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Your key to the latest industrial automation and process control information

Inside this issue:

ARC's Industry Forum— The Elephants in the Room

The INSIDER attended the ARC Forum event in Orlando this month, as we do every year. The Forum is the semi-official kickoff of the media year in the automation industry, and is attended by many influential leaders, both from the end-user and vendor communities.

Andy Chatha kicks off the Forum

This year, the discussion was mainly about the Industrial Internet of Things. What wasn't discussed were the elephants standing right there behind the speakers throughout the event. Of course, there weren't really elephants, just elephant-sized issues people spent the entire event walking past, whistling. The elephants were the oil industry collapse, the fact that nearly nobody is running passionately toward the IoT, and the issue of cyber security, especially with regard to the IIoT. The last elephant was the issue of the effects of Industry 4.0 on the middle class and how to ameliorate those effects (see Walt Boyes' editorial on page 10 in this issue).

> **Of course, there weren't really elephants, just elephant-sized issues people spent the entire event walking past,**

The tone was relatively somber, as smaller delegations from the major automation companies were there. Emerson had only two or three people, with no upper management—highly unusual. Schneider had some upper management from both divisions. Honeywell had the normal contingent. Yokogawa had a very small group, and they gave no interviews and scheduled no meetings with the press, except for their press conference.

Statseeker's Frank Williams

There were new sponsors, like Statseeker, and the Bedrock/Inductive Automation duo was very busy since Bedrock is now shipping products., and Inductive has announced their newest version for the IIoT. Interestingly enough, one person commented to the INSIDER that Bedrock's product was the best old-fashioned DCS system he'd ever seen. Statseeker received attention because the network information management needs of IT and OT networks are becoming the same.

Bedrock's Albert Rooyakkers

ARC's Industry Forum (continued)

Inductive's Don Pearson

Inductive Automation's Ignition University is continuing strong growth and is training the next generation of Inductive's system integrators.

NextNine announced that their platform goes all the way down to the device level. With full visibility of SCADA devices down to the level of PLCs and RTUs at Purdue Level 2.

"By expanding our auto-discovery with layer 2 devices, NexNine's platform brings unprecedented visibility of assets to IT and OT managers," said Shmulik Aran, NextNine's CEO. "Complete and accurate inventory is a pre-requisite for reducing cyber security and operational risks, and is often a considerable operational challenge to overcome without a proper automated software tool."

NextNine's Aran

The new auto-discovery capability passively identifies all devices by analyzing network packets, eliminating any danger of disrupting the operation by active scanning.

A new cyber appliance was introduced at ARC by Indegy. It appeared to be interesting, although from its claims, it might even wash your socks.

The INSIDER staff had meetings with a number of people whose opinions matter. Andrew Ginter from Waterfall Security, had some very interesting things to say about the difficulty of securing the Internet of Things.

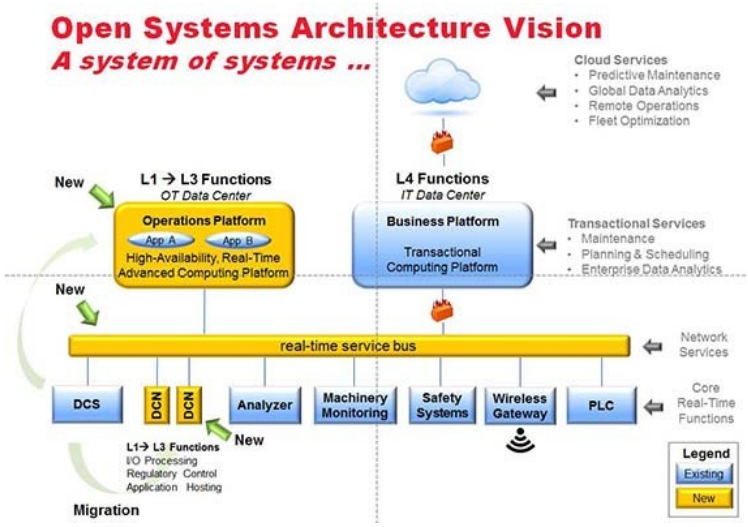
Achim Krueger—SAP

One of the most interesting discussions we had was with Achim Krueger of SAP. Krueger is a lifelong asset reliability expert with an aerospace background. His comments about the way manufacturing does asset management and the way the aerospace industry and the military do it were enlightening. SAP has themselves a good one there.

We also met with Honeywell's cyber duo, Jeff Zindell and Eric Knapp, and with Mike Brown, whose team released Honeywell's new Pulse! app (see the video of the Press Conference).

The Exxon Crisis

The INSIDER uses the word crisis advisedly. In January, and once again at ARC's Forum, ExxonMobil announced their intention to develop, in partnership with Lockheed-Martin, a complete new control system that was open source and modular. This has, of



course, thrown all the DCS vendors into a tailspin. Other companies and industry groups have been trying to work something out for a few years now, including SMLC (whose Chair, General Mills' Jim Wetzel, was at the forum), Industrie 4.0, ISA, and others. ExxonMobil's decision to retain Lockheed Martin as the project manager made no sense to many, and the INSIDER has real trouble seeing how a cost-plus contractor for the Federal Government will be able to hog-tie the many headed Hydra of DCS vendors and get them to go along with this.

