

# INSIDER

INDUSTRIAL AUTOMATION & PROCESS CONTROL

VOLUME 22  
NUMBER 2  
ISSN2334-0789  
February 2018

Inside this issue:

**Special ARC Forum  
Issue!**



Your key to the latest industrial automation and process control information

## ARC's Forum: The Fragmentation of Automation

ARC's Forum in Orlando every February is the semi-official start of the automation industry meeting season. Every year, ARC puts together a program with their own analysts and their customers and their customers' customers, in order to provide a wide cross-section of thought leadership for the industries served by automation, and automation vendors.

This year was significantly different from past years. For one thing, the Forum was officially "sold out" at over 900 attendees, the largest crowd ever at an ARC event. For another, there were companies and individuals who had never attended before.

The theme of the conference was the integration of IT and OT and the IoT, where the technologies of IT and data management, when combined with the technologies of Operational Technology (OT) merge to make the Internet of Things practical. This means that for the first time, ARC expanded the discussion to include building automation and smart cities, as well as the ordinarily discussed industrial controls and processes.

But while the theme was integration, the real story was the fragmentation of the industry.

### Large versus Small Automation Companies—

There is a clear and widening gap between the large automation vendors, like Honeywell, Emerson, ABB, Siemens, Schneider, and the rest; and the small vendors like Inductive Automation, Opto 22, Bedrock Automation, and the German mittelstand companies, like Harting, and the others.

The large automation vendors share a sense of entitlement that the smaller vendors neither have nor want.

The smaller vendors have begun to change the way control systems are architected.

In fairness, the gap began when Siemens and Rockwell Automation began to explore the wider uses of programmable controllers as part of process control systems. But as Rockwell and Siemens have moved into the conventional DCS world, others began to explore what a modular, non-monolithic control system might look like.

### The Open Group

The Open Group dominated the controls portion of the Forum. ARC has decided to drink the Kool-aid, and they certainly have a right. Famously, ExxonMobil started the search for a new model for distributed control architectures because

ARC's Forum: The Fragmentation of Automation 1

- The ARC Press Conference Report 4
- Joe Weiss at Defcon: Protecting field devices has become critical
- The Human Face of Automation, by Joy Ward

The Way I See It— Editorial by Walt Boyes: How to Create Open Systems That Work 10

Rajabhadur V. Arcot: Evaluate technology's potential from manufacturing industry's perspectives 111

Want to know the **Mind of the Customer™**? Do you know why your customers buy and why they buy specific products or services, and don't buy others? If you don't know, call us to find out how we can help you! Call **Walt Boyes** at +1-630-639-7090.

## The Fragmentation of Automation... (continued)

they did economic analysis that showed that they could not continue to spend the money on monolithic control systems that could not be upgraded beyond a certain point, and which stuck them with a vendor who may or may not be capable of fully supporting them in years to come.

What ExxonMobil wanted, and recently has patented, is a platform or substrate very much like IOS, which supports the installation of applications (the famous Apps of the App Store) only as needed, rather than buying a package of applications because their vendor only supports them. So you get a subpar historian in order to get good controllers and HMIs. One of the real advantages of the system that ExxonMobil and others (I first discussed it at the Smart Manufacturing Leadership Coalition meetings years ago, and Inductive Automation has produced a platform much like the one that ExxonMobil wants) is that any app that is compatible can be used— leading to a best of breed solution system.

Many smaller vendors have evolved architectures that can relatively easily be adapted to the ExxonMobil Open Group model. At the same time, most of the large automation system vendors have decided not to participate in (and perhaps to actually attempt to sabotage) the standard that is being created by the Open Group. It will be very interesting to see how much leverage the large automation companies will be able to exert, and for how long, to keep their large end users from insisting on the open automation standard. As a survivor of both ISA S50 and ISA S100, I can assure you that standards can be very long delayed.

### IT and OT

The Forum highlighted the differences between IT and OT, in a very real way. Even though the discussion has been going on for a dozen years now, there are still many instances of IT practitioners being clueless about how Operations Technology actually works, and there are also significant number of OT specialists who really don't

understand how IT/OT integration might be made to work for the benefit of all concerned. It seems that we need to keep talking. We still have IT focused vendors talking about “edge devices” that live on the Ethernet network, instead of the real edge devices of the OT network— the sensors, other field devices, and final control elements.

**Take a look at the entire ARC Forum 2018 program! All the presentations are archived and [can be seen here!](#)**

### Smart Cities and the IoT

For the first time, the Forum included infrastructure in the form of smart cities. The movement toward the creation of smart cities is sort of herky jerky. In places like China, it happens by decree. In the United States and Europe, it happens in spotty areas, where new construction or major revamping of systems are

being done, or when a large high rise building is erected. There are all sorts of exciting reasons to have smart cities, but there are also some potential problems, especially relating to cyber security. The number of sensors and edge devices necessary to really engender a smart city is so large that if you start looking at the threat surfaces, it would be no surprise if you ran away screaming. This, of course, doesn't mention potential human rights abuses and privacy invasion.

