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Your key to the latest industrial automation and process control information

ABB Hits A Home Run at Automation and Power World – Siemens Hosts Manufacturing In America Summit

With over 8000 attendees, ABB Automation and Power World hit a home run in Houston in the first week in March. Having cancelled last year's event, the speculation was that attendance might not be good, but that was clearly put to rest on the first day.

Power and Productivity



Ulrich Spiesshofer: "We do power and automation."

Power, he said, is about 40% of revenue, with automation at 60%. ABB's revenue is split between Utilities at 35%, Industry at 45%, and Transport and Infrastructure at 20%.

Spiesshofer said that ABB's \$40 billion revenue comes 29% from the Americas, 34% from Europe (although he didn't specify if Europe included Russia and the rest of Eastern Europe) and 37% from what he referred to as AMEA, or Asia, Middle East, Africa. It's hard to figure out where the revenue comes from if China, India and the Middle East aren't segmented out.

Ulrich "Uli" Spiesshofer, CEO of ABB since the departure of Joe Hogan in 2013, has presided over some not-so-good financial news (see the February INSIDER for details).

Spiesshofer noted that the reason for the unsteady financials that had been reported, including by the INSIDER, had to do with the large investments ABB had made over the past several years, and the shift into power and software businesses. He said he'd simplified ABB's structure, and initiated a new stock buy back to improve ABB's financial position with analysts.

ABB has made a very large investment in North America, which Spiesshofer declared as a "target market" for ABB. In 2010, revenue from North America was \$4.5 billion, and by 2014 it had risen to \$10.1 billion, with a concomitant doubling of employee head count and manufacturing/engineering sites.

ABB is trying to "expand our value proposition and shift emphasis" from products to services and software solutions. More than 50% of ABB products are software already, Spiesshofer declared.

As far as robotics is concerned, Spiesshofer assured the audience that YuMi (you and me working together—get it?), their new, more agile, less expensive, easier to program robot product line, "will not steal jobs." How that would come about, he didn't really elaborate on.

Proclaiming that ABB had increased R&D spend every year "despite the financial crisis," Spiesshofer also pointed to a new collaboration with Ericsson for data center automation. That's pretty far from ABB's roots.



ABB's YuMi robot

ABB A&P World Home Run, and Siemens' Manufacturing in America Summit in Detroit! **1**

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Cover Story: ABB's Home Run and Siemens' Manufacturing in America (continued)

Pointing back to North America, he declared ABB well positioned to take on all comers in the coming Industry 4.0, the next stage of industrialization.



Greg Scheu, now president of the Americas Region and head of group service and integration, took over from "Uli" and presented some case studies to illustrate ABB's increasing ability to operate in all industrial and utility verticals in the Americas. He talked about

focusing on utilities, and shared about a microgrid and energy storage project on Kodiak Island, and at Big River Steel's new integrated greenfield mill ABB is providing motors and drives, transformers and rectifiers.

Scheu talked about the recently introduced ABB System 800xA, version 6, but his emphasis was on power and utilities, motors and drives. He also spoke about electric vehicles, regenerative braking systems, and vehicle charging stations before discussing the ABB Foundation and its mandate for giving back to the communities ABB serves.

Scheu closed by explaining the new organization of the exhibit hall, which was by application and industry, not product or service group. "From source to socket," he described it.

Musical Jobs

Peter Terwiesch, previously CTO and then head of the European Region, and Veli-Matti Reinikalla, most recently head of Automation globally, have switched jobs.



Terwiesch

Terwiesch is now president of ABB automation, and Reinikalla is head of the European region. The INSIDER was privileged to interview each of them for INSIDER Profiles, and those interviews will appear in upcoming issues.



Reinikalla

Finding Automation Amid the Power

Although Greg Scheu attempted to explain the new organization for the exhibit floor, many people commented that there was lots of power and not so much automation. In the presenta-

tion tracks, however, the power versus automation split was nearly even.

It was very interesting that, despite Spiesshofer's insistence that ABB was spending large on R&D, there were very few new product introductions.



A&P World Exhibit Floor—Lots of Power...from source to socket

ABB has made a very large investment in North America, which Spiesshofer declared as a "target market" for ABB.

The Human Factor

Recently retired Ford CEO Alan Mulally was scheduled to give a keynote presentation on March



Ford's Mulally "off the record"

4th, but instead of speaking for an hour and a half, the former Boeing executive spoke for a very short time, and then took a question and answer period with the audience. The INSIDER would like to report on Mr. Mulally's performance, especially since the INSIDER asked questions at the event, but ABB has declared it "off the record." I can tell you that it was a far-ranging and apparently quite open and candid discussion.

That evening, ABB presented a "customer celebration event" that featured the venerable disco band,



Kool and the Gang at ABB the disco deities was the band Digital Output, comprised of several mostly senior ABB executives. They acquitted themselves well.

Kool and the Gang.

Opening for the



Rick Dolezal on harmonica

Thriving in Change

The final keynote was given by retired U. S. Air Captain Chesley B. "Sully" Sullenberger III, the hero pilot of the "Miracle on the Hudson"—a water landing in an emergency in which nearly no one was injured. Sullenberger talked about thriving in an environment of change.



Sullenberger

Cover Story: ABB's Home Run and Siemens' Manufacturing in America (continued)

Made in Detroit

Siemens invited a pod of journalists and analysts to attend the Manufacturing in America Symposium: Automotive Manufacturing Summit in Detroit, Mich., on March 11. The previous day, Siemens provided tours of two top tier automotive suppliers: Red Viking and Paslin Company.

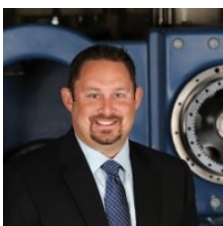
Founded by the man who wrote the original PLC specification for GM-Hydromatic that Dick Morley built the Modicon for, Red Viking was known for years as Superior Controls. Recently, they changed their name to Red Viking after having consulted a branding expert.



Randall Brodzik, CEO Red Viking

We were greeted by Randall Brodzik, the president and CEO, who explained that Red Viking has “a strong legacy of early adoption of new technology.” Under Brodzik’s leadership, the company has grown from 10 to over 200 employees.

Roderick Emery, vice president of operations, regaled us with the story of the creation of the notorious MRAP vehicle. It seems that while Force Protection knew how to protect what had begun as a simple Humvee, they had no idea how to manufacture them in multitudes. So, when the DOD ordered several thousand of them, Force Protection called in Red Viking. Red Viking designed and built an assembly line for Force Protection in 26



Red Viking’s Chris Lake

weeks from design to production. “We got our start in the automotive industry,” Emery said, “and we are proud of that.”

Chris Lake, vice president of dynamic test systems, talked about building test fixtures for helicopter gearboxes, and creating a custom dynamic testing software suite called VSync.

Other Red Viking executives discussed some of their most interesting case his-



Rod Emery, vp operations



A Wingspan assembly line

stories. They have put together a methodology for more easily manufacturing aircraft doors. They have built whirl towers and dynamic blade balance testers for helicopter rotors, and they have built something they call Wingspan. Wingspan is a series of AGVs (Autonomous Guided Vehicles) that are not battery operated.

Instead, Wingspan vehicles draw their power inductively from the control cable that is embedded in the factory floor. To install the cable is simple and swift. Cut the floor with a concrete saw, install the cable, epoxy seal the cut, and paint and polish. There are no batteries to worry about disposal, hazardous area operation, or damaging. Wingspan’s speed is variable, and can be as high as several miles per hour. This might be more inter-

esting to the highway AGV market than driverless cars and trucks using AIs.

After leaving Red Viking, we



Paslin Company makes robotic cell assemblies and tooling for automotive manufacturing

were bused to Paslin Company. Paslin is an old family company recently acquired by a venture capital firm, Tower Three Partners. Paslin produces robotic cells for Honda, GM, Ford, and Chrysler using whatever robot vendor, and controls vendor the end user wants. So Paslin has expertise in Kuka, ABB, Siemens, Schneider, and Allen-Bradley and uses all of it on a daily basis. For design, however, Paslin is migrating to Siemens’ TIA Portal, Profibus and Profinet. They are moving from 120 VAC to 24 VDC for control voltages (something process automation companies did 40 years ago).

After Paslin, we went to the Automotive Hall of Fame, located next to Dearborn Village, Henry Ford’s recreation of an idyllic time in the 19th century that never really existed for an Executive/Thought Leadership panel prior to the summit the following day.

Manufacturing in America



Siemens’ John Billings

Co-sponsored by Siemens and their large Detroit distributor, Electro-Matic Ventures, the summit kicked off with John Billings, Siemens’ vice president for Digital Factory, repeating the talk he’d given the evening before.

He was followed by the charismatic president of Siemens Digital Factory, Raj

Cover Story: ABB's Home Run and Siemens' Manufacturing in America (continued)

Batra, who discussed Siemens' Digital Factory concept and their commitment to Industry 4.0. "Manufacturing is a pretty darn exciting place to be," he said. "We are living in an age of transformative technologies: manufacturers large and small can re-invent themselves.



Raj Batra, Siemens Digital Factory CEO

"The Internet of Things (IoT) by 2020 will be a \$7.1 trillion market with 50 billion devices, 80% manufacturers.

"We live in an age of data. The Library of Congress has 235 Terabytes. Wal-Mart alone has 25K Terabytes. Big data is largely untapped in manufacturing.

"We can simulate the process—this will give us first mover advantage.

"Aging assets: \$65 billion in automation systems reaching end-of-life and Morgan Stanley reports that average age of equipment is highest since 1938, while capacity utilization is at 78%. There is a clear path to modernization for speed, agility, and efficiency. Get to market faster. Shorter innovation cycles, more complex products with larger data volumes. Flexibility in production, individualized mass production, by intensified collaboration. Manufacturers who embrace digitalization will have a competitive advantage.

