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Your key to the latest industrial automation and process control information

SMART Manufacturing in America: Siemens and SMLC hold Summits

For the past four years, manufacturing executives have gathered at Ford Field in Detroit to kick field goals, watch FIRST Robotics teams compete, and attend seminars put on by Siemens, Electro-Matic, and other Siemens ecosystem partners, mostly aimed at the automotive industry. The event is kicked off by a half-day workshop in manufacturing called the American Manufacturing Summit.



years.

Batra pointed out that Industry 4.0 has the power and the opportunity to revitalize manufacturing all across North America (Detroit is only about 5 miles from the Canadian border), not just in the rust belt. Seeing

Detroit up close and personal, for this Editor, makes it even more imperative that manufacturing change and re-imagine itself. At 8



Siemens Industry's Raj Batra

It is interesting that Siemens persists in holding the meeting in Detroit in March, where the chance of bad weather is always present. I suspect that one of the reasons for doing it in Detroit is to surround the meeting's participants with a huge example of what happens when manufacturing technologies stagnate and jobs are sent overseas, and factories die.

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Raj Batra, President of Siemens Industry, began by talking about the potential and challenges of Industry 4.0, which is Siemens' name for whatever 21st Century manufacturing is going to become. Batra is a true believer who has been pushing Siemens in the direction of smart manufacturing technologies for

Chairman and CEO of Tenneco, and Chairman of the Board of Directors of the National Association of Manufacturers (NAM). Sherrill tried very hard to convince the audience that he was not just a spokesperson for large manufacturing companies, but also speaks for small business. He did a fascinating dance between the two poles of reduced government interference in business and low taxes on one side, and the need for

AM, on a weekday, Detroit does not have traffic jams. There is simply nothing going on.

Next on the bill was Greg Sherrill,



Greg Sherrill, NAM

SMART Manufacturing in America: Siemens and SMLC hold Summits

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- +Cybosoft develops flare gas control strategy using MFA control
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SMART Manufacturing in America (continued)

government to support smart manufacturing on the other.

Mike Bastian, Global Controls Manager for Ford Powertrain, gave a surprisingly detailed discussion of the standardization efforts going on at Ford, and the far advanced cyber security methodologies and practices Ford Powertrain is now employing. Bastian has taken Ford Powertrain much further than many other large manufacturing concerns in its grasp of security posture, both from the technology and the social interaction side. One of the things that surprised, though, was Bastian admitting that Ford Powertrain doesn't always play well with the rest of Ford. Still the silos bite us.



Ford's Mike Bastian

the energy used to make composites by 75 percent and increasing the recyclability of composites to over 95 percent within the next decade; the American Institute for Manufacturing Integrated Photonics ("AIM Photonics"); and "NextFlex," the Flexible Hybrid Electronics Manufacturing Innovation Institute, which is focused on developing a new era in flexible hybrid electronics manufacturing.

The next institute to be selected and awarded is to be the Clean Energy Smart Manufacturing Innovation Institute (CESMII), and the final selection is expected to be announced in the next few weeks. The Smart Manufacturing Leadership Coalition is one of the finalists for this institute. Molnar, of course, would not indicate whether the decision has already been made.



Jim Carroll



NNMI's Molnar

By far the meatiest talk of the morning was from Michael Molnar, head of NIST's Advanced Manufacturing Program Office, who talked about public-private part-

nerships and the manufacturing institutes that the Obama Administration is in the process of establishing. This program, called NNMI or the National Network for Manufacturing Innovation, which Molnar leads, consists of a series of linked institutes that further manufacturing technologies. The most well known of these institutes is "America Makes" which is the additive manufacturing institute, and the DMDII, the Digital Manufacturing and Design Innovation Institute, which looks at supply chain issues primarily for the Department of Defense. Other existing institutes are the Lightweight Innovations for Tomorrow (LIFT) Institute, which is promoting light metal technologies using aluminum, titanium, and other lightweight metals; "Power America" which develops advanced manufacturing processes that will enable large-scale production of wide bandgap (WBG) semiconductors, which allow electronic components to be smaller, faster and more efficient than semiconductors made from silicon. WBG semiconductor technology has the potential to reshape the American energy economy by increasing efficiency in everything that uses a semiconductor, from industrial motors and household appliances to military satellites; the Institute for Advanced Composites Manufacturing Innovation, which focuses on lowering the overall manufacturing costs of advanced composites by 50 percent, reducing

"...the machinists in this industry do trigonometry in their heads."

Following Molnar, the Keynote Speaker, futurist Jim Carroll, talked about the disruption that is caused by advanced manufacturing techniques and the Internet of Things. He noted that product life cycles are collapsing, causing manufacturing organizations to have to speed up design and production drastically. The Internet of Things, he said, has major implications in terms of how devices are designed and manufactured. He pointed out the increasing importance of rapid design and rapid prototyping, and the emergence of build to demand instead of build to inventory and noted that crowdfunding has become the new "garage shop." He also remarked about the

acceleration of education requirements. "Robotics, advanced manufacturing methodologies, machining-in-the-cloud, advanced ERP



Harry Major Machine

processes: you name it, the skill of 10 years or even 5 years ago doesn't cut it today. I had one client in the robotics sector observe that 'the education level of our workforce has increased so much...the machinists in this industry do trigonometry in their heads.' That's the new reality going forward!"

