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Your key to the latest industrial automation and process control information

The Changing World of Automation Software: The Ignition Community Conference and the Sale of Schneider Software

Late in September, every year, a whole tribe of people gather in Folsom, California for the Ignition Community Conference. Put on by the authors of Ignition!, Inductive Automation, the conference draws more people than they can accommodate in the venue— about 450 people are the most it will hold. A month and a half before the conference, it is always sold out.

So what is so compelling about this conference in the beginning of the Fall of the year?

The conference is on the cutting edge of automation software. Inductive Automation's modular software design and their unique server licensing model (instead of seat licensing) have drawn a large number of forward-thinking Control System Integrators into the fold.

According to several attendees, including some from some very large companies, the software is extremely easy to learn, and to work with. Several attendees noted the usefulness of Inductive University's over 700 video training courses.

The Four Pillars

Every year, CEO Steve Hechtman lists what he calls the four pillars on which the company is founded.

Steve Hechtman

"What are the four pillars? 1) New Technology Model, 2) New Licensing Model, 3) New Business Model, and 4) New Ethical Model,' Hechtman says, every year.

The new ethical model he refers to is intended to re-assure customers and integrators that Inductive will be there in the future. "We are not interested in selling out," Hechtman says.

But by far the most interesting is the "new technology design" of Inductive's flagship product, Ignition!.

Ignition is designed very much like IOS or the Android operating system. It provides a complete substrate, onto which you place modules. These modules allow you to completely customize the software instantiation to exactly what you want it to do, and no more. Inductive's engineers are vocally opposed to bloatware.

Sometime after releasing Ignition!, Inductive Automation realized that they could be even more like IOS. They released a Software Developers Kit (SDK) and opened their API (Application Programming Interface) to allow third parties to write modules that work just like Inductive's own home-brew.

Now, one of the major features of the Ignition Community Conference is to see the

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The HealthWatch is off this month

Industrial Control System Security in the Age of the Industrial Internet of Things (continued)

modules that have been produced by end-users, system integrators, and other manufacturers.

This year, to illustrate the reach of the concept into conventional automation, one of the most interesting modules, or apps, was by that old-line, very conservative level company, Magnetrol.

One of the other things that differentiates Inductive, and therefore the Ignition Community, is that they really believe in a community, and an ecosystem. Hechtman and Chief Strategy Officer Don Pearson, are dedicated to empowering the ecosystem, and so they take partners instead of trying to be everything to everyone. And their partners are extremely innovative too. Opto22, Bedrock Automation, Advantech, Seeq, Cirrus Link (the fount of all things MQTT) and others are real partners, not just people who show up to exhibit. What is unusual about this collection of partners is that they are all on the cutting edge of automation and the Internet of Things. That's why Magnetrol's app and their attendance and membership in the community is so enlightening. It looks like Inductive Automation's message is getting through to the traditional automation vendors too. Even EZAutomation has jumped on the bandwagon.

The Division of the Software Market

September also saw the third (and hopefully final) try by Schneider Electric to get rid of all the assorted software businesses they acquired with Foxboro and Eurotherm in the Invensys acquisition. These companies include Wonderware, SimSci, Avantis, and some smaller brand names. But Schneider hedged their bet, even though they wanted them off the balance sheet. They sold them to Aveva, along with a heavy chunk of cash, for 60% of Aveva and the right to buy the rest of the company in four years, if the times are right.

Why would Schneider do this? It isn't enough to say, as their detractors do, that Schneider only knows how to make boxes. They kept Foxboro and the rest of the hardware focused product lines— which lends credence to the idea that they believe that software is there to support hardware in both sales and use. The INSIDER does not share this view, either of Schnieider's beliefs or the rightness of the concept.

Schneider believes that their market is the traditional DCS market, and they need to offer the hardware and software their customers are expecting to see. Having Wonderware et al., they felt, was cluttering up the brand.

It will be very interesting to see what happens in the next four years, and whether or not Schneider will buy all the rest of Aveva. It will also be interesting to see how far Wonderware and the other software companies go in mimicking Inductive Automation's four pillars. If they don't, the INSIDER suggests they may not be able to survive.

The new software companies, like Inductive Automation, are focused differently. They know they can't compete well with the conventional DCS vendors, so they have looked to other venues for sales. They are all over the alternative energy markets, microgrids, and solar power. Other non-traditional markets include craft and micro brewing, other food and beverage and pharmaceutical applications. This, in turn, is attracting more untraditional vendors and end users and system integrators.

Magnetrol wants to shed its reputation as a sort of stodgy old line level company, even though it is about the only independent level technology company left, and become a thought leader in the minds of its customers. Ignition! is the best choice for them, as well as a ballpark that welcomes them to play. No other SCADA or MES software company is as welcoming.

Service as a Service

As we have noted before, the major automation vendors have been seeking for years to find a way to end the feast or famine business model that depends on winning major projects for revenue. Not only is this business model difficult to manage and predict, but it is extremely sensitive to downturns in the business climate and the increasingly global economy.

Software only, cloud-based applications are ideal for this new model— you get paid every month whether there's a new project or not. The major automation companies, and as many minor players as can think up a rationale for it, are seizing on this opportunity for software and service contracts, and we expect the market to get pretty cutthroat very soon, as asset owners bid down the price of service.

Companies will continue to push service, if only to be in place when hardware replacement becomes a necessity. Honeywell has already shown that software based updates are more affordable and less likely to cause chaos than hardware based updates, so we can expect more of this.

All of the major vendors have established consulting businesses to be able to extract more non-project-based revenue from customers. The end users are possibly rightly concerned, however, that the consulting businesses and the service offerings are just a way of keeping the camel's nose under the tent at project time.

Does this mean a real sea change in the way automation vendors go to market, and how they intend to serve their customers? We can only sit back, grab a cool one, and watch as it plays out. It may be even more interesting than football.