"Siemens started 10 years ago preparing for the digital factory by acquiring companies like UGS, Camstar, LMS, and some others. \$4 billion in acquisitions since 2007 and nearly \$6 billion on R&D organic growth of which 2/3 is software. Digital Factory has a comprehensive portfolio of hardware and software.

"What this means is that there is a competitive advantage in early adoption with Siemens. The virtual and real worlds are combining to help manufacturers get products to market faster...It is a pretty exciting time."

Digital Manufacturing



George Barnych, DMDII

Batra turned the stage over to George Barnych, Digital Manufacturing and Design Innovation Institute-- DMDII, who said, "Digital manufacturing is an integrated suite of tools that work with product definition data to support tool design, manufacturing process design, visualization, modeling and simulation, data analytics and other analyses

necessary to optimize the manufacturing process."

Barnych went on, "What are DMDII's goals? To demonstrate and apply digital manufacturing technologies, and accelerate these technologies to market in three specific areas: Advanced Manufacturing Enterprise, Intelligent Machining, and Advanced Analysis using an Open Source Platform that enables data aggregation, analysis and action, while meeting industry and national needs for security, trust and IP protection within the manufacturing environment."



Brian Beaulieu from ITR

The Economic Viewpoint

Brian Beaulieu from ITR research, whose twin brother Alan briefs the CSIA executive conference annually, said, "We are moving in the right direction...we see a GDP increase through the end of 2018.

This is a great time to invest. The US is the world's dominant economy, over 20% for the past 80 years. Twice the size of China's GDP. But we are an amazingly paranoid culture-- afraid of losing our place. We won't. We are continuing to grow-- Europe is flat, China is contracting.

"Private Sector Employment Growth is 2.4% and accelerating; job openings are at 16.1% and accelerating and involuntary part time employment -8.6%. However, you must be able to retain the workforce you have trained. Labor price inflation has just started in the US. Cheap labor isn't going to matter in the future.

"Foreign direct investment in US has increased, china has declined. Our dependence on foreign oil is declining...32% in 2013...from 60% in 2005.

"The automobile industry is a classic example of how to reinvent an industry. 45% increase of new robotic orders in 2014 alone."

Stamping toward ONE Ford

The next speaker, Andrew Herbert, Chief Stamping Engineer, Ford, said, "We make the metal-- steel or aluminum, and we have just introduced the new F150 truck, which is all aluminum.

"I have watched the technology of machine controls and the diversity of machine control suppliers from tubes and relays to Simatic and TIA Portal. We have 26 Stamping Facilities Globally—we need a Global Standards Footprint. So we are creating the future Ford Stamping Business Unit to have ONE Controls Platform, for PLC--Motion--HMI--etc. We are working with Siemens to standardize that across the globe.

Cover Story: ABB's Home Run and Siemens' Manufacturing in America (continued)

"With common control standards, safety, quality, delivery, cost, people, maintenance all improve and become higher quality and less expensive. With varying control systems, you can't even call for help to the next plant, because they won't know-- they are on a different system.

"We are going to leverage ONE FORD. We will connect the SBU globally, with continuous improvement of SBU Standards, utilize dedicated suppliers, and grow our aligned OEM base. From one plant to the next, ONE Ford gives us the same ability to run the business."

I am a Really Smart Guy!



Jeremy Gutsche

The keynote speech was delivered by Jeremy Gutsche, the CEO of Trendspotter.com, whose father was an owner in the Canadian Football League. Gutsche delivered a Millennial style rant about change and innovation, insisting that his method of spotting trends is better and faster than any other. He shared some stories about bonehead moves by Kodak, Blockbuster, Blackberry, the founder of Victoria's Secret, Encyclopedia Britannica, Encarta, and Smith Corona. He pointed out that in his opinion, each of these was a misreading of trends and an unwillingness to go for broke. More of his rant can be found on the Soundoff! blog for March 11.

Exhibits and Sessions

There were a fairly large number of exhibits from a variety of suppliers to the automotive industry. Siemens, of course, had the largest exhibit, followed by their co-presenter, Electro-Matic, who incorporated their largest product lines into their booths: Siemens, Light Guide Systems, Stober, Fortress Interlocks, Rittal enclosures, PAR systems, Hilscher, and Turck.



Dr. Robert van Til

Of great interest were the educational and governmental agencies: Macomb Community College which provides two and four year and certificate credentialing in automation and maintenance technologies; Monroe County Community College, which offers fourteen different technical subjects pertaining to manufacturing; Oakland University, whose industrial engineering and engineering management courses are about lean, six sig-

ma, and which offers individual courses in PLM and PLCs for industry engineers. Dr. Robert Van Til, from Oakland University was one of the speakers at the previous evening's Thought Leadership panel, and also spoke in sessions. The other academic institution represented was the University of Toledo, and Dr. W. Ted Evans. UoT offers computer science, construction, electrical and mechanical engineering education. Dr. Evans has a non-published book he uses to teach automation and control systems. He is a former control system engineer who worked in industry before becoming a professor.



W. Ted Evans

At the Seminar

There were a number of very interesting seminars on the two-day schedule, including some very hands-on training with Siemens products and tools. There was an Industrial Wireless Hands-on seminar which had to be limited to 20 people, and a session on Smart Sensing Made Simple using IO Link. There was also a session on Industrial Computers and the Internet of Things.



Sam Hoff

Sam Hoff of Patti Engineering and Wright Sullivan of A&E Engineering presented "Inside Systems Integration," a how-to on building relationships with solution partners. It was illuminating for many of the attendees, who apparently had never thought about what it means to work with a system integrator before.



Wright Sullivan

The academic exhibitors *en masse* produced a presentation called "Where to find new Controls Engineers," which opened a lot of eyes to the much better state of control and automation education, at least in Michigan. It has become apparent that the educational institutions have caught up to modern technology.

A very interesting session on HMIs was produced by a gentleman from Rittal, which discussed the uses of swing arms and wash-down proof enclosures. It would have been interesting to hear about mobile HMIs and other things that are trending.

There was also a repeatedly held session of "ICS Cyber Security Measures Hackers Hope You Ignore." I hope YOU don't ignore them!

CSIA Gets New CEO and There's Something Funny with M&A

CSIA's New CEO is Emerson and Schneider Alumnus

For only the third time in its history, CSIA has changed leaders. Bob Lowe, who succeeded, and more than filled the huge shoes of, Norm O'Leary as executive director is retiring, and now we know who will succeed him. José M. Rivera has significant and very high level chops as an automation leader, first for Emerson, and then for Schneider Electric. José has held a successful global career in the automation industry working in six countries, most often with a regional or global role.



José M. Rivera, new CSIA CEO

During his tenure as Senior Vice President Strategy and Communications, Industry Business at Schneider Electric in France, José realigned the automation business along the overall company energy efficiency direction. He crafted and executed the strategy to penetrate the process automation market, first through an alliance with a leading process automation supplier, later through the acquisition of Invensys plc in 2014.

Prior to Schneider Electric, José had an 11-year career at Emerson Electric in the United States, United Kingdom, Germany and Puerto Rico, involving product line, general and regional sales management roles for the process automation market. He started his career as a sales engineer with Siemens in Costa Rica with later assignments in Germany.

He holds an MBA from the Kellogg School of Management at Northwestern University in Evanston, IL and a Lic (MS) and BS degrees in Electrical Engineering from the University of Costa Rica. He is fluent in Spanish, English, German, with a basic level of French.

José will assume his role with CSIA on March 23. Meanwhile, CSIA Executive Director Bob Lowe will be helping transition José leading up to his retirement on June 1. José will travel to the CSIA offices in Madison, Wisconsin on April 5 to meet with Bob Lowe and President Lynda Patterson and begin the onboarding process to ensure he is up to speed in advance of our Executive Conference, which begins April 29 in Washington, D.C. The only question is how well he will adjust to working in a smaller organization, with mostly volunteer leadership. Time will certainly tell.

There's Something Funny With M&A

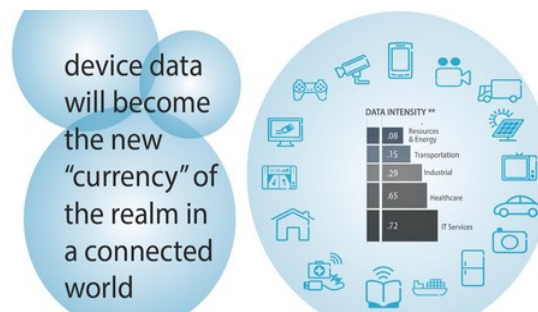
Harbor Research published a report recently in which they discussed the Mergers and Acquisitions scene around the Internet of Things. Harbor says that when it comes to IoT acquisitions, most companies "are plagued by tunnel vision."

"The recent moves in the market indicate that acquisitions strategy for the IoT is far from maturing—it's still stuck, for the most part, on replicating and scaling existing businesses, technologies and models. Technology players have tended to view the opportunity through the prism of what they do today, instead of envisioning a radically different view of the future," Harbor opined.

The INSIDER disagrees, somewhat. The recent acquisition of Silicon Valley wireless company BEEcube by National Instruments is illustrative of what we think is going on. Manufacturers clearly see where the IoT is going, and they know that they will need new input for sensors, devices and software that they are simply not capable of generating for themselves. So they are acquiring companies from outside the mainstream of the automation industry.

Harbor Research goes on to point out that the M&A activity is still focused on the sensors end of the IoT, and not taking into account the second and third tier of applications that the IoT will enable, once it is fully operational. I think we aren't seeing what most companies are doing in this area right now.