A Field Trip, Courtesy of Siemens

Several journalists, along with some Siemens folk, took a field trip to a Tier



HMM Shop Floor

SMART Manufacturing in America (continued)



Siemens S7-1500

One manufacturer/integrator called Harry Major Machine. Founded over 50 years ago, by Harry Major, this company is still run by members of the Major family. Generat-

ing about \$52 million in revenue, this company manufactures parts washers, cleaners and dryers, as well as integrating complete conveyor systems for every automobile vendor you can think of, and probably a few you haven't, all over the world. They have the plant in the Detroit area, and one in England, and have partnerships in Korea (Maxrotec) and Austria (Knoth). Harry Major Machine standardized on the Siemens S7-1500 series for their gantry automation, instead of using CNC controllers, because of the increased speed of the S7-1500 series.

You can see the impact of Industry 4.0 and the Internet of Things on the manufacturing processes and the design processes of Harry Major Machine. They are one of the companies that survived the big 2008 downturn, and they don't want to be caught napping again.



Alcoa Technical Center

sensor suites?

You need to be able to visualize the data in ways that are meaningful.



HMM Gantry



SMLC Hosts Visualization Workshop, Board Meeting

So what do you do with all the data you're collecting with your Internet of Things



Alcoa's Malkani



Jim Wetzel—General Mills

In early March, the Smart Manufacturing Leadership Coalition sponsored a Visualization Workshop in conjunction with its Board Meeting at the Alcoa Technical Center, near Pittsburgh, Penna. Spitzer and Boyes LLC, the publisher of the INSID-



MESA's Mike Yost

ER, Larry Megan from Praxair is a Coalition member, and Walt Boyes is a board member. Haresh Malkani, manager, manufacturing intelligence and automation technologies division, Alcoa Technical Center, and Jim Wetzel, director of global reliability at General Mills, and SMLC Chair, presented a discussion of the challenges for industry in visualization of complex data. Panelists included David Kuhn, manager, systems innovation and integration advanced engineering at Corning Incorporated; Larry Megan, director of Praxair global analytics and R&D productivity; Mike Pietro, director of manufacturing science and technology for Owens Corning (not to be confused with Corning Inc.); Charles Romberger, senior principal scientist at ArcelorMittal; and Mike Yost, president of MESA, the Manufacturing Enterprise Solutions Association.

Visualization systems that start and stop with an HMI, a data historian, and an export to Excel, simply are not up to the challenge of seeing interdependencies in modern data streams.

Big Data analytics systems are generally run by IT departments with limited experience in interpreting time series data from the plant floor.

Visualization is a necessary component of simulation and training for future operations personnel, as well as a key factor in the ability to see connections that will permit rapid optimization of plant processes.

A vendor panel moderated by Wetzel consisted of Jeff Brum, business development director for Mechdyne; Doug Caywood, worldwide industry director, consumer goods, enterprise and partner group from Microsoft; and Mark Besser, vice president of services with Savigent Software. The panel focused on existing technologies for visualization, and what they can do for manufacturing companies.

Then the workshop focused on the future of visualization, with presentations and a panel discussion from Chenn Zhou, director of



Larry Megan from Praxair is a Coalition member, and Walt Boyes is a board member.



Doug Caywood—Microsoft

SMART Manufacturing in America (continued)



Chenn Zhou—Purdue

the Center for Innovation through Visualization and Simulation (CIVS) at Purdue University's Calumet campus; Yarom Polsky, group leader, sensors and controls research and electrical and electronics systems research at Oak Ridge National Laboratory; and Chad Steed, senior research staff, computational science and engineering also at Oak Ridge. Fascinating techniques and technologies are just on the horizon for making sense of Big Data in the industrial and manufacturing context.



Yarom Polsky—ORNL

technologies are just on the horizon for making sense of Big Data in the industrial and manufacturing context.

The remainder of the workshop was a set of breakouts serving to identify visualization, sensing, controls and modeling implementation gaps, and the opportunities for Smart Manufacturing in the visualization space. Challenges and opportunities included technical (systems and data security), organization and workforce challenges, business opportunities and challenges, customer preferences (what operators will accept and what they won't), adoption and integration of visualization technologies in the supply chain, cost and performance issues that may hinder visualization technologies like 3D, augmented reality, virtual reality, and others. In addition, discussion of speed of adoption and replication of technologies was an important factor. The workshop developed a list of test bed ideas that SMLC might become involved in.

The following day, SMLC held its board meeting. The big item of discussion was the proposal SMLC has made for the CESMII (Clean Energy Smart Manufacturing Innovation Institute). The proposal was discussed by Denise Swink, SMLC CEO, Jim Wetzel, SMLC chair, and Jim Davis, SMLC chief technology officer, and CIO of UCLA.



Denise Swink, SMLC CEO

"You keep using that word. I do not think it means what you think it means."

