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Your key to the latest industrial automation and process control information

Cover Story: Rockwell Automation Week Sets Attendance Records

The largest gathering of automation professionals in North America took place in Chicago in November. Taking up an entire week, Rockwell Automation's Automation Fair is actually several events, co-located this year at McCormick Place.

PSUG

The first event was the Process Solutions User Group, with just under 800 attendees, most of them customers. This event kicked off what we should probably be calling Rockwell Automation Week with two days of meetings, roadmap sessions, and customer presentations of how they used Rockwell's PlantPAx DCS in their operations.

RA's John Genovese talks DCS

John Genovese keynoted PSUG by making a comparison between what he called the traditional DCS and the modern DCS (Plant PAx). Unfortunately, the comparison is flawed since the competition has also moved to platforms similar to Plant PAx over the last two decades.

Rockwell introduced the new Director of Process Automation, Jim Winter, recently acquired from Emerson Process Management— an unusual occurrence since RA tends to hire from within for senior management positions. Rockwell also introduced Version 4.0 of Plant PAx, and Plant PAx MPC, which provides modular procedural control in the controller as a key feature. Rockwell says the new offering is based on the emerging ISA106 standard.

On the second day, and competing with PSUG, Rockwell offered a half day media extravaganza called Automation Perspectives. This annual event is the media ver-

Genovese's comparison of DCS types

Rockwell CEO Keith Nosbusch

Cover Story: Rockwell Automation Week (continued)

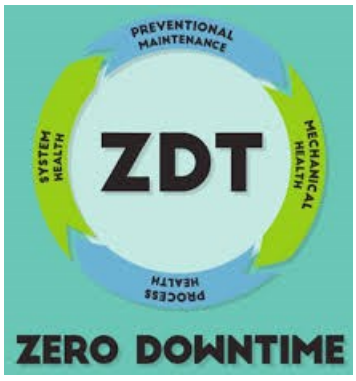
sion of the Investors' Conference, which also takes place during Rockwell Automation Week.

Kicked off by an address by Rockwell CEO Keith Nosbusch, Automation Perspectives attempted to gloss over the financial hole the entire automation industry is in, with discussions about cyber security, the Connected Enterprise, the Industrial Internet of Things, and Automation As A Service (AaaS). Every industry and every company is exploring the aaS model, because it is likely to be considerably more profitable, and provide more regular income than project based solution selling has.

Rockwell touted several partnerships they've made, with Endress+Hauser, Cisco, and FANUC. Matthias Altendorf, the first non-family member to head the Endress+Hauser group, gave a keynote speech in which he discussed the Internet of Things, and later appeared on a panel with other industry leaders.

E+H's Altendorf

FANUC America CEO Rick Schneider discussed the three



cornered partnership with Rockwell and Cisco, called ZDT for Zero Down Time. ZDT basically rents robots, fully programmed and covered with sensors, the data from which goes into Cisco's cloud, where Big Data Analytics uses data from all FANUC installations (stripped of identifying detail and customer IP) to make maintenance and operations decisions. Schneider was very high on the idea, and pointed to Caterpillar as their major first customer. The ZDT portion of FANUC's bright yellow booth at the Automation Fair portion of the event was very busy, even overcoming the hideous bright yellow jackets some marketer made all the booth staff wear.

FANUC CEO Rick Schneider (center)

Cisco circulated a study they commissioned, that purported to show that customers liked the idea of "aaS" but that the uptake rate was very slow. Customers, they believe, need time to integrate these new ideas into their operations. Joy Ward, qualitative marketing practice lead for Spitzer and Boyes LLC commented, "In my experience, what the end users are saying is that they don't understand or want it, and the proponents will have to 'educate' them into agreeing to use it." Time will tell if Ms. Ward is just being cynical or not.

The public part of the week, the two-day exhibition known as Automation Fair, drew a record number of attendees— over 18,000 pre-registered, and perhaps a few more than that as walk-ins. When you think back to the great days of automation exhibitions, this Rockwell and partners only event has become the premier automation exhibition in North America, greater even than the old National Manufacturing Week, or the ISA Show. This is a feat of which Rockwell should be justly proud.

During the last day of the Automation Fair exhibit, Rockwell senior officials such as Joe Kann, and others could be seen guiding gaggles of investors, fund managers, analysts, and investment bankers around the show floor. This was part of the concurrently co-located Rockwell Investors meeting.

Kulaszewicz

There were rumors before the event that Keith Nosbusch would step down. The plan, as the INSIDER understands it, calls for Nosbusch to remain Chairman, and have his successor take over as CEO. The heir apparent is clearly Frank Kulaszewicz, currently Senior Vice President of Architecture and Software. The announcement did not take place. According to sources within Rockwell, Nosbusch, who apparently has been ill, didn't want to go out on relatively bad financial news, so his departure has been postponed until next year.

This, of course, leaves a whole year for continued jockeying by the three favored heirs to Nosbusch's throne. Kulaszewicz is apparently Nosbusch's choice, but it is rumored that the board of directors is not entirely convinced. Blake Moret, who runs the other half of RA, is also a candidate, as are John McDermott (who it is said is too old) and Sujeet Chand, Rockwell's Chief Technical Officer. Some members of the board, it is rumored, favor Chand because of his non-Wisconsin-based experience.

Blake Moret

Sujeet Chand

Cover Story: Rockwell's Automation Week (continued)

One of the most interesting things that happened at Automation Week was Rockwell's seeming abandonment of Ethernet/IP for what they were continually referring to as "undifferentiated Ethernet." The point appeared to be that this would have to happen as support for the IT/OT Convergence that Rockwell sees happening in Manufacturing.

Microsoft and Rockwell announced a "co-innovation" called Project Stanton. The co-innovation brings together leading IP technology from Project Thali (@Thaliproject), an open-source solution incubated by Microsoft. It also includes JXcore from Nubisa Inc., and complements the expanding mobile foundation toolkit from Rockwell Automation. The toolkit enables Rockwell Automation offerings with a consistent web-based user interface for a specific device; tablet, smartphone or desktop and now includes a prototype app, dubbed Project Stanton (@Project_Stanton). Both the product toolkit adopters and a new app prototype were demonstrated at the Automation Fair .

Sujeet Chand

"Project Stanton represents the most forward and innovative thinking in the industry when it comes to mobility and a modern, mobile-first architecture," said Sujeet Chand, chief technology officer, Rockwell Automation. "Microsoft, Nubisa and Rockwell Automation have made significant investments to deliver unprecedented value to industrial users through innovation and leveraging computing power in mobile devices to overcome the existing boundaries and limitations in anytime, anywhere access to valuable information in an enterprise."

Microsoft's Shewchuk

"Microsoft has partnered with Rockwell Automation to look at some of the most difficult challenges in industrial IoT," said John Shewchuk, Technical Fellow, Microsoft. "Rockwell Automation is one of the leaders in the field and so it has been great to work on Project Stanton. Our joint work has been instrumental in setting the direction for the Thali Project work to provide secure peer-to-peer communications and improve industrial productivity."

The mobility developments support The Connected Enterprise vision: the convergence of operations and information technology that will deliver the next wave of manufacturing productivity. Enhanced by the emergence of the Industrial Internet of Things and advances in enabling technologies – including mobility, data analytics, and remote monitoring – The Connected Enterprise creates opportunities for unprecedented benefits in productivity and global competitiveness through greater connectivity and information sharing.

"The Connected Enterprise is an imperative to face future competitiveness challenges at many levels," said Chand. "Not only is this vision important to meet ongoing macroeconomic challenges, but it is critical for almost every type of manufacturer to drive new heights of competitive differentiation. Our co-innovation with Microsoft is one way that customers can build their Connected Enterprise.

In addition to PlantPAx 4.0 and MPC, Rockwell Automation introduced a batch application toolkit to help manufacturers and solution providers reduce the risk, time and cost of implementing batch control systems. The toolkit contains a collection of application examples, videos, documentation and ISA-88 compliant sample code to provide technical guidance when designing and automating a batch system using Rockwell Automation systems.

Jason Wright

"Designing and implementing a batch process system is time- and cost-intensive," said Jason Wright, PlantPAx system marketing manager, Rockwell Automation. "The batch application toolkit gives engineers a starting point to build, implement and maintain a consistent system, dramatically reducing the time and cost associated with designing a system from scratch. It also provides users with flexibility to customize system elements for increased functionality."

For conceptual guidance and learning, the batch application toolkit includes three common batch unit examples – mixer, premix and slurry – along with raw-material and storage-vessel models.

The new toolkit from Rockwell Automation expands the company's existing portfolio of batch solutions, including the PlantPAx process automation system and FactoryTalk Batch software, for systems that range from small, basic sequencing to large, complex batch and sequencing applications.

In the Department of Irony, Rockwell differentiated its process automation offering from FactoryTalk years ago, because people refused to believe its capabilities as a fully functional DCS. Now, with renewed emphasis on the Connected Enterprise, Rockwell may be regretting that decision. Now people are confused between Plant PAx and Factory Talk and how they can work together seamlessly, across an entire enterprise. They've forgotten that the two products are identical, except for name and some software that is included in one, but not the other.

In all, Rockwell's Automation Week was a bright spot in a very gloomy time for manufacturing and the automation industry.

Next year, the Automation Fair and its associated events will be in Atlanta, which is not really considered a hotbed of automation.

Even More Trouble in Brazil

The first World Indigenous Games was held in Palmas (Tocatins, Brazil) late in October and received favorable international news coverage in which President Dilma appeared. Nonetheless President Dilma did not speak but was greeted with boos and by a protest against the Brazilian government. The INSIDER opines that Dilma not speaking was likely a smart decision.

World Indigenous Games

In late October, the congressional committee investigating the Petrobras scandal (followed by the INSIDER since July) found no evidence of corruption relating to President Dilma, ex-President Lula, two ex-Presidents of Petrobras, and members of the congress. This is not news.

What is news is that the politicians conducting the legislative investigation finalized their activities with minimal fanfare and found no wrongdoing --- despite the numerous convictions, ongoing judicial investigations and trials, and now-public documents that cast negative aspersions on at least one politician. More specifically, the report found that there was insufficient proof against the president of the lower legislative body --- despite the existence of documents showing undeclared bank accounts in Switzerland with the movement of money allegedly funded by the Petrobras scandal. His previous testimony indicated that he did not have foreign bank accounts but he now admits that his wife has a foreign trust of which he is the beneficiary. In his opinion, the account is not his so his testimony was correct. The INSIDER opines that this is just semantics and that he (and his family) had an obligation to at least declare their existence. Tax officials tend to agree and will likely investigate him for not declaring the accounts and avoiding taxes.

The congressional report attacked the whistleblowers by being critical that there were too many of them (!!!), blamed the contractors who were considered corrupt, and exonerated the politicians.

The congressional report attacked the whistleblowers by being critical that there were too many of them (!!!), blamed the contractors who were considered corrupt, and exonerated the politicians. One of the more important conclusions was that the largest company in Brazil (Petrobras) was victimized by a cartel of corrupt suppliers. Really??? If Petrobras was victimized, Petrobras executives would not have been investigated, indicted, convicted, jailed and required to return money. Events clearly indicate that politicians, contractors and Petrobras executives were willing participants. The INSIDER opines that this arrangement was a "pay to play" arrangement where everyone won (until getting caught) and failure to pay would result in low or no sales.

The INSIDER opines that the outcome of this committee exonerating the politicians was inevitable --- people (politicians in this case) tend to "circle the wagons" to protect their own. Many people of limited means are dependent upon the programs supported by the parties currently in power so the book is still out as to how the electorate will respond in the next election(s).