INSIDER Special Report: Flow Measurement in an IIoT Digitized World

Picture caption

David W. Spitzer, PE, was invited to present the Main Keynote Address for the 5th "flotek.g"- Global Conference and Exhibition on "Innovative Solutions in Flow Measurement & Control ... Oil, Water, Gas" on 28 August 2017 at FCRI, Palakkad, and Kerala, India. The event was supported by the Fluid Control Research Institute (FCRI) established during 1988-89 by the Ministry of Industry, Government of India, with the help of UNDP/UNIDO is dedicated to flow product industries. The institute is contributing to the growth of Research & Development in the area of fluid flow engineering. FCRI has developed advanced flow measurement techniques during the last 30 years and in addition has carried out number of sponsored R&D assignments for both Government & Private sectors.

With kind support and valuable guidance from experts in flow engineering fields, FCRI had successfully conducted four Global Conferences and Exhibitions. These Conferences had attracted more than 250 – 300 global participants from Flow Industries/R&D/ Academic Institutions etc. These events gave an opportunity/interactive forum for the flow measurement fraternity for trends in R&D activities in flow products, bringing forth current status of industrial/site flow needs and shaping futuristic requirements.

David W. Spitzer is a Professional Engineer and ISA Life Fellow who worked for United States Steel, Mobay Chemical, and Nepera Chemical, and has consulted for numerous other companies worldwide as a Principal at Spitzer and Boyes, LLC that offers engineering, seminars, strategic marketing consulting, distribution consulting and expert witness services for manufacturing and automation companies. Spitzer and Boyes, LLC is also the publisher of the Industrial Automation INSIDER.

Mr. Spitzer has written over 10 books and over 400 technical articles about flow measurement, instrumentation and process control. David developed the ISA Industrial Flow Measurement seminar that he has taught worldwide for almost 35 years. David is a regular contributor to Flow Control magazine and is, or has been, on the editorial advisory boards of Intech, Intech Brasil, and Flow Control magazines. He is also a member of the ASME MFC Committee (Measurement of Fluid Flows in Closed Conduits). Overall, David has more than 40 years of experience in many facets of instrumentation, process control, electrical, and utility engineering, including conceptualization, estimating, design, construction, startup, operation, troubleshooting and teaching.

David Spitzer's keynote address follows:

The title of my presentation is Flow Measurement in an IIoT Digitized World which is a "mouthful" in the sense that you can't get too many more buzzwords into such a short title. Taken in order… flow measurement is understood. IIoT, the Industrial Internet of Things may seem a bit more vague so we'll talk about it in more detail. Digitization. We live in a digitized world today but I contend that this has been going on for quite some time.

The conference that you are attending is really pretty specialized --- innovative solutions in flow measurement and control for oil, water, and gas. If you look at the bigger picture, flow measurement is one part of instrumentation and control which is one part of engineering. Custody transfer metrology is but one part of flow measurement.

Now, the other side, there is the IIoT. What is the IIoT? Well, I'm not sure that we're so sure. Let's examine the different perspectives of people that are involved with it. One such party is manufacturers. What do manufacturers do? They make instruments. They manufacture

INSIDER Special Report: Flow Measurement in an IIoT Digitized World (continued)

instruments, they sell instruments. What about users? They use the instrumentation. And then the third category in the slide, which is really neither one nor the other, is "Consultants" that is intended to include flow laboratories and operations like that, that essentially observe what's going on both sides --- manufacturer and user.

You will notice that the alignment of manufacturers and users is usually pretty well aligned. Manufacturers want to design, and manufacture and sell good instruments. Users want good instruments. But what do manufacturers do? They sell instruments. What do users do? They make products. They make chemicals, they make pharmaceuticals, they make beverages, they make steel, they make the other metals. They make many different things. So that the perspective with which they look at the IIoT is going to be somewhat different based on that.

Now, I want you to understand that I am a consultant. I am an observer who has opinions. As such, what I am going to present is some of the softer aspects of instrumentation, and control, and flow measurement --- not the hard ones. The hard ones like F=ma, E=mc squared, Q is equal to A x v ... Those are really the hard aspects of flow measurement. They are the ones we deal with in science.

But I'm going to be talking a lot about the softer aspects. And I just started doing that by effectively asking, "What are the perspectives of the different groups of people that are involved?"

Again, getting back to what I was saying before, I am a consultant. However I have worked primarily as a user however I did work briefly (when in college) for a manufacturer of instrumentation (but this doesn't really count in the bigger scheme of things). So that my background is primarily that of a user.

In terms of what you see out there in the literature, who's talking about IIoT? Who's talking about that? In general, users don't talk that much. They don't write that much in general and tend to speak even less. You generally don't see them going out and talking very much. Manufacturers are the primary drivers and sources of the information that you will see published. That said, when you hear me talk, it is likely that you are going to hear a different take on what is going on coming from a user perspective, as opposed to manufacturer perspective.

I plan to talk about the theory of the IIoT based upon my observations. This is not necessarily what it is, what it will end up being in five years, three years, ten years or twenty years. It is what I see out there based upon what I read and conferences that I attend. The basic concept behind the IIoT is to have many sensors (more commonly termed the “flow element” and “flow transmitter” in your field). There are some commonly-used terms that I do not prefer. One of them you will hear is "lick and stick" which is intended to mean that something is simple and straightforward like where you can, “just lick a postage stamp and paste it on the envelope." That said, all this information comes in and it goes up to Big Data. I don't prefer the term "Big Data", but the idea is that the data goes somewhere into a sensor repository. Maybe it's in the Cloud, maybe it's not in the Cloud. But you get the general idea --- data is stored somewhere.

There are sensors (transmitter and the flowmeter) and signal transmission ... How do you take the signals from these sensors and get them somewhere they might be useful where device diagnostics and data analysis can be performed so as to produce information from which you can make better decisions quicker? This question has many ramifications associated with it.

