industrial computing for process control has moved beyond its old laptops and desktops. So how can you protect such far-flung data processing?

by Jim Montague

Computers have gone from being impersonal to very personal to basically everywhere. In a few short years, they evolved from being huge calculating devices in laboratories to individual data processing units on everyone’s desk or lap. And now, it seems like they’re going back into centralized server farms to manage the virtualized computing and cloud-based services we’ll all be using soon.

Of course, this technological ebb and flow is driven by the evolution of computing that’s grown relentlessly more powerful, faster, smaller and less expensive—and the plant
floor is no exception. Industrial computers have followed this same path, and process control engineers, technicians and operators have gone from using bulky desktop boxes in costly enclosures to sealed touchscreen HMIs and onward to tablet PCs and smart phones. And, because of their faster, smaller, cheaper microprocessors, computers can take almost any form, be embedded in almost any front-line device from sensors to motors, and perform data processing in almost any location or process control application.

For example, Marquis Management Services Inc. (www.marquisenergy.com) in Hennepin, Ill., operates several ethanol refineries in the midwestern United States, so it’s seeking long-term sustainability and striving to be the low-cost provider in its industry. “We have a lot of data to collect and analyze to better predict operating parameters and reduce variability,” explained Jason Marquis, president of Marquis. “Even small, 1% improvements in production can mean millions of dollars in savings, so we’re creating multivariable process control models with help from Rockwell Automation’s (www.rockwellautomation.com) engineers that can help us produce the highest-quality product at the lowest cost.”

Because many of its bio-refineries are located in small, remote towns, Marquis is even connecting key off-site engineers with these facilities by giving iPads to some of its local operators, which gives everyone access to the data they need—both for routine operations and to run its new multivariable models. “This is also empowering people who have been using mostly wrenches for much of their careers,” added Marquis. “Now, instead of the maintenance guy having to radio in from the field and then wait for actuations to come out from a central control room, he can take the iPad into the field and make direct adjustments as needed.”

**On the Web, in the Cloud**

No matter how much computing formats evolve or where they’re located, the ultimate goal of process control is still production optimization and efficiency. Speedy networking is allowing all kinds of data processing via the Internet so users can perform basic calculations on websites; or contract to have much or all of their computing done by cloud-based services; or even set up internal servers that can do the computing for many employees and applications.

For example, Bronco Wine Co. (www.broncowine.com) in Ceres, Calif., not only produces and ships more than 45 million liters per year of its own Charles Shaw brand, but other vintners also use its facilities to produce their own wines (Figure 1). These processes require lots of rigorous testing and process validation, and Bronco’s expanding operations need this data to be distributed to a growing user group. Unfortunately, Bronco’s former SCADA solution for environmental controls and HMI interfacing was experiencing sporadic and sometimes unresponsive communications, but the vendor was reportedly primarily interested in being paid to re-license Bronco’s existing users. In addition, Bronco’s enterprise plant management and SCADA solution needed to integrate with databases from other enterprise software applications, such as ProPak and IFS Maintenance Management Software. Also, the company needed to provide scalability for more than 150 clients in its four California plants, plus remote access for troubleshooting.

To better coordinate its production and enterprise systems, Bronco recently implemented Inductive Automation’s (www.inductiveautomation.com) FactoryPMI plant management and SCADA software. Using an SQL database as
its engine, Factory PMI is based on Java and OPC software platform and employs a web browser to launch its client interface, so any computer that can connect to the network and run a browser is a FactoryPMI client. This lets users with login identifications access the system at whatever level their login group specifies and allows administrators to add or delete users in real time from anywhere. FactoryPMI’s security model also enables administrators to fine-tune projects, set user policies and track activities at every client.

“I can be in Napa and see what’s going on in Ceres right now,” says Paul Franzia, Bronco’s engineering manager. “Sometimes I tell the supervisor that there’s a problem before he even knows. FactoryPMI has given us insight into our business.” As a result, Franzia can log on wherever he is, view whatever screen his supervisors are looking at, and provide instant feedback. Using the software’s graph trending, data logging tables and click-to-graph function, Franzia adds that he can easily track and pinpoint operational issues to solve problems immediately.

Similarly, Ken Cullum, maintenance manager at the Ceres winery adds that, “Our refrigeration guys used to record the same data in four different places. Now they enter it via the web at any FactoryPMI station.”

In addition, though its four main facilities are many miles apart, Bronco needs them to appear on-screen as if they were under the same roof. Fortunately, FactoryPMI’s project redirection feature allows that to happen. There are presently six servers running FactoryPMI, including four in Ceres, one in Escalon and one in Napa. Each server has certain projects running on it. However, when a user needs to view a different part of the operation, the software redirects the client to the required project, even if it’s on a different server. This “server clustering” method also allows FactoryPMI’s servers to be redundant and run the same projects. In the future, Bronco plans to configure the servers in a clustered environment to provide added redundancy.

Bronco’s staff also uses FactoryPMI to serve up data to help them manage their tanks and raw materials more efficiently. For example, if a tank’s temperature is too high, they’ll be no-

---

**PROTECTING THE NETWORK, ENCLOSING THE CLOUD**

You can’t put an industrial network or the cloud in a box. So how can you protect it from harm? Well, prioritized switching and addressing of communications by intelligent Ethernet switches and firewalls are certainly crucial in that they only allow specific data to be sent or received. As part of this effort, Symantec Security Response (www.symantec.com/security_response) encourages all users and administrators to adhere to the following basic security best practices:

- **Use a firewall** to block all incoming connections from the Internet to services that should not be publicly available. By default, users should deny all incoming connections and only allow services they explicitly want to offer to the outside world.

- **Enforce a password policy.** Complex passwords make it difficult to crack password files on compromised computers. This helps to prevent or limit damage when a computer is compromised.

- **Ensure that programs and users of the computer use the lowest level of privileges necessary to complete a task.** When prompted for a root or UAC (user account control) password, ensure that the program asking for administration-level access is a legitimate application.

- **Disable AutoPlay** to prevent the automatic launching of executable files on network and removable drives and disconnect the drives when not required. If write access is not required, enable read-only mode if the option is available.

- **Turn off file sharing** if not needed. If file sharing is required, use access control lists and password protection to limit access. Disable anonymous access to shared folders. Grant access only to user accounts with strong passwords to folders that must be shared.

- **Turn off and remove unnecessary services.** By default, many operating systems install auxiliary services that are not critical. These services are avenues of attack. If they are removed, threats have less avenues of attack.

- **If a threat exploits one or more network services, disable or block access to those services until a patch is applied.**

- **Always keep patch levels up to date, especially on computers that host public services and are accessible through the firewall, such as HTTP, FTP, mail and DNS services.**

- **Configure your email server to block or remove e-mail that contains file attachments that are commonly used to spread threats, such as .vbs, .bat, .exe, .pif and .scr files.**

- **Isolate compromised computers quickly to prevent threats from spreading further.** Perform forensic analysis and restore the computers using trusted media.