Word on final selection is expected in a matter of weeks. There was discussion of how

the institutes are being aligned, how NNMI activities and opportunities will impact Smart Manufacturing.

Then, Michele Pastel from Corning, SMLC's secretary, presented a high level look at the smart manufacturing landscape. It is becoming clear that one thing

that is seriously lacking in the entire discussion of smart manufacturing, Industry 4.0, Industrial Internet of Things, and so on, is a detailed lexicon so that everybody knows what they are talking about. Otherwise, it often reminds this Editor of the quote from *The Princess Bride*, "You keep using that word. I do not think it means what you think it means."

Following on, and totally fascinating, were live demos of the two test beds, the DOE project test bed, and the Supply Chain test bed. Both of these show real, live usage of the SMLC platform. It isn't just a theory or talking points anymore.

THE SMLC Smart Manufacturing Platform is designed to provide an open substrate for manufacturing applications. It is designed to work with an open marketplace like Apple's App Store, where companies can select specific apps, without worrying that they may be incompatible with the rest of their systems.

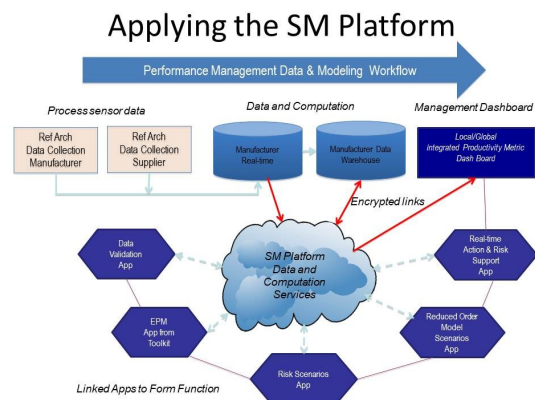
The idea works, and I hope that ExxonMobil and Lockheed Martin (see Rajabahadur V. Arcot's article in this issue) will take a long look at what SMLC has been doing for the past half-decade.



Jim Davis—SMLC CTO



Corning's Pastel



The INSIDER™ Roundup for March 2016

New Separation Technology

According to *Flow Control* magazine, a small business based in Wilbraham, Massachusetts, has developed a new, efficient separation technology to help clean produced water in the oil and gas industry.

Flow Control says that FloDesign Sonics' patented system, called Acoustic Wave Separation (AWS), was designed to treat produced water from hydraulic fracturing operations that extract natural gas. Up to 100,000 gallons of produced water per day can be generated at a single fracking site.

"It's challenging for current technologies to remove particles smaller than 20 microns without the addition of chemicals," said Jason Dionne, co-founder and senior engineer of FloDesign Sonics, quoted in the *Flow Control* article. "AWS separates particulates, oil droplets, sand and bacteria as small as 1 micron."

Compared with current methods for treating produced water, AWS would reduce energy and chemical usage by up to 75 percent, the article reported Dionne as claiming.

According to the company, the technology also has potential for separations in other sectors, such as life science.

ods and products are well suited for this application and we are confident to say that it is the most cost-effective and robust control solution for flare processes," Dr. George Cheng, CyboSoft CEO said.

Hackers Bumble into Water Utility ICS System

This story was compiled from various sources. A group of hackers accidentally made their way into an ICS system installed at a water treatment facility and apparently accidentally altered crucial settings that controlled the amount of chemicals used to treat tap water.

This strange hacking incident is described in Verizon's 2016 [Data Breach Digest](#) (page 38, Scenario 8), a collection of case studies that the company's RISK team was brought in to investigate. The water company noticed that, for a couple of weeks, its water treatment center was behaving erratically, with chemical values being modified out of the blue.

KWC was exposing its internal network to the Internet Right from the get-go, the Verizon Risk team identified a series of issues. First off, KWC was using extremely outdated computer systems, some of which were running ten-year-old operating systems. This, by itself, of course, is not a huge issue, but the rest of the system was configured to maximize its availability to the Internet.

Model-Free Adaptive Control for Flare Gas

CyboSoft, the developer of Model-Free Adaptive (MFA) control technology and products, has announced a flare process control solution that can effectively control the flare vent gas heating value to

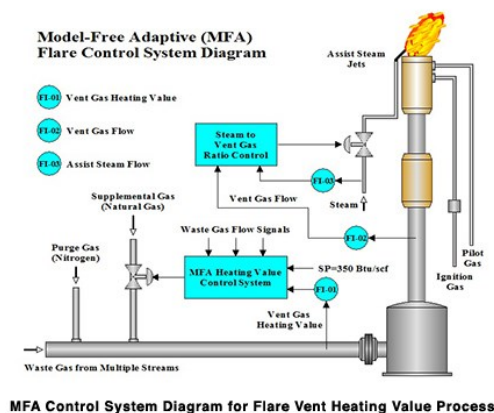
meet EPA regulations. An MFA flare control system has been running in a plant for 1.5 years and achieved substantial economic benefits for the customer. "The flare process is difficult to control using conventional PID controllers. On the other hand, model-based control can be costly to develop and maintain. CyboSoft's Model-Free Adaptive (MFA) control meth-

Additionally, the entire IT network revolved around a single equipment, an AS400 system, which would interconnect the company's internal IT network and the SCADA systems that managed the water treatment facility.