### Real Issues in Cyber Security

It appeared that under the leadership of ARC analysts Sid Snitkin, Larry O'Brien, and Eric Cosman, the discussion of cyber security finally reached critical mass. Cyber security is finally becoming a topic of discussion in the board rooms.

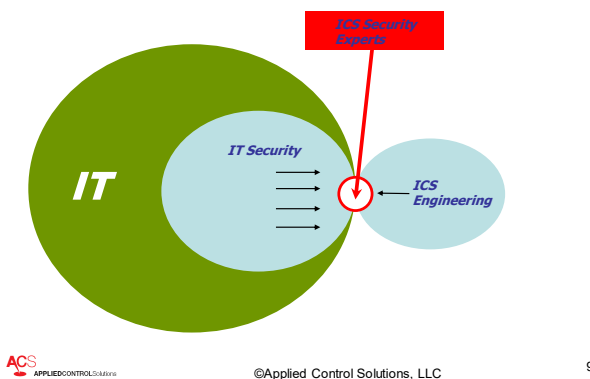
As we have been suggesting for several years now, it appears that the insurance industry is finally understanding what the effect on the economy, and on business continuity insurance payouts of a significant cyber incident might be.

When it became obvious a few years ago that government intervention in cyber security was just not going to happen, the only thing left to head off major disasters would be the insurance industry. It is something we should encourage, and we should assist and train actuaries and investigators to do extensive threat analysis.

## The Fragmentation of Automation... (continued)

One of the problems besetting cyber security has always been that there has been considerable confusion between IT security specialists about how operations technology (OT) works. And as Joe Weiss and I have pointed out for years, there still are not sufficient numbers of OT cyber-security specialists. As he pointed out in his DefCon presentation (see page 7 in this issue), if you hear somebody saying that they are a SCADA security expert, turn the other way and run.

### ICS Security Expertise Lacking



given us is that the Internet of Things may be a cyber disaster of monumental proportions. In order to acquire the Big Data that is necessary to fuel the Internet of Things, the sheer number of sensors and edge devices must become ex-

### IT vs ICS Cyber Security

Attribute	IT	ICS
Confidentiality (Privacy)	High	Low
Message Integrity	Low-Medium	Very High
System Availability	Low-Medium	Very High
Authentication	Medium-High	High
Non-Repudiation	High	Low-Medium
Safety	Low	Very High
Time Criticality	Delays Tolerated	Critical
System Downtime	Tolerated	Not Acceptable
Security Skills/Awareness	Usually Good	Usually Poor
System Lifecycle	3-5 Years	15-25 Years
Interoperability	Not Critical	Critical
Computing Resources	"Unlimited"	Very Limited
Standards	ISO27000	ISA/IEC 62443

ACS APPLIEDCONTROL.SOLUTIONS

©Applied Control Solutions, LLC

7

ponentially larger. And unless those sensors are made intrinsically secure, the problems for cyber security will continue to snowball.

OT cyber security is finally being understood by a larger number of experts. When Joe Weiss first started showing his famous Venn diagram, at first he was derided, as was I, for claiming that only a very small number of people understood how OT cyber security worked.

It is finally making sense to IT security specialists that there are significant differences between IT and OT cyber security, as is made clear in Joe's other famous slide from his keynote speech at Texas A&M University in January.

We keep trying to tell people that it isn't C-I-A in ICS security, it is actually A-I-S-C where the S stands for safety. As Joe points out, confidentiality is not as critical for control systems as it is for business systems. Availability, Integrity, Safety, and then Confidentiality are the critical issues, in the correct order. This often makes IT security professionals gag.

One of the clear learnings that the last dozen years have

The ARC Forum in 2018 was one of the best ARC has ever had. We look forward to seeing what they come up with next year.

**Spitzer and Boyes LLC** offers unique services to high tech companies such as—

**Mind of the Customer™ research**, which can tell you what your customers really think, and what they really want, both in products and services.

**Content Generation** for high tech and automation companies. We have the research and experience to write in your words, for you, on the subjects you care most about, and are most valuable.

**Strategic Research** on Smart Manufacturing, Industry 4.0 and the Internet of Things, Cyber Security and other hot topics, to help you position your company properly for the years ahead.

## The ARC Forum Press Conferences

The media attendees “pay” for their attendance fees by sitting through a sometimes mind-numbing and often buttocks-numbing series of press conferences put on by many of the Forum’s vendor sponsors. Sometimes even news is produced.

The INSIDER does “home video” style recordings of these press conferences, and we present them to you now. Click on the link in the photo caption to play the video.

**AspenTech’s** CEO, Antonio Pietri did a non-presentation presentation. He described the agreement between AspenTech and Emerson Automation Solutions as two global leaders getting together to improve service to their customers. He also discussed two acquisitions AspenTech had made giving it better capabilities in assisting their customers to enable their use of IoT technologies.