The net result of implementing this architecture will be a digital enterprise. In other words, data and information will be move digitally from one place to another to another... If you take a more detailed look at the signal transmission you will see primarily digital protocols.

There is one thing that I said that should scare you. It scares me. But we're going to find out that it's not quite that way. Imagine if flow meters, the ones that you work on, the ones that you study, the ones you are doing research on, the ones that you're testing, and all

INSIDER Special Report: Flow Measurement in an IIoT Digitized World (continued)

that, become lick and stick --- in other words, they become simple to apply, simple to install, simple to operate, simple to maintain… If this happens, I would be looking at three or four hundred people in this room and wondering what are all these people going to do if everything is so simple? So let

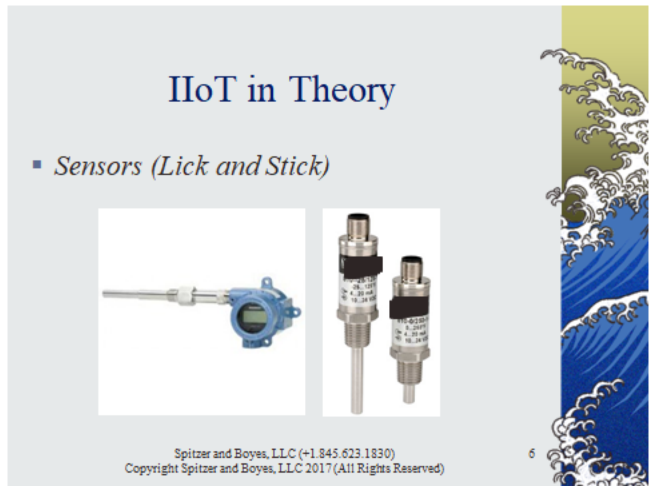
me continue on. That is just a little thought in passing --- but I ask you to keep it in the back of your mind.

If you look at the sensor on the left, you'll see a stainless steel ... I believe it's a turbine flowmeter. On the right side is a plastic turbine flowmeter. And what

you're seeing here is an instrument on the right that costs about 15 to 20% as much as the one on the left. This trend has been going on for quite some time.

If you consider a pressure transmitter, a temperature transmitter, or a flow transmitter from 20 or 30 years ago, it was a pretty big, hefty box, or something like these. And now the differential pressure transmitter is about this big. And it costs less to manufacture than this big thing cost many years ago, correcting for the money.

What you see from left to right is basically the trend



that you are going to see occurring --- but it has been occurring for a long time. And it will continue to occur as sensors become less expensive (and often better). This is just the natural progression in the process of finding better ways of doing things.

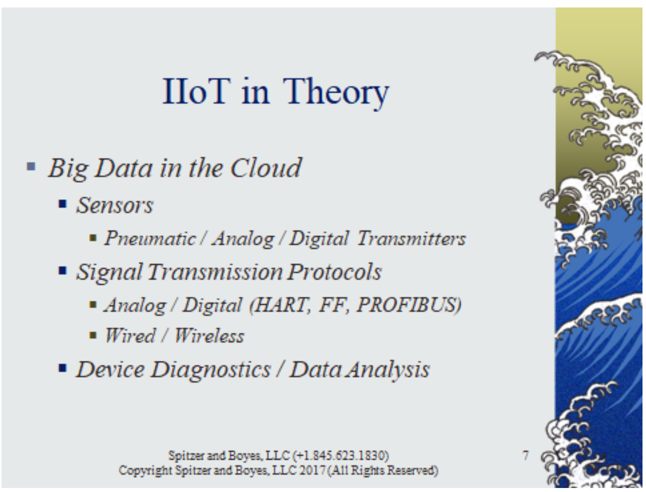
Again, the pressure transmitter on the right is probably about 15 to 20% of the cost of the one of the left. The one on the left is probably much more flexible and likely exhibits better performance… than the one on the right. But the one on the right may be good enough to do the job that needs to be done.

Here's the same thing that you see with temperature. On the left is the temperature transmitter and the thermocouple or RTD is in the thermowell. The transmitter probably can handle many different types of thermocouples, RTDs, and other temperature elements. It has all kinds of flexibility and probably better performance than the one on the right. But the one on the right has a specific temperature element and its temperature range may not be changeable. Again, it costs about 15 to 20% of the cost of the one on the left and may be good enough for many applications (or not).

INSIDER Special Report: Flow Measurement in an IIoT Digitized World (continued)

What we have seen is that sensors are trending to become less expensive and to have more performance, and to be able to handle certain applications. In many applications, less expensive sensors are good enough. Going back 30 and 40 years, sensors used to be pneumatic and they used 3 to 15 psig (0.2 to 1 bar) pneumatic signals that were analog in nature.

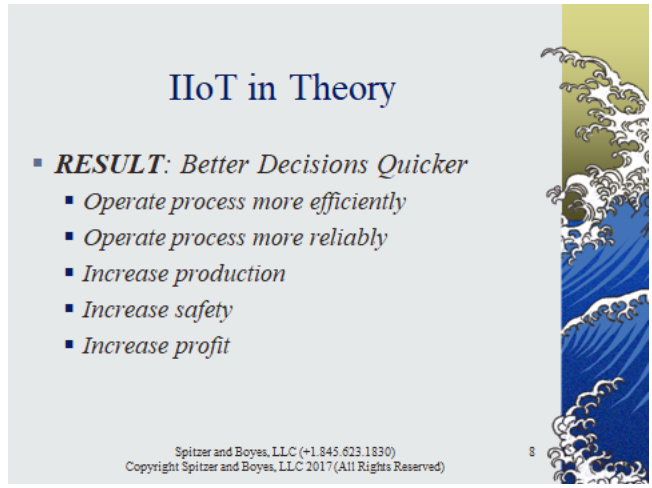
Sensors were originally mechanical, then mechanical with analog with air output signals before eventually becoming electronic. The first electronics had discrete analog components (resistors, capacitors and transistors) that generated analog outputs such as 4-20 mA. The advent of the microprocessor enabled the development of digital



transmitters that preform the same function as the others --- but digitally --- and transmitted an analog signal (usually 4-20 mA) to an indicator, or recorder, controller or similar device.