With HP acquiring Freescale Semiconductor, which itself acquired Zenverge, and KORE Wireless acquiring RACO Wireless, what we



are seeing is a jostling for position, preparatory to the big leap into IoT businesses.

Digital currency in the IoT— from Harbor Research

disruption of existing mature businesses, while at the same time it will enable entirely new categories of opportunities," Harbor's report goes on to say.

"The IoT will drive

The INSIDER completely agrees, as you will see when you read my report on the Internet of Things , Big Data and Control System Architecture, beginning on page 15 in this issue.

—Walt Boyes

CSIA Websites, Tricorder, Graybar Buys Advantage, 1000 mph car

System Integrators Don't Do Inbound Marketing Well



According to a report published by Authentia, control system integrators aren't doing well at marketing using their websites. "Authentia randomly selected 100 North American control system integrators and assessed their digital marketing effectiveness against 32 separate criteria," said the report's author, Jon DiPietro, author of *Social Media for Engineers and Scientists*.

Authentia's Jon DiPietro

Key findings from the report include the finding that the websites are outdated in terms of messaging and technology:

- 79% of CSI websites we analyzed make site visits from a mobile device difficult or impossible, alienating nearly half of their web visitors.
- 48% of the website cannot easily change site content or even enable blogging, as they do not use a Content Management System (CMS).
- 45% of all sites studied make no attempt to establish trust with site visitors through the use of *social proof*, such as testimonials, awards, certifications, memberships, etc.

Search engine marketing is nearly non-existent in the industry:

- 3% of websites surveyed were determined to be paying for advertisements on search engines.
- 85% of CSI websites had a Domain Authority below 40, which is a measure of how much clout a website carries with search engines.
- 42% of websites did not have any analytics operating which track their performance.

The industry has not yet adopted content marketing as a strategy:

- 67% of those studied do not list or promote social media accounts, such as Facebook or LinkedIn
- 65% of websites have no blog or news feed.
- 12% had a blog and published industry-focused content (as opposed to company news).
- 88% of websites surveyed did not incorporate social sharing buttons, making their content difficult to find and share.

There are very few mechanisms in place to interact with prospects:

- 2% of websites were connected to a marketing automation tool.
- 84% of websites surveyed did not utilize visible call-to-action buttons.
- 95% of websites failed to use landing pages, which contain an offer designed to collect information from prospects.

The 2015 Control System Integrator Digital Marketing Benchmark Report can be downloaded for free at www.authentiasoft.com/2015-csi.

The Star Trek Tricorder, For Real?

Robert Kaul, president and CEO of Cloud DX was showing off the components of his entry in the Tricorder Xprize, the



Tricorder for Real?

\$10-million competition that requires teams to develop a sci-fi medical scanner worthy of Star Trek. Each device must be able to diagnose 15 different medical conditions and monitor vital signs for 72 hours.

Although Cloud DX was ready to unveil its prototype at SXSW, all ten finalist teams must be nearly done tinkering with their devices. They're required to turn in their entries on 1 June in preparation for a six-month round of consumer testing.

The XPrize is partnering with the medical center at the University of California, San Diego on that consumer testing, since it requires recruiting more than 400 people with a variety of medical conditions. Just another example of sensor design coming from outside the conventional instrumentation industries.

Graybar Buys Automation and Controls Distributor

Graybar announced March 24th that they will acquire Advanced Industrial Automation, a large, Georgia-based distributor that specializes in automation and control systems. AIA has branches throughout the South, representing Schneider PLCs, GE Intelligent Platforms, Pro-Face, Sick, Rittal, Phoenix Contact, Secomea, Eurotherm, APC, Pelco, Yaskawa, Stober, Hirschmann, ACP, Dynapar, Stratus servers, Digi communications, Junot enterprise connectivity, and SyTech "the report company." Good haul for Graybar.

1000 MPH Car Visits English School



Bloodhound SSC—1000 MPH Car

On Monday 23 March the Institution of Mechanical Engineers took the Bloodhound SuperSonic Car to visit the Simon Balle School in Hertford, UK. The full-scale model of the Bloodhound SSC car was on display to help raise awareness among schoolchildren about

the Bloodhound SSC project and its aims to inspire a generation about science and engineering.

The Institution of Mechanical Engineers is one of the key sponsors of Bloodhound SSC, which aims to break the world land speed record of 763 mph later this year before its 1,000 mph run in South Africa in 2016.

The visit gave pupils an opportunity to explore the different components of the car, as well as providing them with workshops on 3D manufacturing and rocket cars.

James Hobbs, Marketing & Membership Director at the Institution of Mechanical Engineers, said, "At the moment the number of people pursuing STEM careers is just not enough to meet future demands, which is why inspiring young people through the Bloodhound SSC project is so important."

Draeger Buys GasSecure

The company that developed the first ISA100 wireless gas detection sensor, GasSecure of Norway, has been acquired by Dräger Holding International, the Lübeck, Germany based parent company of the family owned Dräger Group for an acquisition value of around NOK500m (\$61m), although the Dräger 2014 annual results statement, suggests the cost will be between Euro55m and Euro60m (\$58m-\$63m), either because of currency variations and phased payments, or the sum is related to future sales success.

GasSecure was founded in 2008 by Knut Sandven, the current CEO, and SINTEF, a Norwegian research institute and contract R&D organization that operates in partnership with the Norwegian University of Science and Technology (NTNU) in Trondheim. The GasSecure sensor emerged from core technology originating from SINTEF.

Dräger's plan is to keep GasSecure intact, as a separate company in the Group, under the leadership of Knut Sandven. Dräger Executive Vice President M&A, Brigitte Dautzenberg commented: "We are truly impressed by Mr Sandven and his team and what they have achieved so far, and want to make sure we integrate this capability into the Dräger organization in a tailored and effective way."

Fast trials and acceptability

Early in 2013 the first installation of 20 of their GS01 wireless infrared gas detectors was made on the Statoil Gullfaks C platform in the North Sea, by a team from Statoil, ABB and GasSecure. Then BP has been one of the main quoted installers of their systems, at BP terminals in the UK, at BP Alaska and in Australia. With the ISA100 wireless interface on this sensor, Yokogawa was a major wireless partner on several of these installations. This led to the announcement of a global marketing agreement for such systems between the two companies last July, as reported in the **INSIDER** for July 2014 (page 6): this also reported on further installations of the gas detector for Petronas in Malaysia and for Shell Sabah, offshore, also in Malaysia.

There was an "Elephant in the Room" at the Yokogawa event last July: one of the major sponsors of the event was Dräger, and the juxtaposition of a Dräger presentation about a newly introduced visual flame detection system, with the announcement about the deal between Yokogawa and GasSecure over the GS01 hydrocarbon gas detector and the ISA100 systems, seemed uncomfortable. Now we maybe see what was going on in the background!

The natural next step

From the GasSecure point of view, CEO Knut Sandven described the change in ownership as a natural step in expanding the GasSecure influence and success further: "Growing a start-up from first concept to a successful company with global reach means going through different phases. The venture companies were perfect owners in the start-up phase with their continuous support, commitment and experience. Now it is all about distribution, support and scaling where a prime industrial brand such as Dräger is the best partner we could ever imagine. This is a huge recognition of our innovative technology, the GasSecure team, and our vision for new, revolutionary products."

This sort of implies the potential for a closer working relationship between the existing Dräger fire and gas protection business, and the Yokogawa automation and control systems, for the future. Looked at the other way round, maybe Dräger wanted the expertise and the technology in GasSecure, and had the cash to afford the acquisition – which after all was fairly expensive! But it might also give further impetus to developing more business in their co-operation with Yokogawa? Two comments from, Eivind Bergsmyr, Chairman of their lead investor Viking Venture, highlight these points. First that GasSecure sees Dräger as the main opportunity

E+H Celebrates Patents and R&D

Endress+Hauser reports that the number of patent applications made by the Group last year was 259, which has brought their total number of active industrial property rights to over 6000. Most of these have been filed in the areas of flow, level and analysis measurement technology: but only about 30% of all patents reach a level of economic relevance – often after many years. But they are crucially important for the growth of the group of companies. Michael Ziesemer, deputy CEO, commented: "Innovative products giving our customers added value are our biggest strength, especially in times of economic uncertainty. Protecting achievements at the earliest possible point in time is our life assurance". One in 16 people working for the Endress+Hauser Group is in one way or the other employed in research and development. The annual E+H Innovators' Meeting, held this year in Muttens, Switzerland, honours these inventors and innovators and promotes the spirit of research: this year it was attended by 344 people who were involved in patent applications in 2014, and awards were made to those behind economically-significant patented developments. The attendees are shown in the



E+H Innovators Meeting photograph.

Dräger Buys GasSecure (continued)

to gain a major distribution network for the product: “Dräger is in our opinion the ideal buyer for GasSecure. They have the capability and distribution power to scale the unique and promising products of GasSecure with their worldwide distribution network”. Then secondly, a comment on the acquisition price: “Dräger understands how to develop an innovative company further and has been willing to offer a competitive price, acknowledging the outstanding [GasSecure] achievements”.

The “competitive price” of \$61m is impressive since the GasSecure turnover last year was around NOK11m, equivalent to nearly \$1.4m. In an interview Sandven explained this as because the potential for wireless gas sensors offshore is to satisfy half the offshore and petrochemical demand for such units within 5-7 years, and that this market is currently 150,000 units per annum. Further, the installed cost of a wired gas detector is maybe 10x the sensor cost, whereas with a wireless unit the installation cost is much lower.

So let's look more closely at the Dräger 2014 results, to see the capability and logic for this acquisition.