- **Train employees not to open attachments unless they are expecting them.** Do not execute software that is downloaded from the Internet unless it has been scanned for viruses. Simply visiting a compromised web site can cause infection if certain browser vulnerabilities are not patched.

- **If Bluetooth is not required for mobile devices, it should be turned off.** If you require its use, ensure that the device’s visibility is set to “Hidden,” so that it can’t be scanned by other Bluetooth devices. If device pairing must be used, ensure that all devices are set to “Unauthorized,” requiring authorization for each connection request. Do not accept applications that are unsigned or sent from unknown sources.
Allen Bradley
Telemecanique
Siemens
Mitsubishi
Texas Instruments
Modicon
Cutler-Hammer
Reliance
Omron
General Electric
Square D
Keyence
Bailey

In Stock!

Your resource for industrial automation and controls

www.santaclarasystems.com
888.450.0301

INDUSTRIAL COMPUTERS

Allen Bradley
Telemecanique
Siemens
Mitsubishi
Texas Instruments
Modicon
Cutler-Hammer
Reliance
Omron
General Electric
Square D
Keyence
Bailey

In Stock!

Your resource for industrial automation and controls

www.santaclarasystems.com
888.450.0301

tified, and can adjust their procedures. Bronco is also moving to adopt wireless tank gauging, which will be monitored by FactoryPMI.

Likewise, during the 24/7 grape harvesting season, known as “crush,” FactoryPMI works with the company’s ProPak software and its “grower relations” database. ProPak analyzes each load, FactoryPMI interrogates the ProPak database and compares this information with its own database. Because it’s crucial for the right truck to dump into the right pit, they’re only allowed to dump if their documentation matches correctly.

“It makes me a better manager,” says Franzia. “Efficiencies have improved upwards of 50%, productivity targets are hit everyday, and I can be more responsive to the business and to my managers.”

Guts of Virtualization

One of the most amazing aspects of the data processing revolution is that computing power has grown so fast that many applications haven’t kept pace. So many PCs use only a small fraction of their capacity, and the rest goes largely unused. This is where virtualized computing comes in.

Honeywell Process Solutions (HPS, https://hpsweb.honeywell.com) reports that virtualization can slash the number of PCs needed to perform the same amount of data processing by 75% or more and produce equally huge savings in maintenance and power consumption. This is achieved by breaking the formerly unbreakable bond between the operating system (OS) software and hardware running traditional one-box PCs, and instead enabling one computer to run multiple OSs for multiple users at the same time.

“Users want to reduce the number of PCs in their facilities and their total cost of ownership (TCO), but they can only do it if they don’t compromise existing safety, reliability or production,” says Paul Hodge, Honeywell’s product manager for Experion Infrastructure and HMI. “However, as PCs evolved, they became increasingly inflexible due to the tight coupling between their OSs and underlying hardware, so the challenge for virtualization is to break this coupling between these layers.”

Hodge added that virtualization consists of three main families of computing technology that can enable much greater levels of computing flexibility and agility. These include platform virtualization, which extracts the OS from the hardware; application virtualization, which separates the application from the OS; and client virtualization, which extracts the user interface from the OS. “Without platform virtualization, users must run multiple applications on separate OSs in separate boxes, so they end up with very low utilization of their data processing workload,” said Hodge. “However, computers have gotten much faster lately, so most applications only use 5% to 10% of their individual PC’s resources, and this leaves a lot of those resources and money on the table.”

Hodge added that, consequently, virtualization is achieved by placing a thin software layer, called a hypervisor, between the OS and underlying hardware, and this enables multiple OSs to run and be supported on one PC box. Also, this hypervisor includes a “virtual hardware layer” that emulates x86 computing, and gives it all the same operating parts and functions as a regular PC.

“Virtualization also improves site protection because users can ‘snapshot’ computers back to before problems occurred. It’s also much easier to restore virtual machine files,” said Hodge. “In fact, if an entire site somehow becomes unavailable, the whole site’s virtualized computing workload can be moved from one location to another. Without virtualization, you have a large number of servers that can be hard to manage, interoperability problems, and hardware that’s time consuming to procure. Platform virtualization reduces the number of servers, allows better server and client manageability, improves interoperability, but preserves needed isolation in the virtual machines, and increases server and user agility.”
Ron Kambach, platform and supervisory applications product manager at Invensys Operations Management (www.iom.invensys.com), explains, “The basic benefits of virtualization include server consolidation with smaller OS footprint and virtualized hardware, and reduced costs by using less space, facilities, hardware, maintenance and power. Virtualization also provides application compatibility by using OS isolation to help run legacy and incompatible systems and applications, and allows centralized management, faster installation and deployment, and greater use of software templates. For example, users can snapshot multiple versions of virtual machine, so if one goes down, they can just go back the version from 10 seconds earlier. In fact, users can have a library of different devices and easily set up a virtual network or put together a sandbox of tools to meet the needs of particular applications. To accomplish these functions safely, host servers should always have spare resources about 25% above what the virtual, guest machines require.”

However, Kambach adds that “Virtualization 2.0” enables more than consolidation. It also permits simpler installation and movement of software apps, lockdown of corporate PC images, better software distribution, backup images of virtual machines for quicker recovery, restacking workloads for much easier, on-the-fly work movement, isolation of hardware differences, and division of functions into smaller virtual servers. In addition, Kambach says that some market predictions for virtualization include the likelihood that the software “hypervisors” that enable them are going to become commodity items; management solutions will be available for sale from vendors; users will be able to set up either private or public cloud servers that include virtual machines; and their resources will be organized and managed as a “fabric” that includes optimization and lifecycle control.

**Friendly Faces on New PCs**

One of the perks of high-capacity data processing is that users can make initially alien-looking computing tools look just like familiar instruments and displays. For instance, National Fuel Gas in Williamsville, N.Y. (www.nafuel.com), recently partnered with engineering integrator EN Engineering in Woodridge, Ill. (www.enengineering.com), to upgrade a few of the 40 compressor stations that move natural gas over its 2877 miles of pipeline that bring gas to its 728,000 customers in western New York and northwestern Pennsylvania. The upgrade was also needed to help National take advantage of increased development and gas recovery in the local Marcellus Shale region.