So that progression, if you look at it, has been going on for perhaps 30 years or more as a progression from pneumatic to analog to digital electronics. And you can expand the discussion of a digitized plant to include the actual sensor itself --- not only the transmitter --- because some sensors are inherently digital. For example, consider vortex shedding and fluidic flowmeters that are essentially digital flow elements.

What has been going on with the sensors has been going on for a long time. What about the signal transmission? It was originally pneumatic and evolved to become electronic (4-20mA) which evolved to include digital protocols such as HART, PROFIBUS and Foundation Fieldbus, among others. These digital protocols are able to move the signal from one device to the other --- in this case from the transmitter, back to some other location such as a distributed control system and/or programmable logic controller.



If you look at this transition from analog to digital… you are digitizing the plant. This has been going on for quite some time. It's a different way of doing it, but it's doing the same thing. Digital is doing what the analog did in a different way and there are a lot of advantages in doing this (that I am not going to cover in this particular talk).

There are wired and wireless signal transmission and protocols. If you have a large installed base of wired transmitters and you might want to get this information out of those transmitters on maintenance item where something that might be broken or on its way to failure. Examples include the internal gain of an amplifier that might be a problem if it is too high, or similar. This is where wireless signal transmission can provide useful information. And again, the information is digital --- not analog --- and it is part of the digitization process.

The result of analyzing sensor information and other data analysis is to try to make better decisions quicker. And if you make better decisions quicker, you can operate the process more efficiently. You can operate more reliably. You might be able to increase production and allow higher production rates. You can increase safety. You can increase bottom line. You can increase profit. But not all of these apply for everywhere.

So, basically, what I have discussed is a review of my observations. The idea is to have many sensors, bring the information digitally back to a central location, do diagnostics, analyze the data and develop information that you can actually use to make your decisions quickly.

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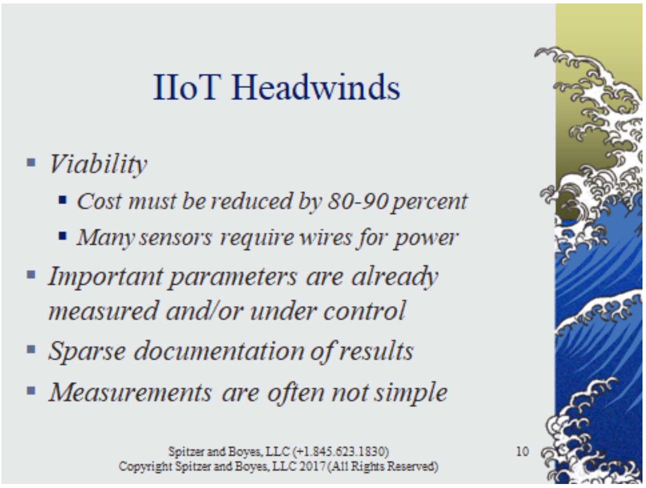
That makes logical sense and sounds great on paper… but there are some headwinds that are involved.

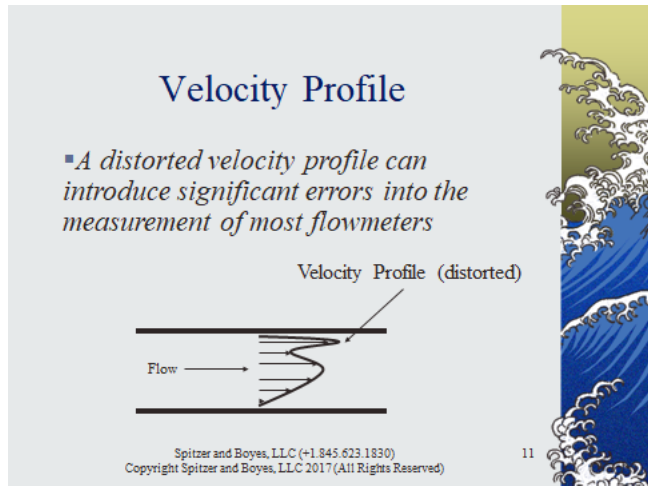
In order to become viable, we need easy-to-use sensors that are relatively low cost so you can install them anywhere that you think they might be useful. I suggest that the cost is going to have to come down 80 to 90% of where it is today. And also, many of those sensors require wires that are going to require a conduit, and cable, and an appropriate infrastructure. But if you're running a Coriolis flow meter (for example) it's not going to operate on batteries. It's going to have to use some sort of power. So you have the viability issue.

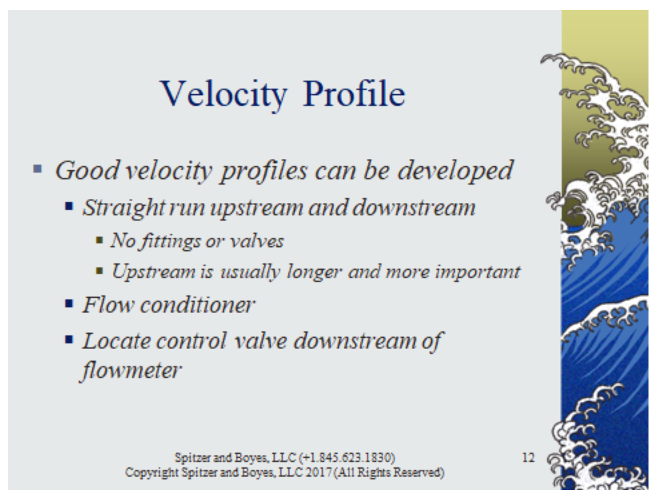


And again, remember I said earlier about what the different groups are? You had manufacturers. They love this idea of having sensors all of the place. Why is that? They can sell a lot of sensors. Users, on the other hand, want information. And just throwing sensors all over the place, that's a potential problem, because it costs money in order to do that. And for that, they have to go out and justify the expenditure. And it can't be a "pie in the sky" justification. There has to be solid justification behind it.