This is especially difficult to understand since Exxon's Sandy Vassar announced just last October at Emerson Exchange that they'd be working exclusively with Emerson from now on.

The basic problems are two: first that the industry has a huge number of installed systems that for the most part are working just fine, thank you very much; and second, trying to find vendors who will cooperate in an endeavor to make control systems open source and with a common open platform will be like finding a virtuous person in a house of ill repute. The INSIDER will put serious money on the belief that even ExxonMobil is not big enough to pull this one off.

Cyber Security and the IIoT

Publicly, there was a lot of uptalking the Internet of Things, but privately things were quite different. Several vendors told the INSIDER that they were having some difficulty persuading their customers of the wonderfulness of the IoT, and that many customers were moving glacially slowly to implement it. The INSIDER's Joy Ward noted that when customers want to do something, they

ARC's Industry Forum (continued)

do it, the money is found, and the projects get done. It is only, she went on to say, when they don't really want to do something, or buy something, that the objections become like an obstacle course.

And one and all, the security researchers at ARC expressed themselves privately to be quite concerned about the potential for security issues with the Internet of Things. Entirely new ways of securing the industrial control system will need to be developed for the Internet of Things. This is, to some, a daunting task, but one that must be done for the IIoT to become useful and effective.

The Press Conferences

Press conferences are often interesting for what is not said, more than what is said or done. These are no exception. The INSIDER provides videos of the press conferences so that our readers can make up their own minds. Of course, we will have a few comments along the way.

The first press conference was from Telit. The first video has Fred Yentz from Telit talking about the IoT offerings Telit brings to the party, and then Inductive Automation's Don Pearson and Arlen Nipper, co-inventor of the MQTT protocol, on Ignition! native support for MQTT. MQTT is IBM's horse in the interconnectivity protocol races, so if you don't know MQTT now, you will. You can see the video at https://youtu.be/l5gRiPIIisA

Greg Scheu, president of ABB Americas, and Peter Terweisch, president of ABB Automation, talk about ABB's different take on the Industrial Internet of Things: https://youtu.be/Qf_slFhDwyY ABB is alone in emphasizing people in the Internet of Things, which is both refreshing and potentially a winning play.

Next up, Yokogawa insisted that they've turned over a new leaf and are now very much interested in acquisitions, which

they have not been until just now. Yokogawa's Tom Fiske introduces Satoru Kurosu, director and executive vice president of Yokogawa HQ, and Simon Wright, CEO of new Yokogawa Business Unit Industrial Knowledge, based on the January 2016 acquisition of Industrial Evolution Inc., to talk about Yokogawa's new cloud-based data capabilities. Here's hoping Yokogawa can become a company based on acquiring technology, rather than insisting on making it all themselves: https://youtu.be/_AK_hWywz2Y

Bentley Systems CEO Greg Bentley talks about new ways to get to three-dimensional engineering models of brownfield sites, using small, inexpensive drones and cell phone cameras. His technology is wonderful— until you get started asking the hard questions. How easy would it be for somebody who isn't friendly to buy his software, buy a few camera drones, and work up a three-dimensional model of any industrial facility or power plant they intend to attack either by physical or cyber-physical means. https://youtu.be/7iV0jUAf6rk

Mara Weber and Hillary Gwisdala from HPS introduced Honeywell Pulse! a new, mobile client for iOS (iPhone and iPad). The Android version is next, and the mobile client's security will have to be upgraded before it is as useful as it can be. It appeared to be easy to learn to use, easy to use, and quite powerful as a mobile data visualization tool. https://youtu.be/jF42IL-_UGU

ARC, as always, provides interesting news from the industry.

Are Webinars Worth Doing?, by David W. Spitzer PE

Webinars have been around for a while… but how effective are they? What do suppliers and attendees expect when presenting or attending a webinar? Is there a benefit to suppliers and attendees? Should resources be devoted to webinars? The answers are not that simple.

Webinars should not be confused with online classrooms where paying customers are trained remotely. Internal personnel often sit to improve their knowledge and skills. Webinars are free online events typically focused on introducing the attendee to the information --- not to substitute for classroom instruction or to convey in-depth knowledge of the subject at hand. Webinars typically provide the customer with a cursory understanding of the subject matter in a short period of time. However, it should be understood that uneducated (and/or partially educated) customers can be problematic and sometimes dangerous --- especially if they misapply an instrument and/or install it incorrectly. Low or no travel expenses for webinars clearly benefit both parties.