Dräger 2014 Results

Dräger announced their financial results for the calendar year of 2014, a year in which they achieved record order intake and net sales levels, before exchange losses were taken into account. Both figures were approx Euro2500m (\$3Bn), with sales up 2.5% and orders up 1.3% year on year. EBIT was Euro178.6m (\$220m), down 11% on 2013 and at 7.3% of net sales. Employees total 13700, and the research and development spend in the group in 2014 amounted to 8.7% of net sales, or Euro209m (\$255m). For the previous year, the geographical sales split was biased strongly to Europe, with 20% in Germany and 35% in the remainder of the EU, only 19% in the USA, 18% in Asia/Pacific and 8% elsewhere. [Note: These Euro to USD conversions are made at 1.22USD for 1Euro, the rate at the end of 2014.]

The business is split into two divisions, of which the slightly larger is the Medical Division, Dräger Medical GmbH, with net sales of Euro1600m (\$1.9Bn), and EBIT 8.1%. The medical division produces anaesthesia workstations, medical ventilation systems, and gas management systems.

The other division is the Safety Division, Dräger Safety AG & Co, which offers complete hazard management solutions, gas detection and fire-fighting equipment, plus also alcohol and drug testing instruments. With sales in this division of Euro900m (\$1.1Bn), up 3.1%, and an EBIT of 9.9% (Euro88m - or \$107m - in cash terms), this represents 36% of Group sales, and maybe 40% of earnings.

Stefan Dräger, Chairman of the executive board of Dräger Group, commented “We can look back on a fiscal year of mixed performance. Weak business development in the first half of the year was followed up by a brilliant end to the year”. The medical business performed weakly in the key markets of US, China and Russia, but very well in Southern Europe. He did not comment on the Safety Division performance, but said overall the fourth quarter produced excellent Group results, with sales up 6.3% and an EBIT margin of 12.6%.

Where does this position Dräger?

The process and automation industry related business, (i.e., without the medical division) is about \$1.1Bn, placing it as #25 or so in the Control Top 50 World sales rankings, around the same as National Instruments or Teledyne. In the Rest of the World listings, their automation business positions them at #22, alongside Ametek and Yaskawa, and with only half of the equivalent sales of Endress+Hauser, outside the USA.

So Dräger is a major business, and the Group is not likely therefore to be the target of any take-over bids from process automation majors in the short term: but it is also a German family owned company, and would not be open to such an approach. Dräger celebrated their 125th anniversary in 2014, and are managed by the fifth generation! Recently they have raised some capital by selling some shares, which raised around Euro100m for the company in 2010. Presumably some of this cash investment is being used on the GasSecure investment. The family still retain control of over 70% of the voting shares.

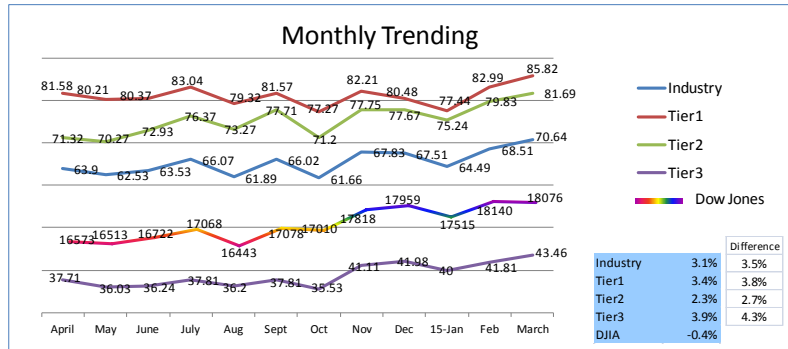
Moving forward in technology

The introduction of the Dräger Flame 5000 “Visual Flame Detection System” last Summer at the Yokogawa European User Group meeting in Berlin was reported in the July and August 2014 issues of the **INSIDER**: this new type of fire detection sensor is particularly immune to false alarms offshore. So Dräger has the most advanced technology on the market for offshore platform fire detection use, and with the GasSecure product, they have a similar edge in the field of offshore hydrocarbon gas detection. The product is already featured on the Dräger website, and their own press release about the acquisition explains the logic further:

“The combination of Dräger and this young, innovative company also shows that we are aware of our technological pioneering rôle in gas detection technology, as well as our desire to further strengthen our market position.”

—Nick Denbow

Oil Prices Hurt Process; Factory Automation Booms



INSIDER

INDUSTRIAL AUTOMATION & PROCESS CONTROL

Health Watch

By Mary Samuelson

We suggested cautious optimism in the February Health Watch, and so far that optimism is warranted. For the second consecutive month, the ACI stock index score increased for all tiers and outperformed the Dow, which remained relatively flat compared to last reporting period. The Index score increase last month was slight (+2.4%) but this month is a bit higher (3.5%). All Tiers did well, topping the Dow by at least 2.7% with smaller Tier 3 companies outperforming the Dow by the largest percentage.

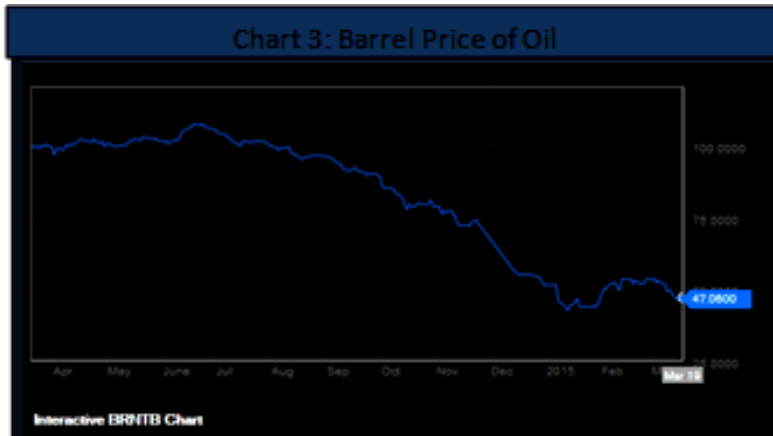
The upswing in the industry is especially heartening considering that other economic situations do not appear to be improving substantially. Currency prices continue to fluctuate, directly impacting oil prices because a stronger dollar weakens demand from holders of other currencies for commodities denominated in the greenback. The opposite occurs when the dollar declines.

All Tiers did well, topping the Dow by at least 2.7% with smaller Tier 3 companies outperforming the Dow by the largest percentage.

Reuters analyst Barani Krishnan reported on March 19 that crude prices tumbled on Thursday as the dollar rebounded from its largest drop in 18 months, with Kuwait's stance, that OPEC has no choice but to keep producing in an oversupplied market, driving the price of oil even

lower. Kuwait Oil Minister Ali al-Omar said OPEC had to keep production steady because "We don't want to lose our share in the market." His comments echo those of OPEC leader Saudi Arabia. The members of the producer group plan to continue production to defend its market share against rival shale oil producers in the United States and other non-OPEC nations.

The US currency stumble was precipitated by the lack of a clear timeline for a US interest rate hike. As the value of the dollar declined, oil prices rose. Brent rose nearly 5 percent and U.S. crude about 3 percent as the dollar suffered its biggest one-day slide in 18 months. As the USD rebounded, however, oil prices again fell, with Benchmark Brent oil down nearly



Source: <http://www.bloomberg.com/quote/BRNTB:FP>

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INDUSTRIAL AUTOMATION & PROCESS CONTROL

Health Watch

By Mary Samuelson

3% and US crude down almost 2%. Phil Flynn, analyst at the Price Futures Group in Chicago commented that, "It's dollar play all over again today. The fact that the oil market is oversupplied is a given, so the only real variable now are currency moves and how they impact commodities demand."

The Yen has fallen again since last reporting, and orders for the ACI are still

relatively flat yet even with the declining yen, the Japanese ACI Index performed

extremely well in the past year. One year returns for Japanese companies in the Index were

In some instances, the declining Yen actually helped sales for Japanese companies because other currencies had a much stronger value, allowing foreign buyers to purchase Japanese products for less.

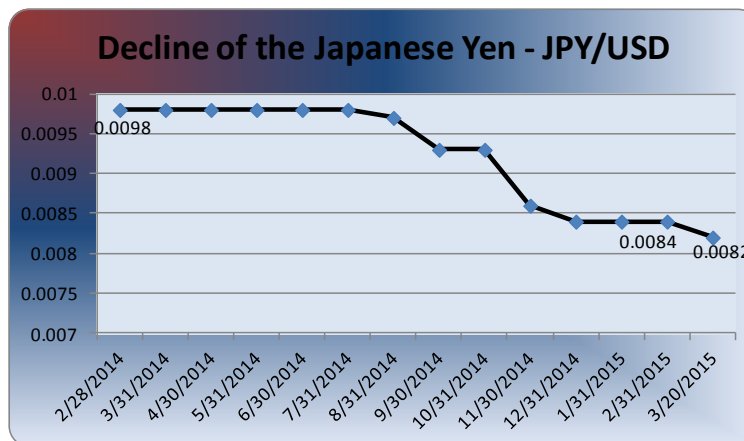
over 20% higher than US companies for the same time period. In some instances the

declining Yen actually helped sales for Japanese companies because other currencies had a much stronger value, allowing foreign buyers to purchase Japanese products for less.

Looking at the current reporting period, stock prices for Japanese companies in the Index were slightly but not significantly higher on average than

US companies; an indication that even with (or possibly in part because of) the continued decline of Japanese currency, the Japanese ACI industry is holding its own.