The initial project upgraded 12 compressor units at two compressor stations, one in Roystone, Pa., and the other in Independence, N.Y. The Roystone station has eight Ajax compressor units, five headers, six operating configurations, and a storage field of 2.5 billion cubic feet (BCF). The Independence station has four Ingersoll-Rand compressor units, four headers, 10 operating configurations, a gas dehydration unit and 4.0 BCF storage field. The upgrade’s main challenges were to understand and replicate functionality of the existing controls; integrate new control systems with existing systems; interface new control panels to existing equipment and instrumentation; and prevent disruption of operations during installation. (Figure 2)

“We used a unitized design concept, and then employed Rockwell Automation’s ControlLogix PLCs with Flex I/O, as well as redundant PC-based HMIs with Factory Talk View SE at the station level, and PanelView operator interfaces with Factory Talk View ME at the unit level,” reported Jennifer Shaller, National’s lead electrical engineer. “We also used a plant-wide, fiber-optic control network with Stratix managed Ethernet switches, put all control functionality in a PLC, hardwired our shutdown circuits, and made sure we followed a Class 1, Division 2 design.”

Shaller added that the upgrade has given National’s two stations more consistent and reliable control, fully automated compressor operation, more efficient station operations, enhanced data collection, improved diagnostic and troubleshooting capabilities, improved reliability of the control systems, improved mechanical protection of integral compressor units, and opportunities for additional control functions.

“The new compressor controls have all the legacy look and feel that our operators needed, but they no longer have to deal with the stress of continually babysitting them,” explained Shaller.

Jim Montague is Control’s executive editor.
Hooking Up the Plant and the Enterprise

The benefits of connectivity among process plant automation and information systems and higher level computing platforms such as ERP systems and data historians have been touted for years. Advantages include widespread visibility of issues before they impact production, maximized throughput and supply chain optimization.

Implementing this level of connectivity can be very complex, but standards such as OPC, ISA-95 and Business to Manufacturing Markup Language (B2MML) can ease challenges. Using these and other standards can provide a vendor-independent format for data exchange, enabling seamless connections among systems from different suppliers.

In one recent project at a major oil refinery, Yokogawa’s Manufacturing Data Exchange (MDX) software replaced a proprietary interface to integrate a plant’s process control system with an aging, in-house ERP system that also incorporated a laboratory and composition management system. The scope of the project included a CS 3000 batch control system, an Exaquantum batch management system and MDX, along with associated engineering services, training and support—all supplied by Yokogawa.

“MDX is Yokogawa’s standard-based software integration application for enterprise connectivity, enabling integration for both continuous and batch processes,” says Wayne Matthews, technical director at Yokogawa Marex. “MDX supports web services and the ISA-95 enterprise-control system integration standard using B2MML.”

For this project, MDX provides an interface that maps production schedules between the customer’s ERP system and the batch control system. Batches are initiated with the sending of batch system schedules and material-based recipe parameters from MDX.

Upon receipt of the production schedule from the ERP system, the batch control system automatically creates batches, with a single production request typically sent from the ERP system for each order. The batch control system then interacts with other automation components as required to produce the batch.

After production, the batch control system sends a corresponding production performance message to the ERP system, reporting on actual production results. This batch production information allows the ERP system to be kept up to date with inventory information, which is used for scheduling future batches.

In addition to batch results, multiple production performance messages can be sent from the batch control system to the ERP system for each order. These messages can be triggered by a variety of conditions within the batch control system throughout the production cycle.

For this project, Yokogawa also assisted the customer in the development of a B2MML interface adapter to the custom ERP system. This custom ERP system is due to be replaced with a SAP R3 system including the NetWeaver ISA95 module, with which MDX has been certified. “Utilizing standards such as ISA95 and B2MML will make the future transition from the custom ERP system to SAP a relatively straightforward task,” notes Matthews.

“The project provided our customer with a number of specific benefits, including increased functionality and accuracy in stock accounting. MDX’s standards-based interface proved itself more robust than its custom-built predecessor, and the B2MML interface provided greater functionality, allowing for a richer message set and more detailed information than was previously available,” explains Matthews.

“Previously, the custom system was prone to errors that required significant man hours for reconciliation, but our customer reports virtually no errors with the MDX system. As a result, the information produced is now trusted and is used for decision making in a way that just wasn’t possible with the old system,” concludes Matthews.

Standards can provide a vendor-independent format for data exchange, enabling seamless connections among systems from different suppliers.
All Flow Products All the Time

Check out some of the latest in flow instrumentation technology.

**PADDLE-WHEEL FLOWMETER**
The DOR series insertion paddle-wheel flow sensor measures the flow of water or water-like liquids in large pipes. The insertion type design is much less expensive than full bore flowmeters, especially in larger pipes. The DOR series features 316L stainless-steel construction and is available with a blind pulse transmitter, battery or loop power, and is tolerant of liquids containing dirt and solids.

Kobold
412/788-2830; www.koboldusa.com

**PORTABLE FLOWMETER**
DXN portable ultrasonic flow and heat meter is built using hybrid technology that automatically switches between transit-time and Doppler modes. It has a 7-in, full-color touchscreen and an advanced software interface. It’s available in multiple configurations from a basic kit with two sets of transit-time transducers, cabling and a carrying case to one that includes transit time, Doppler, RTD and more.

Dynasonics
800.535.3569; www.dynasonics.com

**ATEX-APPROVED PORTABLE FLOWMETER**
Fluxus F608 and G608 portable gas and liquid flowmeters are covered by ATEX certification (EX II3G). They have a carbon-fiber housing, together with a rugged transducer design that ensures high-impact protection and resistance against oil, water and other liquids. They are usable in pipes from ½ in. to 21 ft inner diameter and temperatures ranging from -250 °C to 750 °C.

Flexim
631/ 492-2300; www.flexim.com

**ELECTROMAGNETIC FLOWMETER**
WaterMaster flowmeters are available in sizes from 1.5 in. to 84 in. For popular sizes up to 8 in., the new unit incorporates an innovative octagonal sensor design. They have a rugged, robust construction to ensure a maintenance-free life. The sensors are inherently submersible (IP68, NEMA 6P), ensuring suitability for installation in any environment liable to flooding.

ABB
800/829-6001; www.abb.com/instrumentation

**MAGNETIC FLOWMETER**
Admag AXR magnetic flowmeter is available in line sizes from from 1 in. to 8 in. AXR two-wire meter employs the advanced “dual frequency excitation” method, which cancels process generated noise without sacrificing response time. It can be installed in a loop-powered system, which eliminates the need for a second conduit run, extra wiring, a separate power supply and additional engineering.

Yokogawa Corp. of America
800/888-6400; www.yokogawa.com/us

**COST-EFFECTIVE MAG METERS**
M-5000 and M-2000 are two cost-effective, electromagnetic flowmeters. The M-5000 is a battery-operated, general-purpose mag meter in a standalone package. It is ideal for remote settings without access to power. M-2000 delivers precise flow measurement on potable meter lines, in fluids with suspended solids, and most applications requiring exacting measurement.