There are calls among some legislators (and other groups) for the resignation of the president of the lower legislative body due to his alleged involvement in the Petrobras scandal. Similarly there are calls throughout the country for the impeachment of President Dilma on a number of charges --- including incompetence and spending more money than the law allowed on certain programs. The INSIDER opines that finding charges to begin impeachment proceedings against President Dilma may be possible but removing her from office will likely prove difficult.

Notwithstanding the completion of the legislative committee's work, the criminal investigation into corruption at Petrobras and other semi-governmental companies continues. A comprehensive list of politicians, business executives, Petrobras executives and others who are being investigated, awaiting trial, awaiting sentencing, and serving time in jail can be found here --- http://infograficos.oglobo.globo.com/Brazil/lava-jato-personagens.html. This page is worth a glance just to see the number of people involved and the scope of the investigation. For the record, the page shows that so far only two people were not convicted (both due to lack of evidence).

Most of the Petrobras scandal investigation has been focused on major Petrobras projects where contracts were typically awarded to large suppliers and large contractors that received much larger contracts than is common for instrumentation suppliers. However it is reported that the Department of Justice is also investigating smaller projects and smaller contracts that would be more likely to involve the purchase of instrumentation from the major instrumentation suppliers.

The Minister of Justice reported that significant corruption has been found at this (lower) level that has not yet been made public. The large instrumentation suppliers generally have strict anti-corruption policies, periodic training and audits to ensure compliance. Despite these controls, the INSIDER opines (based on anecdotal evidence) that one or more of the major

More Trouble in Brazil (continued)

instrumentation companies might eventually be involved in scandal. It is worth noting that (despite its zero tolerance policy) Siemens was suspected of bribery in 2014 and banned from bidding on federal contracts. Visit http://www.bloomberg.com/news/articles/2014-02-28/siemens-banned-from-bidding-in-brazil-on-suspected-bribery

Initial reporting insinuates that the Operation Zelotes scandal could be larger in scope and involve more money than the Petrobras scandal.

It would not surprise the INSIDER if punishment for corruption and bribery (over and above negative publicity) included significant fines plus jail time for participants plus the inability to sell to governmental entities for a number of years. In other words, this has the potential to become extremely serious for major instrumentation suppliers who bend the rules.

Changing scandals… In October 2015, a major player in the Petrolao scandal was finally extradited from Italy to Brazil to serve the remainder of his jail term. He was a union leader and the only person in the Mensalao scandal to not surrender to authorities. After being convicted, he fled to Italy using his deceased brother's documents. After being caught in early 2014, he was held in an Italian jail as he fought extradition. In Brazil, he was sentenced to approximately 12 years of prison time and will likely serve about one-sixth of his sentence in jail before he is released to house arrest. The time spent in the Italian jail will likely count toward the Brazilian jail term. Reports indicate that the government plans to exact reimbursement for the expenses associated with his extradition (approximately USD 250,000).

Changing scandals (again)… Just when you think that corruption could not get any worse, the Federal Police are in the midst of an investigation (Operation Zelotes) involving a governmental agency that is responsible for judgements relating to tax matters. The governmental agency was set up to provide balance and transparency and is staffed by a mix of career auditors and people who work for (and are paid by) companies.

The Zelotes investigation is reportedly focused on corruption schemes that may have forgiven billions in unpaid taxes and/or altered votes in favor of companies in return for payments. Initial reporting insinuates that this scandal could be larger in scope and involve more money than the Petrobras scandal.

Yet another scandal… The 2015 FIFA corruption case brought by the Federal Bureau of Investigation (USA) routinely makes the evening news as participants are being extradited to the USA to stand trial --- especially when the alleged perpetrator is Brazilian. Soccer is a passion in Brazil, so the INSIDER opines that events in this scandal will be followed closely.

The "crisis" continues in Brazil with almost all economic indicators pointing down. Thousands of workers have been laid off as some factories are shut down for the foreseeable future. Major projects have been canceled or delayed --- including an oil refinery that is well over half complete --- adversely affecting instrumentation sales. Petrobras expansion plans are on hold and its spending has been scaled down to the extent that it may be a challenge to maintain existing production facilities. Workers (especially those that have been or might be laid off) are protesting and often blame the government for some of the major cutbacks. Almost 1 million jobs have been lost in the past 12 months and GDP is contracting. The "crisis" affects just about everyone in Brazil and there appears to be no end in sight.

Previously reported layoffs of 30 to 50 percent by one major instrumentation manufacturer as compared with smaller cuts by other manufacturers prompted the question --- Why?

Historically, the major instrumentation manufacturers (worldwide) modified their sales strategies to sell via representatives, direct, and a combination of the two. In recent decades, the major manufacturers have generally migrated to direct sales in Brazilian regions with significant sales --- with varying degrees of pain and success.

The direct sales strategy can be good in good times (more coverage and control) and bad in bad times (lots of people with little work). Needless to say, Brazil is now in a bad time and companies that are farther down the path to direct sales tend to be more acutely affected. Sentiment by users that all large companies are likely to be involved in scandal (even if they are not) does not help.

Manufacturers' instrumentation and automation sales have plummeted. This appears to be one of the effects of the trend to sell direct in some Brazilian markets combined with low oil prices that significantly reduced Petrobras' capital spending. When added to the Petrobras scandal that stopped and then slowed Petrobras' payment, automation manufacturers' cash flows slowed substantially, leading to layoffs. Then you add in Petrobras' vastly reduced spending combined with Petrobras being a large percentage of manufacturer sales Combine that with the Brazilian "crisis, " combined with a strong dollar. Finally, there is widespread suspicion of scandal about all foreign and domestic automation vendors (even if unfounded).

The positive side of the equation is that the weak Brazilian Real means that the cost of paying employees in Brazil (calculated in foreign currency) is about half of what it was about a year ago which puts somewhat less pressure on companies to reduce headcount. The book is still out as to the strategy that each company

Even More Trouble in Brazil (continued)

will take as they decide how to address the "crisis".

The Doce River flooded with toxic waste after the dam collapse flows into the Atlantic Ocean.

In other news, two dams holding waste water from the Samarco iron ore mine burst near Mariana (Minas Gerais) on 8 November that buried a small town and caused a wall of mud (15 meters high in some locations) to flow downstream. Almost 30 people were either killed or missing as rescue workers search for bodies. Rivers downstream that are the source of water for hundreds of thousands of people were contaminated and had fish kills as the waste-laden water traveled downriver. Other dams are reportedly not as safe as they should be.

The Samarco mine is jointly owned by Vale (Brazil) and BHP Billiton (Australia).

Reports indicate that there may have been operational problems and lack of oversight as its license was recently renewed despite concerns of destabilization and erosion. Samarco's license to operate has now been revoked.

The INSIDER opines that further investigation might uncover a localized version of the Petrobras scandal.

The Brazilian Real has retreated to under 4.00 Reals per US dollar. Aside from making instruments more expensive to import (as previously reported), the high US dollar makes Brazilian employees less expensive (when accounting in USD, Euros, Swiss Francs…), provides more export opportunities for Brazilian instrument manufacturers, and tends to reduce international travel by Brazilian tourists. Conversely, the stronger US dollar should entice more international travelers to visit Brazil -- - a large and diverse country with much to see and experience.

There are a number of Brazilian instrumentation manufacturers, software providers, and System Integration firms expect to see international expansion as a result of the very favorable exchange rate.

> Aside from making instruments more expensive to ... the high US dollar makes Brazilian employees less expensive , provides more export opportunities for Brazilian instrument manufacturers...

The INSIDER would like to report better news… but this "crisis" will likely be around for a while. Overall opinion indicates that 2016 is expected to be a difficult year.

Most observers see four possibilities going forward. First, Dilma is impeached. Second, the Court forces new elections. Third, Dilma stays and finishes out her term. Fourth, the scandals continue and worsen and the economic crisis becomes considerably worse. At that point, it becomes a question of whether the Army will intervene or not.

Currently, Dilma has the worst rating of any Brazilian president since Fernando Collor who was impeached in 1002.

So far, the civic institutions and the economy are weathering the storm, but should Dilma stay and not be impeached (see sidebar), and the economy continue to worsen, it remains to be seen whether Brazil's institutions can weather the storm.

To Impeach or Not?

Ironically, impeachment proceedings are started by the president of the lower legislative body who was reported to be actively considering initiating the impeachment of President Dilma.

Brazilian President Dilma Rouseff

It was also reported that the president of the lower legislative body was negotiating with the government to not investigate his alleged ethics issues (including having unreported foreign bank accounts in which he allegedly received millions in the Petrobras scandal) in return for not impeaching President Dilma.

It was reported that he wanted to have documents and information associated with the ethics investigation sealed so they would not become public.

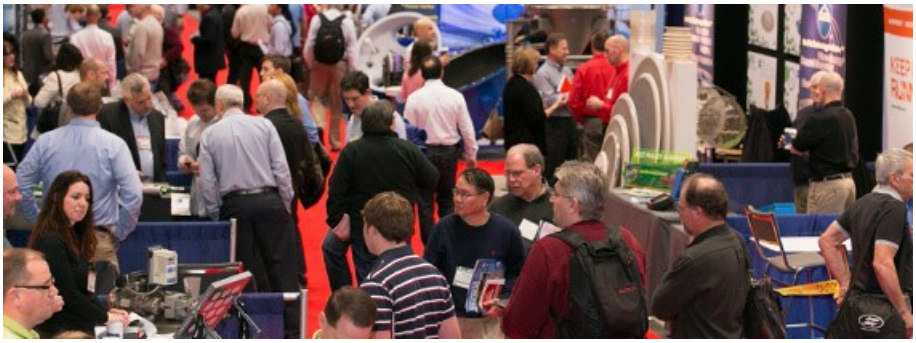
Nonetheless the existence of negotiations between the president of the lower legislative body and the government were summarily denied by both parties.

Further, the president of the lower legislative body is using his position to throw up procedural roadblocks that impede the progress of the ethics committee investigating his activities.

Nonetheless, the president of the lower legislative body quite coolly (arrogantly?) denies any wrongdoing and both he and President Dilma have stated that they will not resign.

Just a Ghost of Chem Shows Past

The 2015 Chem Show held at the Javits Center in New York City on 17-19 November was but a fraction of its former self and could be reasonably visited in one day. Nonetheless the instrumentation seminar was informative and the lack of huge crowds allowed time to chat with the instrument manufacturers that were presenting.



2015 Chem Show could be reasonably covered in one day.

In addition to chemical equipment and technology demonstrations, three of the 21 free seminars related to process control and instrumentation --- one on each day of the show.

The content and presentation of "The Future of Wireless Technology and Simulation Software to Increase Pump Reliability and Efficiency" seminar presented by Jeremy Frank (President at KCF Technologies) and Ray Hardee (Chief Engineer at Engineered Software) was pleasantly surprising.

Given companies presenting, one would expect the focus to be on the wireless equipment and software.

However the presenter was so engrossed in pump cavitation when I walked in (about 10 minutes late) that I thought that I was in the wrong room.

The wired and wireless instrumentation was apparently already discussed as part of the problem-solving process so the remainder of the 90 minutes could be spent focusing on problems and the process used to solve them --- not on their hardware/software. The INSIDER opines that this approach is much more relevant and valuable to the attendees.

One problem involved a pump that exhibited excessive vibration and was suspected to be operating in cavitation.

Relevant existing measurements were inventoried and temporary instruments were installed as necessary --- including a wireless vibration transmitter on a suspect pump.

The pump was then monitored under different operating conditions whereby measurements revealed that the pump was not in cavitation. The source of the vibration was discovered to be a hydraulic instability originating in the return piping located about 30 meters above the pump. This knowledge was then used to develop potential solutions from which the best fix could be selected. As mentioned, it was a pleasure to attend a seminar that was focused, helpful and (especially) non-commercial.