Even worse, the same AS400 was also exposed to the Internet because it was routing traffic to a Web server where KWC's customers could check their monthly water bill, their current water consumption level, and even pay bills via a dedicated payments application. There was only one water company employee who could manage the AS400 system, meaning that cyber-intrusions when that employee was off-duty would have gone under the radar and could have easily crippled the company's activity.

Looking deeper into the issue, the RISK team discovered that the hackers first breached the system via the Web-accessible payments application, looking for sensitive information about the company's clients.

It appears that the hackers discovered a vulnerability in the payments system, which they used to get access to the Web server, where they also found an INI file that contained administrative credentials, in plaintext, for the AS400 equipment. The only thing worse would have been a username Admin and a password Pass-



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

word.

Curious as they were, the hackers accessed the AS400 system, from where they also ended up on the SCADA system and started modifying parameters at random, unknowingly changing water treatment values.

Yokogawa Gets Patent on an Optical Fiber Temperature Distribution Measuring Device

US Patent 20160018272 has been issued to Yokogawa Electric Corporation for a fiber optic temperature distribution sensor. The optical fiber temperature distribution measuring device includes: an optical fiber as a sensor; a light source for outputting, to the optical fiber, signal light which has been amplified by excitation light; a temperature distribution calculation unit for measuring a temperature distribution along the optical fiber by using backward Raman scattered light from the optical fiber; an ASE light intensity variation measurement unit for measuring an intensity variation of an ASE light generated at the light source; and a temperature distribution correction unit for correcting the temperature distribution based on a measurement result of the ASE light intensity variation measurement unit.

Siemens Innovative Power Management Solution Links Five Oil Rigs from Single Source

Siemens UK & Ireland has helped develop an innovative and integrated power management system based upon its SIMATIC PCS 7 platform, which has been specified for use on a collection of five oil rigs situated in the Caspian Sea.

Siemens SIMATIC PCS 7 Power Control was selected as the primary system to create what is effectively a 'power island', making it feasible for all operators to be trained on a single system, eliminating the requirement for a number of separate systems, and reducing multiple hardware needs. The creation of the power island to control all aspects of electrical and power distribution across the five rigs is industry's first use of PCS 7 technology in this way.

Siemens Solution Partner, Industrial Control Systems (ICS) worked alongside Siemens to develop the integrated solution. Steve McDermott, director at ICS, said: "The challenge was to implement a fast-acting load management system, together with the process automation system, as a single integrated answer. We selected the SIMATIC PCS 7 Power Control system because it allows for the in-depth degree of integration we were seeking and it offered a complete process and discrete equipment control solution as one package.

"The system ensures power is shared equally, and at the right frequency and voltage, across the five oil rigs, with all controllers

linked together and supervision undertaken from a single control room featuring the ability to communicate remotely with the different platforms. The Caspian Sea is a very challenging operating environment with extreme temperatures and weather conditions. It means the software at the heart of the system has to be durable and proven. This is the case with PCS 7. "The integrated power management system now controls everything on the five rigs from a single source, including electrical distribution, voltage, heat recovery and process automation. The system also includes PCS 7 standard alarm management which vastly reduces instances of alarm overloading for operators. The overall system is designed to deliver real operational efficiencies and cost effectiveness, and is an ideal solution for challenging projects of this type of complexity."

Emerson and MYNAH Technologies combine to add PROFINET to DeltaV

Emerson Process Management, working with MYNAH Technologies, has added PROFINET protocol abilities to the DeltaV distributed control system (DCS). Taking advantage of PROFINET, users do not need to use a protocol converter to connect to the system.

PROFINET joins a wide range of DeltaV Ethernet-based protocols, such as Modbus/TCP and Ethernet/IP. The new capability is easily added to the system via both M-series and S-series Virtual I/O Module 2 (VIM2) interfaces.

The PROFINET driver supports simplex VIM2 modules deployed with standard commercial off-the-shelf (COTS) network equipment. For enhanced reliability and availability, simplex VIM2 modules can be deployed with an external switch that handles media redundancy network topology via Media Redundancy Protocol (MRP) and also behaves as the ring master.

Saving time and increasing safety, the VIM2 interface and firewall function allow a high level of access without sacrificing control system security and integrity. The VIM2-based PROFINET architecture enables users to optimize expansion activities or perform maintenance operations on applications in remote locations using a laptop with vendor-specific diagnostic tools — all while constantly monitoring applications from a centralized network.



"PROFINET is a growing bus protocol choice in process industries," said Emerson Process Management's chief strategic officer Peter Zornio. "The DeltaV system has a strong history of interconnection to busses of all types with seamless information integration for end users. MYNAH has been a great partner in attaining this achievement, and the addition of PROFINET will help our customers reduce their integration costs."

Will the Upswing Continue or Is It Just a Flash in the Pan?