Badger Meter
800/876-3837; www.badgermeter.com
MASS FLOWMETER FOR GASES
The new GF40/80 is a high-performing, reliable and flexible mass flowmeter/controller for many gas flow applications. At the heart of the GF40/80 is MultiFlo gas and range programmability, making it perfect for customers who use mass flowmeters/controllers on a variety of gases, need to change gas type frequently, or need to re-range while preserving gas measurement and control accuracy.
Brooks Instrument
888/554-3569; www.BrooksInstrument.com

SHED THAT VORTEX SAFELY
CoolPoint vortex-shedding flowmeters have an intrinsic safety option. They are electronic instruments that have no moving parts to stick or coat, eliminating potential for clogging. The transmitter with intrinsic safety is two-wire and 4-20mA with approved barriers and no display, alarm or pulse output. It conforms to requirements for NEC Class I, Division 1, Group D environments.
Universal Flow Monitors
248/542-9635; www.flowmeters.com

MULTICHANNEL TRANSMITTER/CONTROLLER
The MultiCell Type 8619 multi-channel controller for water treatment, food and pharmaceutical applications can indicate flow, or measure the ORP value or percentage retention value. It can also be used to regulate pH value, the dosing of chemicals and ratio control. The standard version includes the user interface, the mainboard and AC adapter, two analog and digital outputs and two digital inputs.
Burkert Fluid Control Systems
800/325-1405; www.burkert-usa.com

VARIABLE-AREA FLOWMETERS
The P-Series variable area flowmeter line enhances Parker’s existing Rotameter product lines. The range includes gas flows up to 350 scf/m (9910 slpm) of air; liquid flows up to 450 US gpm (1700 lpm) of water; pressures up to 4000 psig (275 bar); temperatures up to 575 °F (300 °C); NEMA and IP enclosures; and certified calibrations conforming to ISA RP 16.6, NIST-traceable.
Parker Porter Instrument Division
www.Parker.com/porter

NEW FLOW TECHNOLOGY
Sonartrac flow technology is a new class of non-intrusive flow monitoring systems that make no contact with the liquid or slurry, and can be removed and reinstalled without process interruption. They have superior performance levels in the presence of highly variable fluid properties. Their high level of accuracy (within 1%) allows them to play a dual role in flow measurement and leak detection.
CiDRA
203/265-0035; www.cidra.com

THE LATEST IN ULTRASONIC FLOWMETERS
The new FDT-21 ultrasonic flowmeter is designed to measure the fluid velocity of liquid in a full/closed pipe, with accuracy of 1% and repeatability of 0.2%. It also features a positive, negative and net totalizer. The four-line LCD display makes reading the measurements easy. The FTD is perfect for monitoring liquid flow in manufacturing, chemical treatment, automotive and biological applications.
Omega Engineering
800/TC-Omega; www.omega.com
CORIOLIS FLOWMETERS FOR CUSTODY TRANSFER
The CNGmass Coriolis flowmeter series is approved by NTEP and five other standards organizations for custody transfer of compressed natural gas (CNG) and fueling vehicles with CNG. It measures mass flow up to 330 lb/min (150 kg/min) at fluid temperatures up to 257 °F (125 °C) and pressures to 5080 psi (350 bar). It is approved for use in hazardous areas by UL, ATEX, FM, cCSAus and NEPSI.
Endress+Hauser
888/ENDRESS; www.us.endress.com

IN-LINE PROCESS RHEOMETER
The Viscoline In-line Process Rheometer provides continuous, in-line, measurement of fluid viscosity. It can be used for a variety of Newtonian or non-Newtonian applications, including emulsions, cosmetics, shampoos, ketchup, yogurt, sauces, cheese, paint, resins, oil, plaster, and more. It has a repeatability of 0.2%, resolution to 0.1cP and meets government policy on metrological traceability.
Krohne
800/FLOWING; www.Krohne.com/northamerica

SMART METER VERIFICATION
Smart Meter Verification technology is now available in Rosemount magnetic flowmeters. It delivers complete, on-line verification of device performance, eliminating process interruption. It is embedded in the transmitter to verify calibration and the complete health of the sensor, electronics and analog loop. It can run continuously in the background or on demand.
Emerson Process Management
800/999-9307; www.emersonprocess.com/rosemount

FLOW CONDITIONER VIDEO
A new video features the flat panel Vortab VIP Flow Conditioner that maximizes air/gas flowmeter measurement performance accuracy with a design that significantly reduces flowmeter straight-run requirements. It is made of 316L stainless steel for pipes from 2 in. to 40 in. diameter (50 mm to 999.9 mm), and is available in both ANSI and DIN flange-mount or weld-in-place configurations.
Fluid Components International
800/854-1993; www.fluidcomponents.com

MAGNETIC FLOWMETERS
The Nor-Mag magnetic flowmeter measures electrically conductive liquids in industrial applications. It’s an AC/DC-powered meter for flow rates in water, heat and supply systems, and chemical and food processing applications. Integral electronics provide rate and total, as well as functions for liquid batching control, detection for empty piping, internal meter status diagnostics and more.
Hoffer Flow Controls Inc.
800/628-4584; www.hofferflow.com

CORIOLIS FLOW SENSOR
The VersaFlow Coriolis 1000 Mass Flow Sensor has a straight measuring tube that is available in Hastelloy, titanium or stainless steel. VersaFlow reliably measures mass flow, density, volume, temperature, mass or volume concentration and solids content. The TWC 9000 converter allows easy selection for the output options required and fits various housing configurations.
Honeywell
800/343-0228; www.honeywell.com/ps/hfs
MANAGE YOUR SUPPLY CHAIN

aspenONE supply chain software for chemical, specialty chemical, polymer and other process companies offers completely redesigned user interfaces for Aspen Supply Chain Planner and the Aspen Plant Scheduler family. The redesign features rich data visualization, multi-screen viewing, active user assistance, improved navigation, streamlined workflows and user-configurable layouts, and improved data editing, filtering and analysis capabilities.

Aspen Technology
781/ 221-6400;  www.aspentech.com

CHECK VALVE FOR ODOR CONTROL

CheckMate inline check valve is the ideal solution for odor mitigation. In outfalls, stormwater, CSO and SSO applications, its custom-engineered, all-rubber unibody design prevents a sewer system's offending odors from backing up, while still allowing water to discharge as needed. The valve’s unique elastomer fabric-reinforced design provides a proven record of maintenance-free performance, cost savings and results that no other inline check valve can match. CheckMate Valves are available in 4-in. to 72-in. sizes.

Tideflex
412/279-0044;  www.tideflex.com

SURGE PROTECTION

SPD Series DIN-rail-mountable surge protection family has local and remote self-monitoring. The power range, SPD II, is UL 1449 Edition 3-approved to protect AC single- and multi-phase distribution circuits with nominal voltages up to 480 V, and safely discharge impulse surges up to 40 kA (8/20μs) to ground. SPD III model for single-phase devices provides low-cost, common-mode protection with maximum discharge capacity of 20kA (8/20μs).