Some specific companies' performance over the past year are worth mentioning this month. Bloomberg posted a one year ROI for



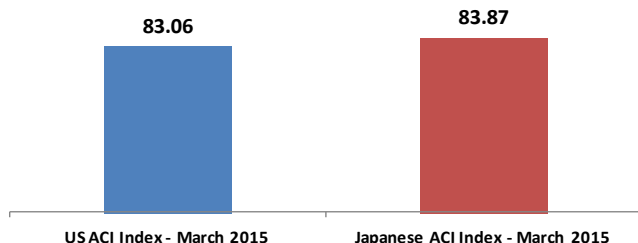
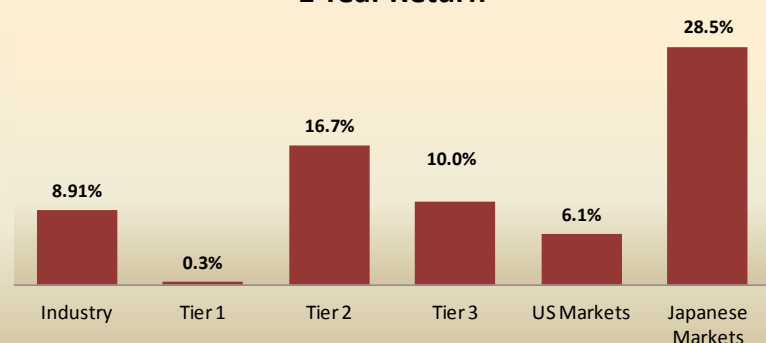
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INDUSTRIAL AUTOMATION & PROCESS CONTROL

Health Watch

By Mary Samuelson

1 Year Return



tions such as a new generation of wider temperature isolated EMC level 4 series device servers. Looking toward the future

Keyence Corporation (6861:JP) of 80% on March 18. On that same date, Mettler-Toledo, (MTO:GR) which trades on the Stuttgart Market and focuses on retail, pharmaceutical, and the food industry showed a one year ROI of 78%.

Mettler-Toledo US also did extremely well, with a 40% ROI.

Next in line was Advantech with a 59% ROI. Advantech's innovative and cutting edge R&D make it a leader in the ACI, with recent contribu-

With a 59% ROI, Advantech's innovative and cutting edge R&D make it a leader in the ACI

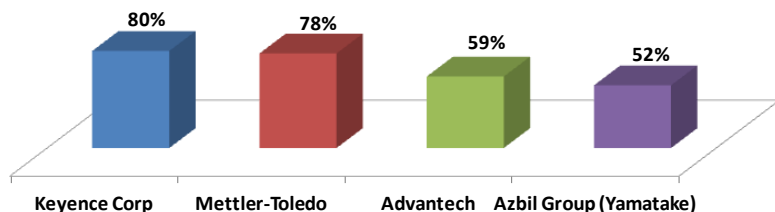
of manufacturing changes and predicting a new industrial revolution that will involve cyber-physical production systems, Advantech focuses on several areas that are less effected by the current economic upheaval.

Azbil Corp, formerly Yamatake, also did well with a 1 year ROI of 52%, according to Bloomberg. Azbil had some ups and downs across the different divisions. For example, their quarterly report for December notes the challenges of the current socio-economic environment and the effects of those challenges on their business model, but in addition report that:

As regards profits, the LA [Life Automation] business suffered a fall in income.

And there was also an impact from increased R&D expenses and an increase in expenses incurred for the updating of core information systems, etc. However, the BA [Building Automation] and AA [Advanced Automation] businesses achieved growth in sales, and initiatives aimed at cost im-

Top 4 - 1 Year ROI March 2014-March 2015



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INDUSTRIAL AUTOMATION & PROCESS CONTROL

Health Watch

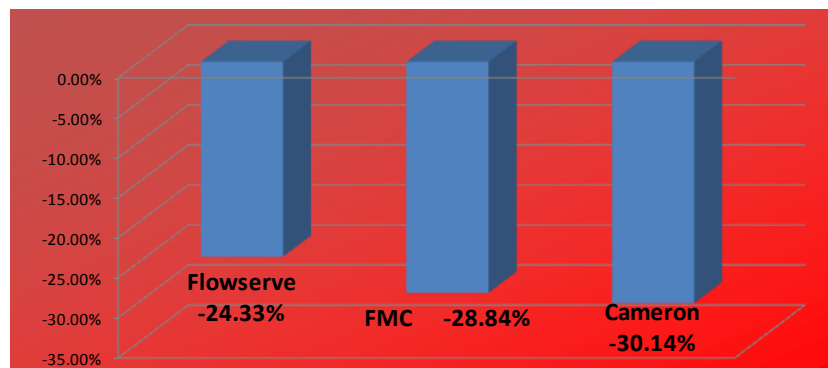
By Mary Samuelson

provement, etc. bore fruit. As a result, operating income was up 62.8% at 6,586 million yen, compared with 4,046 million

Cameron is working to correct its position. At the end of February the com-

perience to our board coupled with an exceptional track record in leading organizations. Scott brings a deep and diverse understanding of Cameron having successfully led a number of our operating units. As such, the two of them bring fresh and complementary perspectives to our board. We are pleased to welcome them, and we expect they will make significant contributions to our objective of building long-term shareholder value."

Bottom 3 - 1 Year ROI March 2014-March 2015



yen for the same period last year.

Others did not fare so well. Flowserve, FMC, and Cameron, all of which trade on the NYSE, were reported by Bloomberg to have negative ROIs between 24% and 30%. Cameron, with its strong focus on the oil and gas industry is the poorest performer, ROI-wise, in the Index.

pany announced that it is making changes to its Board of Directors, adding Brent J. Smolik who served as CEO of EP Energy Corporation since 2012, and R. Scott Rowe, a current Cameron employee since 2002 and its current COO. According to Cameron Chairman and CEO Jack Moore, "Brent brings substantial E&P operating ex-

I have tried to stress within this report, and it is important to note, that while some areas of industrial control automation are currently in a slump, due in part to the socio-economic conditions discussed earlier, not all of the ACI is feeling the pain. In addition to the companies

The Thing That Went Bump In The Night Was the Price of Oil, continued...

INSIDER

INDUSTRIAL AUTOMATION & PROCESS CONTROL

Health Watch

By Mary Samuelson

shown in the Top 4, Honeywell (ACS and HPS) is cur-

Company	ROI-March 2014/March 2015
Horiba	29.71%
Belden	26.76%
Roper Industries, Inc.	25.40%
Toshiba	20.07%
IDEC	19.19%
MKS Instruments, Inc.	18.13%
OMRON Industrial Automation Corporation	17.56%
Danaher	17.25%
Spectris plc	16.95%
Hitachi	15.23%
Honeywell Automation and Control Solutions	12.69%
Badger Meter	11.46%
MTS	11.30%
Rotork Controls	11.22%
National Instruments	11.06%

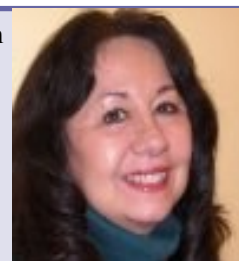
companies within the ACI where positive ROI was posted by Bloomberg for the past year.

As those more heavily invested in the oil and gas industry and other areas where socio-economic factors are playing havoc suffer, we must remember that our industry overall is more than oil and gas based, and is at this point in time, moving forward nicely.

rently cash flush and looking toward new acquisitions. Above is a chart of other

...we must remember that our industry overall is more than oil and gas based, and is at this point in time, moving forward nicely.

The *INSIDER* Health Watch™ is written by Mary Samuelson, Quantitative Research Practice Lead at Spitzer and Boyes, LLC.



Ms. Samuelson was director of research at Maritz Research, and vice president at Rockhopper Research, and a Senior Project Manager with The Right Brain People.

“The Health Watch shows what we are capable of, in quantitative research, at Spitzer and Boyes, LLC,” she said. “If you are looking for research that is different from the kind you get from the usual suspects, give us a call.”

Spitzer and Boyes, LLC has a complete qualitative and quantitative research capability, focused on the automation industries. For more information, contact Walt Boyes at waltboyes@spitzerandboyes.com.

The *INSIDER* Health Watch™ is available for license to use in other publications. If you are interested in doing that, please let Walt Boyes know.

Mary Samuelson is available for speaking engagements about the Health Watch™ and other quantitative marketing issues. Contact Walt Boyes for details at waltboyes@spitzerandboyes.com.

INSIDER Special Report— The Internet of Things, Big Data and Control System Architecture by Walt Boyes

The Internet of Things (IoT) is at the height of its hype cycle, along with its associated buzz word, Big Data. It is instructive to look at the hype, and see how IoT will be used outside of manufacturing, and what issues and problems will be seen in the general use area, and then relate those applications, issues and problems to an Industrial Internet of Things, which will be quite different and have different applications than the general Internet of Things may have.

We will discuss how the Internet of Things, and its variant, the Industrial Internet of Things, will affect automation and control systems and the process industries and manufacturing in general.

Beginning fifteen or twenty years ago, people discussed the benefits of interconnecting all the sensors everywhere, giving us Machine-to-Machine control (M2M). Your refrigerator could call and order your supplies directly from the grocer without you having to do anything other than make sure the money to pay for it was in your account. Less improbably, your HVAC system could interact automatically with the energy suppliers, making demand-response power pricing practical.

The Internet of Things was originally called M2M, now M2M is considered a core part of the IoT.

However, the number of sensors and other nodes that will have to be connected together to form an Internet of Things, or an Internet of Everything is so large that it will require wholesale

In order to produce the IoT devices, the same trends that we have been discussing in the INSIDER will apply: very low power radio networks, very inexpensive “lick and stick” sensors, and intelligent final control elements.

adoption of IPv6 (Internet Protocol version 6). To date, IPv4 stubbornly continues to be the protocol version in use, even though there are no new IP addresses. A variety of workarounds have been established to make it possible to continue to use IPv4.