Walking the exhibit, instrumentation suppliers were generally not enthusiastic about the prospects for business in 2016 but no one was talking about "gloom and doom" either. The overall tone felt "subdued" and the underlying theme expressed by a number of people was that sales are far from good. One business owner opined that the economy is in trouble and that the low unemployment statistic rings hollow because most of the jobs created were of poor quality (low-paying). He was upset that this is not being talked about or addressed. In addition, removing people from the unemployment statistic calculation (after an arbitrary time period) tends to make the published unemployment rate deceptively low --- even as workforce participation hovers near all-time lows.

...the economy has hit a (stealth) soft patch that will last well into 2016 and perhaps beyond.

Analysis of anecdotal evidence (as above and elsewhere) and recent financial statements from the major instrumentation suppliers leads the INSIDER to opine that the economy has hit a (stealth) soft patch that will last well into 2016 and perhaps beyond.

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Bedrock, PAS and Statseeker: IT/OT Convergence Rolls On

Everywhere you look in manufacturing, whether it is in the process industries or in discrete factory applications, the OT network that connects factory and process automation devices is looking more and more like the IT network that connects the enterprise above the plant floor.

We have taken to calling this the IT/OT Convergence, and it is real. Plant engineers, operators, and maintenance people have had to start learning the things that IT admins have known for a decade or more. Looking at the plant network with this in mind, here are three vendors who have something unique to offer in the cause of IT/OT integration.

SIO4.E module

Bedrock Automation has released a new 5 channel Ethernet I/O module. The new **SIO4.E** Ethernet I/O module plugs into the revolutionary Bedrock™ pinless electromagnetic backplane to receive Bedrock's patented Black Fabric™ cyber security protection. Each of the module's five I/O channels is independently software configurable. The initial library of Ethernet protocols includes Ethernet IP, Modbus TCP, and OPC UA on TCP IP. All channels also deliver Power over Ethernet (PoE) while Bedrock's unrivaled computing horsepower and advanced electronics enable easier integration into real-time communications and control strategies.

Tightly coupling Ethernet into the process control and I/O network enables deployment of a wide range of edge device and enterprise data into real-time control logic, much in the same way an engineer incorporates more typical process sensor and actuator data. This results in real-time communication channels for the exchange of data between OT production and IT enterprise systems.

Bedrock's Rooyakkers

"Unlike an Ethernet switch traditionally sitting at Purdue levels 3 to 5 with the operations and business networks, the SIO4.E module delivers Ethernet as **secure I/O** at levels 0 and 1 with the sensor, actuator and process control logic. This collapses the legacy hierarchical ICS model into a simplified and inherently more secure automation architecture. Equally empowering is the deployment of OPC UA on any of the SIO4.E Ethernet I/O channels, opening up a world of opportunity and innovation while reducing all aspects of software lifecycle cost. This is the way of the future," says Bedrock CTO and Engineering VP, Albert Rooyakkers.

Ethernet is becoming widely adopted for open ICS applications because it builds on proven, high speed stacks that have been enhanced for use on industrial devices such as robots, PLCs, sensors, CNCs and other industrial machines. Bedrock secures Ethernet I/O in many ways, including by connecting the FIPS compliant anti tamper SIO4.E I/O module on a pinless electromagnetic backplane, embedding authentication logic, true random number generation (TRNG) and cryptographic keys into the semiconductor hardware and by isolating information flow within each channel by way of separation kernel functionality in a secure real-time operating system (RTOS).

"Robust ICS cyber security is just part of the tremendous value that the new Bedrock module brings to process automation," says Bedrock Automation President Bob Honor. "The fact that each channel can be software configured adds new levels of flexibility and scalability. No other I/O module allows process engineers to program so much communications capability into one system component. We are especially excited about the positive impact for ICS users. That user experience is increasingly configurable."

What this leads up to is the network visibility issue. OT networks are comprised of sensors, which usually cannot be seen using IT network technologies like network information management software, and increasingly, IT network technologies which can.

The most important IT tool for OT network administrators is the network information manager. These software applications, such as Statseeker, provide real time visibility deeply into the network, down to the device and port level. OT sysadmins can use Statseeker to help architect the network, determine where bottlenecks, non-performing devices, heavy traffic and even problems with some sensors and edge devices. Statseeker's ability to store time-series data in real time granularity allows it to be used for the network in the same way that a data historian is used for the process data. Trends, potential maintenance issues, and other problems can be seen and dealt with before a network failure occurs. Unusual traffic patterns can be used to detect potential intrusion into the network.

Statseeker Version 4.0 combines the full features of previous versions with a range of additional features such as Advanced Report Generation with Customized OID Support – see more of your network by discovering and monitoring specific data from all of your supported devices; Multiple Dashboards – save time by configuring multiple dashboard displays and automatically rotate different dashboards for a greater range of metrics from a single screen; Increased VM Interface – reduce CAPEX/OPEX costs and add flexibility as Statseeker now supports up to 150,000 interfaces from a single virtual machine environment; 95th Percentile Usage Reporting – add greater visibility for ISPs and customers who use services with 95% billing – plot your 95% usage lines against your defined interface usage reports, or calculate the 95% value for suitable times of the day such as business operating hours; and a RESTful API Inter-

IT/OT Convergence Rolls On (continued)

face – add more comprehensive network information. Statseeker's outbound web based API query engine allows specific data extraction requirements to query Statseeker and easily retrieve information in a real-time basis.

Statseeker CEO Frank Williams

"Interdependencies between applications, servers, and your network facilitate your businesses operational efficiency, or will contribute to its failure," remarked Frank Williams, Statseeker CEO and long time automation professional. He continues by saying "this is quite a challenge and one that is becoming tougher to manage. Using the right network monitoring solution makes the above challenges much easier to manage."

Other tools OT admins can borrow from IT include intrusion detection and prevention systems that can react to threats coming from outside the network, or from another part of the network. The OT admin should be able to conduct deep packet inspection on any network trunk to see if malware is finding its way into the network. Intrusion detection (IDS) systems are passive monitoring systems that detect suspicious activity. Intrusion prevention (IPS) systems are active systems performing in-line monitoring and can prevent attacks from both known and unknown sources.

Like any IT network, OT networks need anti-malware systems. Anti-virus and anti-malware systems need to be updated and upgraded regularly, and you should be able to both monitor for intrusion by malware and also perform surveillance on users and others who may be introducing malware into the network. Anti-malware best practices include the use of whitelisting and blacklisting IP addresses and web URLs, as well as filtering and proxies.

The Industrial Internet of Things will force the OT network to cope with mobility, both of devices and of various HMIs like tablets and smartphones. Plant operators and managers will want to be able to connect from anywhere, so another IT tool that the OT network sysadmin can borrow is mobile device management (MDM) software, which will enable the OT admin to push patches where possible, remotely monitor usage, remotely control security configurations, manage policies and procedures for mobile device use. OT admins will also need network access control (NAC) systems that allow you to enforce your security policies by granting access to the network to only compliant devices, as well as controlling access by authorized persons by responsibility, role, and geographic location. This software can manage roles and responsibilities to only serve appropriate data to the device. Additional tools can be found in authentication and authorization rule sets, such as Active Directory, or by use of newer authentication software that manages digital certificates and public key authentication schemes. The most recent version of the SNMP protocol, SNMPv3, even provides authentication, authorization and encryption capabilities not found in the first two versions.

Finally, OT networks still need firewalls, both in-line and edge. Next generation firewalls provide stateful inspection, deep packet inspection, and application visibility functions. OT network admins still need to keep firewalls configured properly, and updated regularly. Firewalls can be used to segment off various portions of the network to direct traffic and establish authentication and authorization policies.

But what about the rest of the network?

PAS' David Zahn

PAS, which is well known for its Integrity software, has perhaps solved the problem with its new release of *Cyber* Integrity 5.0, a part of the PAS Integrity Software Suite, according to David Zahn, general manager of the cyber security business unit at PAS.

PAS Cyber Integrity is based upon the proven PAS Integrity platform, and it automates internal and regulatory compliance reporting while reducing associated efforts by up to 90 percent.

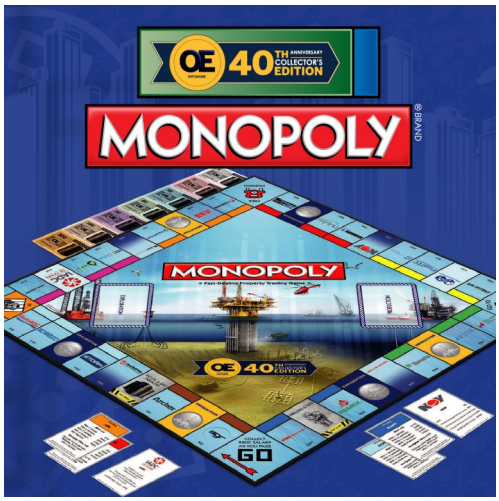
Cyber Integrity works across the heterogeneous control environment found in plants providing enterprise scalability and performance. Cyber Integrity enables industrial companies to gather and maintain an accurate inventory of IT and OT cyber assets, automate patch processes throughout the enterprise, monitor for unauthorized change to cyber asset configurations, and implement a program for system backup and recovery.

As the Purdue model melts down into one or two layers, it is becoming more and more important to have visibility into the plant's OT network. With tools like Statseeker, PAS Integrity Suite, and hardware like Bedrock's native cyber security, the IT /OT Convergence will be manageable, instead of the royal clusterfluff many people have been expecting it to be.

Nick Denbow's Roundup for November 2015

OE Christmas Gift?

For any enthusiastic oil and gas worker, and his family, or maybe to while away boring evenings off watch next year, why not buy him a game of OE Monopoly for Christmas this year? The ideal gift when you can't afford a real oil well.



OE Monopoly just in time for Christmas

AtcoMedia, the publishers of Offshore Engineer, amongst other magazines, have partnered with the makers of the Monopoly Board Game, to produce a custom version, called OE Monopoly, where all the property and "Chance" cards and game pieces follow an oil and gas offshore theme. It seems like ABB, Cameron, Aveva and FMC are all on the table as potential hot properties…..

OE say the objective is to create interest, understanding, and a passion for the oil and gas industry in our business community, families, and future generations in a familiar, fun, educational, and family-oriented manner.
Maybe it also shows how the oil and gas business is also really just a big game of chance, where assets and companies are easily bought and sold, and can go down the tubes very fast…..Wishing you all a healthy and prosperous 2016!

Assurance 360 in NZ

Refining NZ, north of Auckland

There is one oil refinery in New Zealand, run by Refining NZ, and positioned on the coast, north of Auckland. After a 25 year relationship with Honeywell, HPS has been selected to supply five years of full lifecycle maintenance for the refinery control systems, as well as to provide migration to the most recent process control technology of the Experion Process Knowledge System (PKS).

Assurance 360 multi-year partnerships maintain, support and optimize Honeywell control systems, focusing on system performance and outcomes, so operators - like Refining NZ - can focus on operations. Such contracts are in operation at major facilities in South Africa, the North Sea, Saudi Arabia and the Middle East, and in the USA. Last September, HPS Assurance 360 was chosen by Lundin Norway for use on their Edvard Grieg field in the North Sea.

Refining NZ is also a long-term user of processes from Honeywell UOP, such as UOP Bensat for high octane gasoline, and a fixed–bed reforming unit. In 2005 the UOP CCR Platforming process was added, to convert naphtha into high octane blending components, and the UOP Chlorsorb process to help meet waste gas specifications.