If you take a look at this, this "put in many sensors", "look at all the data", out comes this information. If you go and do this, you're really doing it on faith --- F-A-I-T-H. In other words, if you build it, they will come. If you do this, you're going to be all kinds of profitable, and have all kinds of positive things happen. The only thing is, when a user goes to look for money to implement this, management asks, "Okay. Well, what is going to be better?" and "What is the benefit?" and "How much is it going to be better?" and "What is that worth in terms of cost?" and (in your case) How does it better improve the uncertainty” and the like. The (above average) user really doesn't have any hard and fast numbers to provide management.

That gets us down to the third item which is sparse documentation of results. How many papers have you seen that actually say, "We did this IIoT thing, and we got these results, and we saved this kind of money in order to be able to get a payback when we did this." It's hard to do that.





A rather salient point is that when dealing with industrial process control, the important process parameters are already measured and/or are already under control. You have a flow at a particular location going from A to B. If the measurement is important, there is already a flowmeter there and there is already a controller there to control the flow. So now, where are you going to put all of these

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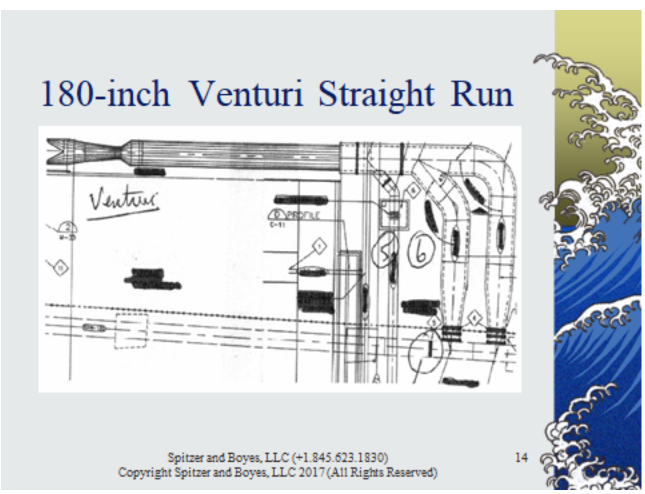
additional flow meters? There are more points to measure pressure than are installed currently. But then, how much information are you really going to get from those? In some processes, it may be fantastic information that you can use. In other processes, it might be a waste of effort and money to install them.

A people involved with flow measurement, you are well aware that measurements are often not simple. In industry, you do not just plug a flowmeter in, lick and stick, or whatever you want to call it. Let me do a brief tutorial from my flow measurement seminar and give an example to help illustrate this point. Most flowmeters will exhibit significant flow measurement errors if a distorted velocity profile is present --- not all flowmeters but most flowmeters.



How do you get around that? You develop a good velocity profile upstream of the flowmeter. One way to do this is by having sufficient straight run upstream and downstream of the flowmeter. The manufacturer tests it and determines how many diameters you need. This is what we know. And there should be no valves and fittings in the straight run. The upstream is usually longer than the downstream, because it is usually more important.

Another way to implement this is to use a flow conditioner upstream of the flowmeter and locate the control valve downstream of the flowmeter. If the control valve is located upstream of the flow meter it usually means that somebody didn't know what they were doing.

I am joking when I say this but… here is a photograph of one of those simple lick and stick sensors. I had the privilege of being able to work on this one. You see these things over here at the bottom? These are people. This is 180-inch, or 4.5-meter diameter Venturi flowmeter. The inlet is here, comes in here, the throat is ... I believe it was 96 inches (2.5 meters) in diameter. The outlet is back over here.

This photograph shows it when it got to the site. I worked on it when it was actually in and running. Now, the reason I became involved with this particular flowmeter was because a student in one of my seminars worked at this facility. The water balance was off by, I believe, 2.5% --- and that was normal. And then it went to 3, 3.5, 4, and then the boss said, "Who can we get to come in and take a look at this to figure out what is going on?"

So I went to the site and found a number of issues. This slide shows the installation of the Venturi. The flow was from right to left and goes up through these two lines over here, which I believe were 96-inch pipes. They're pretty good size. And then they come up and go into this straight run over here. This particular Venturi required five diameters of upstream straight run. I actually had about four and a half diameters. So I figured, "Hey, that's pretty close. I shouldn't have any problems with it but maybe it'd be off a little bit. Maybe it won't be perfect. But I shouldn't have any tremendous problems."

Well, that was pretty much true. I ended up getting the water balance down to about 1/2 a percent to 3/4 of a percent. But to the right (off the slide) the line that came this way went up this way, and that's where the pumping station was --- way up at the top. What happened was that the plant made a tie-in for a bypass line that was tied in upstream of the piping to the upstream straight run

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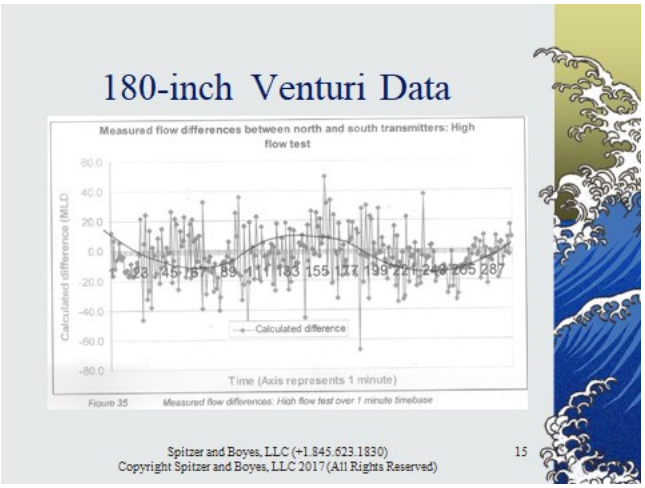
(twice removed from the flowmeter). When they turned it on, I found that there was about a 10% shift in the measured flow of the Venturi.