In order to produce the IoT devices, the same trends that we have been discussing in the INSIDER will apply: very low power radio networks, very inexpensive “lick and stick” sensors, and intelligent final control elements. The sheer numbers of these devices required for the IoT will feed back into the design and availability of these sensors for the Industrial Internet of Things, exactly the same way as advances in design and economies of scale for automotive sensors have reduced prices for many devices used outside of the automotive environment.

The Industrial Internet of

Siemens Gas Analyzers

Siemens has announced new gas and oxygen analyser products designed to optimize safety and efficiency. The Siprocess UV600 is a UV gas analyzer able to meet the strict emissions monitoring regulations for low concentrations of gases such as NO, NO₂, SO₂ and H₂S, and is ideal for monitoring gas turbine emissions. The Siprocess UV600 is MCERTS approved, and is compact, in a 4U height enclosure: it will enable plants to avoid the use of maintenance-heavy catalytic converters or ozone generators for total NO_x measurements. The Siemens Ultramat 6 multi-gas analyser has gained Germanischer Lloyd certification, meeting the requirements of MPEC 184 (59) and MARPOL Annex VI for ship-board monitoring of SO₂ and CO₂ emissions. Finally, the Siemens Oxymat 6/61 series has now been released with a Safety Integrity Level (SIL) 2 rating: it can be used in applications measuring up to 100% oxygen, with a suppressed zero, and can be delivered in a completely ‘cleaned for oxygen service’ state.

INSIDER Special Report: The Internet of Things and Big Data, continued...

Things, working with Smart Manufacturing systems, will be able to produce a revolution in the way manufacturing is done, especially in discrete manufacturing and batch processing, but also effect a considerable change in process manufacturing as well. Based on the way the Internet of Things is designed, an “app-based” design approach may well produce the agile, limber process environment and process control systems that have been called for in the past ten to fifteen years.

The aggregation of sensors and data in the Industrial Internet of Things will first be able to revolutionize the process control lifecycle. Completely automating maintenance work orders, diagnostics and calibration will be among the first major effects of the IIoT. Connecting to vendor purchase networks automatically, for replacement and repair will be another major effect. This will permit maintenance and operations personnel to concentrate on causing the control system to work in an optimized fashion, and not spend time collecting and aggregating data and inputting data into dissimilar systems.

Using RFID technologies, inventory can be made entirely automatic. Delivery of raw or intermediate materials using robot-guided vehicles can also be made practical and will improve time to market and agility. RFID technologies can also be used to improve worker and asset safety, by providing location services both of personnel and critical assets such as

fire trucks and safety gear.

The IIoT will also affect how simulation and modeling can interact with the real time process. Models can be much more detailed, with the huge amounts of data available from the IIoT, and simulation can be morphed into ways to meta-control the process in real time.

But... There Is a Problem With Security

Increasing drastically the number of sensor and controller nodes on a control system network and extending the network beyond the physical boundaries of the plant to include suppliers and supply chain networks, increases the potential for threat to the system in a topologically complex way. Increasing the number of sensors and controllers, as well as other network nodes, increases the threat surface available to invaders of the system. It also opens the network and the control system to physical and cyber-physical attack, not just cyber attack.

The control systems of today cannot be made safe with the number of sensors and controllers and the limited complexity of industrial networks currently in existence or in design. In order to operate safely within the Industrial Internet of Things, control systems and industrial networks must be re-designed from the beginning to enhance safety and security and prevent both accident and cyber-intrusion. This will require an entirely new class of control system.

FPSO orders in Ghana and Norway

An \$850m GE Oil & Gas order, for equipment on an FPSO on the Offshore Cape Three Points (OCTP) block in Ghana, incorporates both turbomachinery and subsea elements, from several GE divisions. Three LM2500+G4 gas turbines for power generation and four centrifugal compressors, will be delivered by GE Turbomachinery Solutions. The associated electric motors and generators will be delivered by GE Power Conversion. The subsea production system will be delivered by a consortium of GE Oil & Gas and Oceaneering International Inc, and includes the Subsea Production and Control System (SPS) and umbilicals engineering, as well as project management, fabrication, transport and testing.

GE is supporting this work by building a local capability in the region: asset management services will be provided by an indigenous company JV, and a skills development program is being funded with the Ghana National Petroleum Corporation and Ashesi University. GE employment locally in Ghana will grow by 65%.

Alfa Laval has an order worth SEK115m (\$13m) to supply Framo crude offloading and fire water pumping systems for an FSO which will be moored in the Norwegian sector of the North Sea.

INSIDER Special Report: The Internet of Things and Big Data, continued...

What Will the IoT and IIoT Mean for Vendors?

The implications of the Internet of Things, Big Data, and the Industrial Internet of Things are enormous. They will create a completely different vision of control systems and how to control process plants based on the amount of data and the availability of data, and the ability to mine and refine that data into usable information.

The theory of Big Data brings to process control and manufacturing not only the concept of complex systems, but the complex systems themselves in practice.

The IIoT will make the entire sensor network, including final control elements, and the safety instrumented system, and the control system a single complex system. Adding to the complexity will be the integral interconnections to the supply chain, and to the enterprise. This will especially be true if, as is predicted, it will become commonplace for the business systems to be seamlessly connected to the control systems.

This clearly has implications for the design and operation of plant control systems. Control systems have always been somewhat isolated from the business systems of the plant, as the Purdue model and its many variants have shown. The Industrial Internet of Things will force the control system to be a part of a “network of networks,” and be capable of interfacing easily and in an agile manner, with all the other networks that surround it in the business

enterprise, however large.

Automation system vendor, as some already have, must embrace the IIoT by whatever name the vendor wants to call it. The vendor must also embrace the theory of Smart Manufacturing, again, by whichever of the many names currently in use the vendor prefers to use.

The IIoT will finally do for sensors and networking what the PC did for control systems. The introduction of the PC produced a COTS (Commercial Off The Shelf Systems) platform onto which the control system software could run. IIoT will provide the COTS sensors and networks that will be usable with no or minor modification in the industrial environment. The reason for this is that the sensors and networks will have to be more robust, not less, than the current technologies for sensors and sensor networks because they will be used in electric grid, building automation, and home automation systems where the level of training and support will be significantly lower than the standard in process automation.

Big Data and the Future of Control Systems Architecture

Ever since the development of large relational databases, theoreticians have discussed what could be done if the database were to be large enough, or if multiple databases were interconnected in useful ways.

Big Data is at the height of its hype. It can do anything for anybody. It is like magic, and not entirely well understood. But Gartner says,

New Emerson electronic “Logbook”

Emerson Process Management has introduced an electronic “Logbook”, to electronically document activity records - to streamline shift changes, drive operator action and accelerate decision-making. The resulting benefits can include minimizing shift handover risk, improving task management, and facilitating collaboration.

“Emerson is committed to delivering solutions that capture operator expertise while streamlining tracking and documentation for improved operation effectiveness,” said Peter Zornio, chief strategic officer at Emerson.

The electronic Logbook delivers a shift change dashboard that shows detailed information on assigned tasks. Operators can see events in the previous shift and identify priorities for the next. Automating task management ensures work is not overlooked, nor incomplete. Critical tasks are scheduled and prioritised. Non-urgent tasks like training, reviews and routine maintenance can be seen, and are documented when completed. All tasks are visible on the shift dashboard, so operators can determine criticality and plan work. Because it is in an electronic form, Logbook can also benefit from automated searching.

INSIDER Special Report: The Internet of Things and Big Data, continued...

“Through 2015, 85% of Fortune 500 organizations will be unable to exploit big data for competitive advantage.” This is true of both business systems and process control systems.

Arguably, the automation systems vendor that first, or best, applies the theory of Big Data and its ability to improve operation of both the control system and the enterprise will have a significant strategic advantage over automation systems vendors who maintain the status quo regarding system design and use. There is, thankfully, meaning at the bottom of the hype about Big Data. We'll concentrate on the uses of Big Data in process automation. As the Internet of Things will provide the same injection of COTS enablement that the PC provided in DCS and SCADA systems, Big Data's analytical tools for process automation and factory automation will be modifications and extensions of the COTS tools that have been developed over the past decade to use the ocean of data we swim in.

Big Data applications in industrial control systems

There are hundreds of potential applications in the industries process automation serves, including design of processes, design of products, and the actual design of process plants and discrete automation systems for factory automation.

Big Data will have a major

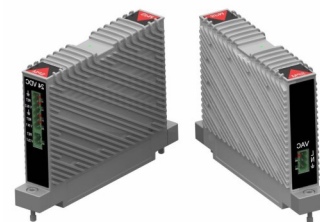
impact on modeling and simulation, both off-line and in real time. Big Data will make possible relatively inexpensive and high-resolution 3D training environments using the predictive analytics that have already been developed for consumer analysis, and using COTS data for things like piping, valves, etc. so that such objects do not have to be developed independently. Big Data can reduce costs to the point that using online modeling and simulation tools to predict outcomes of batch reactions becomes practical. Big Data will be used to improve operations as well as gaining insights that are not entirely obvious or easily apparent.

Another major implication for Big Data (and the Internet of Things) is how the architecture of supply chains will be changing. Currently, most people (and most product developers and product users) visualize the plant, enterprise, and supply chains as two-dimensional representations. Big Data, and the Internet of Things, will force us all to see these constructs as three dimensional, moving through time—in other words, four dimensional constructs.

Big Data is, simply, relational databases, and databases of databases, containing extremely large amounts of data. The amount of data beyond a certain point isn't important—what are important are the tools that are available to analyze the data and use the data to reach important conclusions, including conclusions that are not obviously available from simple

It Came from Outside!