Profinet interface….from REO

Reo is a name you are maybe beginning to recognise, for resistive and inductive wound components for use with static frequency converter drives in lift and HVAC applications, to improve power quality. The company say they are becoming increasingly involved in renewable energy technology, where power quality is of over-riding importance. But the latest PR is different: it launches a Profinet module that accepts analogue inputs from sensors, to insert them into the network. Reo see these as useful primarily for actuator position monitoring in food industry applications, but comment that they can also act as a node, accepting inputs from other sensors! It's a bit out of the power quality market.....but maybe a company worth watching for electronics interfaces etc!

Alfa Laval Leader retires

Lars Renström, President and CEO of Alfa Laval Group, is stepping down next April, on reaching 65, after 12 years leading the Group. Tom Erixon will be the next CEO and President, moving from his current position of President and CEO of the Ovako Group, a leading producer of engineering steel for customers in the transport and manufacturing industries. The two had previously worked together at Seco Tools.

Anders Narvinger, Chairman of the Alfa Laval Board, commented "I also want to thank Lars Renström for his outstanding achieve-

Nick Denbow's Roundup (continued)

ments during close to 12 years as President and CEO for the Alfa Laval Group. Under his leadership the company has grown tremendously whilst the core values of the company have been maintained. Revenues have grown about 3 times and the market capitalizations about 6 times."

Significantly, the comments from Lars Renström on possibly one of his last news releases, issued this month, refer to a new SEK100m order won by Framo Pumps for emergency power generators to be supplied to Statoil, for a platform on the Johan Sverdrup field in the North Sea. Frank Mohn Pumps was a major acquisition for Alfa Laval in 2014, and in my view that was one of the most significant and far-sighted publicly visible moves for the Group under his leadership. It brought a whole new dimension into the Group product portfolio.

Over the last five years he has also steered plenty of other interesting acquisitions and developments for the Group, which have maybe not been so visible: for your INSIDER reporter, the significant investment and business choice shown in the Alfa Laval launch of their "PureBallast" technology in 2010 was the trigger that made the Group worthy of a close watch. This has been followed by other investments in similar effluent control and monitoring systems, establishing them as leaders in the field.

…and in refineries

Alfa Laval heat exchangers achieve regular significant sales in process plants and refineries, and further news this month is of a major order for air heat exchangers to be used in a major Spanish refinery. These new exchangers will replace old non-Alfa Laval exchangers, retrofitting new equipment suitable for reliable operation at higher temperatures and pressures. Total order value will be SEK65m (US$7.5m).

New partnerships

GE subsea services Acquisition

GE Oil & Gas is to acquire Advantec, a leading provider of subsea intervention equipment and services, based in Stord on the west coast of Norway.

GE Oil & Gas is currently one of Advantec's largest customers, utilizing its core capabilities in electro-hydraulic subsea controls equipment, system integration as well as engineering and fabrication to support GE's services, offshore portfolio and installed base of subsea equipment. For example, Advantec is a leading supplier of Installation WorkOver Control Systems (IWOCS), including a fleet of IWOCS rental units. IWOCS are a key enabler for a wide range of subsea intervention equipment. GE sees the Advantec services as important in addressing the challenges faced by oil and gas customers operating the growing number of mature subsea fields. The acquisition also suits the broader GE strategy to expand its position as a leading provider of subsea production equipment and services solutions for full life-of-field management.

Advantec will operate under the existing name and management team as part of the GE Oil & Gas Subsea Services & Offshore division, and will continue to supply products and services directly to existing and new clients. Established in 2005, the company had grown from 20 to 370 employees with facilities in Norway, the UK, Lithuania, and the US: since 2010 the major investor had been Norvestor, a Norwegian private equity fund.

Rod Christie, President and CEO of GE Oil & Gas, Subsea Systems & Drilling, commented "With the acquisition of Advantec, we are expanding our comprehensive portfolio of services, so we can provide added value to our customers at a time when the industry requires more effective solutions. The acquisition will enable us to accelerate growth in our subsea services operations by helping us build a leading well intervention equipment supply and rental business alongside accelerating our integrated solutions offering."

Honeywell Process and UOP

A new, greenfield, 140,000bpd refinery is under construction in Iraq, at Karbala, 120km south of Baghdad. It will use refining processes from Honeywell UOP, and automation controls from Honeywell Process Solutions, to maximise production and help meet growing domestic demand for refined fuels, LPG and asphalt. Good to see these two parts of Honeywell getting together now they are separated, in different divisions.

"The Honeywell solution combines UOP's deep process knowledge with HPS expertise in plant automation, to make the refinery run at the top of its capability," said Mike Millard, vp and gm of Honeywell UOP Process Technology and Equipment.

Pieter Krynauw, vp and gm of the HPS Projects and Automation Solutions business, said: "When we combine UOP process technology with HPS automation and controls, including safety controls, refineries will be able to reach peak performance faster and lower the total cost of ownership while getting the best return on investment for the project lifecycle." The plant will also use Honeywell UniSim training simulators.

GE Healthcare and Emerson

Emerson and GE are collaborating to produce more effective biopharma production operations. The two companies are to collaborate to integrate the Emerson Process Management DeltaV distributed control system with the GE Healthcare Life Sciences enterprise offerings of start-to-finish technologies for the global biomanufacturing industry. The combination is aimed at increasing productivity and improving efficiency in the production of biopharmaceuticals such as monoclonal antibodies and vaccines.

The first DeltaV-driven GE Healthcare installation, which is expected to be complete before the end of this year, will be a FlexFactory, GE's integrated manufacturing platform based on single-use bioprocessing technologies. The DeltaV system is offered as an automation control platform for these GE single-use offerings, which allow manufacturers to reduce set-up times and increase manufacturing flexibility.

Nick Denbow's Roundup (continued)

Emmanuel Ligner, Global Commercial Manager for BioProcess, GE Healthcare Life Sciences, said: "Emerson and GE share a vision that an integrated and automated approach to biopharmaceutical manufacturing has the potential to help drive improvements in production efficiency of these life-saving medicines. This collaboration with Emerson, combined with our depth and breadth of expertise in start-to-finish technologies for bioprocessing, promises to bring real benefits to our customers and to healthcare providers worldwide."

"The combination of Emerson's automation technologies and the GE FlexFactory will offer superior process performance, consistency of product, and reduced validation time," said Jerry Brown, svp industry solutions for Emerson Process Management. "This collaboration will support more predictable processes that eliminate unnecessary work, which translates into a reduced time to market for our customers."

ISA Food and Pharma in Ireland

For the first time ever, the ISA Food and Pharmaceutical Industries Symposium will venture outside American shores, and take place next March in Ireland. Recognising the major position that Ireland has in the pharmaceutical manufacturing industry, not to mention their long established food and beverage industries, the 2016 Symposium will be held in Cork. The conference is planned to focus on how automation can help address the critical modern challenges — relating to regulatory requirements, manufacturing costs, security threats and other concerns — which are prominent concerns within the food and pharmaceutical sectors.

The ISA presumably hopes to attract European speakers in their line-up of Government officials invited to deliver updates and clarify current regulatory requirements. A range of panel discussions and sessions is planned to deliver the varied perspectives of experts, suppliers and end users: presentations will illuminate the latest developments, trends and projections, and provide case studies demonstrating real-world successes. As ever, the list provided for potential topics of interest is endless, but the deadline for abstract submissions is imminent: these two seem to be the wrong way round.

ABB and CGM Workstations

The extended operator workstation (EOW) concepts and designs produced by CGM of Sweden have been applied in many industries, from train control networks, mining operations and process control. Prominent amongst the suppliers adopting CGM systems has been ABB, who have featured the EOW in their demonstration installation on a carbon capture pilot research plant in Imperial College in London.

After several years of working alongside ABB on such projects, CGM have now announced that they have been acquired by the ABB Group. However, CGM say that they will be run as an independent unit within the group, and will remain available to work with all other process control vendors who are interested in creating the most efficient control room layout for their client, tailored to both the organization, and to the operator's well-being. Their EOW control panels are reported to be on display at demo centres in all regions of the world – although presumably attached to ABB control systems!

HPS Orion Console

Meanwhile, Honeywell HPS have announced that a large chemical facility in Brazil will be the first in the world to use Honeywell's state-of-the-art Experion Orion Console, or workstation, which they also suggest is designed with plant operating personnel in mind - by providing a single visual workplace that allows for more effective responses and less operator fatigue. This is to be installed at the ICL Brazil phosphoric acid production facility in Cajati, near São Paulo.

The console was developed using the Honeywell User Experience, a new approach to the design and development of new products focused on making them easier to use, more intuitive, more efficient, and more productive. The console features adjustable sitting and standing operating positions, to reduce fatigue, with large, ultra-high definition displays showing clear status readings of operations, operating limits and targets: a touchscreen display helps operators quickly and accurately respond to changing conditions.

Optical TDLAS process analysers

A new PR from UK instrumentation distributor Quantitech provides a wake-up call, on many levels. Hopefully readers of the ***INSIDER*** will already have been woken up to the technology awarement level. Quantitech has been appointed the exclusive UK and Ireland distributor for Focused Photonics Inc, a supplier of process gas analysers based on tuneable diode laser absorption spectroscopy. TDLAS is one my favourite technology adaptations that has made significant recent progress in process industry instrumentation: maybe on fairly specific difficult applications it's true. Yokogawa were out there in front, buying the technology developed by Dow Chemicals in 2008 (believe me I had to look this up on the NickDenbow blog); Endress +Hauser has invested in it for years, big time, and then bought SpectraSensors too, in 2012; predictably, Emerson bought someone in 2014 (Cascade Technolo-

Nick Denbow's Roundup (continued)

gies, a UK technology start-up. And again I had to find the name on the blog). Quantitech MD Keith Golding sees much wider application for these products, on the basis that Focused Photonics already have a world-wide installed population of over 8000 instruments.

FPi factory in Hangzhou China

The only other report that has quoted decent numbers was one earlier this year, and someone quoted hundreds of TLDAS units offshore measuring the moisture content in North Sea gas, - but the blog has failed to tell me who it was, on that one.

Golding also adds: "Developed out of Stanford University California, the cradle of TDLAS commercialisation, FPi was established in China in 2002 and now employs over 3,000 staff. We have visited a number of LGA installations and were very impressed by the standards of quality and reliability being delivered by these instruments."

Indeed the FPi website confirms the above comments: they have a factory in Hangzhou, China, and claim "FPi is the world leading integrated solutions provider of process control and environmental monitoring. Since being established in 2002 by two elite graduates of Stanford and UC Berkley, FPi has specialized in analytical instruments innovation and manufacturing." The two key personnel appear to be Dr Jian Wang, the Chairman, General Manager and Chief Engineer, plus Naxin Yao, another General Manager and Director.

"As a world class innovator in gas, water and particulate analysis technologies, FPI has been acknowledged for its expertise in DLAS (diode laser absorption spectroscopy), DOAS (Differential Optical Absorption Spectroscopy), UltraViolet, Near-Infrared, Atomic spectroscopy, Molecular spectroscopy, Chromatography, spectrophotometric colorimetry and electrochemistry." The applications quoted include flue gas monitoring and CEMS systems, air and water quality monitoring, lab analysis and metal analysis systems, as well as process analytical instruments.

FPi TDLAS product

So here we have technology expertise developed by Western (US in this case) universities, then taken up by foreign research students, who, all credit to them, establish a business based on this in China, backed by Chinese investors, and the resulting products, and jobs, arise from this Chinese investment in start-up technology. Not quite what UK PM Cameron sees as the end result of UK University technology expertise leading to high-tech UK jobs. But just what China wants to invest in, to enhance *their* industry.

Typical FPi applications include ammonia slip control, HCl measurement for sorbent injection optimisation, furnace oxygen, flue gas monitoring in FCC catalyst regeneration, trace H_2S and H_2O in natural gas, H_2S measurements in sulphur recovery, and cross-duct CO monitoring for electrostatic precipitator safety.