The motivation for suppliers to present webinars is ostensibly to attract potential customers by offering timely information for free --- usually presented by in-house experts. At times, companies will hire people well-known in their industry and/or purchase lists of applicable contacts to enhance attendance. Suppliers typically present solutions and in doing so attempt to create a relationship between a potential customer and the supplier so the attendee will trust the supplier to be there to help solve problems --- not just sell products.

Large companies can afford to have a dedicated infrastructure for webinars. It is more difficult for smaller instrument companies to present webinars because often they cannot afford dedicated personnel to handle the logistics of development and advertising --- especially when their people already wear many hats and focus more on day-to-day operations and sales. As a result, many small companies use YouTube videos to disseminate information about their technology and products. However a few small companies are or are planning to present webinars. In particular, one relatively small instrument company reported good attendance for their webinars that are focusing on their products and applications that help educate not only potential customers but also personnel at distributors, catalog houses and OEMs that sell their products.

Attendees often use webinars to obtain an understanding of the desired subject matter that is often outside of their primary areas of expertise. Viewing a webinar in a group setting can be distractive but it can also help introduce plant personnel to a new technology and foster its adaptation --- especially when multiple disciplines and stakeholders are involved. Referring a recording of the webinar for viewing later by others in the organization can also help foster adaptation. Further attendees can vet a potential resource for use in the future when they actually need to apply the information.

Attendees often find webinars rudimentary and "canned" in the sense that they appear to be pre-recorded --- even if they are not. Even the experienced individual will often find a couple of important ideas or subtleties in the webinar that may justify attendance --- however wading through the entire hour to get them can be frustrating. That said, webinars do have the advantage of having no registration fees.

From an experienced attendee's perspective, the value in many webinars often comes from questions that other attendees ask. However some webinars are so long as to leave little time for questions. In addition, it was suggested that webinars would have more value if attendees could type questions, allow other attendees to vote on their interest in the question (up/down), and then prioritize to answer the questions with the most attendee interest. It was suggested that more interaction between the presenter and the attendees improves the quality of the webinar.

One presenter stated that a steady 40-60 percent of registrants do not attend webinars for which they signed up. Some people register for webinars they find interesting and may not attend because they were not available at the time of presentation. Others are more selective and register for webinars of interest that are at times when they know that they will be available.

It is difficult to determine if attendees actually do pay attention. One supplier reported that approximately 80 percent of attendees pay attention. I suggest that this number is likely somewhat lower because many people multi-task and may exhibit an online appearance of paying attention. One experienced attendee said that about one-third of the webinars he attends are worth the time --- hinting that he might not pay a lot of attention to the other two-thirds. These rough percentages would likely be different if the engineer was not experienced.

In principle, webinars would not be provided for free if suppliers did not perceive some benefits. However these benefits are not immediate because attendees are usually in the process of acquiring awareness and far from making a purchase. However suppliers find webinars are worth the effort because each webinar can immediately replace a number of expensive customer visits over a wide geographic area to people interested in a particular subject as well as provide interaction with the customer.

IMHO, webinars benefit both suppliers and customers and in doing so will be around for a while --- especially as new subject matter emerges and as new people enter instrumentation.

David W. Spitzer, PE is a partner in the technology consulting firm of Spitzer and Boyes, LLC, which is the publisher of the Industrial Automation INSIDER. He is an ISA Life Fellow, and is an expert on field devices, variable speed drives, and technology transfer in the automation space. He can be reached at dspitzer@spitzerandboyes.com.

David W. Spitzer, PE lives for part of each year in Rio de Janeiro, Brazil.

The *INSIDER* Roundup for February 2016

Endress+Hauser CFO says E+H recorded growth in Fiscal year 2015

Endress+Hauser was able to hold its ground during the 2015 fiscal year despite a difficult business environment. Net sales increased 6.6 percent to 2.1 billion euros, and that's the end of the good news. The rest of their financial report was, as has been the practice of so many of its peers, putting lipstick on the pig. Preliminary financial figures show the impact of the strong Swiss franc and the oil industry collapse on earnings.

Dr Luc Schultheiss E+H CFO

"2015 was marked by currency rate fluctuations," said Dr. Luc Schultheiss, Chief Financial Officer (CFO). "Last year's decision by the Swiss Central Bank to revoke the cap on the franc was a major blow to the budget right at the beginning of the year, impacting earnings especially hard." The CFO anticipates Endress+Hauser's net income will decline around 25 percent compared to 2014. "We were unable to follow on the heels of good results in previous years."

The weak euro also had a significant influence on the Group's consolidated revenues. "In local currencies, the Group's sales grew less than 1 percent," highlights Luc Schultheiss. The economic transformation in China as well as the drop in the prices of raw materials – especially declining oil & gas prices – weighed heavily on the business.

500 new jobs worldwide

While dissatisfied with the performance of the business, Luc Schultheiss nevertheless emphasizes several positive developments. "The Endress+Hauser Group continued to show sound profitability and financial stability."

The company increased both its equity capital ratio and the headcount. The Group created more than 500 jobs worldwide, ending the year with a total of 12,952 employees. Endress+Hauser will present the audited annual report in Basel on 3 May 2016.

