

INSIDER

INDUSTRIAL AUTOMATION & PROCESS CONTROL

NEXT GEN AUTOMATION?

Automation, and control systems in general, are based on a single metaphor. What? It is science, you say! Well, yes, and no. It is science in that it is physics but backed up by a metaphor. That metaphor goes all the way

IN THIS ISSUE:

- **NextGen Automation?**
- **The 21st Century Marketing Blues, Part Two**
- **Transportation in the Age of Electricity**



Nilometer on Roda Island, Egypt

back to ancient Egypt. Pharaoh went to the temple which housed the “nilometer” and read the level of the Nile. Then he commanded the sluice gates to be opened. Does this sound familiar? It was the first control system we know of in human history. Ever since, we have searched for a way to replace Pharaoh in the system. The nilometer, Pharaoh, the sluice gates and the gate tenders are the first example of a control loop, as well.

There’s not much difference between Pharaoh and the nilometer and a 19th century operator with a wrench. And there is not much difference between a field sensor, a single loop controller, whether standalone or embedded in software, a control valve.

It comes down fundamentally to an issue of cost. It costs too much to have Pharaoh act as the loop controller. It costs too much to have hundreds of gate tenders watching for his signal to open or close their sluice gates.

In addition, whether the controller is Pharaoh, or an operator, or a single-loop controller, we are still looking for a way to replace “the man in the machine” with some other, faster, better, cheaper way to open and close the final control element, whether a valve, a gate, a sluice, or something else. So far, all we have been able to do is replicate the “man in the machine” with

INSIDER

INDUSTRIAL AUTOMATION & PROCESS CONTROL

circuitry and software. Even Artificial Intelligence maintains the metaphor. The only difference is that the “man in the machine” has more capabilities and is faster. But AI is still only mimicking what a human being can do.

Now, please understand, this metaphor business isn’t necessarily bad. But it *is* limiting.

In our 2013 book, *Controlling the Real-Time Enterprise*, Dr. Peter Martin and I explored the fact that there are two ways data gets to

management in a manufacturing setting. One is from the operations side. That’s the one that uses the “man in the machine” metaphor and is defined by time-series data. The other is from the accounting side. It is not time-bound. It does not use the “man in the machine” metaphor at all. This is why operations connections from the sensor to the boardroom are relatively easy to conceive of and construct. Time-series data is simply the history of the actions of the “man in the machine.”



Pay no attention to that man behind the curtain...

Accounting data uses different concepts. The concepts are not limited to time-series data. As people have found, and our book reported, it is very hard to try to get time-series data into a data format that accounting software can understand and handle. There have been numerous attempts to do this, so that operations data can be fed in real time to the financial controller, and financial goals can be fed in real time to the time-series data-based control system. So far, it hasn’t worked well. It appears that it is very hard to convert financial metrics like dollars-per-hour to a way to move a control valve proportionally.

We have been looking at open systems of several kinds as the next generation automation systems. The problem is that they are all smarter, faster, cooler versions of “the man in the machine.”

There is only one thing that can integrate both financial and operational paths: a human being. We humans have the ability to integrate data from a wide variety and range of sources and in many cases we do it subconsciously.

So, the goal of the enterprise today is to produce 250 tons of specialty chemical, package it, and load it onto transportation, and get it to the buyer. Almost none of those things is closed loop control. That’s why there is the disjunction between financial and operational metrics.

INSIDER

INDUSTRIAL AUTOMATION & PROCESS CONTROL

The other issue is that the control systems are in fact “owned” by the automation companies. They own the designs, the operating systems, the maintenance, and repair facilities above the plant level. They control what asset owners can do beyond a certain point, with their systems. And they have gone pretty far in defending their control. That’s why, for example, after nearly ten years of development, O-PAS hasn’t developed much traction.

Unfortunately, waiting for financial rollup data every thirty days or so, before the business can make decisions that should be much more agile, is not working. With the increasing volatility of the world markets, we cannot be 45 to 60 days behind when we need to turn like a dancer.

We need a new metaphor for manufacturing and automation that isn’t tied to time-series data. In the meantime, there’s a compromise brewing. It is possible that AI-enabled shells will be able to extract production information from business systems and economic goals, translate that information into time-series instructions, and return time-series data, converted to business information, direct to the business systems in real time.

We are waiting.