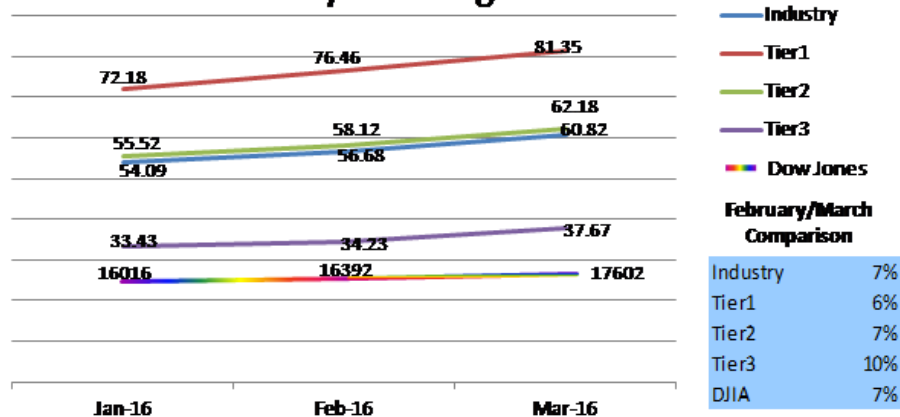
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INDUSTRIAL AUTOMATION & PROCESS CONTROL

Health Watch

By Mary Samuelson

Chart1

Monthly Trending



The Automation Health Watch Index experienced a better than normal upswing between February and March.

The Industry percentage increase (7%) matches DJIA's increase for the month, with Tier 3 companies outperforming the Dow as well as its sister Tiers by 3 to 4 percent.

Will this upswing continue or is it just a flash in the pan? There are a large number of differing opinions and predictions being put forth right now.

For instance, on March 22nd, Barron's analyst Ben Levisohn commented that the S&P 500 Industrial Sector Index has gained 4.5% so far this year,

outperforming the S&P 500 which is slightly negative for the year. He points out that the increase cannot be attributed to an increase in one or two large companies because the gains of every stock in the index is now trading above its 50 day moving average, an event which has only occurred eight times since 1990.

He cautions that "the turn for the group is still in its early innings and subject to correction, [but] the expansion in new 65-day highs for the Industrial Machinery sub-sector is the best we've seen in more than 2 years."

Scott Jenkins, a writer for *Chemical Engineering*, took a

bit different view in his article written March 21st. Jenkins cites the latest Weekly Chemistry and Economic Report from the ACC (www.americanchemistry.com) in reporting that overall, industrial production decreased in February by 0.5%.

He notes however, that a closer look at the individual industry sectors reveals mixed results, with a small (0.2%) increase in manufacturing output. Weaker performance in the mining sector which includes oil and gas however, negated the increase.

The ACC report points out that, manufacturing outputs increase of a higher-than-expected 0.2%, indicates that the sector may be starting to stabilize.

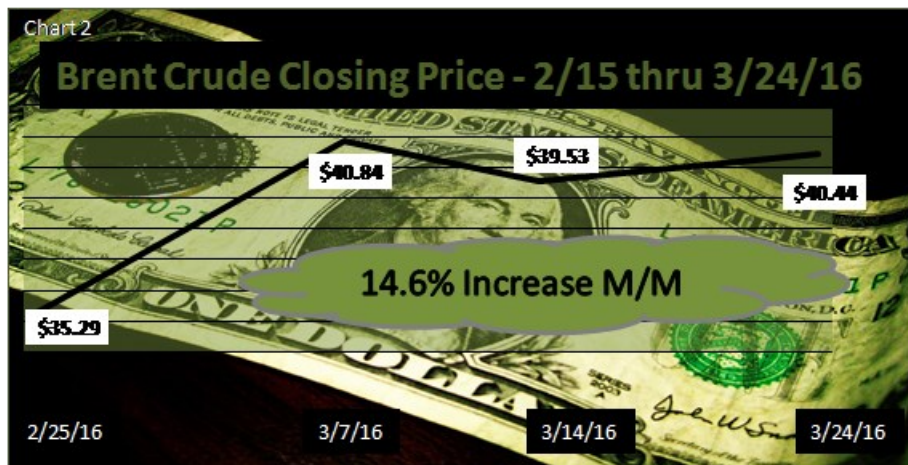
Our belief is that sector stability is still a fair distance away and the jump seen in the Health Watch Index is primarily related to increased oil and gas prices, with which our industry is intimately linked.

Will the Upswing Continue or Is It Just a Flash in the Pan?

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By Mary Samuelson



As Chart 2 shows, Brent Crude prices have risen 15% since February 25, with a closing price of \$40.44 US/barrel on March 24.

It is important to note, however, that the primary jump occurred between the last week of February and the first week of March, with prices leveling and remaining fairly steady since March 7th. As with predictions for the industry, there are several contradicting theories and predictions on the future of oil prices.