Bedrock Automation, whose origin is outside traditional automation vendors, continues its “Revolution” series of white papers, describing in detail the design of the first blank-sheet-of-paper-out programmable field controller since Dick Morley first designed the Modicon PLC. The first chapter, “Backplane—Our Journey Begins” was released in January. It described the revolutionary backplane design that uses Bedrock's proprietary Black Fabric mesh network. The latest chapter, “Empowering Power” talks about the foolishness of using cheap power supplies to operate mission critical controllers, and suggests a different way. Bedrock's white paper describes a power supply that is secure, has its own communications and diagnostics, and an onboard 32-bit ARM cyber secure microcontroller.



Bedrock power supply

Watching Bedrock is getting to be an interesting occupation. To get a copy of these white papers go to <http://www.bedrockautomation.com>.

INSIDER Special Report: The Internet of Things and Big Data, continued...

data scans.

An example of this is the movement from real time data analysis for maintenance and diagnostics to including in the data historical data, data from other sources

outside the plant, manufacturers' data, and other information to allow the

scribed as a web that is not linear, and not single connection in-and-out. Each

Currently, the flow of data is conceived *ab initio* to be linear and unidirectional. How it really will flow is best described as a web that is not linear, and not single connection in-and-out.

piece of data will have multiple connections, multiple uses, and reside in multiple data-bases. Visually, this data flow will be indistinguishable from the data flow in the larger Internet.

This concept alone will require a major rethinking of how process and discrete control systems interact with data.

Typically, data feeds to control systems have been confined to field sensors and feedback from final control elements. Sometimes, OPC feeds from special purpose computers, and APC control information are also fed to the plant control system. The control system of the future will require inputs from all those and also from the enterprise, the supply and distribution chains upstream and downstream from the plant, and from other plants in the enterprise.

The architecture of the control system of the future will be completely determined by the Internet of Things, and the uses Big Data can bring to the industrial plant or factory setting.

Conventional Data Flow

- Sensor
- Data
- Controller
- Control system
- Historian
- Maintenance system
- ERP system



maintenance managers to make even more informed decisions.

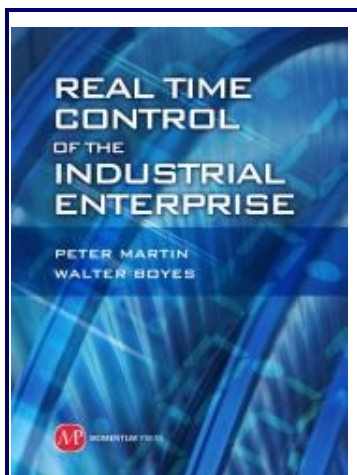
This example leads inextricably to the conclusion that the two-dimensionality of the Purdue model, and its modified successors, is not correct. As data flows from sensors, its path will no longer be linear. Currently, the flow of data is conceived *ab initio* to be linear and unidirectional. How it really will flow is best de-

Baxter and Sawyer Want to Play at Your Factory— More “It Came From Outside!”



Baxter and Sawyer from Rethink

Rethink Robotics has released its second robot, Sawyer, in a continuing attempt to disrupt the robotics industry. According to Rethink, labor costs in Chinese factories are rising 15 to 20 percent every year. Sawyer fits into a 2 x 2 x 5 feet volume, which is small enough to replace a human on an electronics assembly line. Unlike Baxter, Sawyer was designed for use internationally. The wrist camera now comes from Cognex, and is designed so it isn't blocked by large grippers. Sawyer runs Rethink's ROS-based software platform Itera and features the same interactive control system as Baxter. You can still teach the robot to do simple tasks just by moving the arm in the correct motion showing it once. Sawyer will adapt to minor changes in its environment without any additional input.



SMART MANUFACTURING? 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.

Good News From Valmet's Capital Markets Day

by Nick Denbow

A visit to the Valmet Capital Markets Day presentation this month was a new experience: normally these are attended virtual-

ly, by struggling with a relatively poor internet connection.

In person this was far more enjoyable, with Valmet executives explaining

their excellent results from their first year as an independent company, plus their plans to develop further following the acquisition of the Metso Process Automation Division.

The January issue of the INSIDER announced



Pasi Laine Valmet CEO

the planned acquisition of this division, from within their original Metso Group. Pasi Laine, president and CEO of Valmet, explained more of the background to this change, answering some of the speculation raised in that report, plus also gave the financial results for the 2014 year, which were a significant improvement on the notional 2013 results, prior to the formation of Valmet.

Automation background

Pasi Laine has a background embedded in process automation. His first job within the Metso Group was back in 1988 in Canada, where he joined the Automation Division within the Group as an engineer working on programming the Metso DCS

systems. Between 1996 and 98 he was managing director of Eltag Bailey Hartmann & Braun Oy, from where he returned to Metso as the VP of the Pro-

cess and Energy Business Unit, culminating in being President of Metso Automation until 2011, when he took over the Paper and Fibre Technology Division: this led to his new rôle in the Valmet spin-off.

There was therefore an opportunity for Laine and Valmet, when at the end of July 2014, the new Metso company announced that Process Automation orders were up 4% for the first half, at EUR515m, and up 10% in Q2: PA sales improved 15% in Q2. Despite these figures, and a 14% EBITA on a rolling 12 month basis, Metso had decided to "study strategic alternatives, including potential divestment, for its current Process Automation Systems business, which is primarily serving pulp, paper and power industries".

This presented an excellent opportunity for Valmet, who therefore expressed an interest in such an acquisition, so the thought expressed that this was sorting out a hiccup in the previous split was incorrect. Metso have however kept control of the Flow Control (Neles, Jamesbury and Mapag valves) aspects of this business.

Valmet 2014 results

The first year as a separate company showed a significant change compared to the notional 2013 figures for the business before the split. Net sales

Good News From Valmet's Capital Markets Day (continued)

were down 5%, at EUR2473m (\$2.7Bn), but EBITA doubled to EUR106m (\$116m), or 4.3% of sales, as employee numbers were reduced overall by 11%.

This was part of the business cost cutting exercise, where the 5230 employed in the Services business remained stable, but all the manufacturing businesses cut 22% of their employee numbers to reduce their cost base.

The cost cutting exercise also included outsourcing of significant parts of the plant equipment manufacturing operations — perhaps particularly for the Pulp and Energy projects: much of Valmet's own manufacture is carried out in China.

As a result of the web broadcast of the CMD presentations, the Valmet share price had increased 5% by the end of the day, and stayed there.

Order intake in the Pulp and Energy Division doubled, to EUR1344m (\$1.5Bn), and the Paper Division order intake increased 43% to EUR671m (\$733m). These were recognized as exceptional results, in a lumpy, cyclical capital equipment business: it was also noted that the main competitor, Andritz, had initiated a cost cutting program similar to that now completed by Valmet.

Q+A Sessions

The presentations (in London) were made to a room packed with fund managers and analysts: many of them from Scandinavia and Finland in particular: 70 were registered, so maybe 55 were present. The audience also included representatives of major shareholders, and one journalist (from the INSIDER!).

Major concern from some analysts seemed to be to ask how dependent Valmet was on paper and particularly newsprint production lines. Pasi Laine

explained the last order for a newsprint line had been received four years ago, and that in Europe the existing newsprint lines had to invest to keep themselves competitive, but for the last few years many such EU assets had been rebuilt to produce board.

The area of the previous Valmet business that still impressed me the most was in Pulp and BioEnergy: Laine claims Valmet is the biggest in the world at taking green raw materials and changing such renewa-

ble resources into sustainable results, whether in the form of energy, fuel or fabrics from wood pulp. Their wood pulp processing plants can produce

textiles, cellophane wrap or pharmaceuticals.

For the future, with Process Automation, Laine commented that "Many customers have reacted positively": detailed plans will be brought forward once the acquisition is completed, after April 1st. He saw opportunities in expanding the DCS sales outside the pulp/paper industry, into the wider, larger market, building on the PA success already achieved with Akzo Nobel, Borealis, Outokumpu (in Scandinavia) and Petrobras (in Brasil). Criticized over only targeting up to 5% per annum growth in automation, Laine said that at this stage he was taking a conservative approach.

As a result of the web broadcast of the CMD presentations, the Valmet share price had increased 5% by the end of the day, and stayed there.

Even More From Outside!

New Infrared Technologies SL has introduced a vastly less expensive MWIR sensor for robotic welding and other similar applications. The reason it is less expensive is that it is not cooled, as typical competitive devices are. The introduction of high-speed infrared imaging sensors (frame rate > 100 Hz) provides real-time information about the quality of the welding process, such as the area covered by the Heat Affected Zone or HAZ, the dynamics of the process, as well as spatial information that allows the detection of defects that may arise during the process.

The image shows a sensor capable of reading 10,000 images per second. The company's least expensive sensor, capable of 1000 images per second, sells for EUR 2200.



NIT sensor

Medium Wavelength Infrared or MWIR was developed for military applications, and companies like NIT are moving into the industrial space with this technology. Traditional companies in the sensor manufacturing space should be aware that new technologies keep coming into manufacturing from outside.



THE WAY I SEE IT

Editorial

Filling the Funnel— Getting Kids Interested in Manufacturing

As you have seen from the article on page 3, I attended the Manufacturing in America summit earlier this month at Ford Field in Detroit. Along with all of the Siemens exhibits, both from the factory and from its partner ecosystem, there were a fair number of educational institutions and government-sponsored job assistance and creation entities. The educational institutions ranged from community colleges to advanced universities, like the University of Toledo.