[AspenTech Press Conference](#)

**Bentley Systems’** CEO, Greg Bentley, laughed about the very short time allotted for the press conferences this time, saying that he’d have to dance quickly through his presentation. He discussed the convergence of IT and OT, and commented that there was, in his view, a gap that was filled when engineers create digital engineering models. He noted that the expanded theme of this year’s ARC Forum including Infrastructure and Smart Cities mirrored Bentley Systems’ offerings and he allowed as how he was pleased that ARC had recognized Bentley Systems as among the leading vendors in all of those spaces. He gave some financial information, including that Bentley is on track to realize over \$700 million in revenue in 2018. He noted that Bentley had invested



[Bentley Systems Press Conference](#)

over \$1 billion in R&D and acquisitions since 2012, and increased headcount by 200. Bentley also noted that Siemens is now the owner of 9% of Bentley’s stock.

He went on to explain that the “Be Inspired” contest winners are truly international, with more than 50% of the winners in many categories from China.



[Emerson Press Conference](#)

new alliance with AspenTech (mirroring the relationship between Honeywell and UOP), and they announced the very latest in their DCS suite, DeltaV version 14. Emerson continued to portray themselves as less a vendor and more of a thought leader and consultant that also happens to make field devices, equipment and control software.

**HIMA** vice president of research, Alexander Horsch talked about a holistic approach to both safety and security. This holistic approach includes not only the SIS but also its environment, including engineering workstations, asset management tools, HMIs, and others. For security to exist in a SIS, it depends on five different areas, the controller hardware and firmware, the engineering tools, the communications infrastructure, the PC interface, and finally, lifecycle management. Horsch noted that “security is built in from the beginning and not added on,” Horsch said. “Either you do it or you don’t. This is something you can’t come back to. This is cybersecurity down to its core.”



[HIMA Press Conference](#)

The Triton attack, the Stuxnet attack, and others continue to point

## The ARC Forum Press Conferences... (continued)

to Joe Weiss' point that there is no real security in the field devices at this juncture.



[Honeywell Press Conference](#)

Honeywell Process Solutions described the work they've done on AR/VR simulation to train the industrial workforce and help close the skills gap. Honeywell has provided a complete solution they call "Immersive Competency which trains workers in a sort of flight-simulator environment, which, according to Honeywell, improves skill retention by up to 100% and reduces the length of training time by up to 150%, while tracking employee training progress in real time. Honeywell demonstrated the VR system at the Forum, and handed out Virtual Reality Glasses to all the media attendees.

Inductive Automation announced at the ARC Forum a new program they call Ignition Onboard and Ignition Edge Onboard which allows allied vendors to embed the Ignition! Software into their hardware. Opto 22, Advantech B+B Smartworx, Hilscher, Moxa,



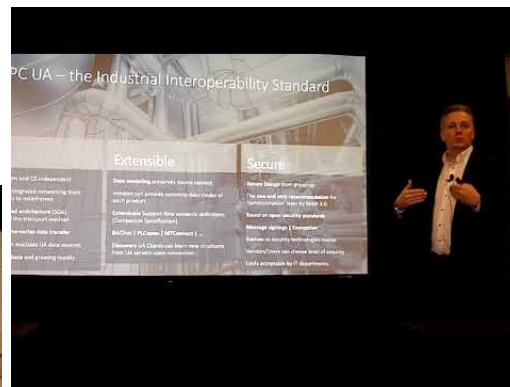
[Inductive Automation Press Conference](#)

EZ Automation, and others are putting the Ignition Edge on their devices, while others are embedding the full version of Ignition. Kevin McClusky, co-director of sales engineering, said that over a dozen more companies are joining the program in the near future. Seeq has a connector to enable Ignition users to use Seeq Workbench for data insights, and Bedrock Automation recently announced an easy-to-deploy interface specification that enables Ignition users to leverage the security capabilities of OPC UA, with Inductive Automation support.

For the second year in a row, L&T Technologies, an Indian company founded by two Danish refugees, Larson and Tourbro, presented some of the things they've done in the last year. They are working with a wide variety of other companies, including Rockwell Automation and Siemens, and are also in the health care industry. They have a very forward thinking look at the human face of automation (see Joy Ward's story in this issue).



[L and T Technologies Press Conference](#)



[Microsoft/OPC Press Conference](#)

are over!" Microsoft has been working with the OPC Foundation to implement industry standard communication protocols.