Goldman Sachs predicts that oil prices will remain low through the end of the year. According to Co-head of European Equity Research at Goldman Sachs, Della Vigna, "The surge in US oil production has created 'The New Oil Order', the most far reaching market development since the global financial crisis. As the US becomes more and more oil independent, OPEC and the new shale oil production are fighting for market share, with the rest of the market just fighting for relevance." Sachs predicts that the increase in

shale oil production will render many of the current oil producing methods no longer viable, leading to billions to trillions of dollars in current global oil production projects being shut down. Of course it is important to remember that Goldman Sachs also predicted that oil would drop another \$20 per barrel by the end of the year and remain depressed for the foreseeable future.

Barclay's Kevin Norrish and team call the oil rally "fragile" and warn that it "may soon run out of steam." He discusses three reasons for this belief. The first reason given is that optimism over China appears "somewhat premature."

According to Norrish, economists point to several Chinese economic indicators, including the slowing of vehicle sales, limited investment opportunities, and the probability of moderate fiscal policy expansion this year.

Secondly, Norrish continues, "the US data improvement is relative, and the big picture is that many of the most important commodity-consuming sectors of the economy still look soft, in our view."

Third, it is uncertain if OPEC's production freeze will succeed. Norrish points out that the countries who currently support the freeze are those already producing at close to capacity. He is skeptical that the freeze talks will have much of

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a long-term positive impact on oil market balances.

Analysts at Citi note that a mixture of money flow and temporarily solid fundamentals have lifted the crude oil complex in the late fourth quarter. The bank further notes, however, that a \$45/bbl number for December Brent or December WTI “appears to represent a formidable ceiling of resistance in the multi-trillion dollar oil trade.”

Citi attributes the February to current rally to several factors, including impending North Sea field maintenance, a surge in Chinese imports, and well-documented disruptions in Nigerian and Northern Iraqi exports.

As was already noted, however, Chinese auto sales are already beginning to slow down slightly, and with the plethora of variables alive and well in the world today that affect the markets in general and Brent and WTI in particular, it is difficult to predict with any accuracy what will happen.

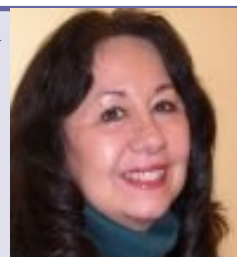
On the other end of Oz, is OPEC's Secretary-General Abdulla al-Badri who decided to go all-in right out of the gate, saying that we'll see oil hit \$200 per barrel. He bases that prediction on the implementation of budget cutbacks, exploration grinding to a halt, and the high cost of production associated with today's oil fields.

Who is right and who is wrong? The true answer is, “Who knows?”

With as many variables in play as currently exist, there is no real way to predict what will happen over the next several months.

I believe that Claudia Cattaneo said it best an article written for the Financial Post. Her comment, “The fact is that oil – and gas — forecasting is a crap shoot, that too many people become invested in their own views to see contrarian trends, and that reality changes all the time. That’s why everyone missed the current crash,

The *INSIDER* Health Watch[™] 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.

Will the Growth Continue or Is It Just a Flash in the Pan?

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and why predictions that oil is down and out should be regarded with skepticism,” rings with a truth we must all accept to survive.

And of course, if there aren't enough issues in play already to make the oil and gas situation as unpredictable as the number of stars in the sky, let's add in technology related advances. I'm not talking about shale oil production which is already removing US reliance on foreign oil resources and moving us quickly from the consumer to producer category, but to alternative fuel sources such as biofuels.

On March 23rd, Oilprice.com published an article on a new technology developed by MIT that “looks likely to bury biofuels, and potentially to take a swipe at oil as well.”

I know, I know, we heard the same thing about electric cars and ethanol, but for China in particular, this technology could prove a literal life saver.

The MIT project converts emissions from power stations, steel mills, garbage dumps, and other waste gas producers into liquid fuels using engineered microbes. Garbage dumps have previously been used to produce electricity, but the process requires burning the gas itself, which is not always economical, nor acceptable to environmentalists due to global warming concerns.

What differentiates MIT's approach is that the gas produced by emissions sources is used to

produce liquid fuels that in theory can substitute for conventional crude in transportation needs. The technology is already being displayed in a large-scale pilot facility in China, a primary target for the technology given the number of garbage dumps, steel mills, and power stations there.

The Oilprice.com article also notes that “China's ongoing issues with pollution certainly makes the technology attractive given the extremely toxic air that permeates Beijing and much of the most populated areas of China.”

While no one can predict the future of oil (although many try), if current larger commercial testing goes well and this technology is successful, it is entirely possible that in the next few years, numerous dumps and steel mills across China could be using the technology. That would decrease China's reliance on oil imports and further drive down the price of oil, possibly ringing a death knell for the already struggling bio-fuel industry.

As far as our industry is concerned, it is much too early to be optimistic. The Motley Fool points to players in our industry who are not as oil dependent such as Danaher Corp (NYSE: DHR), noting that its “mix of defensive businesses (life science and diagnostics, dental, and environmental) generate around 70% of operating profits. Essentially, it's one of the least cyclically exposed industrial companies on the market. Meanwhile, its test measurement and

Resetting the Health Watch for the Post Oil Industry Future

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industrial technologies segments don't have significant exposure to oil. In a nutshell, Danaher has upside from corporate actions as well as non-energy end markets -- a useful mix in 2016."