Wind power investment in the UK

You can get really rather disenchanted with all the press statements issued about wind and solar power, with their constantly changing subsidies for renewables, and all that. Just as the UK Government says it is stopping all wind power subsidies, immediately, in terms of the excessively high buy-in rates payable, a consultant produces an enthusiastic report about the 2015-2020 investments planned by Dong Energy for the Humberside region, on the Northeast coast of England, in support of future wind farm projects in the area.

Dong Energy Wind Farm on the northeast coast of England

The report suggests 1600 jobs will be created in the construction sector over this period, as a result of the GBP6Bn ($9Bn) Dong Energy investment into two further offshore projects - Race Bank and Hornsea Project One - which are under construction or in development. Hornsea offshore projects 2 and 3 may also follow, after 2020. Dong Energy's involvement has

Nick Denbow's Roundup (continued)

previously been supportive of a number of wider developments, such as the construction of the Siemens wind turbine factory, located in Hull.

Other local investments made as support for the offshore wind sector include Hull University's special offshore wind training courses; Hull College have opened a Digital and Green Energy Centre to support local businesses and offer relevant qualifications; and there has been a GBP11m ($17m) investment into a new University Technical College in Scunthorpe, specialising in engineering and renewably energy.

The first Foster Wheeler Energy constructed energy-from-waste plant, being built on Teesside for Air Products, seems to have run into process performance problems, according to the GMB worker's union. Construction on the second plant alongside has been suspended until the lessons learned are established.

Changing patterns in magazines

The decline of the industrial exhibition, in the UK at least, seemed to take place ten years ago. Maybe it was the first result of the Internet. Since then it seems the relevant industrial journals are under pressure, with most issues far reduced in page numbers, editorial content and advertising. Many magazines publish merely supplier provided articles, with limited word counts, offered in a small type face within a single page. Obviously there are some exceptions to this generalisation, with some long established and well targeted promotion events and journals continuing to prosper.

The response from the larger industrial suppliers to both these trends has been to create their own events, or journals. So we saw the rise in importance of the European user events, or customer days, replacing commercial exhibitions: events such as the Honeywell User Group, the Emerson Exchange, Yokogawa User Meetings, Rockwell/Endress Roadshows, National Instruments NI Days: with their preferred suppliers also being allowed to attend, making a contribution to the Exhibition costs. What has also grown is the company specific journal or annual review, and these resurrect the better side of paper based articles providing application examples across a spread of industries.

Some excellent examples are coming out of some major European suppliers. In particular the Endress+Hauser "Changes", a paper publication issued in the Summer, not only covers applications, but discussed the Company results, the areas covered by research, and the development of their newer technologies. More recently, Copa-Data have posted out a paper publication, known as "Information Unlimited" - which I see is Issue 28, and 62 pages – to report on their Zenon technology, and its links to pharmaceuticals, power grids, energy data management etc. Like any good magazine it also has articles provided by guest contributors. Then NI followed up their big NI Day series of multi-stream presentations, with a 33 page PDF booklet of all the application stories presented that day, including electronic links to longer background stories. This is an essential aid that overcomes the problem of only being able to listen to one lecture at once. Last it is worth mentioning the less frequent major publications from groups like Profibus, or PI, such as their "Milestones" review of the previous 20 years, published in 2009.

So some decent and informative engineering and industrial publications are still available, they are just a little more spread around, and coming from alternative sources. These documents may be supplier or technology specific, but they are worthy of a place on a bookshelf, and present what they say on the cover: which might not be the case for the thinner commercial journals.

Biggest Pipe Bender!

Unison of Scarborough in the UK has installed and commissioned the world's largest and most powerful all-electric pipe bending machine, at the Norwegian offshore and maritime services company, Westcon Yard AS. Capable of generating a colossal 660,000 Nm of continuous, servo-controlled torque, the custom-designed machine will be used for precision bending of thick-walled carbon steel pipes up to 10 inches (273 mm) in diameter.

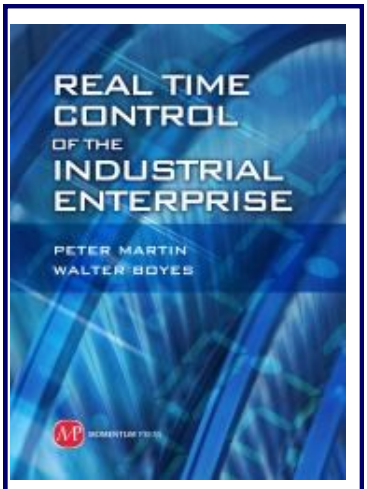
Unison Pipe Bender

This is the second all-electric pipe bender that Unison has supplied to Westcon's pipe production facilities in Ølensvåg, Norway. The first, a 90 mm single-stack model from Unison's Breeze range, was installed at the beginning of 2015 and enabled the company to bring fabrication of all pipe sizes up to 60.3 mm in diameter in-house. It has also helped Westcon to simplify and accelerate its production process dramatically, by allowing parts to be fabricated from single-piece piping stock, instead of from multiple cut-to-length straight sections and pre-formed bend parts bought-in from external suppliers.

Westcon has similarly high expectations for its new 10-inch machine. The company now intends producing virtually all the pipe sizes that it needs for its outfitting, service and repair operations entirely in-house, without having to use pre-fabricated bend sections.

This application of all-electric bending technology to pipes up to 10 inches in diameter is without precedent. Although Unison's bending machines are used by a number of the world's leading ship and submarine builders to produce large pipe and tube assemblies, this is by far the most powerful that the company has ever designed and built. It highlights the inherent scalability of Unison's machine architecture and underlying motion control technology – the company's range of all-electric bending machines now extends all the way from 16 mm (5/8 inch) to 273 mm (10 inches).

Nick Denbow's Roundup (continued)



SMART MANUFACTURING? INTERNET 4.0? READ THE BOOK!

In the last fifty years, almost all of the productivity gains in manufacturing have come from better automation and control of the processes: continuous, batch, hybrid, and discrete. The secret to sustainable manufacturing is better control. So, why aren't the theories that have led to enormous gains in productivity being used above the plant level? This book explains how better controls can be applied to the supply chain, and to enterprise financial management. It provides managers the insight and tools for achieving a fully integrated automated manufacturing enterprise, from the technical side to the business management side. It is helpful to anyone seeking to bring the non-technical parts of a manufacturing operation in line with the already automated production, inventory management, and plant management. The book is available from www.momentumpress.net, Amazon and other retailers.

Honeywell Continues Elster Acquisition

Honeywell announced in July 2015 that it has signed an agreement to acquire the Elster Division of Melrose Industries plc, a leading provider of thermal gas solutions for commercial, industrial, and residential heating systems and gas, water, and electricity meters, including smart meters and software and data analytics solutions, for approximately $5.1Bn.

The Honeywell corporate release continued as follows:

Elster also manufactures flow computers and regulators for the gas industry. Elster consensus sales for 2015 are estimated to be $1.8Bn. T

he price translates to approximately 12.6 times Elster's estimated 2015 consensus earnings before interest, taxes, depreciation, and amortization (EBITDA) - [so this is around $400m - Ed] - and the acquisition is anticipated to occur in the first quarter of 2016. The agreement is subject to customary closing conditions, including regulatory review and Melrose shareowner vote.

"The acquisition of Elster will generate strong future returns for Honeywell's shareowners because it increases our growth profile globally – creating both organic and inorganic growth opportunities – and because Honeywell can run this company effectively and accelerate its growth through our complementary technologies, software knowledge, and presence in High Growth Regions," said Honeywell Chairman and CEO Dave Cote.

"Elster has outstanding technologies, brands, energy efficiency know-how, and global presence, all of which we are very well-positioned to build on. Elster also creates a new platform for acquisition targets for Honeywell that will be additive to the business' growth and global presence. We will see immediate benefits to Honeywell's portfolio, accelerating into 2016 and 2017. This is a great acquisition for Honeywell and our shareowners."

"The Elster acquisition proves that we are staying true to our disciplined M&A approach and integration processes because it's a model that has worked very well for us," said Cote. "During the past decade, we have completed more than 80 acquisitions adding approximately $12Bn in revenues. We will continue to look for good acquisitions to enhance our growth profile. We see Elster as a great opportunity to deploy our operating model and key process initiatives to grow the business, enhance our position globally, and drive significant returns to shareowners over the long-term. The Honeywell Operating System (HOS) will be a major factor in creating new synergies that will increase the growth and profitability of each of Elster's businesses."

Elster employs approximately 6,800 people with major locations in the United States, Germany, the United Kingdom, and Slovakia. The company maintains an impressive installed base with more than 200 million metering modules deployed over the course of the last 10 years alone.

"This acquisition will allow us to improve customer value with technologies and lifecycle management solutions for industrial end users served by Honeywell's Environmental Combustion and Controls and Process Solutions businesses," continued Cote. "Elster's gas business offers products in high demand among natural gas customers and brings a strong, global distribution network and numerous cross-selling opportunities for existing Honeywell technologies to new customers in both developed and High Growth Regions."

"Elster's gas, electric, and water meters are highly valued for their reliability, safety, and accuracy. Elster has a world-class reputation for delivering on the operational efficiency and regulatory certification requirements of utility customers globally. We expect that energy efficiency initiatives and mandates and the increased need for natural resource management will drive meaningful and sustained growth for Honeywell in the metering segment. Utility metering in particular is

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rapidly evolving as new 'smart' technologies and software and data analytics capabilities are becoming adopted around the world and we expect strong growth from this segment globally. Elster's differentiated technologies, extensive industry expertise, and relationship with utility customers globally – combined with their strong positions in the highly regulated heating, controls, and metering segments – are a great fit for Honeywell's portfolio," concluded Cote.

There is no change to the 2015 full year guidance Honeywell provided in its second quarter earnings release. Honeywell expects that the dilutive impact of the transaction on its 2016 Earnings Per Share to be minor.

Yokogawa Order for Natgasoline LLC Methanol Plant

Yokogawa has received an order from Orascom E&C USA to deliver control and safety systems for the Natgasoline LLC methanol plant, which will be one of the largest methanol plants in the World. Currently under construction in Beaumont, Texas, this facility will have a capacity of approximately 1.75 million metric tons per year when it starts production in 2017.

For the process control and safety of the Lurgi MegaMethanol process technology and auxiliary facilities throughout this plant, Yokogawa will supply their Centum VP integrated production control system, ProSafe-RS safety instrumented system, Exaquantum plant information management system, and Plant Resource Manager (PRM) software package. The Yokogawa Corporation of America will be responsible for the engineering and delivery of these systems, and will provide support with installation and commissioning.

Daniel Duncan

"Yokogawa entered the U.S. market in 1957 and has grown the business across diverse markets, but have had particular success in the oil and gas refining and offshore production, LNG liquefaction and chemical manufacturing areas. We are proud to win the first order for a new US-based grass roots methanol plant that exceeds a million metric tons per year. This project allows us to build on our already extensive track record in executing and maintaining methanol production in North America", said Daniel Duncan, President and CEO of Yokogawa Corporation of America.

Though the chemical industry in the USA has long relied on imported methanol, the amount of methanol produced locally is steadily increasing, because of the ready availability of ethane produced from domestically sourced shale gas. Yokogawa won this order because of its excellent track record in completing projects, and its demonstrated ability to deliver comprehensive, integrated solutions that help optimize operations.

Endress+Hauser cooperating in smooth system integration

In future, operators of process plants will be able to more easily integrate their devices and components into their automation systems. Endress+Hauser has launched the Open Integration partner program that promotes the cooperation between providers of industrial automation systems and fieldbus communication. To date, eight companies have joined the program: AUMA Riester, HIMA Paul Hildebrandt, Honeywell Process Solutions, Mitsubishi Electric, Pepperl+Fuchs, Rockwell Automation, R. STAHL and Schneider Electric.