So we thought we knew that we needed five diameters of straight run upstream so four and a half diameters might introduce some error… but not much. The Venturi was okay under normal conditions. But when a change was made in the piping upstream of the upstream piping to the upstream straight run... there were errors and it was a problem.

As a result of this experience, you can see is that what we thought we knew --- we did not know. We thought that five diameters was enough --- but it is not enough.

What we actually found out was that flow through the changed piping affected the measurement.

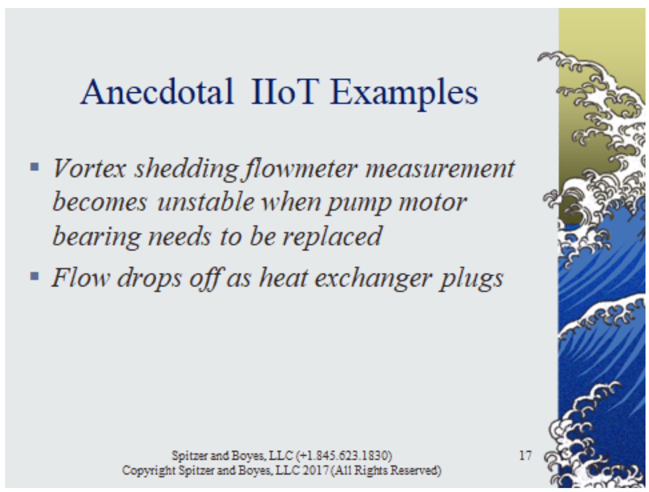
Why is it affecting it? Because swirl was occurring in the pipe due to the new flow path, and when you have tons per second of swirl occurring in the large pipe, the liquid was not touching the side wall all that much, like would occur in (say) a 1-inch (25 mm) pipe where the liquid is in relatively intimate contact with the walls.

Therefore, a good velocity profile is generally developed after only a few diameters in a 1-inch pipe. However this is not the case in this large 180-inch diameter pipe.

This work was done with a colleague from the UK, who actually first discovered it in India, where there was a 2 meter pipe (as best I recall) that ran over a road, and then 1 kilometer parallel to the road above the ground. What he found was that the velocity profile near where the pipe went over the road was better than the profile that he found 500 diameters downstream of that point.

We thought we knew things --- but we did not.

Remember lick and stick? It's real simple, right? This is some of the pressure data we took on opposite sides of the Venturi. You're down in this area and you're up in that area which proved that we had some swirl occurring inside that pipe. Some years ago, I wrote a brief article about this --- https://www.flowcontrolnetwork.com/what-do-we-know.



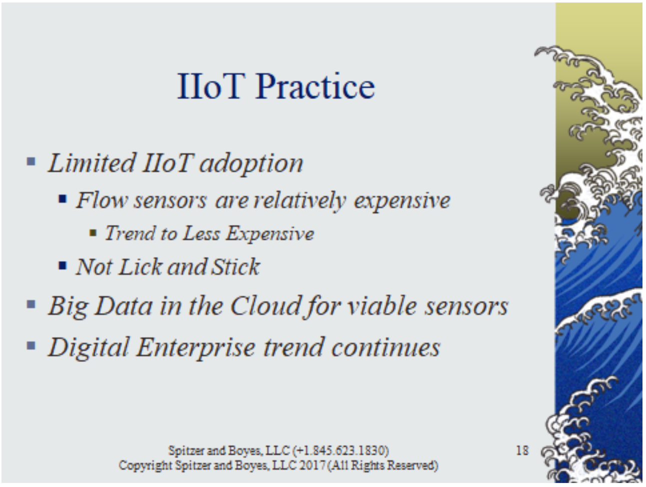
In one anecdotal example of the IIoT, a vortex shedding flowmeter measurement became unstable when a pump motor bearing needed to be replaced.

In other words, the electrical/instrumentation supervisor came to me and said, "Hey, this flowmeter's going crazy. Nothing wrong with the flowmeter, but we found that the motor bearing was going bad."

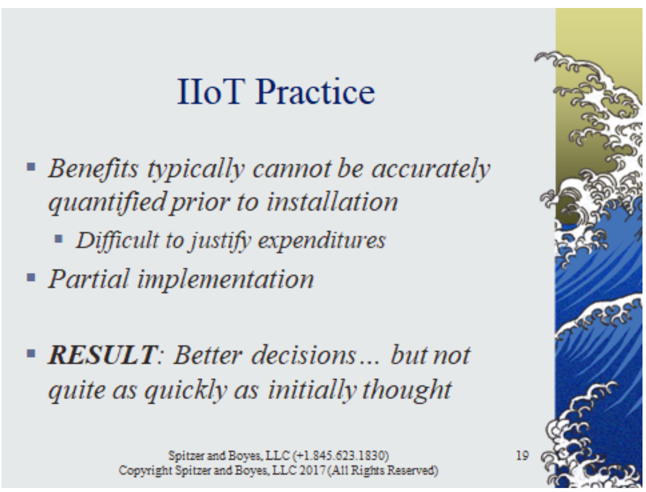
This could be something that you might find if you put that flowmeter data into this cloud and do analysis. You could tell management that this is an example of something that would result from implementing the IIoT and save money because as soon as the vibration started occurring in the flowmeter and the signal was going up and down, you could replace the bearing and not wait for it to fail. Great!

But this actually happened in the plant where I worked about 25 years ago. So a person was able to look at that and say, "Here's the connection between one and the other."