Weidmuller
800/849-9343;  www.weidmuller.com

CALIBRATION AND SWITCHING MODULE

Built on a modular platform, the new Swagelok Calibration and Switching Module (CSM) delivers the ability to select from up to 10 samples and two calibration streams. Users can select the configuration required for a specific system, and each CSM is delivered preassembled for easy integration into existing or new analyzer systems. CSM meets the following regulatory directives: PED 97/23/EC, ATEX 94/9/EC, RoHS 2002/95/EC, CSA/UL and CRN registered in Canada (individual components of assembly).

Swagelok
www.swagelok.com

WIRELESS ACCESS

The EKI-6331AN IEEE 802.11a/n IP55 industrial wireless Access Point/CPE provides three times higher data rates than legacy 802.11a devices and a reliable 5-GHz wireless connectivity with a wide, clean band of more non-overlapping channels than 2.4GHz. With 2x2 Multiple Input Multiple Output (MIMO) technology, it provides both larger data rates in transmission and greater reliability in received quality.

Advantech Industrial Automation
800/205-7940;  www.advantech.com/ea

ADVANCED SIGNAL CALIBRATOR

Jofra ASC 301 portable process signal calibrator provides the accuracy and functionality of a laboratory calibration instrument, but is compact enough to fit into a toolbox or operate with one hand for easy field calibration. Combined with a Jofra APM external pressure module or a Jofra dry-block calibrator, it is a multifunctional pressure and temperature calibrator. When used with JofraCal calibration software, it can document as well.

Ametek Test & Calibration
800/527-9999, x3555; www.ametekcalibration.com
REDESIGNED STEAM TRAPS
The 3-in. and 4-in. FT450 steam trap series has been improved with a new fabricated mechanism suitable for the oil and petrochemical, hydrocarbon processing, chemical processing, pulp and paper, and power generating industries. The traps are made of cast carbon steel and feature a balanced pressure thermostatic air vent available for maximum temperatures of 572 °F, and can operate from 0 psig to 450 psig steam pressures.
Spirax Sarco Inc.
800/575-0394; www.spiraxsarco.com/us

INDUSTRIAL-STRENGTH PRESSURE SENSING
Ashcroft A2, A2X and A4 pressure transmitters answer the call for an accurate, rugged and reliable heavy-duty sensor. Available in accuracies up to ±0.25% F.S., A2 is offered with a variety of electrical connections, analog output signals and pressure ports to meet the requirements of most any industrial application. A2X (explosion/flame proof) and A4 (intrinsically safe) configurations are specially designed for hazardous environments.
Ashcroft
800/328-8258; www.ashcroft.com

ILLUMINATED FIELDBUS
Balluff offers fieldbus I/O modules with an illuminated LCD display. This not only makes addressing in the network simpler, but also provides a variety of additional functions, including the lock bit, search and rescue, and device identification. Menu guidance on the bright, high-resolution display is easy to use and self-explanatory. It is now available for CC-Link, Ethernet/IP and Profinet. Versions for the other commonly used fieldbus systems will be available soon.
Balluff
859/727-2200; www.balluff.com

SAVE DIN RAIL SPACE
The UT series of screw-clamp terminal blocks now comes in a space-saving, three-level version. The UT 2.5-3L accepts solid, stranded or ferruled wires with 26-12 AWG. Push-in bridging on each level saves space while distributing power. The series features Phoenix Contact’s Reakdyne screw-clamp design to prevent screws from backing out. UT 2.5-3L terminals have current ratings of 300 V at 20 A or 600 V at 5 A under UL file #E60425.
Phoenix Contact
800/322-3225; www.phoenixcontact.com/usa_home

DANGEROUS AREA BAR CODE READER
PowerScan barcode reader system operates in Zone 1 and Division 1 hazardous areas. The wireless PowerScan M system for Zone 1 locations consists of a transmitter and base station, with power provided by a charger located in the safe area. The wired PowerScan D system for Div. 1/Zone 1 locations consists of a bar code reader connected via a junction box to the host PC, which can be located up to 150 meters away in the safe area.
Pepperl+Fuchs
330/486-0002; www.pepperl-fuchs.us

LINK REMOTE SITES
WNM wireless network module is an accurate, reliable solution for sending process signals between remote sites. WNM provides a low-cost, wireless link between field sites that are in rugged or impassable terrain, with a single unit transmitting for up to 30 miles, and the ability to act as a repeater for a virtually unlimited transmission range. It does not require a regulatory license and can typically be installed without RF site surveys.
Moore International
818/ 894-7111; www.miinet.com
ALL-PURPOSE I/O FPGA CARD
Mesa 5125 is a low-cost, general-purpose programmable industrial I/O card for the PCI bus. The 5125 is a low-profile PCI card that uses standard parallel port pinouts and connectors for compatibility with most parallel-port-interfaced motion control/CNC breakout cards/multi-axis step motor drives. The 5125 has a 25-pin DB25F back panel connector and a 26-pin header for the second I/O port. PCI bus interface is 3.3V- and 5V-compatible.
Mesa Electronics
510/223-9272; www.mesanet.com

ULTRA-WIDE DC/DC CONVERTERS
The dual-output AHW series of DC/DC converters features a continuous input range of 9VDC to 75VDC. It’s isolated input to output, and provides a regulated ±5VDC, ±12VDC and ±15VDC output at ±400mA, ±167mA and ±133mA. All models fully regulate down to a no-load condition. The input to output isolation voltage is 1544VDC. All models have a -55 °C to +100 °C operating temperature range.
Calex Manufacturing
800/542-3355; www.calex.com

EX-PROOF RECHARGEABLE LED LIGHT
The EXP-LED-RL-FX5R explosion-proof, rechargeable LED, handheld lantern produces 135 lumens of bright light, and offers five different operating modes, as well as UL and ATEX explosion-proof compliance for hazardous locations. It is Class 1 Division 1-certified and an ideal portable work or inspection light for operators in hazardous locations where flammable gases, vapors and chemicals are present. It is made of lightweight, impact-resistant ABS plastic with a shatterproof Lexan lens.
Magnalight
800/369-6671; www.Magnalight.com

ROOM STATUS MONITOR
Series RSM room status monitor is designed for low-differential-pressure applications that require stringent pressure monitoring and alarming. It can be configured to monitor positive or negative pressure in protected environments. RSM is a complete system that includes a backlit RGB LCD display with a graphic user interface which enables access to pressure, security, calibration, and alarm set-up.
Dwyer Instruments Inc.
800/872-9141; www.dwyer-inst.com