"By working closely with our partners, we want to make sure that a relevant selection of products can be easily combined and integrated for common target markets," outlines Michael Ziesemer, Chief Operating Officer of Endress+Hauser. This is done by using open communication standards such as HART, PROFIBUS, FOUNDATION Fieldbus, EtherNet/IP or PROFINET and open integration standards such as FDT, EDD or FDI. Ziesemer continues: "We are open for more cooperation partners. Every market stakeholder who, like us, consistently relies on open standards is invited to join the Open Integration program."

Reference topologies are key

Reference topologies are the key

Cooperation starts with what are known as reference topologies, which are worked out jointly by the Open Integration partners. Each reference topology is tailored to the customers' applications and the field communication technologies used in these applications. "To fill the program with life in terms of content, we are going to target specific customers who might be interested in joining us," announced Ziesemer.

Depending on industrial segment and market, the focus will be on typical requirements such as availability, redundancy or explosion protection, followed by the selection of system components and field instruments of practical relevance. This exact combination will then be tested and documented before it is published as a joint recommendation, giving customers concrete and successfully validated suggestions for automating their plant.

Michael Ziesemer adds: "With this joint validation as part of the Open Integration, we go well beyond the established conformity and interoperability tests that we have carried out for many years with all relevant process control systems."

First showing at the SPS IPC Drives

The program was officially presented at the SPS IPC Drives electrical automation trade fair held in Nuremberg, Germany from 24 to 26 November 2015. This is also the venue where the partners will present their first results.

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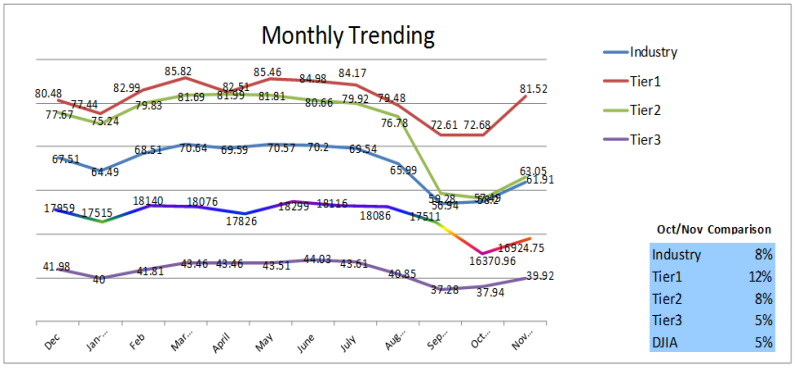
INDUSTRIAL AUTOMATION & PROCESS CONTROL

Health Watch

Who Are We Trying to Fool?!



By Mary Samuelson

Things appear to be looking up in the short term. At first glance, it appears that the industry is outperforming the Dow for the first time in several months.

Closer inspection, however, reveals that the jump is driven by tremendous increases in the stock price of two major players, Keyence and GE. If those two companies are removed from the equation, the remainder of the Index actually underperformed the Dow by 1%. Table 1 shows the stock price percentage increase/decrease for the two month period between September 14 and November 17 of this year, for several of the Tier I companies in the Industry Index.

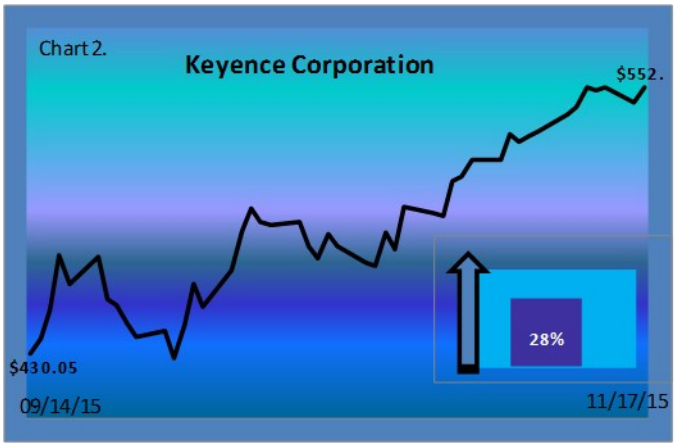
Table 1. Percent Change - Sept/Nov	
Keyence Corporation	28.36%
GE	22.41%
Mitsubishi Electric	15.02%
OMRON	13.32%
Danaher	9.89%
Emerson Process	8.01%
Flowserve	5.92%
Yokogawa	5.30%
Cameron	5.02%
Siemens	3.89%
Honeywell	3.09%
ABB Inc.	0.05%
Rockwell	-1.80%
Schneider	-2.17%
Ametek EIG	-2.85%
Spectris plc	-7.12%
IMI	-12.81%

When reviewing the chart numbers, several questions come to mind. Why Keyence and GE? What are they doing differently? Why did these two corporate giants' stock increase over 20% in the past sixty days when other large industry leaders are not doing nearly so well? Both GE and Keyence are primary players in the control automation/ industrial arena, and the industry overall has not performed well for the past year.

Keyence and GE, Both A Step Ahead

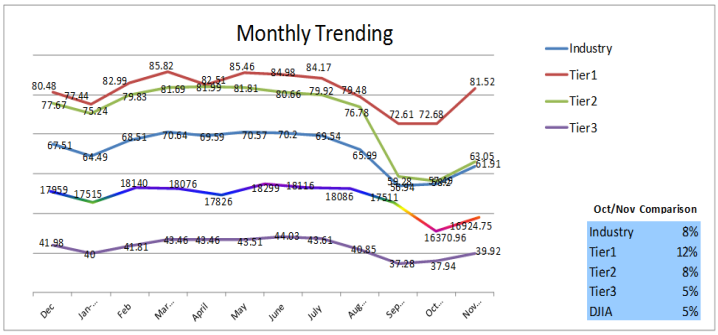
The Keyence annual report provides some possible answers for its performance. Keyence Corp's profile contains the following statements:

Today, Keyence serves 200,000 customers in some 100 countries around the world, where its name stands for **innovation** [emphasis mine] and *excellence. Sensors, found in millions of applications, provide the positioning information essential for factory automation. There could be no automation of assembly lines without sensors. Keyence has consistently aided the automation revolution by developing superior sensor solutions.*



Keyence constantly strives to create new and improved products that aid the automation industry. In addi-

Who Are We Trying to Fool?



tion, over the past fiscal year, the Keyence Group worked to enhance planning and development and strengthen sales capabilities, while continuing to develop new products such as a 3D laser scanning confocal microscope, a 3-axis hybrid laser marker, and an ultra-compact vision sensor.

In the sales field, while many in the Industry were reducing staff, the Keyence Group increased human resources and expanded overseas sales offices. The result? Net income growth of 47%, sales growth of 33%, and a YTD return of 18%. And now, for the rest of the story. Keyence has minimal involvement in the oil and gas industry. Chart 2 provides a visual of Keyence Corporation's phenomenal stock increase over the past sixty days.

The picture for GE is almost as good, but the underlying causes for the stock increase are different. Unlike Keyence Corpora-

Table 2.

GE Comparison: Percent Change - Jan/Sept 2014 to Jan/Sept 2015

Segment	Revenue	Profit/Loss	Change attributed to:
Power & Water	4%	5%	**Revenue:** Higher volume in equipment sales for renewable energy partially offset by strong US Dollar **Profit:** Services growth, cost productivity, partially offset by unfavorable business mix and strong US Dollar
Oil and Gas	-13%	-10%	Lower sales and increased strength of US Dollar affected both revenue and profit
Energy Management	-2%	78%	**Revenue:** The impact of the stronger U.S. dollar ($0.4 billion), partially offset by higher volume ($0.3 billion). **Profit:** Attributed to Improved productivity
Aviation	2%	10%	**Revenue:** Increase is attributed to price increases partially offset by lower volume **Profit:** Increased prices and favorable business mix
Health Care	-4%	-4%	**Revenue:** Decrease due to strength of US Dollar was partially offset by higher sales volume, principally in the Life Sciences area **Profit:** Decrease driven by lower prices in Health Care systems, stronger US Dollar, and effects of inflation, partially offset by higher productivity
Transportation	6%	15%	**Revenue:** Increased volume due to locomotive and service sales **Profit:** Driven by higher cost productivity, higher volume in locomotive & service sales, colntinued deflation, partially offset by an unfavorable business mix
Appliances/Lighting	6%	78%	**Revenue:** Increase attributed to higher volume in appliance sales partially offset by lowered prices and the impact of a strong US Dollar **Profit:** Improved productivity including the effects of classifying appliances as a business held for sale and the effects of inflation, partially offset by lower prices

INSIDER
INDUSTRIAL AUTOMATION & PROCESS CONTROL

Health Watch

By Mary Samuelson

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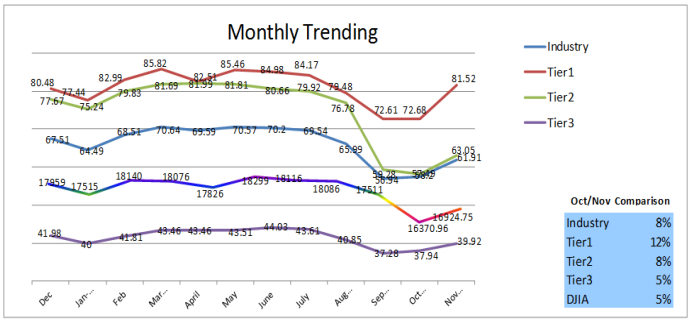
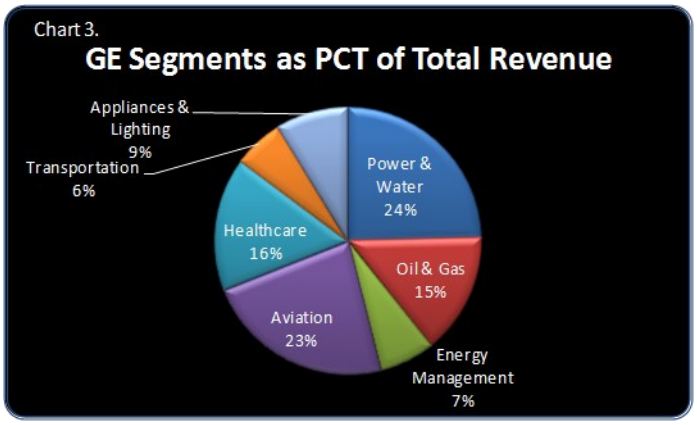


tion that reports only one segment, GE has a multifaceted industrial segment and the numbers for the oil and gas portion of that segment did as poorly as other companies focused primarily on that area. Table 2 outlines percent change in revenue and profit for the different segments within GE, for the first nine months of 2015 compared to the same time frame in 2014. It also includes the reasons for the revenue and profit/loss change that were provided by GE in its SEC Form Q10, filed on November 2nd of this year.



While most GE segments show increases in both revenue and profits, oil and gas decreased considerably in both areas compared to last year. The reasons given for the decrease mirror what is said repeatedly in our industry; sales are down and the strength of the US dollar is detrimental to profits. There is more to this story, however. The strength of the US dollar affects all of GE's segments, as is noted in the Table. The other part of the equation has to do with the size of the segment that is dedicated to oil and gas. To determine the percentage of revenues attributable to that segment and others, individual segment revenues were divided by total revenue to obtain the information provided in Chart 3. Combining the resulting information with the information provided in Table 2 shows the true strength of GE's diversification and how that diversification allows the company to thrive even when times are tough. For example, even though the oil and gas segment shows a 13% revenue decline, it makes up only 15% of GE's total offering, and other segments such as Power and Water, Aviation, and Appliances are doing well enough to more than make up for its losses. This diversification allows GE to continue to operate successfully in an environment that has caused other control automation companies extreme pain.