There were also several FIRST Robotics teams, doing a demonstration competition on the playing field, that was called "Technology Tip-Off." The robots tried to sling a large ball through an opening...like a hoop. It was a show of incredible inventiveness among the young people involved.

After looking at the curriculum of Oakland University's school of industrial engineering and systems analysis, and the curriculum of the University of Toledo's automation engineering program, I began to realize that the educational institutions are catching up to the real world. Both pro-

grams would have students completely prepared to walk onto a plant floor and begin work immediately, with some supervision and little further training. This is vastly different from the way things were just a few short years ago. Both programs, by the way, have space available.

Some experts say that children make up their minds by fifth or sixth grade whether they want to do math or science or not.

What seems to have happened is that we have moved the funnel downward. We have programs available for young people who want to be in manufacturing. But we have fewer young people who want to be in manufacturing than we have programs.

By the time young people are in high school, like the FIRST Robotics team members I chatted with, they've already decided whether they want to go to work in a factory or process plant. For most of them, it is *not*. Educators blame this on high school guidance counselors, who continue to direct young men and women away from manufacturing. They also blame it on parents who want to see their children working at Google, or Apple or Ama-

zon, not for GM, Ford or Chrysler. How bad is the shortage? Robotics system integrator, Paslin Company's CEO, Kirk Goins, told me that if I could produce qualified applicants he had 125 open positions, and he'd get his HR director down to Ford Field immediately to sign them on.

Clearly the disconnect isn't in the plant, or in academia anymore. The disconnect is in high school, and before high school. Some experts say that children make up their minds by fifth or sixth grade whether they want to do math or science or not. And it is worse yet. It costs approximately \$18,800 per year to take even a two year Associate degree. A four year engineering degree is more expensive yet. Scholarships are dwindling and loans are expensive. Even if a young man or woman can land a \$60,000 a year job out of these programs, or maybe even an \$80,000 a year engineering job, they're saddled with \$30- or \$40-thousand student debts. With that much debt to service, they can't buy houses, realistically get married, or have children.

So if we want young people in manufacturing, first we have to get them interested, and keep them interested, and then we have to figure out how to get them the education they need without going so deeply into debt they won't have a life.

Walt Boyes

Comments? Talk to me!
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Read my Original Soundoff!! Blog:
<http://waltboyes.livejournal.com>

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Rajabhadur V. Arcot: Electric power industry in India is all set to expand



India, with an installed generating capacity of around 256 gigawatts (GW), is presently the world's third largest producer of electricity

such as steel plants and others generate another 40 GW. Both state owned and private enterprises operate in India's electric power industry. From the consumption perspective, the industrial sector has emerged as a major consumer of electricity.

and the fourth largest energy consumer. It has one of the world's largest transmission and distribution network.

The International Energy Agency publication on World Energy Statistics 2013 places the country at the 110th position in the ranking based on per-capita consumption of electricity.

Despite the country's electric power industry generating close to 300 GW of electric power, India's industrial growth is stymied by endemic power shortages. The situation will worsen as

Despite this, more than 300 million people of the country have no access to electricity. India's per capita consumption of electricity is nearly one among the lowest in the world, thus depriving many of electricity that can improve the quality of their lives. The International Energy Agency publication on World Energy Statistics 2013 places the country at the 110th position in the ranking based on per-capita consumption of electricity.

India becomes more industrialized and grows economically, if the growth of the electric power industry lags.

Thus, the onus is on India's electric power industry to augment the generation, transmission and distribution capacities vigorously and the industry seems well geared to play its role.

Presently coal-fired power plants, accounting for almost 60 percent of the generating capacity, dominate India's electricity generation sector.

The country has 20 operational nuclear reactors with a generation capacity of 4.8 GW, representing about 2 percent of the total installed generating capacity. While hydroelectric power accounts for around 16 percent of India's electric power generation, gas, diesel and renewable sources such as wind, solar, and biomass energy account for the balance.

Set to expand and become greener

According the existing industry projections, the generation capacity is expected to expand by another 89 GW out of which 72 GW will come from coal based power plants, between 2012 and 2017.

India is also committed to establishing nuclear

All this will be change as the country inches forward to realize its dream of achieving economic growth and improving the wellbeing of the people. The electric power industry is set to expand and its profile is also changing. As the industry grows, it will witness on one hand the share of the renewables increasing and on the other greater use of the technology to achieve better efficiency. This augurs well for all stakeholders including automation and other technology solution supplier companies. The electric power industry contributes very significantly to the growth of automation market in India.

Although the third largest producer, India is still power deficit

In addition to generating 256 GW from power utility companies, captive power plants that are operated by major industrial companies

Rajabhadur V. Arcot: Electric power industry in India is all set to expand (continued...)

power plants in the years to come and towards that goal it has signed several agreements with countries such as Russia, France and the United States.

The investment required for expanding the generating capacity along with the required transmission and distribution infrastructure is of the order of \$250 billion. Almost 30 percent of projected generating capacity expansion has already been achieved.

If the other plans which are linked with the country's economic development roadmap are taken into consideration, the demand will more likely exceed the target, thus providing the impetus for the growth of India's electric power industry.

The industry is all set. It will be focusing not only on expanding the generation and transmission capacities but also on improving the entire electricity network performance, the efficient use of capital and get ahead on the curve in adopting emerging technologies.

Countries that latch on to emerging industry trends and technologies stand to benefit and leapfrog economically. While on the generation side, the future is in renewables, microgrid and smart grid technologies will dominate the transmission and distribution side. India seems to be definitely moving in that direction.

Recently, India's Ministry of new and Renewable Energy spelt out its plan to add 100 GW of solar power and 60 GW of wind power revising the earlier target of 22 GW by 2022. To put those numbers in perspective, as one report points out, 1 GW of power can meet the energy requirements of almost 700,000 modern homes; 160 GW would power a sizeable portion of India's energy needs.

The recently held global investors meet in India, Re-Invest 2015, elicited excellent support from various organizations and renewable energy firms from across the world. The conference received commitments from more than 200 global and domestic companies to

set up 266 GW of renewable power over the next five years. For some analysts, the program and the commitments may seem audacious but Michael Bloomberg, UN secretary general's special envoy for cities and climate change had this to say about India's renewable energy vision, "Imagine the signal it would send to the

world if India were able to achieve its goal of bringing electricity to every household that lacks it, largely using clean solar power - at a fraction of the cost of the conventional grid. It would be a success story told - and copied - around the world."

Countries that latch on to emerging industry trends and technologies stand to benefit and leapfrog economically.

Additional focus on improving efficiency

Apart from the challenge in increasing the generating capacity, the electric power industry in India also has to grapple with the task of bringing the transmission and distribution losses under control and improving the plant load factor of the power plants. The transmission and distribution losses fall under two separate constituents - losses from the technical perspective and losses from the commercial perspective.

The technical losses are primarily due to overloading, arising from inadequate investments in transmission and distribution over the years. The commercial losses are due to low metering efficiency, theft, and pilferages. Presently T&D losses in India are around 27 percent compared to 4-6 percent in countries such as China, Japan and Germany. It clearly establishes the need to invest more in improving the transmission system.

The plant load factor which is a measure of the efficiency of the generating plants is hovering around 65 percent thus giving a good indication about the need to focus on improving the plant efficiency and the scope for improvement.

Rajabhadur 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 rajabhadurav@gmail.com



Technology solutions, such as plant automation, asset management systems, smart metering, software solutions that do performance monitoring, diagnostics, and optimization play an im-

Rajabhadur V. Arcot: Electric power industry in India is all set to expand (continued)

portant role in bringing down the T&D losses and improving the plant efficiencies.

Automation is integral to safe and efficient operation

Power plants extensively use complex automation, asset management and intelligent load and demand side management systems, energy conservation solutions, and such others. The generating plants extensively use distributed control systems (DCS) for plant performance information & automatic control and programmable logic controllers (PLC) for startup, shutdown & sequencing.

Supervisory control and data acquisition (SCADA) systems along with remote telemetry units, find extensive application in the control and management of transmission and distribution of electricity.

There are also special purpose systems such as furnace safeguard safety systems / burner management systems, steam turbine governing control systems, automatic turbine run up systems, and nuclear reactor safety systems.

Performance analysis, diagnostics and optimization are also carried out using software solutions.

Human-machine interface displays provide the operators the information and access to manage the operations.

Additionally various types of transmitters and sensors, alarm annunciators, sequence of events recorders, historians, condition monitoring and asset management systems and such others are extensively used.

Be proactive and consultative to emerge successful

The information provided by these systems and their autonomous operation capabilities help generation plants and transmission & distribution grids to operate efficiently while complying with health, safety, environmental requirements and improving the plant availability and in reducing downtime. Investments in

these systems and solutions have the potential to significantly enhance the capabilities of operations management and control, asset management, energy saving, and demand side management.

Electric power companies understand these benefits but India being a country where capital is scarce and costly, often end users hesitate in increasing the investments and therefore it becomes necessary for suppliers to be proactive and adopt a consultative approach to establish the true financial benefits.

"Imagine the signal it would send to the world if India were able to achieve its goal of bringing electricity to every household that lacks it, largely using clean solar power - at a fraction of the cost of the conventional grid. It would be a success story told - and copied - around the world."

India's expanding electric power industry provides excellent growth opportunities to automation and other technology solution firms at a time when such prospects in many other parts of the world seem not so upbeat.

Opportunities include not only grassroots but also renovation and modernization projects.

The future is bright for companies that are ready to develop marketing strategies that are

tailored to address the market nuances.

We are proud to announce the appointment of Rajabhadur V. Arcot as Director Asia Operations for Spitzer and Boyes LLC, the publisher of the Industrial Automation INSIDER. Contact him at rajabhadurav@gmail.com.

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.