ENTERPRISE HISTORIAN
Proficy Historian 4.5 collects, aggregates and organizes the massive amount of data that exists across organizations, enabling effective decision-making and tight governance. It is easily integrated into any company’s enterprise systems portfolio through an open, flexible architecture that easily leverages existing investments. It adds support of more than 15 million tags, allowing users to aggregate and disseminate information across the enterprise through a secure and scalable historian platform.
GE Intelligent Platforms
800/433-2682; www.ge-ip.com/historian

SCALABLE VALVE MANIFOLD
The MPA-L valve manifold is scalable down to a single valve slice, making directional valves adaptable to any application. The sub-base is made from a lightweight, rugged polymer with good corrosion resistance. The valves are electrically connected to an internal printed circuit board for exact coil allocation with no wasted connections. Electric multi-pin connector options and network interfaces to most industrial and Ethernet protocols are available.
Festo
800/993-3786; www.festo.com/us
**Battery-Powered Valve Controller**

VC10 valve controller is a battery-powered, wireless field device for controlling pneumatic valves in hazardous locations. Included with the VC10 are two digital inputs, the first one configured as a counter for use in plunger arrival systems, and the second for use with any discreet signal. Magnetic switches and an LCD display allow for configuration settings in the field without compromising zone restrictions.

Schneider Electric
www.controlmicrosystems.com

---

**Radar Level Transmitter**

Sitrans LR250 radar level transmitter has a new, threaded polyvinylidene fluoride (PVDF) antenna for liquid and slurry measurement. The antenna is designed for extreme conditions characteristic of acids, alkalis and other corrosive chemicals. Sitrans LR250 measures ranges of up to 20 m (66 ft.) due to its compact 25 GHz two-wire transmitter. It's available with HART, Profibus PA, or Foundation fieldbus protocols. It's also NAMUR NE 43- and SIL 2-compliant.

Siemens
www.usa.siemens.com/level

---

**Fast Start for Wireless**

ION QuickStart application starter kit allows companies users to incrementally build wireless application infrastructures or extend wireless controls in a facility. The kits include the network infrastructure, video monitoring and the wireless sensor devices; IONizers, industrial field appliances for processing automated data from multi-protocol, multi-vendor sensor devices; and the IONosphere network appliance that manages enterprise-wide data services, workflow, security, monitoring and maintenance.

Apprion
650/934-5700; www.apprion.com

---

**Tough High-Performance Computer**

The rugged GD8200 notebook computer delivers powerful computing, razor-sharp images in full sun, and highly sensitive global positioning in a compact case. Equipped with the Intel Core i7 processor, GD8200 easily handles hefty imagery, video and data files. For mobile users who work in cars, trucks, even combat vehicles, GD8200 is the ideal balance between high-performance computing and rugged durability.

General Dynamics Itronix
800-441-1309; www.gd-itronix.com

---

**Dissolved Oxygen Sensor**

Triton DO9 dissolved oxygen analyzer is ideal for the continuous measurement of trace levels (ppb) of dissolved oxygen in aqueous systems. It is a three-electrode, amperometric sensor with a gold cathode, currentless silver-silver bromide reference electrode, and current carrying counter electrode. It measures dissolved oxygen from 0.001 mg/L to 20.00 mg/L (0.0 to 200.0% SAT, 0 hPa to 400 hPa) for maximum accuracy.

Electro-Chemical Devices
800/729-1333; www.ecdi.com

---

**Metric-Mounted Accelerometers**

The side-exit 712F-M4 and 997-M4 high-frequency accelerometers can monitor in low-clearance areas. The captive screw design with a safety wire hole adds additional protection in underwater applications to ensure the sensor can’t become dislodged. The 712F-M4 houses a general purpose 100 mV/g vibration sensor with ±10% sensitivity and operates from 3 Hz to 25 kHz. The 997-M4 comes with 10 mV/g output with ±5% sensitivity and a frequency range that extends down to 0.5 Hz.

Wilcoxon Research
800-WILCOXON; www.wilcoxon.com
Protecting Blast Furnace Pressure Transmitters from Plugging

This column is moderated by Béla Lipták (http://belaliptakpe.com/), automation and safety consultant, former chief instrument engineer of C&R, and former Yale University professor of process control, who is also the editor of the Instrument Engineer’s Handbook. If you have automation-related questions for this column, write to liptakbela@aol.com.

Q I need your help in installation of a pressure transmitter for dusty service. We’re working on blast furnace stack pressure measurement. It’s full of dusty particles. We suggest a scheme, attached herewith, wherein we are purging the impulse tube constantly with low-pressure nitrogen and also blasting nitrogen at regular intervals using solenoid valves (Figure 1). Please suggest any alternate option or your opinion on the same.

Pressure is near 3 bar, and temperature is around 1200 °C. I have attached a scheme for installation of the pressure transmitter, wherein we propose to purge the impulse line with low-pressure nitrogen constantly so as to avoid choking of the impulse lines. Also we have made provision for blasting at regular intervals using a solenoid valve that is operated by our PLC system.

PRATEEK RAJ
prateek.raj@siemens.com

A As shown in Figure 2 below, I would simplify the configuration. I would make the furnace nozzle larger and install it with a 45° slope. I would also use a seal diaphragm on the pressure transmitter and make it an indicating one, so that the operator can see the pressure without going to the control room. If the nitrogen blast pressure is higher than the normal purge pressure, I would place a check valve in the purge line, and instead of a rotameter, I would use just a needle valve. This will reduce maintenance.

BÉLA LIPTÁK
liptakbela@aol.com

A Chemical seals are temperature sensitive—I suspect the blast furnace stack is likely to be too hot. There are pneumatic pressure repeaters but these will become coated—I assume from your design that the dust is adherent, which is why the gas blast. A small spring return pneumatic cylinder driving a ramrod scraper through the process tapping may be worth considering as part of the intermittent blast (use the nitrogen to drive the cylinder and the exhaust to flush as it retracts).

Figure 1. The original plan for purging the impulse tube with low-pressure nitrogen in a blast furnace stack.

Figure 2. An alternative, simplified arrangement for clearing dust from the stack.
I once used a NaK alloy chem seal fill for a bitumen blowing column level transmitter, but a technician took the easy way out to undo the seal from the vessel. The NaK ignited his boots. I have never tried it again. Too many folk don’t care to read warning notices.

IAN H. GIBSON

I agree—using a process seal instead of an impulse tube is likely to work better, unless the pressure differential is so small that the added mass of the seal changes the sensitivity of the instrument. Also, using a process seal doesn’t completely evade the problem of particulate adhering to the seal itself, which will also degrade the measurement. Fly ash is ugly, nasty, abrasive, corrosive and adheres to steel really well, as I found out when I was putting in nuclear point level gauges for fly ash level detection back in the 1980s. In that case, the use of nitrogen purging is the only way I know of to keep the impulse tubing clean and unplugged. It may be a pain, but it works.