INSIDER Special Report: Flow Measurement in an IIoT Digitized World (continued)



What I'm trying to say is that we have been doing this" IIoT thing" for some time. It's just that we haven't used the tools that have become available recently. Another example



is where flow drops off as a heat exchanger plugs. The first example is real and could happen today. Somebody might find this using the IIoT or your electrical/instrumentation supervisor might have told you about it.

What happens in practice? Basically, what you are looking at is limited IIoT adaptation. First off, flow sensors and their transmitters are relatively expensive.

Second, they're not lick and stick. If you've done flow measurement for a while, you find out you can't just throw a flowmeter in here, throw a flowmeter in there, and have them work. You might be able to do that on some specific applications and certain size lines and say, "I've seen this before."

But it is a more difficult once you get over into the process aspects, looking at different materials, and different gases, different liquids, and the like. It's not lick and stick --- and it won't be for a while --- which means that we will have jobs because the cost of flowmeters has to come down in order for the IIoT to really take off in any way, shape, or form (especially with regard to flow measurement).

Is Big Data in the Cloud viable for sensors? When the user feels that there is a certain area that might really benefit from this, they will target that area or maybe target a part of the plant or maybe target particular loop(s). Their perspective will be to try to see things before they occur so as to be able to make better decisions.

Of course, the trend towards the digital enterprise --- the idea of having digital transmitters, digital transmission, stored digital information --- is going to just keep on going.

One of the problems is that IIoT benefits typically cannot really be accurately quantified prior to installation. You might get a payback afterwards but tools are not available to quantify them beforehand. For example, if you were able to increase the heat rate of a boiler by a certain amount, you could say that there will be a one percent efficiency improvement and you say that, "we are going to save this much money" or "we are going to make this much money" or "the plant is going to produce this much more".

But such justification is difficult given the current state of the IIoT. Therefore, it is difficult to justify the expenditures so some users are opting for partial implementation where the net result is better decisions --- but not quite as quickly or quite as completely as was originally intended.

David W. Spitzer, Walt Boyes and the other INSIDER staff are available for speaking engagements, webinars, and workshops. David is an ISA Life Fellow, and a Professional Engineer, and Walt is a member of the Association of Professional Futurists, as well as an ISA Life Fellow and an InstMC Fellow in the UK. For information, contact Walt at +1 630-639-7090 or waltboyes@spitzerandboyes.com.

THE WAY I SEE IT
Editorial

How Are We Going to Keep Priceless Data from Hackers?

The word has been that the Cloud is the safest place in the world for your data. After all, banks, big stores, credit agencies, and huge corporations all store data in the Cloud…so it must be safe, yes?

Well, no.

We have seen banks (Chase) and investment houses (Schwab), big stores like Target, credit agencies like Equifax, huge corporations like Merck, and lots of other huge databases that were supposedly safely stored in the Cloud, hacked and in some cases hacked repeatedly. So it is pretty clear that just putting information in the cloud, and using Amazon's or Microsoft's or whoever's built in cloud security is hardly sufficient or fit for the purpose.

For some automation companies, who are touting engineering tools in the Cloud, this may make their customers even more wary of letting their data out of their sight, let alone off the plant site. Saying that the Cloud is safe, look who else uses it is becoming a bit threadbare.

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Not only that, but the trend toward putting SCADA and DCS tools in the Cloud is somewhat problematic, too.

The factory and process environments are real-time based. Most parameters update at least once per second. Doing management of processes through a Cloud-based interface only works if you are certain that the interface is not hackable, and will not lose connectivity. Connectivity loss is something that just cannot be borne. We already know that the Olympic Pipeline disaster, which while not a hack from outside, was caused by a connectivity problem, and several people were killed.

For some automation companies, who are touting engineering tools in the Cloud, this may make their customers even more wary of letting their data out of their sight, let alone off the plant site. Saying that the Cloud is safe, look who else uses it is becoming a bit threadbare.

Imagine what might happen if you were running APC in the cloud, and a hostile invader changed parameters on you without you noticing the difference, and used those changes in the sensor readings to cause the plant to go into unplanned upset. Does Stuxnet come to mind? How about Aurora?

Now think about all the data and intellectual property contained in your control systems and asset management and ERP systems. Let's say you keep a backup of it in the Cloud server you contract with. It gets hacked, and you get invited to buy back your data and intellectual property from the thief.

Worse yet, suppose the thief sells your intellectual property to your nearest competitor. What makes you think that isn't a very viable scenario?

Marty Edwards, formerly head of US ICS-CERT and now Executive Director of the Automation Federation, has said on more than one occasion that we have to think very deeply about what we put on the Internet or in the Cloud. Mostly, I think Marty is right. If you absolutely positively cannot either lose or have the data stolen, don't put it where someone could get at it.

Companies that provide Cloud services, and companies like the automation vendors who retail them to their customers, need to provide assurance that their services will be unhackable and the connectivity will be unbreakable. Otherwise, watch out!

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Rajabahadur V. Arcot: India's Industry 4.0 Readiness Report

India, which has emerged in recent years as a robustly growing large-sized economy, is likely to get a booster dose that will spur its economy further in the coming years. The manufacturing industry, which until now has not contributed much to the growth of India's economy, is all set to receive policy impetus for its expansion.

...only a vibrant manufacturing sector can create productive employment opportunities. The United Nations Development Program's *Asia-Pacific Human Development Report* points out that such a "switch has been key to high job growth in China, leading to a significant decline in poverty.

Growing acceptance that the country cannot move beyond the current levels of growth rate on the back of the service sector alone is influencing policy makers to realize that a strong manufacturing sector is needed both to propel further the economic growth in a sustainable manner over the next few decades and to create jobs for the country's growing population.

According to the country's labor ministry report, around 1 million more people enter the workforce every year.