So What About Everybody Else?

In most instances the names may change but the circumstances remain the same. While there is some deviation, overall we see lower sales and compared to last year, combined with break even or lower profit margins. Some examples are provided below, but they are but a small piece of the repetitive overall picture. The forward looking statements provided are optimistic, but one only has to read the disclaimer attached to those statements to be a bit wary of their validity, unless of course, it can be verified that the person providing them owns a crystal ball.

Siemens

One of the players in our industry that is projecting better times ahead after a very rough year, is Siemens. 2015 brought thousands of job cuts in Siemens' energy division, and the sale of its remain-

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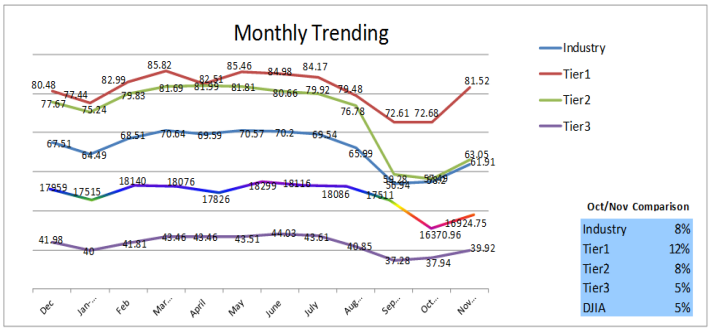

ing consumer businesses.

Siemens prediction for the upcoming year includes a double-digit jump in earnings per share, and faster order growth. It expects performance to be enhanced by cost cuts in its headquarters and other corporate areas, and strong orders for the fourth quarter.

According to an article published on November 14 by Keyinvesting, "With higher-than-expected profit from its industrial business segments, the company [Siemens] was able to reach its margin target for the year, which was 10.1%. This figure was still well below its rival General Electric, but on par with the Swiss group ABB." Siemens' also benefits from diversification, with renewable energy, transport, and healthcare taking up some of the deficit generated by oil and gas.

FLIR Systems

With a focus on electronic solutions for the security market, FLIR stock held at around $30 to $31 per share until the end of August, when it dropped to $27. It remained low through the middle of November, possibly based on third quarter earnings which showed gross profit decreased 10.4% compared to the same time frame for 2014, with earnings down 7% comparatively, in part due to weak government sales.

For FLIR and other companies who focus on applications such as surveillance, detection and security however, what is bad for the world can be good news for FLIR.

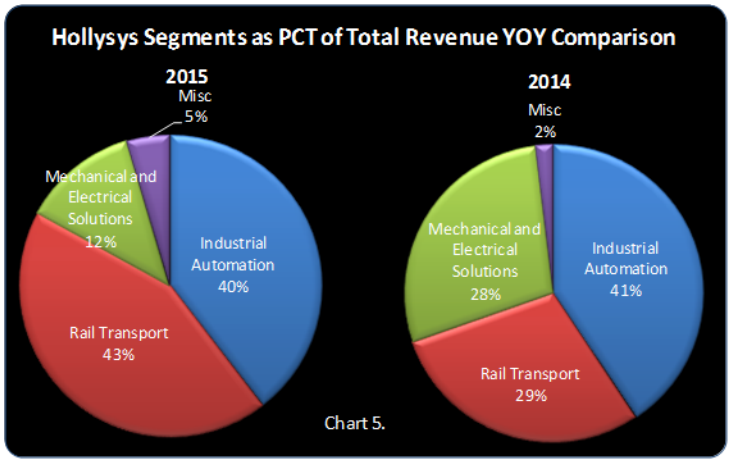

Chart 5.

As Street Authority reported in its November 23 article, FLIR is on the frontlines in the war against terror and holds an impressive 1,374 patents. At $26 per share as of market close on November 13, FLIR stock increased 14% within a few days of the November 13th Paris attacks and has continued to increase, as investors seek defense-related stocks in light of current events.

Motley Fool concurs. In his November 17 article, Dan Caplinger noted that with terrorist threats on the rise, many believe that governments around the world will be more willing to invest in the sophisticated technology needed to help fight against potential attacks. FLIR's emphasis on thermal imaging and other sophisticated detection and surveillance equipment could put the company in an especially strong position in this fight, especially if it can demonstrate its ability to recognize individual threats in time to prevent future attacks. Caplinger also noted, as did we, that FLIR's latest earnings report showed some challenges, but noted that some believe that the company has potential to respond favorably to this latest opportunity.

Hollysys

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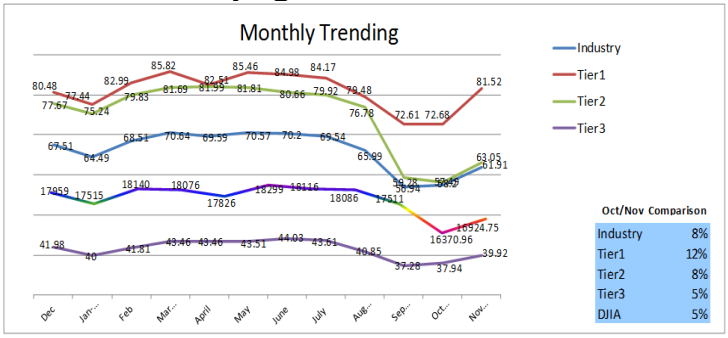


The headline generated by Automated Insights dated November 12, 2015 reads, "Hollysys Automation posts 1Q profit." It goes on to report that Hollysys Automation posted a profit of $30.3 million.

That sounds wonderful until one looks at the historical data.

As a case in point, the article states, "The maker of industrial, rail and subway automation systems posted revenue of $125.1 million in the period." What it does not say is that for the same period last year Hollysys posted revenue of $140.7 million, a decrease of 11.1% over the same period last year.

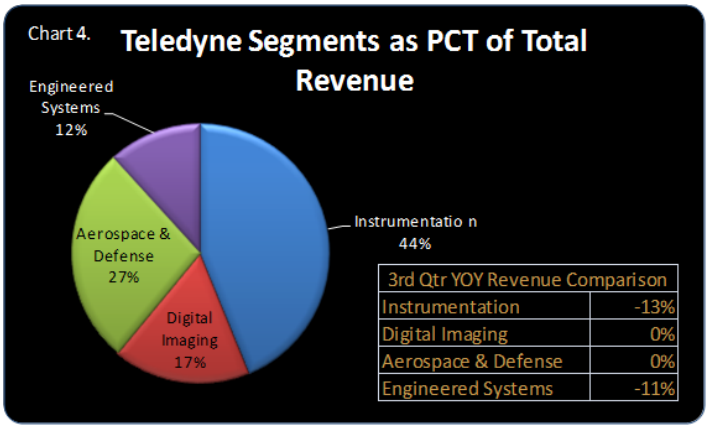
Hollysys is, however a diversified player with a strong survival instinct. They are changing their focus, at least temporarily, away from mechanical and electrical solutions and more toward rail transport, which is a lucrative market for them.

The Industrial Automation segment, which makes up 40% of Hollysys' revenue base, is highlighted for changes as well. In the quarterly report published November 12, the company relays the following information concerning its industrial automation segment:

In industrial automation business, during this quarter, we continuously insisted in executing our strategies to maintain the gross margin by penetrating the high-end industrial automation market and providing more highly customized solutions such as power, chemical, food & beverage, pharmaceutical and environmental protection related industries, while offering diversified value software packages to the end users for saving the cost and improving their efficiency.

Although Hollysys Automation shares have decreased 15% since the beginning of the year, they expect their full year revenue range to hit between $565 and $600 million.

With targeted markets that steer safely away from the oil and gas industry, they might just make it.



Teledyne

According to the segment results reported in Teledyne's SEC Form 10-Q filed November 3, 2015, The Instrumentation segment's third quarter 2015 sales, which account for 44% of total sales for Teledyne, were $243.2 million, compared with $280.4 million in the third quarter of 2014, a decrease of 13.3%. Operating income for the third quarter of 2015 was $38.6 million, compared with operating income of $46.9 million in the third quarter of 2014, a decrease of 17.7%.

The decrease is attributed to lower

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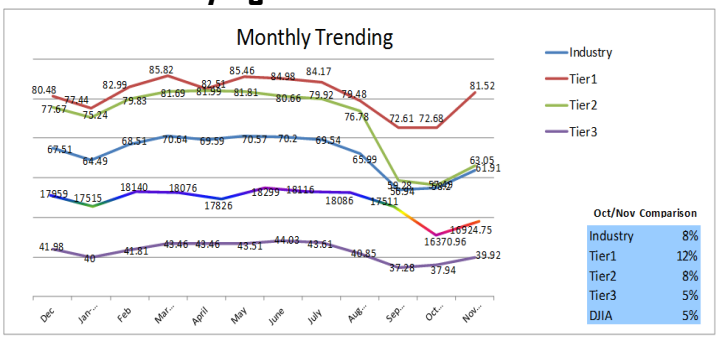

sales of marine instrumentation and electronic test and measurement instrumentation, partially offset by higher sales of environmental instrumentation. Marine instrumentation sales decreased by $30.9 million and primarily reflected lower sales of geophysical sensors for offshore oil exploration, interconnect systems for land-based energy applications, and other marine sensors and systems, especially for international markets, partially offset by $10.8 million in incremental sales from recent acquisitions. Sales of electronic test and measurement instrumentation decreased $7.6 million and sales of environmental instrumentation increased $1.3 million.

How Long Will It Continue?

The names vary but the story is the same for the majority of the companies that make up the control automation industry.

The past year's events impacted sales that led to lower revenues, further compounded by the strength of the US dollar and the lowest oil prices seen in years.

The result is lower revenue and profits, layoffs, acquisitions, and extreme pain in our industry for many of its key players.

Forward looking statements abound that predict a better year coming.

With the US dollar showing no immediate signs of weakening and oil prices projected to stay low through 2016, which will continue to stem oil and gas drilling and the revenues those areas create, some of the forward-looking statements contained in our industry's annual reports may be a bit optimistic.

Like Hollysys, many in our industry and changing their focus to other areas such as food and beverage, factory automation, automotive, and pharmaceutical, and project that these changes will put them back on track.

Remember, though, they don't call the statement that warns against the accuracy of those forward looking predictions 'SAFE HARBOUR' for nothing.

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Industrial Cyber Security and Safety
Analytics and Machine Learning

Asset Performance Management

Service Performance Management

IT/OT Convergence

Automation Innovations
Industrial Internet Platforms

Human Capital and Organization Development

Designing Connected Products

Connected Smart Machines

Partial List of Executive Speakers

South Africa Mint, Lungile Binza, Chief Information Officer

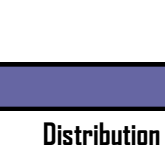
American Electric Power, Jeff Fleeman, Director Advanced Transmission Studies & Technologies

ExxonMobil Development, Sandy Vasser, Facilities I&E Manager

Dow Chemical, Carrie Schaller, I/T Director Manufacturing Operations

GE Transportation, Rob Burnett, IT Leader

Watson Solutions, IBM Software Group, Rob High, VP & CTO



SSE, Seth Murthuraman, Condition Monitoring Engineering

CERN-European Organization for Nuclear Research, David Widegren, Head Engineering Processes Support

National Consortium for Mission Critical Operations, Mitchell Sepaugh, Project Manager Industrial Systems

Georgia-Pacific, Michael Carroll, VP Innovation and Operations Excellence

Temputech, Adrian Merrill, CTO & VP of Operations

ArcelorMittal Dofasco, Mike Dudzic, GM Process Automation

Trinseo, David Garrett, Sr. Process Automation Leader

National Automation, Steve Mustard, President & CEO

Duke Energy, Bernie Cook, Director Maintenance Diagnostics

ExxonMobil, Carol Eidt, Automation & Control Division Manager

PJM Interconnection, Ed Kovler, Lead Business Solutions Architect

Dow Chemical, Glen Mutscher, Global Director Manufacturing & Engineering

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THE WAY I SEE IT
Editorial

The Internet of Things May Be the Internet of No Jobs

I have been saying it for several years. Recently, an article in the *New Scientist* as well as some blog posts on LinkedIn *Pulse* have been saying it too. Pat Kane, in his article in the *New Scientist* (21 November 2015, p. 42) says that an "unstoppable wave of automation is set to break over the professions. He asks if they will survive. The answer is probably not.