WALT BOYES

A For light, dusty service, purging the impulse line (0.25 in. O.D.) may work. For heavy, dusty service, purging even every hour may not work, and can damage the sensor in the pressure transmitter. You may need to change the small impulse line into a 3-in. pipe (or bigger) with a flange, and then use a pressure transmitter that uses a flanged pressure diaphragm for sensing. One supplier (Rosemount) has them. Sometimes even the 3-in. pipe can get plugged up, in which case, you will have to engineer a purging system (a 3-valve “T” system) for purging the dust. Make sure that the pressure diaphragm is isolated before purging. Do not use gas containing oxygen (or any combustibles) for purging dust particles to avoid explosion.

A possible grey area between mechanical discipline and instrument discipline could exist when a pressure sensing line (impulse lines), typically 0.25 in. O.D., is changed into a 3-in. sensing pipe. In many process plants in North America, the first valves that connect to any process are the responsibility of the mechanical engineers. In the case of a 0.25-in. pressure sensing line, a threadolet and a mechanical isolating valve is normally used for connecting the line to typically a 3-valve instrument manifold on which a pressure transmitter is mounted by instrument discipline.

In the case of a 3-in. pressure sensing pipe connecting to a process, a double-block-and-bleed valve is often engineered; this provides an isolation of the instrument system when maintenance of the pressure sensor (a 3-in. pressure diaphragm with flange) is required. You may like to change your ball valve into a double-block-and-bleed valve if a 3-in. pressure sensing pipe is implemented. When a single ball valve was used in existing practice, you may need to consider the need to protect your pressure sensor when the ball valve is turned on suddenly. For processes with toxic gases, the bleed valve (in the double-block-and-bleed) is often connected by a pipe vented to a safe area defined by area classification. Operation procedures are often written on how the double-block-and-bleed valve is to be operated during start-up and shutdown of the plant. Although the purging process by instrument discipline looks simple, a hot permit for purging will be inevitable when the plant is running.

The use of purging rotameters in very dusty applications is not recommended owing to high maintenance. I can see that it is likely to be used during manual purging of the impulse line. For automatic purging (by energizing your solenoid valve by PLC), you need to modify your existing purging scheme by adding more solenoid valves because of the need for automatic isolation of the pressure sensor before purging and of the manual purging system. This suggests that your PLC ladder logic will likely need to be modified.

GERALD LIU

A The proposal as outlined might work well. Preferably the impulse lines should be relatively large and arranged to let gravity be your friend and let the dust flow down and back out. I suspect that the pressures involved might affect the listed accuracy of the pressure transmitter. The loss of accuracy might be less of a problem than the problems of plugging. Moore Products (now Siemens) once made a sensitive pneumatic pressure repeater with a large diaphragm as the seal. Any gas purge should have the flow rate set by a needle valve with a relatively high pressure that to that valve. This keeps the flow rate constant.

CULLEN LANGFORD

A This scheme will work; however it has too many fittings, and dependencies like rotometer adjustments will make it a maintenance headache. A sealed diaphragm type transmitter mounted directly on spool piece after the first flange on the pipe with a N2 purge connection on the spool piece will help. This can be manually operated too if you wish to save some money.

H. S. GAMBHIR
Gas Chromatographs Rule

Greg McMillan and Stan Weiner bring their wits and more than 66 years of process control experience to bear on your questions, comments, and problems. Write to them at controltalk@putman.net.

**Stan:** We continue our venture in the world of analyzers with an interview of Michael Chaney, a consulting technologist providing analyzer support of olefin and polymer plants.

**Greg:** What comes first—the analyzer or the analyzer application? The tendency in some plants to use analyzers for just process monitoring may have led to a status quo and, in some cases, a decline in applications. If an analyzer is used for closed-loop control, the demand and benefits are greater. I agree with Shinskey in that, if you can create the control systems that take advantage of the analyzers, you will create the demand for analyzers. What drives the demands for analyzers in your plants?

**Michael:** Our regulatory and advanced process control applications are a major user of analyzers. The plants demand high performance for accuracy and on-stream time. The model predictive control (MPC) dynamic and the real-time optimization (RTO) steady-state models depend upon on-line or at-line analyzers. If an RTO system is turned off, it can be a flag that an analyzer needs maintenance.

**Stan:** How can analyzer maintenance be improved?

**Michael:** Gas chromatographs (GCs) are consistently reliable, but as with any device, parts need to be replaced. GCs have a 25-year life expectancy. For the first year after a new product release, experience is gained before the analyzer is used for control. For the next 10 to 12 years, we have support from the manufacturer followed by 12 to 24 years of just an offering of service and spare parts. At the end of the lifecycle (about 25 years) we resort to maintaining equipment with used spare parts.

**Greg:** The total time delay in an analyzer measurement is the sample transportation time delay, plus an equivalent dead time from analysis cycle time and multiplex time. The equivalent dead time is 1.5 times the cycle time and 0.5 times the multiplex time, since the results are communicated at the end and beginning of the interval, respectively. What are the control requirements in terms of allowable analyzer time delay?

**Michael:** We work to design the system so that the data is fast enough for an update of the model. The advanced process control (APC) group can give a specific time target. The regulatory control group tends to want the data even faster, and that is often a consideration. We keep the analyzer shelter within reasonable distance of the analyzer sample point, and choose a slip stream and sample flow rate and volume to provide an acceptable transportation delay. We recycle these streams as much as possible. We do...
not multiplex normally. When model update times are exceptionally slow, as might be the case with RTO systems that have relatively long execution time intervals, we may multiplex sample readings. For example, we have a single GC servicing up to five furnaces sequentially.

**Stan:** One of the problems we have seen is the reaction of control systems to extraneous changes in analyzer reading. How do you help ensure updates are representative of actual process changes?

**Michael:** I make sure the new analyzer meets the application requirements before I turn over the analyzer for use in control systems. It is attention to every detail in the entire system from the process tap to the DCS communications.

To avoid contaminants running along the pipe wall, a sample probe is extended into the pipe, paying attention to engineering fundamentals developed for thermowell wake frequencies. Sometimes I use an elbow with the sample tube facing downstream. The end of the sample tube is beveled (cut at a 30° angle) with the high edge on the side of flow impingement to minimize solids taken in the sample.

Small amounts of two-phase flow or solids are disastrous to analysis and can cause contamination and detector damage. We normally use a ¼-in. to 3/8-in. sample probe. The more process you take out, the more you have to clean, filter and return.

Membrane hydroscopic filters have helped some difficult sample systems. Good pressure and temperature control does a lot to eliminate the liquids from vapor components dropping below the dew point. A vaporizing heated regulator is often installed at the sample point. Steam tracing is not used because of the cost of ownership. A slight leak, a blocked condensate return, or overheating can cause thousands of dollars of damage. We use electrical tracing and smart temperature control with a resistance temperature detector (RTD), PID and soft start protection to prevent the lines from going from super cold to hot.