The CFO anticipates the current year will be even more difficult, with a single-digit growth in net sales and stagnating profits. Assuming the business develops as planned, the company will probably add around 350 jobs. The INSIDER understands that to be essentially zero job growth, based on attrition.

UK Not All Gloom and Doom, Or Maybe Not!

Deloite's UK Manufacturing Leader, Mark Stephenson, commented on the December economic numbers from the Office for National Statistics. "December's decreased manufacturing output highlights the real challenges of UK manufacturers in an uncertain climate," he said.

Deloite's Mark Stephenson

Stephenson went on, "Export conditions remain tough with a weak Euro and decreasing manufacturing output in the Eurozone. Continuing factory output shrinkage in China is affecting global markets and growth forecasts for manufacturers. Considerable headwinds clearly remain, but it's not all doom and gloom."

"Whilst the manufacturing PMI had a dip in December, it rose up again in January. Domestic demand remains strong with consumer credit confidence and spending continuing to rise. 2015 also represented a 10-year high in car production. Looking ahead, even a weakening pound could boost exports for UK manufacturers."

Martin Walder, Schneider Electric

CBI says UK Manufacturers Approaching Stagnation

Recent news from the CBI claims that thousands of British manufacturers risk slipping into stagnation unless the Government and

The *INSIDER's* February 2016 Roundup (continued)

industry does more to help them adapt to the fourth industrial revolution, Martin Walder, VP Industry for UK and Ireland at Schneider Electric commented, "Global industry is well on the road to a game-changing evolution. It is not some hyped up notion years away from reality. It's already here and has its origins in technologies and functionalities developed by visionary automation suppliers more than 15 years ago. So the Government should be doing everything in its power to help the UK realise the potential of the fourth industrial revolution.

"Improvements in efficiency and profitability, increased cybersecurity and innovation, and better management of safety, performance and environmental impact are just some of the benefits of an Internet of Things-enabled industrial environment. In order to combat the stagnating UK manufacturing sector, there needs to be fresh investment from the Government into automating plants so that the UK can produce the best products in the most cost effective way possible.

"With increasingly fewer skilled operators in today's plants, the fourth industrial revolution presents a further golden opportunity for UK manufacturing to bridge the gap and bolster the workforce, putting real-time status and diagnostic information at their disposal. As the necessary global standards around the new face of industry evolve, it could take a number of years before full maturation, but that's no excuse for missing out on the benefits available today."

Open Connectivity Foundation Has No Major Manufacturers??

Major industry leaders (ARRIS, CableLabs, Cisco, Electrolux, GE Digital, Intel, Microsoft, Qualcomm, and Samsung) who are invested in the future of the Internet of Things, have announced they will unify as the Open Connectivity Foundation (OCF), an entity whose goal will be to help unify IoT standards so that companies and developers can create IoT solutions and devices that work seamlessly together. Via cross industry collaboration, the OCF will work towards unlocking the massive opportunity of the future global IoT segment, accelerate industry innovation and help all developers and companies create solutions that map to a single, open IoT interoperability specification. Ultimately, with OCF specifications, protocols and open source projects, a wide-range of consumer, enterprise and embedded devices and sensors from a variety of manufacturers, can securely and seamlessly interact with one another.

The OCF unifies the entirety of the former Open Interconnect Consortium with leading companies at all levels – silicon, software, platform, and finished-goods – dedicated to providing this key interoperability element of an IoT solution.

The OCF's vision for IoT is that billions of connected devices (appliances, phones, computers, industrial equipment) will communicate with one another regardless of manufacturer, operating system, chipset or transport. With the OCF fulfilling this promise, anyone – from a large technology company to a maker in their garage - can adopt the open standards of OCF to innovate and compete, helping ensure secure interoperability for consumers, business, and industry.

Greg Petroff, Chief Experience Officer at GE Digital said, "Breaking down the barriers of technology silos and supporting better integration of these solutions and devices will be key to advancing the Industrial Internet of Things. GE is excited to join together with other organizations to create the standards that will help enable interoperability in the future."

Greg Petroff, GE Chief Experience Officer

Billions of connected devices (devices, phones, computers and sensors) should be able to communicate with one another regardless of manufacturer, operating system, chipset or physical transport. The Open Connectivity Foundation (OCF) is creating a specification and sponsoring an open source project to make this possible. OCF will unlock the massive opportunity in the IoT market, accelerate industry innovation and help developers and companies create solutions that map to a single open specification. OCF will help ensure secure interoperability for consumers, business, and industry. For more information, please visit www.openconnectivity.org.