We have been talking about the automation of the workforce for a decade or more. We know that there will be many fewer low skilled jobs in the next few decades because automation is getting smarter, more sophisticated, and more connected with the enterprise and the growing Internet of Things. Proponents who believe this is a good thing point to the re-education and re-purposing of the agricultural work force in 1900 to the manufacturing workforce in 2000.

The problem is that the comparison is false.

In 1900, the manufacturing economy was growing and there were places for the displaced workers to get new jobs and prosper. Unfortunately, in the new information-based economy, there aren't new places to put them. Worse yet, the day of the middle manager, or the professional may be ending too. This means that the oft-touted education as a way out of job displacement may not be available either.

Professionals had the knowledge, and the experience, and the ability to perform relevant analysis and come to relevant conclusions. This made them valuable. They became managers because they knew what to do.

> "...the mood in the hall resembled that of the proverbial turkey farm recently privy to the true significance of Christmas." Or Thanksgiving if the turkey farm happened to be in the USA or Canada.

Now, however, automation is affecting this part of our society as well. Kane points to eBay's conflict resolution software, which already resolves 60 million disputes a year, without the involvement of a single lawyer. Medical expert systems are rapidly replacing the unaided diagnostic expertise of even the best internists. Robot surgical systems are performing better than most surgeons can do by hand.

In an event to mark the launch of their book, *The Future of the Professions: How Technology Will Transform the Work of Human Experts,* Richard and Daniel Susskind faced an increasingly anxious crowd of academics and professionals, where, according to Kane, "the mood in the hall resembled that of the proverbial turkey farm recently privy to the true significance of Christmas." Or Thanksgiving if the turkey farm happened to be in the USA or Canada.

Kane says, "The Susskinds foresee the professions being 'decomposed' into their various tasks, scattered across new divisions of labour, such as 'process analysts' or 'knowledge engineers' and 'system providers.'"

You can bet that these new positions will be paid significantly less than the professions command currently.

So, professionals will not be able to smugly opine that it is too bad that production line workers didn't avail themselves of education when they could. Professionals will themselves be replaced in large part by artificial intelligence and expert systems, based on Big Data analysis technologies made practical by the Internet of Things.

Don't like the future? Too bad. As Richard Susskind said at the book event, "This debate is not about what is best for you. It's about what's attractive for recipients." Since those recipients pay the bills, it is likely that they will want more for less. Since expert systems don't have to eat, and never call in sick, what Kane calls "meat machines" will have to find something else to do. But what?

Comments? Talk to me!
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Rajabahadur V. Arcot: The Automation Industry's Growth, Opportunities and Challenges

While the manufacturing industry has played a crucial role in transforming our lives and the global economy, automation has played its part in ensuring that manufacturing operations are safe, efficient, and productive. Their fortunes are intrinsically connected!

> ...while the manufacturing sector has changed—bringing both opportunities and challenges— neither business leaders nor policy makers can rely on old responses in the new manufacturing environment.

The manufacturing industry, influenced by the growing demand in developing countries and the technological developments, is rapidly changing. So too is the automation industry.

Both manufacturing and automation industries have undergone changes. As McKinsey in its report *"Manufacturing the future: The next era of global growth and innovation"* points out while the manufacturing sector has changed—bringing both opportunities and challenges— neither business leaders nor policy makers can rely on old responses in the new manufacturing environment.

The Automation industry too, which addresses the needs of the industrial companies, has changed and must continue respond to emerging market challenges and trends appropriately. To succeed, it is necessary for them to be responsive and adaptable to changes. Let us look at some of the automation industry's opportunities and challenges.

Growth of Manufacturing Industry in Developing Countries

With the spread of affluence and industrialization to developing countries, these countries have witnessed robust demand growth for goods and products that satisfy the basic needs and aspirational wants in the last couple of decades. As a consequence many new production facilities have come up in emerging economies in industry verticals such as automobile, consumer electronics, chemicals, electric power, refining and petrochemicals and others.

Global industrial companies with their existing production capacities already tied to meet the demand in their domestic and traditional markets and interested in seizing the emerging growth opportunities, set up global-sized new facilities in developing countries.

Some companies, seeing a labor-arbitrage opportunities, also shifted production facilities to developing countries. They met the incremental demand in their traditional markets mainly through brownfield expansions and plant modernization.

For the automation industry, which thrives in countries with robustly growing manufacturing industry, developing economies provided and continues to provide growth opportunities.

However, the market dynamics of developing countries vastly differ from those of developed countries. Automation companies have to adapt themselves to the associated challenges.

For example the automation industry grew in developed countries in tandem with the growth of their economies & industries and their sophistication. Therefore automation affordability for the end-users was not a major issue in the developed markets.

On the other hand, most of the developing countries are low cost economies where capital is still scarce and expensive. Therefore, these markets are price sensitive and many of the owner operators in these countries are under economic compulsions to keep their capital expenditure under control and therefore they tend seek cost effective solutions.

Additionally, the investment in higher level of automation is not always justifiable in low-

Rajabahadur V. Arcot: Automation industry's growth, opportunities and challenges (continued...)

cost economies on return-on-investment criteria. Additionally in advanced countries revenues from the service and software contribute significantly to the total revenues. In developing countries price realizations are weak especially the service and software components. These and other such issues continue to pose challenges to the automation industry.

Global Excess Production Capacity

With the spread of manufacturing, large new plants came up in a number in developing countries which in turn resulted in creating excess production capacity at the global level in industry verticals such as automotive, steel, and many others. For example, according to the recent report OECD Science, Technology and Industry Policy Papers No. 18 which deals with "Excess Capacity in the Global Steel Industry and the Implications of New Investment Projects" says that the global steel industry's capacity to produce steel in 2013 has more than doubled since the early 2000s to support growing construction and manufacturing activity, as well as to help build infrastructure in emerging economies.

According to recent news reports, David Eyton, BP Group Head of Technology is quoted having said that the world is no longer at risk of running out of oil or gas for decades ahead...

However in 2013, the global crude steel demand stood around 516 MMT below the nominal capacity, representing one of the highest excess capacities in the history of the global steel industry.

Yet another OECD's report ECONOMICS DEPARTMENT POLICY NOTE No. 21 on automotive industry says that future car sales growth will mostly take place in emerging markets. The growth rate until 2020 is projected to average 3 percent per year for OECD countries and 9 percentage per year for the BRICS.

OECD countries accounted for 80 percent of world passenger car sales in 2000, but their share in 2013 has since dropped to around 50 percent.

On the other hand, the share of BRICS in car sales more than tripled over the same time period and has almost reached 40 percent. The report while pointing out the demand shift towards cars that are more fuel efficient and environment friendly states that future capacity expansion will be required mostly in emerging countries.

Even with regard to oil industry there are similar reports about excess production capacity. According to recent news reports, David Eyton, BP Group Head of Technology is quoted having said that the world is no longer at risk of running out of oil or gas for decades ahead with existing technology capable of unlocking so much that global reserves would almost double by 2050 despite booming consumption.

He is quoted as saying "Energy resources are plentiful. Concerns over running out of oil and gas have disappeared."

Prevalence of excess capacities in the above and other industry verticals is no good news for the automation companies as they depend on their growth for their revenues.

The good news is that companies operating in these verticals may invest in automation systems to gain competitiveness.

Impact of Sustainability Concerns

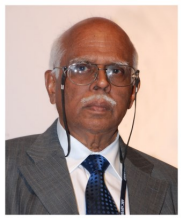
Manufacturing is among the largest consumer of energy and mined materials, a major producer of solid waste and a significant user of hazardous materials and therefore they contribute to the growing environmental problems.

As a consequence, the pressure is mounting on the manufacturing industry to adopt more sustainable ways.

This trend calls for serious realignment of manufacturing strategies necessitating changes in the way the industry uses energy, water, and minerals and handle the waste and byproducts.

The need is for manufacturing companies to seek a quantum leap in resource efficiency and productivity, supply chain efficiency, and waste reduction and therefore it has become incumbent on industrial firms to embrace resource-efficient material management and environment-friendly production processes with effective emission protection.

Rajabahadur V. Arcot is an Independent Industry Analyst and Business Consultant with 40 years of senior management experience. Until recently, he was responsible for ARC Advisory Group's business operations in India. Contact him at rajabahadurav@gmail.com



Rajabahadur V. Arcot: Automation industry's growth, opportunities and challenges(continued)

The sustainable manufacturing industry trend on one hand presages more automation investments as companies try to become more resource efficient including energy conservation. On the other, it also may completely alter the industry profile.

For example, the electric power industry which is one among the largest users of state-of-the-art automation systems may switch over from fossil fired electric power generation to renewable energy sources such as solar and wind.

Solar and wind generators do not require large distributed control systems and variety of transmitters. Adjusting to these changes poses challenges to the automation companies especially those which depend on revenues from the electric power industry.

How the automation industry responds to the changes taking place in manufacturing, with a preeminent role assigned to the Industrial Internet of Things (IIoT) and related technologies, will greatly shape its future.

Impact of New Manufacturing Era Trends

Reports, such as the Factories of the Future Public-Private Partnership and Recommendations for implementing the strategic initiative INDUSTRY 4.0, look at the development of the next generation of production technologies with the Internet of Things and Services, big data analytics and cloud computing playing a transformational role.

How the automation industry responds to the changes taking place in manufacturing, with a preeminent role assigned to the Industrial Internet of Things (IIoT) and related technologies, will greatly shape its future.

With technology companies taking great interest in all things associated with IoT and carrying the prefix 'smart' such as smart cities and smart grids, cloud computing and big data analytics, leading automation companies of the day have their task cut out for them in retaining their positions.

Smart cities which include apart from others managing transportation, electric power, and water distribution and smart grids involve extensive application of networked intelligent devices, sensors and actuators.

Technology companies such as ATT, Cisco, IBM, GE and others are vigorously staking their claims.

Some of the companies having strong competencies in big data analytics, cloud computing, and industrial networking may disrupt the traditional business model and offer cloud based industrial automation solutions as services.

IoT has all the potential to usher a new era of affordable and adaptable automation. GE is already offering its smart grid solutions as a subscription based service. Google has been buying robotic companies furiously.

[Cisco is impacting the automation space as well, as shown at the recent Rockwell Automation Fair, and in a survey they were circulating that said that automation customers wanted more opportunity for Automation As A Service, or AaaS.— Ed.]

Opportunities are growing rapidly in the IoT space. It might as well turn out to be a perfect storm for not-so-agile automation companies!

The emerging manufacturing era offers numerous growth opportunities for the automation industry and it is for the automation companies to develop their business strategies to overcome the accompanying challenges and reap the benefits. How they adapt and respond will determine their future.

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Spitzer and Boyes LLC is a technology consulting firm providing expertise in marketing, social media, M&A activity, technology transfer, and strategic advice to companies in technology fields such as automation and control system vendors, system integrators, distributors, and end users and asset owners.