For India, with large rural & low-income population and big agriculture sector, only a vibrant manufacturing sector can create productive employment opportunities. The United Nations Development Program's *Asia-Pacific Human Development Report* points out that such a "switch has been key to high job growth in China, leading to a significant decline in poverty. In India, in contrast, the manufacturing sector contributes to only 15 percent of its GDP and 11 percent of employment." In comparison to the size of the country's economy, population, and growing appetite for the present-day needs, such as consumer electronic devices, washing machines and other home appliances, smart phones, communication & networking equipment, and high-end machines, the manufacturing base is still small.

As a result, India presently imports them and thus runs a large and unsustainable trade deficit.

India's manufacturing industry is largely dominated by mature industry sectors such as cement, steel, textiles, and such others. With almost 300 million people not having access to electricity, at one level it can even be said that India is still grappling to come to terms with Industry 2.0 era.

Consequently, serious initiatives are underway, on one hand, to spur the industrial growth rate to exceed the country's GDP growth rate and, on the other, make the industry adopt smart technologies, such as data analytics, artificial intelligence, robotics, and Internet of Things so that the country becomes ready to reap the benefits of Industry 4.0 era.

Recently India has initiated measures to get its industry ready for the new age of manufacturing. Thus it joins other countries that have launched similar efforts, such as the *Smart Manufacturing Leadership Coalition* of the US, *Made in China 2025* initiative by China, I*ndustrial Value Chain Initiative* of Japan and *Industry 4.0* by Germany.

According to the press information re-

Rajabahadur V. Arcot: India's Industry 4.0 Readiness Report (continued…)

leased a few days back by the Ministry of Commerce and Industry, the Department of Industrial Policy and Promotion (DIPP) has set in motion the process of formulating the **Industrial Policy – 2017** that will help the country to become future ready and emerge as a center of manufacturing excellence with an industrial ecosystem that has strong and competitive presence along the entire value chain in sunrise industries.

On one hand, the policy's aim is to facilitate the country's industry to become innovative and a global technology leader by spurring investments in modern smart technologies that will make India a smart manufacturing hub.

…Industrial leaders in India are digitizing essential functions and are focused on driving both revenue growth and operational efficiencies by adopting smart technologies. Digital is now a priority for most CEOs of industrial companies in India.

The policy will also include measures to help the industry to overcome present constraints that it faces, such as inadequate expenditure on R&D and Innovation, low productivity, slow technology adoption, restrictive labor laws, and complicated business environment.

Some of the objectives like innovation, R & D expenditure, and improving the technology linkages require mindset changes among the captains of the Indian industry.

Presently they are extremely risk averse which inhibits them from venturing beyond their comfort zones. It is time for them to think and act as thought leaders so that they truly emerge global players.

For the purpose of framing of the new Policy, expected to be finalized by October 2017, DIPP has invited comments, feedback, and suggestions and, in this regard, it has released a discussion paper.

The discussion paper states that developing "a globally competitive Indian industry equipped with skill and scale and technology" as the overall objective of the initiative.

This policy initiative that is on the drawing board will be finalized through consultations with all stakeholders, including the captains of the industry, think tanks, industry associations, academia, end-user and technology supplier companies, and others.

Such collaborative initiatives are already taking place and the overall narrative of many of the recent reports is that Industrial leaders in India are digitizing essential functions and are focused on driving both revenue growth and operational efficiencies by adopting smart technologies.

Digital is now a priority for most CEOs of industrial companies in India.

While the Grant Thornton India LLP, in association with CII, has prepared the knowledge paper "India's Readiness for Industry 4.0", the PwC in association with the Federation of Indian Chambers of Commerce and Industry (FICCI) has conducted a survey to understand the expectations and opinions of major manufacturers in India and their preparedness for Industry 4.0.

"India's Readiness for Industry 4.0" provides an analysis of Industry 4.0 at the global and domestic level.

PwC's survey finds the Indian manufacturing industry acknowledging the importance of Industry 4.0 and making it

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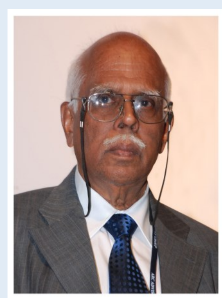

Rajabahadur V. Arcot: India's Industry 4.0 Readiness Report (continued)

part of its long-term business strategy.
"India Manufacturing Barometer," yet another PwC's report, states that 86 percent of the respondents from India are expecting investments in Industry 4.0 to increase in the next 3–5 years.

A study "IoT: A Revolution in the Making" done by the General Electric India Technology Centre in partnership with National Association of Software and Services Companies (NASSCOM) and Deloitte, states that the demand for Industrial applications will drive IoT growth and expects the IoT adoption to grow across industries, with utilities, manufacturing, automotive and healthcare seeing greater opportunity than other sectors.

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Leading smart technology companies, such as IBM and GE among others, are beginning to foresee the emerging opportunities in India in the Industry 4.0 space.

According to recent reports, IBM plans to build IoT solutions in collaboration with Reliance Group's UNLIMIT, Kone, and KPIT for specific industry verticals, such as automotive, utilities, and industrial automation using the Watson IoT platform to collect and connect data.

A few months back, GE announced its global partnership agreement with Reliance Industries to drive digital transformation in the industrial world.

Reliance Industries and GE agreed to work together to build joint applications on GE's Predix platform.

The companies will work together to provide Industrial IoT solutions to customers in oil & gas, fertilizer, power, healthcare, telecom and other industries.

Exploitation of Industry 4.0 opportunities calls for technology providers and end user companies to work as collaborative partners in evolving total solutions and the agreements of IBM, GE, and such others are probably only precursors to such trends.

The policy initiatives, cooperation among the stakeholders, and collaborative partnership arrangements augur well not only for India and its endeavors to catapult to the new industrial age so as to ride the Industry 4.0 wave but also for all those pursing growth opportunities that India offers.