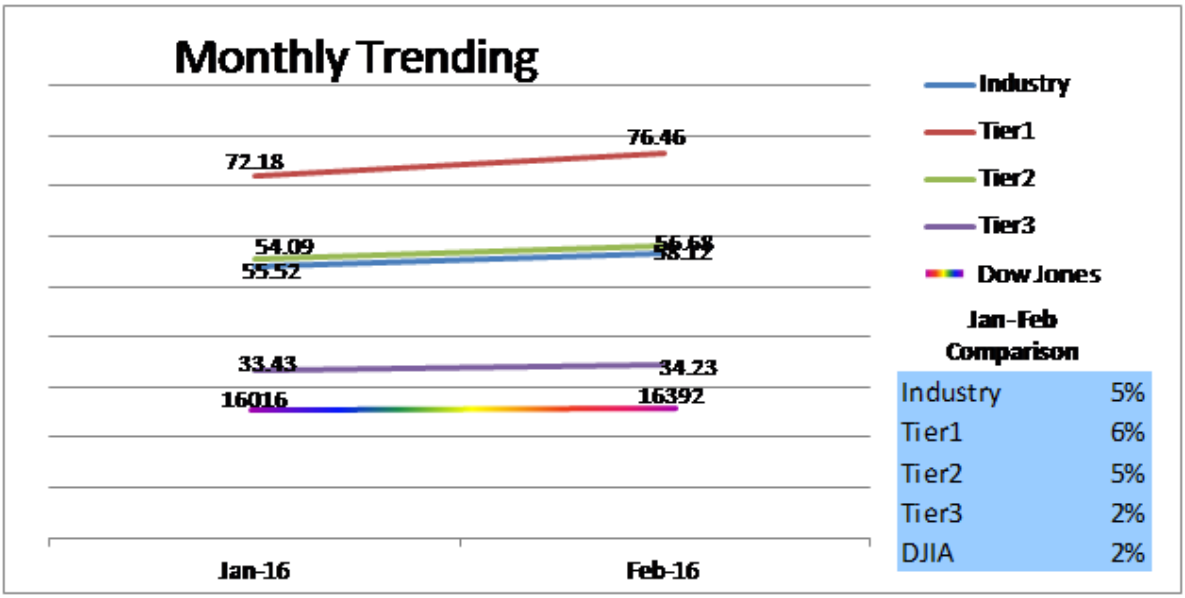
When a whole troop of vendors declare that they are doing an open source project for interoperability, the INSIDER grabs our wallet and backs slowly away. We served on ISA SP50 and ISA100.

Resetting the Health Watch for the Post Oil Industry Future

INSIDER
INDUSTRIAL AUTOMATION & PROCESS CONTROL

Health Watch

By Mary Samuelson



A New Focus

After a year of reports focused on an industry that has been pummeled by economic upheaval on several fronts, we believe it is time to stop looking at where we've been, and start looking at where we are now and where we want to be in the future. With that in mind, we are resetting the Health Watch to begin anew as of January 2016.

What is done is done; it is highly doubtful that oil prices will rebound in the near future, and it is time to move forward in this new world where oil and gas is not a primary driver of profits for many in the industrial control automation industry.

Although the Health Watch Index dropped between December and January (not shown), it has since increased 5% compared to its January score, beating the Dow's performance for the same period by 3%.

All Tiers performed well, either matching or outperforming the Dow. Tier 3 shows the smallest increase relative to its January position, matching the Dow at 2%.

The primary driver for its lower than average performance lies in the number of foreign based companies in this Tier. The continued strength of the U.S. dollar combined with continued economic challenges in Japan worked together to keep the increase in this Tier's score lower than that of the others. With Japanese based companies eliminated from the analysis, the Tier 3 percentage increases from 2% to 6%.

The Winners And The Losers

In many instances, quarterly and annual reports released in February were more positive than expected, leading to a jump in stock prices.

Chart 2 shows the companies in the Index with the largest gains and losses between January 19 and February 19. Belden is the clear winner with a month over month share increase of 33%, followed by Badger Meter, Flowserve, and Eaton, all of which increased at least 15%.

Belden was definitely helped by its announcement of $49.7 million in profit for Q4 earlier this month, with an expectation of $2.3 billion in revenues for this fiscal year. The good news could not have come at a better time. The increase seen in February more than made up for the 22% decrease Belden stock has seen since