The OPC Foundation and the Fieldcomm Foundation (formerly the HART and Fieldbus Foundations) press conference announced an alliance to further advance process automation system multi-

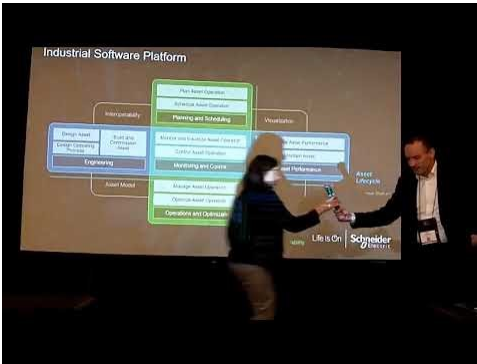
Microsoft talked about the steps companies will have to take to digitalize their processes. They even talked about not selling sensors, but rather selling information, and service. "Not every system should be connected to the Internet." And "the days when Microsoft could make their own standards



OPC and Fieldcomms Press Conference

## The ARC Forum Press Conferences... (continued)

vendor interoperability and simplified integration by developing a standardized process automation device information model based on the FDI technology.



[Schneider Press Conference](#)

**Schneider Electric** discussed the challenges of the new Industry 4.0 paradigm, noting that to tap into the potential of the IIoT, you need empowered operators, a proactive maintenance team, and agile management. And, with the reverse takeover of Aveva, they expect to be able

to supply a complete end-to-end software suite that will stretch from CapEx to OpEx, with Design, Build, Operate and Maintain components. This allows the end user to develop and use a Digital Twin of their plant and enterprise. They described a new way of looking at what were formerly simply products. Schneider, too, talked about AR/VR technology for training.

Not to be outdone by its competitors, **Siemens** presented a look at the next major release of Mindsphere. This release is Mindsphere 3.0, Siemens sees this as the entry point for digitalization (the grammar police point out that there is no



[Siemens Press Conference](#)

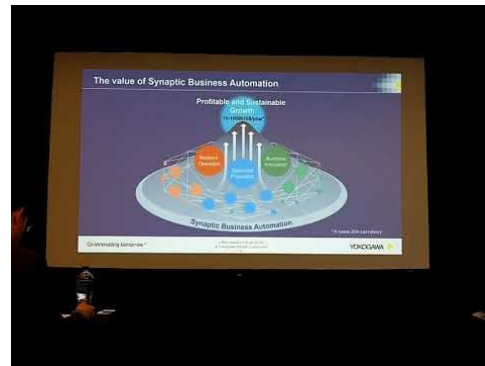
such word), a foundation for the development of applications, and a multiplier for digital services and new business. This new version has expanded end user and analytic capabilities, using Tableau, which is built into the software. Mindsphere 3.0 has extensive additional connectivity with other software, such as data historians, ERP, MES, and other packages, and expanded connectivity and protocols for connecting field devices. In addition, Siemens pushed hard on the Open Mindsphere Ecosystem, a group of vetted partner companies and products that will

work easily and well with Mindsphere.

**Stratus Technologies** introduced their latest series of what they call “edge devices” at their ARC press conference. The “edge” they refer to is the edge of the Ethernet network, not the actual edge of an OT network, which is comprised of the field devices and final control elements, and field controllers. In other words, the edge that connects to Stratus’ edge. The products have some very useful features, including an easy to use interface for OT workers (and it is not too dumbed down, either).



[Stratus Technologies Press Conference](#)



[Yokogawa Press Conference](#)

Yokogawa presented a detailed look at what they call “Synaptic Business Automation.” It is apparently not easy to explain what synaptic automation is or what it means, but Yokogawa attempted to describe a system that addresses the most important challenges facing their customers today.

These challenges include digital transformation, a changing business environment, supply chain visibility and optimization, profitable operation with TOTEX optimization, sustainability, circular economy, and a changing workforce. Synaptic Business Automation will co-innovate with customers, synthesize synaptically everything, deliver answers through Yokogawa’s domain knowledge and proven solutions and services, all this to create sustainable value for customers. Yokogawa proposes to use their entire portfolio from sensors to cloud based software to do this, including their relatively new acquisitions of KBC and other software and optimization solutions. Yokogawa believes that they are uniquely competent to provide real profitable operation, with considerably more profit than previously. Using Synaptic Business Indicators, SBIs, Yokogawa can improve profitability from \$5 to \$15 million per year in additional profit.

## Joe Weiss at Devcon and Black Hat

Joe Weiss has held unpopular positions before. Over the past fifteen years, he has sometimes been a lonely voice talking about things that nobody else wanted to discuss. He has often been right about those things, and sometimes wildly wrong. But even when he's been wrong, he has made us think.

For the past year or so, Joe has been asking us to focus on the lowest levels of the automation hierarchy...the sensors and real edge devices. When many vendors and security experts talk about edge devices, they talk about devices that are at the edge of the network, the switches, the Ethernet devices that live near the edge of the network. But the devices that Joe talks about, the sensors and final control elements, are the real edge of the ICS OT network, not the Ethernet devices that are the edge of the IT network.

Last year, Joe was invited to present at Defcon, the Black Hat conference in Las Vegas. He began by explaining process control.

“It doesn't matter what it is-- it doesn't matter if it's a power plant, a pipe, a human body-- if you've got physical processes and you've got to monitor, for example, temperature or pressure or flow or radiation and then you want to control it that's a control system. Industrial was a poor term-- we didn't know what else to call it.