In the meanwhile Zacks downgraded Rockwell Automation Inc. to #4 (Sell) on March 15, citing among other things that a "persistent decline in oil and gas will continue to weigh on Rockwell Automation's results."

To add to the fray, presidential candidates Hillary Clinton(D) and Donald Trump(R) actually agreed on something for a change, labeling Eaton Corp. as a corporate ingrate for moving it's Cleveland headquarters to Ireland in 2012, and currently seeking to move its manufacturing operations to Mexico.

Eaton's core businesses in hydraulics, truck transmissions and electric equipment have been strongly affected by a broad-based pull-back in industrial spending, commodity prices and manufacturing activity.

Closing the Berea plant is part of the company-wide restructuring plan initiated late last year that will shutter eight Eaton plants and trim the company's work force by 3% or about 2,900 employees.

It is difficult to see the loss of jobs in such an already uncertain economy, but Eaton as an entity is doing what it believes it must do to survive

and maintain the other 97% of its workforce.

So many potential outcomes. So many possibilities.

Will oil go up? Will oil go down? Will oil demand increase or decrease?

Will countries who depend on oil imports find ways to produce their own supply?

How many jobs will be lost due to the morass in which we find ourselves?

Like a whirling dervish, the world economy, emerging science, global discord, and new options are swirling our industry around in a most unpleasant way, and like an amusement park ride that you are not enjoying, you just hope you can make it to the end before something even more unpleasant happens.

Is it any wonder that stocks in our industry jumped with the increase in oil prices?

We are all looking for a bright spot, and it is my belief that the bright spot of a 15% oil increase temporarily pushed our industry's stock prices higher because overall we are so highly dependent upon it for our survival.

What comes next? Who knows?



THE WAY I SEE IT

Editorial

The U. S. Presidential Election and Manufacturing

Whether you call it Smart Manufacturing, Industry 4.0, the Internet of Everything, or some other buzzword, it is clear that everywhere in the world, government support has been critical for the renaissance of manufacturing in the early 21st Century.

In Germany, the government has funded and guided the growth of Industry 4.0 through a series of public and private partnerships with companies like Siemens, Schneider, and many others.

In the United States, the federal government has led the development of smart manufacturing technologies, first by grants from DOE, DOD, and others to organizations like the Smart Manufacturing Leadership Coalition, and then by setting up a series of manufacturing institutes.

These institutes are producing techniques, philosophies, and technologies that are directly applicable to existing and new factory and plant floor situations. These institutes are looking at everything from energy use in smart factories to automatic integration of supply and distribution chains.

These are public-private institutes, on the European model, as well. Private industry is providing matching funds, as are state and municipal governments.

Why can't industry do it themselves? If you are a certain political stripe, you certainly are asking this. The answer is that beyond a certain point,

If you think that the road to Industry 4.0, smart manufacturing and the Internet of Everything is a good road to be on, it might be a good idea to gauge the candidates you plan to vote for, for President, for the Senate, and the House of Representatives, based on how they will either support or hinder the continuing development of the manufacturing institutes.

industry does not have the long term vision or funding to be able to spend the capital needed. We got over fifty years of technology directly from the space program that we would not have gotten without the race to the Moon and the solar system exploration we're now doing. We would have gotten those technological advances eventually, but at a much slower pace. The computer or laptop or tablet or smartphone you're reading this editorial on might not exist, or only in a much less effective form.

Eventually, when the dust settles, the Obama administration will undoubtedly get much of the credit for supporting and funding the basic re-

search needed to create smart manufacturing, just as the German government will for its own version, Industry 4.0.

If you think that the road to Industry 4.0, smart manufacturing and the Internet of Everything is a good road to be on, it might be a good idea to gauge the candidates you plan to vote for, for President, for the Senate, and the House of Representatives, based on how they will either support or hinder the continuing development of the manufacturing institutes.

Some people believe that the current Congress is waiting for a new president to defund this entire activity of supporting manufacturing, on the basis that the government should not be doing it at all. If you agree, by all means vote accordingly.

If you don't agree with defunding smart manufacturing and the manufacturing institutes, you might think about putting your money, your mouth, and your time into helping elect candidates who believe that government can and should assist the development of manufacturing in the United States as a way of revitalizing cities, and making the economy grow.

At election time, we all have to remember that the way the country goes is the way we collectively want it to. If we want to support 21st Century manufacturing, we need to stand up now and say so.

Walt Boyes

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Rajabahadur V. Arcot: ExxonMobil's clear message to the automation companies

Industry initiatives, such as Industry 4.0, have highlighted the expected role of the convergence of Information Technology and Operational Technology on the factories of the future. The automation companies must respond to the manufacturing industry and technology trends so that they can meet needs of the new era of manufacturing.

...automation companies seem to continue to rely on architectures of the past and their traditional business model, which does not permit them to quickly embrace evolving technological developments...