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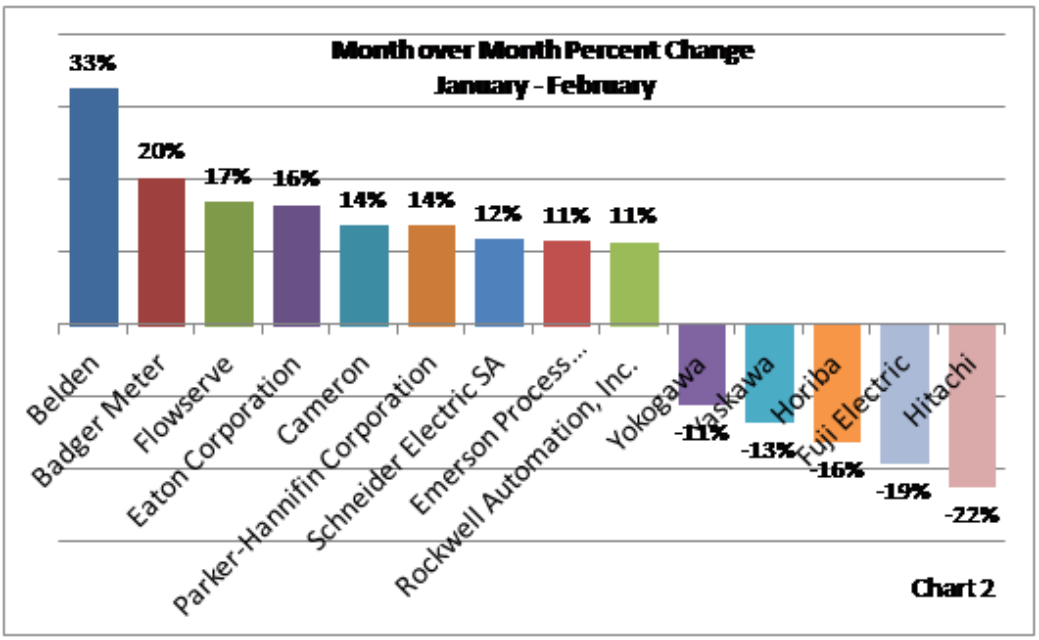
the beginning of the year and if it can be maintained, will help offset the 56% drop the stock has experienced in the last 12 months.

Badger Meter is the runner up, with a 20% increase in stock price compared to last month. Net sales for Badger increased 3.5% in 2015, with water meter sales up 8.8% and flow instrumentation down 10%.



In its SEC filing dated February 26, the company attributes the decline in flow instrumentation sales to the same issues that plague every company in our industry right now, "…the strengthening U.S. dollar's effect on sales of products sold in Euros, lower volumes of products sold to oil and natural gas customers related to the weak conditions in these markets, weather conditions for a portion of the year and general softness in the overall economy."

Flowserve takes the number three position for February, with a 17% increase in stock price between January and February reporting periods.

On February 19, *The Street* reported that the stock was sliding almost 5% to $41, due to mixed quarterly results. Although revenue for the period was $1.29 billion, surpassing Wall Street's estimates of $1.22 billion, adjusted earnings of 89 cents per share did not meet analysts' estimates of 92 cents per share. It should be noted however that the "fall" was short lived, as by COB on Monday, Flowserve had surpassed its pre-slip price by 15 cents per share, closing for the day at $43.30.

Flowserve is still struggling, but the company is working diligently toward restructuring and stock buybacks that will help offset lower than expected orders and deteriorating end market demand.

While potentially unstable at this time, it is good to see that others are recognizing the potential fruits of the company's hard work as stock prices increase.

At the other end of the spectrum is Hitachi with a price drop of 22% and Fuji which follows closely with a drop of 19%. The largest losers this month are all Japanese companies and much of the issue is the continued devaluation of the Japanese Yen compounded by the economic tsunami that is devastating the Japanese business landscape.

In July of last year at a presentation in Washington, Randall Jones, the Japan specialist at the Organization for Economic Cooperation and Development, outlined the fearsome obstacles confronting Japanese policy makers. According to Jones, living standards have gradually eroded so that per capita incomes to-

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Randall Jones, OECD Japan specialist

day are 10% lower than they were in 1990. Worse, Jones states that because of current issues such as low productivity, massive government debt, a shrinking population and aging work force, Japan's economy is so constrained that its growth potential is below 2% annually.

Focus Economics , (http://www.focus-economics.com/countries/japan) an excellent source for global economic data, outlines many of the challenges that Japan faces. One of the largest, it contends, is the current slowdown in China. This source also pointed out in an article dated February 2nd that, "After rebounding in Q3 on stronger-than-expected dynamics in investment, [Japan's] GDP likely decelerated in Q4 as manufacturing activity was less robust and investment was less buoyant than in Q3." It also mentions the resignation of Akira Amari, and its possible effect on Prime Minister Shinzo Abe's ability to continue the implementation of Abenomics policies.

A Potential Bright Side

Rumor has it that there are ways to make money in a Bear Market and that one of those strategies involves buying stocks that are devalued then holding them until they rebound.

With regard to the oil industry, Michael McDonald of Oilprice.com (February 27, 2016) asks if now is the time "to get into oil." His question is based solely on this strategy.

I have been wondering the same about our industry. Have we finally reached the bottom of the pool?

Will a good strong push motivated by the changes and restructuring we are seeing send us back toward the surface; toward an industry wide fiscal recovery that will cause stock prices to return to their pre-crisis levels?

There are risks involved, of course. There is no way to know how long it will take to see a recovery, and if the recovery is long-term, some companies will not be able to maintain indefinitely and will either be acquired or will close.

I agree wholeheartedly with McDonald however, that, "for investors with a long-term mindset, these are clearly interesting times full of opportunity."

The *INSIDER* Health Watch(tm) is written by Mary Samuelson, Senior Editor, and 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.