“All the building controls here are essentially ICS because you're monitoring temperature, you're monitoring steam flow, water flow, humidity-- all of the things you'd think about.

“There's nothing different so everything we're talking about here crosses every border but the big thing is most of you if you're coming from the IT world you have the CIA paradigm—confidentiality, integrity, and availability. It isn't just that it's backwards for us, it's actually missing the most important letter and that's the letter S and the letter S is for safety because in our world we can kill people.

“That's the most important. Everything we do is reliability and safety.

“Confidentiality, really one of the only places it's important is if you have a meter like a smart meter in a house or something like that for almost everything else, confidentiality is very trivial. When you put it in a database and store it somewhere, *then* it becomes IT and confidentiality is a big thing.

“We're talking about data in motion, and we don't have enough people who actually understand. In a Venn diagram, there's a really small dot where you have actual ICS security experts-- and by the

way one of the things I always tell everybody if somebody tells you they're a SCADA security expert, run the other way-- it generally means they learned how to spell SCADA within a year or so.

SCADA is not every control system. SCADA is only one type of control system and it isn't used in a lot of places, so when you use the term SCADA and you don't use it right you will lose all credibility really fast.”

Joe continued to talk about the fact that there is no security at all in nearly all field devices, and that now that they are closely interconnected to the IT networks, this is a dangerous situation that has already been exploited.

Joe points out the unwelcome fact that “ICS” systems include building automation, and the same or similar

hazards exist for sensors used in building automation as exist in process plants and factory settings.

We believe that the concepts and the potential for serious danger to ICS systems, to the population that lives around petrochemical plants, chemical plants, and power plants, is important enough to strongly recommend that you take the half-hour or so that it needs to view this video. Click on the link in the photo above, or [click here](#) to go to the YouTube video posted by DefCon 25.

After you have seen the video, tell me what you think.



[Joe Weiss speaks at DefCon 25](#)

### Joe Weiss

- >40 years experience
- Managing Director ISA67, 77, 99, S&P Board
- ISA Fellow
- Database of ~1,000 actual ICS cyber incidents
- Patents on control systems
- Author – Protecting Industrial Control Systems from Electronic Threats



## The Human Face of Automation, by Joy Ward

The ARC event in Florida is always a great place to see growing trends in automation. This year was no exception. But unlike previous years when the hot topics were disembodied things such as new sensor technology, breaking security issues and more, this year's hot topic was never overtly pointed out or discussed as such. This year the underlying but still strong meme was the human face of automation. Maybe the subject is not as much geeky fun as some new shiny tech but it is much more important in the long view.

Automation, at its base, should be for and about humans. Yes, it decreases cost, speeds up production, yadda, yadda, yadda. But, and this is a big but, humans invent it, run the equipment and are the ultimate judges of the success or failure of all that equipment and applications. If your humans cannot, or will not, use it everything you as an automation provider is for naught.

There are several reasons potential automation users may turn away from your nicest, shiniest, most cutting edge technology. It could be because they do not understand what you offer or do not want to pay the prices. Nice, rational answers but can I suggest those are the answers your potential customers give you when they do not really want to engage with you? Other deeper reasons can be their own fears of interacting with new ideas and equipment. A while back I identified a widespread, almost ubiquitous, psychological state that has been affecting people across all ages, races, social groups, educations and even nations. It is a mental state called techno-trauma. Techno-trauma is the underlying emotional unease that one is being left behind by constantly changing technological change which seeps through almost every aspect of daily life. While most people would like to feel that they are masters of the technology around them that is a fleeting feeling at best. Learn your new technology and soon it will be changing, maybe into something completely unrecognizable. Automation users and corporate leaders in charge of automation may be engineers and technologists but even they cannot really keep up with all the changes. They may not openly admit it but get one aside and he or she will admit with some unearned guilt that is true. So consider the plight of the uninitiated, the non-automation bloodied souls and how much more are they experiencing the unacknowledged techno-trauma? Maybe they are concerned with how their

employees will accept the technology. There could be more deep answers to the question but the savvy automation companies are taking all of this into consideration.

**Automation, at its base, should be for and about humans. Yes, it decreases cost, speeds up production, yadda, yadda, yadda. But, and this is a big but, humans invent it, run the equipment and are the ultimate judges of the success or failure of all that equipment and applications. If your humans cannot, or will not, use it everything you as an automation provider is for naught.**

While sitting in the ARC press conference listening to the various companies tout their newest and hopefully greatest I was reminded of an episode of the original Twilight Zone series. The episode, entitled, *The Brain Center at Whipple's*, was about a sad, disgruntled company president who brought in a computer that quickly replaced all of his human employees. As almost every Twilight Zone was a morality play I bet you can see where we are going. The last shot of the episode showed the computer sitting in the president's chair and smoking cigars as we hear the last human, the president, being hauled out of the company. I wonder how many of your potential customers saw and still remember that episode somewhere in the back of their minds? Let's call this the Whipple Effect.