While IT companies such as IBM, CISCO, Google and such others are vigorously positioning themselves as technology providers of Industrial Internet of Things (IIoT), data analytics, artificial intelligence, cloud computing, and such others for the connected enterprises of the future, automation companies are content in highlighting that they have been in the forefront in developing and supplying control systems that are connected to smart sensors and actuators through communication buses. Historically, they are right, but future will belong to those who can shape it and viewed in that context IT solution providers are seen to be doing a better job. But to shape the future, one has to deliver what the end-user customers want and gain an understanding of their imminent needs that include among others seamless interoperability & networkability and cyber-security.

Instead, automation companies seem to continue to rely on architectures of the past and their traditional business model, which does not permit them to quickly embrace evolving technological developments, which the customers want. End users demand standards-based systems as they understand their benefits, such as interoperability and lower lifetime costs.

While automation suppliers are viewed as laggards, IT suppliers are seen to be more proactive and responsive to these demands.

Control systems are yet to become truly in-

teroperable and most often they require massive upfront investments that form part of the capital expenditure (CapEx) cycle. Because of the rapid developments in technology and the current business uncertainties, end users prefer operational expenditure (OpEx) investments

that offer pay-as-you-leverage benefits.

Compared to information technology companies, automation suppliers have been more guarded in adopting emerging technologies and slow in pushing

for open standards-based architecture. They are locked into closed system platforms that require expensive customization both in terms of costs and efforts.

On the other hand, manufacturing companies, operating under tremendous competitive forces are under pressure to leverage technology to the fullest extent; they want solutions that are interoperable and easy to integrate, reconfigure, & expand. They want to eliminate customized solutions as much as possible. Therefore, manufacturing companies' initiatives to make known their needs so that they are addressed should not come as a surprise to the automation suppliers.

Thus driven, ExxonMobil Research and Engineering Company (EMRE) recently initiated and entered into an agreement with Lockheed Martin to serve as a system integrator in the early stage development of a next-generation open and secure automation systems for process industries. Explaining the reasons behind such an initiative, Don Bartusiak from ExxonMobil Research & Engineering said recently in an industry conference that the status quo position of automation industry is not acceptable to end users because they are "not getting enough value" from existing process control systems. Now, it is up to the automation suppliers to understand the clearly articulated needs of end users, pick up the gauntlet, and respond appropriately.

Rajabahadur V. Arcot: ExxonMobil's clear message to the automation companies (continued...)

The scope of the engagement requires Lockheed Martin to design an automation system architecture, which while ensuring modularity, interoperability, expandability, reuse, portability, and scalability, will also provide intrinsic cybersecurity protection that is adaptable to emerging threats.

Vijay Swarup, vice president of Research and Development at EMRE describes the agreement as a breakthrough initiative that “could help transform refining and chemical manufacturing through the use of high-speed computational components, modular software, open standards, and the use of autonomous tools.”

Paula Hartley, vice president of Advanced Product Solutions for Lockheed Martin Mission Systems and Training believes that the advantages of his company's secure commercial processing experience combined with the expertise in applying open architecture standards provides a low risk solution for the ExxonMobil process control requirements.

ExxonMobil expects the initiative's outcome, the standards based open secure and interoperable control platform, to be ready for deployment by 2019. ExxonMobil and Lockheed Martin believe that the new architecture, while promoting value creation, competition, and innovation in the automation industry, will facilitate “effortless” integration of best-in-class components, preserve asset owner's software, significantly lower the cost of future replacement, and employ an adaptive intrinsic security mode. They intend to share with DCS players the details of the new architecture.

In the past, it was the General Motors' initiative that spurred the development and deployment of programmable logic controllers.

Numerous articles on the birth of PLC say that it all began with a paper, presented at a Westinghouse conference by Bill Stone, who was part of a group of engineers in a GM division. The paper discussed the reliability problems of hardwired relay based controllers and suggested the development of a solid-state controller as an electronic replacement for them.

I believe that the present ExxonMobil's initiative has similar potential to herald a new saga and change the course of the automation industry.

Following that, in 1968, GM issued a request for proposals (RFP) for an electronic replacement for hard-wired relay systems. Bedford Associates, a company started by Dick Morley, “father” of the PLC, submitted the winning proposal.

The acceptance of the Bedford Associates' proposal spurred the company, on one hand, to proceed with the development of the PLC model on which they were already working at that time and, on the other, to start a new company, Modicon, which went on to successfully make and sell PLCs, changing forever the factory automation market.

The rest is history. The PLC's introduction paved the way for automation companies to build control systems on IT platforms and that transformed the landscape of the automation industry and fortunes of many automation suppliers.

I believe that the present ExxonMobil's initiative has similar potential to herald a new saga and change the course of the automation industry.

It will be interesting to see how the automation companies respond to the challenges facing them and more specifically from the ExxonMobil initiative.

Will they read the writing on the wall, understand the customers' need, and mobilize resources to meet their expectations or fritter away a big opportunity to move with the times and remain successful?

I believe, some automation companies that want to remain masters of their own future will emerge to lead from the front.

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



I remain confident about the automation industry's inherent strengths. However, it is for the companies to draw up their own future roadmaps.

What is more important for automation companies, however, is to develop strategies that will attract people like Dick Morley to work for them.