THE WAY I SEE IT
Editorial

It's All About the "American Dream," Stupid!

The US presidential election campaign mirrors the things that the World Economic Forum (the Davos Conference) and other futurists like John Bernaden (formerly of Rockwell), Jim Pinto and I have been saying for a while now.

The American electorate, like people everywhere, are not stupid. They clearly see what is coming. They see Industry 4.0 as a significant break with the past. They see the growing intelligence of computing devices for exactly what it is— a threat to middle class jobs and careers. If Google can make an autonomous car, the day is not far ahead when autonomous trucks will no longer need truck drivers, and thousands of them will be unemployed. If Google's robotics subsidiary can make robots that walk and can easily be programmed to do things, the day is not far off when manual laborers will be unemployed—robots dig ditches and tote bales faster, longer, better, and don't join unions.

In the past, there was always some other career to pursue when you became surplus. Buggy whip makers could be retrained as line workers for automobiles. Not so this time.

Bernaden is fond of pointing out that 28% of the world's working population is involved in sewing together clothes. One day soon, somebody is going to produce a robot that can take cloth and do all the manual labor necessary to turn that cloth into clothing, and the lights-out factory will have a rebirth. And 28% of the population will be out of work and not retrainable for anything else to do.

The American electorate, like people everywhere, are not stupid. They clearly see what is coming. They see Industry 4.0 as a significant break with the past. They see the growing intelligence of computing devices for exactly what it is— a threat to middle class jobs and careers..

Now look at doctors and the rest of the healthcare professionals. Intelligent, autonomous diagnosticians and monitors will replace the majority of doctors, nurses, and medical technicians.

Paralegals, librarians, tax preparers, accountants, engineers —in fact most of the "professions" will be surplus in ten to twenty years as well. Sales and sales management will require far fewer humans as computing devices get smarter and more capable.

This is a frightening scenario, and the American electorate are reacting to it, sometimes without completely understanding it. The core messages of Bernie Sanders and Donald Trump resonate with the same people. They are, in fact, the opposite poles of the spectrum, but they are on the same spectrum.

Sanders sees what's coming and says that capitalism needs to be adjusted to have a more human and more compassionate focus. Trump sees what's coming and wants as many people as can to get theirs first, so they can survive the smash. They both see the current leadership as not up to the task of carrying the electorate through the biggest shift in economic life since the abolition of slavery in the countries of the West. While the courses of action each espouses are fundamentally opposed, they appeal to the same groups of people.

I have been saying for several years now that we are forced to choose between two broadly defined futures. The one most likely to be the result of a Trump victory is the one shown in the movie, *Elysium* from a few years ago, where the 1% live on their flying island and the 99% live in decaying infrastructure with no jobs and no hope. Sanders' hope is that we can move to a *Star Trek* style future, where everyone receives basic incomes and no one needs to work.

In both cases, we are seeing the end of the American Dream of growth and independence for all—unless we do something to avoid it, and soon.

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

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Rajabahadur V. Arcot: The other side of astounding technological advancements and industry 4.0

With the technology continuing to evolve rapidly, those tracking the manufacturing industry and its associated technology trends are talking about the emergence of Internet of Things and Industry 4.0.

There is agreement that both manufacturing and the related automation industry will undergo transformational changes, but the challenge is to foresee its consequences on the lives of people and the society at large so that we become aware of the implications and are better prepared.

The first three industrial revolutions, associated respectively with the mechanization using water and steam power, mass production with the help of electric power, and overall enterprise automation using electronics and information technology, leveraged fundamental scientific and technical breakthroughs and helped us to be more efficient in the use of muscular power.

In its fourth version, both manufacturing and automation will witness greater exploitation of the evolutionary advancements in IT and the convergence taking place in electronics, information technology & communication, that includes cloud computing, big and fast data analytics, mobility, internet networking, machine learning, artificial intelligence & robotics, and such others.

In the traditional sense, control systems are production floor enablers that on one hand, sense and transmit various process parameters, display them to the operator or store them for historical review and analysis purposes and, on the other, process data relating to parameters & plant and regulate them or change plant status to detect & prevent onset of hazard.

In today's context however, automation systems, having emerged more as business enablers, are applied not only to ensure safe operation of the plant and production of quality products but also to manage costs and improve business performance.

One of the added objectives of automation are to reduce human dependency due to various reasons that include high cost of labor and widening gap between skill availability and demand.

Industry 4.0 scope extends beyond connectedness

In the case of the INDUSTRY 4.0 initiative, presently the Industrial Internet of Things (IIoT) / cyber physical systems are assigned the preeminent role. The present focus is mostly on lever-

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aging the benefits of networking and achieving manufacturing connectedness of cyber physical systems.

Current attention is mostly on embedded intelligence & computing power in sensors and actuators on machines or equipment and connecting & empowering them to communicate using the Internet as the platform. Extensive use of networked sensors, actuators, embedded hardware and software will result in the tighter integration of the physical and digital worlds. Soon, major advances in cloud computing, virtualization, data analytics, artificial intelligence, robotics, and such others will also begin to influence automation. Central to this evolution is the ever increasing power of software which has the potential to supplement and complement our mental power.