**Greg:** What are some of the latest developments in sample systems?

**Michael:** Miniaturization, standardization and smarter automation with the use of pressure transmitters instead of pressure gages and flow transmitters instead of rotameters. The cost is coming down, and the reliability is now being proven for chemical industry use.

**Stan:** Where do you use viscometers?

**Michael:** We use viscosity measurement as an inference of melt index in polymerization products. A sample is taken at the die plate of the extruder where a screen catches particles. A precision pump, a melt-pressure transducer, precision temperature control and orifice are used. The melt index changes by two orders of magnitude (0.5 for hard to 50 for soft). The speed of the pump manipulated within a 0 rpm to 75 rpm range for pressure control provides a measurement of melt viscosity. One unique issue is that the time delay of this analyzer depends on using the proper orifice. The volume is fixed from the extruder to the orifice. At 10% speed you are pumping 12 cc/min and at 90% speed you are pumping 108 cc/min. This variable process delay time gives us a 55-minute down to a 9-minute delay, depending on the process viscosity measured.

**Greg:** Where do you use density meters?

**Michael:** We use vibrating tube type density meters in our olefins plant where harmonics change with gas density. They are extremely reliable, and I haven’t touched them in many years. We have installed Coriolis meters for distillation advanced process control (APC) models.

**Stan:** What is your experience with mass spectrometers?

**Michael:** Our success level has not been good. A drop of liquid is disastrous. It is difficult to get them working reliably. The total cost of ownership is much higher than the cost of a GC. The skill level needed for proper application, installation and maintenance is much higher. The precision achieved may be lower than the stated catalog precision due to lack of chemistry stability where background gases cause interference.

**Greg:** How about other analyzers?

**Michael:** If we are looking at absorption at a particular frequency, IR is our first choice. New multiwave techniques can measure more than one component. The cost of ownership is low, since there are no or very few moving parts. We view NIR as a last resort. NIR is too complex and expensive, and the chemometric models are impossible to decode for some of our complex streams. We need extensive sets of lab samples to calibrate and validate and at least one PhD on the project team.

**Top 10 Reasons to Use NIR**

1. **IR is too far.**
2. **Black boxes are special.**
3. **Your son has a PhD in math.**
4. **The supplier says you don’t need a sample system.**
5. **The supplier says you can analyze anything.**
6. **The supplier says you can have results in seconds.**
7. **You think gathering samples for calibration is fun.**
8. **You will be retired by the time the analyzer is validated.**
9. **The supplier says billions of calculations are a piece of cake.**
10. **You haven’t touched them in many years.**
Shared Documents Aid Valve Repairs

It’s quite simple really. One missing valve certification document or buried email with a repair specification isn’t a big problem. The problem is there’s never just one. Incomplete, lost or misdirected records usually multiply by the dozens and hundreds and can make already complex projects more difficult and time-consuming. Paper documents are static and difficult to distribute widely, while email threads stretch out until critical points are lost in the electronic sauce.

To combat these organizational gremlins, maintenance engineers at BP’s Texas City refinery, local business partner Puffer-Sweiven, and the Instrument & Valve Services division of Emerson Process Management recently used new file-sharing and procedural tools to complete a huge valve turnaround project in just under nine weeks. Stacy Baltzegar, BP’s instrument and control reliability engineer, Tate Cunningham of Puffer-Sweiven and Ryan Baker of Instrument & Valve Services described their efforts at the recent 2011 Emerson Global Users Exchange in Nashville, Tenn.

The scope of repairs for the valve turnaround swelled because a scheduled turnaround on another of BP Texas City’s 20 process operating units was pulled back at the same time, and due to new requirements by the plant’s Safety Instrumented System (SIS) Lifecycle project.

“The SIS project encompassed every valve associated with our SIS on the turnaround units. They all had to be pulled and shopped to establish a health baseline for starting a condition-based valve maintenance program,” says Baltzegar. “This boosted our scope from 212 to 457 valves—all scheduled for Class A repairs. Without enough manpower to oversee timely decision-making, our turnaround schedule was threatened. Despite this scope growth, the repair window was only slightly extended to just under nine weeks, which put the plant at risk for lost production if this schedule wasn’t met.”

To address safety and quality assurance/control issues, meet agreed-upon lead times and deadlines and support the new requirements of the SIS Lifecycle project, BP and its partners decided to use two tools to organize the valve turnaround project. The first was getting all team members to use a custom collaboration portal based on Microsoft SharePoint software; the second was employing Emerson Process Management’s Six-Step Turnaround Process, which includes outage development, project kick-off, refining details, internal planning, outage execution and outage review. The customized SharePoint application gave BP, Puffer and Emerson’s stakeholders a common, online location to communicate with each other 24/7. This allowed easy project assignments and updates; prevented the loss of useful inventory items and requirements; helped maintain efficient workflow by disseminating revised tasks; and enabled thorough documentation.

“Everyone had immediate access to review the conversations about specific issues as they arose,” says Baker. “By the end of the turnaround, all team members were using SharePoint on a daily basis as the primary source of contact. This electronic file sharing supported real-time selective engagement of various areas of responsibility, including safety, quality assurance, project management and managing mechanical discovery issues. It also involved all stakeholders in real-time decisions to aid reliability and enabled the logistics of efficient scheduling of plant resources.”

Baltzegar adds, “SharePoint and Six-Step meant that scope changes on a ‘moving target’ were communicated effectively, avoiding lost revenue and unexpected downtime. Also, electronic file-sharing accelerated repair decision-making, and it can be leveraged for future maintenance planning. Consequently, we were able to complete the control valve repairs within the scheduled maintenance window. Using industry-derived data for shop-time to repair vs. number of valves, we actually achieved a three-day reduction in our repair window over that expected for a similar turnaround.”
The A1000 drive from Yaskawa is so reliable, you just might forget you installed it in the first place. This evolutionary drive is designed to last two times longer than typical drives. So, when other drives wear out, ours keep working. That means you will spend less time fixing things and more time making them.

Call Yaskawa today, if you want better performance out of your drive. Don’t forget.
There’s no way I can get all the I/O change orders done before start-up. But we can’t start-up until the change orders are done.

YOU CAN DO THAT

Get the flexibility you need—where and when you need it—with Electronic Marshalling. Tight project schedules and changing requirements are the norm, not the exception, so Emerson makes handling them easy by eliminating re-wiring altogether. Only with DeltaV Electronic Marshalling can you land field cabling wherever and whenever you want, regardless of signal type or control strategies. It’s the flexibility to add I/O today, tomorrow or ten years from now. See how DeltaV Electronic Marshalling makes it easy, scan the code below or visit: IOonDemandCalculator.com