If suppliers want to reach those and other even slightly tech-phobic customers then they MUST look for and

serve the human face of automation. What do I mean by that? Find what humans need to accept and thrive with automation, not just what the techies can invent. We have all seen that. Techies invent something, because they can or because they think it will save money (often interpreted as putting workers out) and then they turn to the sales force to push it. The sales force does but finds (unexpected) resistance. Hmm. Could it be the Whipple Effect? I saw a few companies that inspired that effect at ARC.

I also saw some companies that seem to have realized that the truly successful companies are aiming to serve and augment the human face of automation, not merely push out more "shinies" to attract the penny-pinchers and the Whipples. These forward-looking companies are the suppliers looking to the human face of automation. Companies like Honeywell, Emerson, Schneider and Yokogawa are looking beyond the hardware and seeing opportunities with human enrichment. But don't think this is only a big boys game. Some smaller companies, like HEMA and PAS Global have made care for humans a central focus for some time. Some newer, but hungrier companies, are seeing the possibilities, too. L&T is de-



## The Human Face of Automation...(continued)

veloping a program serving healthcare that promises to increase the potential of the humans involved.

There is another driver forcing automation companies and customers to re-examine the human face of automation.

Automation professionals are aging out-- many are in their fifties and even sixties with retirement around the corner. Replacements must be found, recruited and trained.

This is much easier said than done in a world where education and teaching practices have changed in so many ways.

**There is another driver forcing automation companies and customers to re-examine the human face of automation. Automation professionals are aging out-- many are in their fifties and even sixties with retirement around the corner.**

staff, much more must be added to the package. We know from recent research that what younger generations want are intangibles such as job satisfaction, feeling useful, etc. The only way to address these needs is by finding and addressing the human face of automation.

Yes, you can and should keep a tech focus on the hardware with new sensors, controllers, etc.

But if you want to stay around, keep in mind who will buy, use and continue to use your products if you are lucky — and it won't be the automation devices themselves. Ask Mr. Whipple if you find him.

Younger potential recruits are not interested in extensive book study or long hours spent memorizing gauges and controls. This means if they are to be recruited into automation jobs then ways must be found to attract, train and retain them.

Many corporations have become lazy over the decades of having stable employees who accept decent pay and long hours.

Younger employees are neither as accepting of jobs they perceive to be boring, tying them down to one location for too long or believing in the myth that if they take care of the company the company will take care of them.

Too many young people have watched their parents lose pensions and opportunities. They are not nearly as likely to trust corporations and sublimate their own employment desires.

Where does that leave companies who must have qualified people to run their equipment and factories? Management must find ways to make these jobs attractive, and money is not it.

As management science taught us as far back as the 1980s, it takes a certain level of income to make employees content in their jobs, but there is almost never enough money to make them totally happy and dedicated.

The term for that is “necessary but not sufficient. “ In other words, companies still need to pay good salaries but if they want to retain

**Joy Ward is Research Director for Spitzer and Boyes LLC, the publishers of the INSIDER. If you want to know more about the human face of automation, techno-trauma, and how in-depth research really works, and how it can help you discover the Motivators and Barriers you need to understand to maximize your successful sales and marketing strategies, contact her at [joyward@sbcglobal.net](mailto:joyward@sbcglobal.net) or +1 -314-283-5251.**





# THE WAY I SEE IT

## Editorial

### How To Create Open Systems That Work

The great Dutch computer theorist Andrew S. Tanenbaum famously said, "*The nice thing about standards* is that you have so many to choose from; furthermore, if you do not like any of them, you can just wait for next year's model."

In the history of the automation industry, we have seen this to be true. And it matters who is behind the standards. Generally speaking, standards backed by end users and asset owners have had less success than standards backed by automation vendors. Even very large companies, like General Motors, have had less success with standards than companies like Emerson and Honeywell and Siemens. The MAP standard, and ISA95 have been considerably less successful than HART (originally developed by Emerson) and Profibus (originally developed by Siemens). OPC (originally developed by Microsoft) has become successful in similar fashion.

The fact is, a standard is only as good as its implementation. HART 6.0 failed because it wasn't implemented by most of the major instrumentation vendors. HART 7.0 was

Comments? Talk to me!  
waltboyes@spitzerandboyes.com

Read my Original Soundoff!! Blog:  
<http://www.spitzerandboyes.com>

successful, simply because it was the vehicle for WirelessHART. Foundation Fieldbus was never completely successful, because it was seen to be Emerson's standard.

Recently, we have seen ExxonMobil and other end user companies attempt to create a new "open standard" for automation, especially process control and systems.

We understand why ExxonMobil wants the open standard they have patented. We are very clear that quite a few smaller automation vendor companies have climbed on the bandwagon— among other things, so they can stop being packaged out by the major vendors at companies like, oh, for example ExxonMobil.

We continue to wonder how well the open standard will fare if the majority of the large automation vendors simply say, "No."