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While the first two eras of industrialization typically displaced people from agriculture and created industrial hubs, the third era made significant contribution to enhancing their productivity though automation.

While on the shop floor it diminished human dependency, it created new white collar jobs and livelihood opportunities that required new skills. The emerging era, Industry 4.0, with deeper reliance on enabling technologies, has the potential to further reduce human dependency and make redundant not only manual jobs but also managerial occupations. In their research paper "The future of employment: How susceptible are jobs to computerization," Carl Benedikt Frey and Michael A. Osborne say that according to their estimate about 47 percent of the total US employment is at risk due to computerization. They examined the expected impact of future computerization on 702 occupations in the context of trends in machine learning, robotics, and such others while arriving at their findings.

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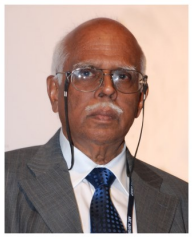

Barriers to computerization are disappearing

Until recent times the overall perception was that computerization will mostly affect routine manufacturing tasks and not those involving human cognitive and perceptive skills. However, the barriers to computerization are rapidly coming down. Recent technological advances are making it possible to computerize tasks that were considered as non-routine only a decade ago. The Google's driverless car, provide one example of a task considered cognitive non-routine until recently. Today's technology advancements, such as ability to produce large and complex datasets and big data analytics allow non-routine tasks to be converted into well-defined problems and computer code.

This makes it possible to computerize even some of the cognitive tasks and thus threaten jobs which use human's mental power. Some of the recent reports give us a glimpse of the big technological strides that are taking place around us that make some of us uncomfortable.

The world Economic Forum's Global Agenda Council on the future of software and society released its report "Deep Shift: Technology Tipping Points and Societal Impact" based on the findings of its Technological Tipping Points survey. According to the findings of survey, robots and artificial intelligence machines may find their way to the corporate board rooms in the next ten years.

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A report, quoting a research paper attributed to the University of Washington and published recently in PLOS Computational Biology, talks about a radical new computer program that decodes people's thoughts almost in real time with better than 95 percent accuracy. These technological advancements can not only potentially influence manufacturing but also go far beyond to influence our lives in ways never before imagined as possible.

Technology has entered a new phase with powers to control most of our activities while limiting our choices. That such power vests largely among so few is more ominous. It is time for us to understand the implications of the astounding developments that are taking place in software and especially in the realm of artificial intelligence, data analytics, robotics, and such others.

The WEF conducted the survey to seek the respondents' views on 21 "tipping points" that will impact human health, the environment, global commerce and international relations and when specific technological shifts will hit the mainstream society.

The survey was aimed at helping us to prepare ourselves for changes that are expected to result from the software trends, such as Internet and Internet of Things, rapid decline in the size and cost of computing and connectivity technologies, artificial intelligence & robotics, and such others.

The survey report observes that software and related technological advancements are making it possible to automate many activities that currently require human work and thus directly impact jobs. It goes on to point out that while the industrial revolution that played out over several decades gave time for the society to come to terms with the changes, the digital revolution is happening at a much faster pace in a much more complex and interconnected world.

The report highlights that neither social norms that inherently ties self-worth with jobs, professions, and careers nor economic systems that only rewards those who succeed in them are ready for the expected large-scale changes, both scale and speed.

Need to contemplate

Technology thought leaders including Elon Musk, Physicist Stephen Hawking and Bill Gates have expressed their concerns at the rise of super intelligent robots and the threat they pose to humanity. Professor Hawking in a BBC program echoed the sentiment 'the development of full artificial intelligence could spell the end of the human race'…. 'Humans, who are limited by slow biological evolution, couldn't compete and would be superseded.'

Speaking at the Massachusetts Institute of Technology (MIT), Elon Musk, the investor entrepreneur known for Space-X and Tesla Motors, described artificial intelligence as our 'biggest existential threat'. He is also quoted to have warned about the risk of 'something seriously dangerous happening as a result of machines with artificial intelligence. In an Ask Me Anything (AMA) program Microsoft's Bill Gates said: 'I am in the camp that is concerned about super intelligence.' He has highlighted that initial machines will do a lot of jobs for us and not be super intelligent; that should be positive if we manage it well.

A few decades after that though when they become super intelligent they will become strong enough to be of concern. While, the developments taking place in artificial intelligence, robots, IIoT are great from technology perspectives, they are also a matter of significant unease. It is good to remind all those involved with such technological breakthroughs of what Albert Einstein said 'Concern for man and his fate must always form the chief interest of all technical endeavors. Never forget this in the midst of your diagrams and equations.'

It is doubtful whether those pursuing such technical endeavors and captains of the industry interested in leveraging their outcomes to improve their corporate performances will pay heed to such concerns!