Some people connected with the Open Group (the standard body for the ExxonMobil-backed standard), have said that the smaller companies and the end user companies will create the standard, and eventually the large automation vendors will have to follow suit. Please pardon us if we are ever so slightly skeptical of this. Thirty-something years after its first promulgation, the ISA88 Batch Standard is still not fully adopted, and one

major automation vendor has said recently that their customers aren't requiring ISA88 compliant batch systems. So that vendor doesn't make its software compliant with ISA88.

The problem is that the Open Group and its supporters have not made a credible case for complete adoption of a single standard for control system architecture. Standards for which a credible case can be made, are the ones that are successful.

So, it is up to the Open Group and its members to make the case. Why should Emerson, Honeywell, Yokogawa, ABB, Siemens, and Schneider and other vendors give up their proprietary control systems and agree to permit their systems to be architected by anybody, including competitors? Is there a realistic case, or is it wishful thinking on the part of end users and asset owners that they can expect vendors to give up their competitive advantages so that the systems are more likely to be adaptable to the changes everyone sees coming in the industry?

We want an open architecture platform onto which can be plugged operating apps. We have wanted one since we first proposed it at the Smart Manufacturing Leadership Coalition. But we want one that is supported by all the major vendors. Until that happens, we won't have a real standard.

A handwritten signature in black ink, appearing to read "Walt Boyes".

The Industrial Automation and Process Control INSIDER™ is published by Spitzer and Boyes LLC., Copyright 2014-2018, all rights reserved.

The INSIDER is edited by Walt Boyes. Joy Ward is a columnist. Additional reporting is done by David W, Spitzer PE., Rajabahadur V. Arcot, Nick Denbow, and Steven Meyer.



The INSIDER is a subscription based publication and does not take advertising. This means that the INSIDER can be completely independent and unbiased in its reporting and in its analysis.

To subscribe to the INSIDER, please visit <http://www.iainsider.co.uk> and click the "Become an Insider" button.

Send comments to [insider@spitzerandboyes.com](mailto:insider@spitzerandboyes.com). We want to hear from you!



### Rajabahadur V. Arcot: Evaluate technology's potential from manufacturing industry's perspectives

Business entities' success depends on their ability to gather relevant information and leverage the same for managing their operations; it is more so in the case of manufacturing.

Manufacturing requires information not only about production level operations but also about the demand for the goods produced, availability of human, financial, material and energy resources, condition of the plant equipment, delivery schedules to be met, and such others.

While Industrial control systems evolved to meet the real-time information needs for the production floor operations to be performed safely and efficiently, enterprise solutions, such as enterprise resource planning (ERP), supply chain management (SCM), supplier relationship management (SRM), customer relationship management (CRM), and enterprise asset management (EAM) evolved to meet the business or enterprise level information needs.

Enterprise solution packages evolved to meet the specific functional needs and, often, manufacturing companies implemented them as and when the need arose over the lifecycle of their plants and as standalone packages.

While it is inconceivable to think of a manufacturing plant without a robust control system, the same cannot be said about enterprise solutions. Many manufacturing plants are yet to automate their enterprise level operations and even now depend on information from offline systems for decision making.

**The journey's goal is to become Industry 4.0 compliant.**

#### Integrated information imperatives

With the complexities of industrial firms on the increase, the benefits of integrating information from control systems and enterprise

solutions are becoming apparent and manufacturing companies are seeking ways to achieve this goal.

While, some have integrated their plant control systems with enterprise solutions, there are numerous others who do not find enough investment justifications in terms of both costs and efforts.

All the same, this journey in search of truly becoming real-time

information driven entities is enticing for manufacturing companies and, for some futurists, the enabling technologies that help manufacturing companies to achieve this goal are Industrial Internet of Things, cloud and edge computing, artificial intelligence, data analytics, robotics, virtual reality, and such others.

The journey's goal is to become Industry 4.0 compliant.

As a consequence of the manufacturing industry's quest to become information driven, an opportunity has emerged for technology companies, such as Cisco, Google, IBM, and Microsoft, to challenge the domination of industrial control suppliers, such as ABB, Siemens, Honeywell and Rockwell in the OT domain by advocating a more pervasive role for the emerging enabling technologies, such as IIoT, AI etc.

New words and abbreviations, such as Industrial Internet of things (IIoT), operational technology (OT) to mean industrial control systems, cyber-physical systems (CPS), and such others have also started entering the common

**Rajabhadur V. Arcot: Evaluate technology’s potential from manufacturing industry’s perspectives (continued...)**

lexicon.

**Overarching role for the growing information technology**

Essentially, the enabling technologies associated with Industry 4.0 are the outcome of the ever-increasing power of the information technology, which is the foundation on which the modern control systems are built.

Going by the Moore’s law, the processor speeds or overall processing power for computers doubles every two years, and we are witnessing this.

Therefore, it should only be expected that these developments in information technology will continue to influence the industrial control systems of the future.

The major impact of information technology on control systems can be traced back to the time when PLCs replaced the relays, DCS replaced panel mounted instruments and controllers, and when transmitters with HART Communication Protocol came into the market.

Proponents of the impending revolution in the operational technology (OT) and its convergence with information technology (IT) are mostly the technology companies, such as Cisco, Google, IBM, and Microsoft, as they sense a business opportunity.

There is a dichotomy in their stance; while they loudly proclaim the advantages, they are not pointing out their challenges in addressing plant owner operators’ deep concerns, such as system availability, cyber security, data ownership, and others.

Unfortunately, the industrial control system suppliers are also not forthcoming in pointing out that the emerging technologies, while having the potential to play a greater role in the control system architecture, have to become much more robust to be more widely used.

This situation leaves the manufacturing companies without a proper roadmap and they are left bewildered.

Numerous articles and reports bombard us, almost continually, about the benefits of emerging technologies, such as the ease

**This situation leaves the manufacturing companies without a proper roadmap and they are left bewildered.**

of data connectivity & OT/IT integration and massive analytical and data processing & computing power & capabilities; numerous conferences and seminars are held to convince manufacturers of

Industry 4.0 imperatives and the role of enabling technologies.

**Discussion narrative changes**

As a consequence of the information blitz, the narrative of discussions among professionals from manufacturing industries and automation system suppliers companies has changed in recent times.

The focus of discussions has shifted from control systems’ value contribution to the benefits of technology.

In the past, the discussions typically centered on issues such as selecting the appropriate communication protocols, interoperability, challenges in justifying

automation investments, migration strategies, support and up-gradability, ease of configuration, and similar others and less about the underlying technology and how it will shape the control systems of the future and manufacturing.

It is necessary to recognize two things - that ICS have a specific role to play in manufacturing industries; and companies’ investments are justified on the basis of expected returns.

ICS investments are made with the objective of safe and efficient production level operations because they provide the relevant online real-time information required for monitoring and controlling of production processes. The upfront investments in ICS are made from the production level operation perspectives and form an important component of a plant’s project capital budget.

Decision-makers associated with ICS procurement, evaluation, investments, operations, and maintenance are concerned more with accuracy, reliability, availability of production floor information and less with integration of production floor information with enterprise information.

They understandably remain conditioned to associate control systems and the related sensors and actuators with the primary objective, which is to monitor and control various production level parameters.

These systems, from the point of view of control system professionals, already have the necessary & appropriate connectivity capabilities and power to gather data, analyze and convert them into information so as empower the operators and safely automate

**Rajabahadur V. Arcot: Evaluate technology’s potential from manufacturing industry’s perspectives (continued...)**

the production processes.

For automation engineers, the goal of securing OT/IT convergence is only a secondary goal and from their perspective, the technology for achieving the same already exists.

With the help of OPC Unified Architecture, which is open standard based, scalable and platform independent, it is possible to achieve machine to machine communication as it facilitates flow of data among various enterprise and control system, such as ERP, SCM, EAM, DCS, PLC, and others.

**Leverage enabling technologies to expand portfolio of offerings**

While it is mandatory for ICS suppliers to continually upgrade their solution providing capabilities, it is also equally necessary for them to evaluate all emerging technologies and adopt them.

In the past, they have successfully trodden the path of adopting new technologies as they became available and worked closely with end users to gain their acceptance.

The introduction of PLC, DCS, SIS, communication protocols, process simulators, optimization and modelling software & development of related algorithms are some of their past achievements in technology adoption and adaption.

Information-technology’s enhanced capabilities offer opportunities to automation vendors to expand the portfolio of their offerings to the manufacturing industry or enhance their performance.

Automation companies must develop realistic strategies to identify specific applications where power and capabilities of internet of things, artificial intelligence, cloud and edge computing, and such others are best suited to create value.

For them, to remain in command, as the pace of developments in the information and communication technologies accelerates, it is necessary to leverage their deep understanding of the manufacturing industries needs and work collaboratively with them to identify areas where they see value and work towards satisfying them by investing in pilot projects that will demonstrate the quantifiable benefits.

One such area, which resonates with manufacturing industries need, is the predictive maintenance.

**Automation companies already have a strong foothold in this domain and companies like GE are engaging with other stakeholders to take this to the next level. Other such application areas where automation companies have strong links are control-in-the-field and throughput-optimization.**

Automation companies already have a strong foothold in this domain and companies like GE are engaging with other stakeholders to take this to the next level. Other such application areas where automation companies have strong links are control-in-the-field and throughput-optimization.

With plant equipment becoming cyber physical systems, the goal of achieving truly distributed control is closer to realization with the help of edge computing and IIoT connectivity capabilities. This will give fillip wider use of CIF. Also artificial intelligence can complement conventional optimization algorithms to improve throughput.

**Rajabahadur 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. He was responsible for ARC Advisory Group in India. Contact him at [rajabahadurav@gmail.com](mailto:rajabahadurav@gmail.com)**