THE 21ST CENTURY MARKETING BLUES, Part Two

In the February issue of the INSIDER, we talked about marketing no longer being a one-way street. It used to be that companies declaimed and proclaimed, and customers took it. But what customers really wanted was a way to enter into a two-way conversation with their vendors. Eventually, this resolved into the representative-to-customer relationship. The customers could express themselves to the vendor reps, in the hope that the message would get through that the vendor was either doing it right, or more often and more likely, screwing up by the numbers. Sometimes, the vendor rep would minimize the seriousness and extent of the problem to managers and try to stifle the problem at the source. This makes unhappy customers who will go to social media to get their problem, whatever it is, heard and dealt with.

The advent and proliferation of social media from Facebook (successor to mySpace and others) and LinkedIn to Twitter, now “Xitter,” all the Twitter-clones, Instagram, TikTok, Whatsapp, Discord, and others has made it possible for two-way conversation from vendor to customer to be easy and happen in near real-time.

INSIDER

INDUSTRIAL AUTOMATION & PROCESS CONTROL

Why is this good? You have to be transparent and act on customer issues and complaints rapidly, and more than that, you have to be *seen* to be acting on them.

We aren't going to do more than a quick study here. You can find out about all the social media apps anywhere. What you need to know is how to use them.

First, you need to establish a social media team, with each person having specific responsibilities. If everybody has responsibility, no one has responsibility—and after the first surge of activity, other work will get priority, and your blog, Facebook page, Instagram, LinkedIn pages,

will start showing old posts. There is nothing interactive about the newest posts being a year old. Having a team means that you will have multiple viewpoints—so it is extremely important to have rules about what to post, and how to do it. Of course, your rules should not be prescriptive. They should be guidance, not orders. You should have a way to decide how to deal with a problem, even how to take the issue to management. You never want your social media team to be hanging out with responsibility for an issue that is way above their pay grade.

You have to be transparent and act on customer issues and complaints rapidly, and more than that, you have to be *seen* to be acting on them.

“Yes, they had a problem, but they fixed it right away, and made it better.” It is better than not having a problem at all.

If you open up your communications with your customers, you need to be prepared to handle unhappy people. How you do this says more about your company than all the slick advertising you do. It is good not to have unhappy customers, but even better (and this is not obviously correct) to have solved a problem or rectified an issue with a

customer. “Yes, they had a problem, but they fixed it right away, and made it better.” It is better than not having a problem at all. Inviting your customers to bring you their problems is a good way to show your company's flexibility, honesty, and integrity. As any novelist knows “Show, don't tell.”

Having an open social media program is significantly less expensive than advertising, appearing at trade shows, and the like. But it won't replace all those things entirely. It is a part of an integrated marketing and communications plan.

More about this next month.

INSIDER

INDUSTRIAL AUTOMATION & PROCESS CONTROL

TRANSPORTATION IN THE AGE OF ELECTRICITY

Once again, we have had an example of the brittleness of the world's infrastructure. The crash of the huge SuperPanaMax container ship Dali into the Francis Scott Key Bridge in Baltimore, Maryland, has exposed the flaws in the shipping systems around the world. The interference by the Houthis in Yemen, who have been given sophisticated missiles and other weaponry by Iran, with the shipping through the Red Sea has reduced the traffic through the Suez Canal, thereby raising shipping rates globally, significantly increased delivery times, and has sent maritime insurance rates skyrocketing. This is not the only flash point in the world, just like the SuperPanaMax cargo ship is not the only one with issues. A ship blocked the Suez Canal for six days in 2021, resulting in delays for about 12% of the world's trade, at a cost of \$9.6 billion per day. This is not an isolated incident. The largest oil tankers and cargo vessels cannot transit the Panama Canal because they are too large. The largest ships that *can* have a clearance of about a foot on either side. Imagine what a sudden gust of wind can do.

The largest oil tankers and cargo vessels cannot transit the Panama Canal because they are too large. The largest ships that *can* have a clearance of about a foot on either side. Imagine what a sudden gust of wind can do.

Look at increasingly severe weather changes brought on by global climate change. There is no way to predict how bad the weather will get. The promise of much heavier storms and associated flooding and infrastructure destruction will also have an impact on the cost of doing business. Insurance rates will rise, and in some cases, insurance companies will refuse to cover infrastructure in areas where bad weather damage is a surety. Climate effects have been exacerbated by the transportation industry carbon emissions. It is the single largest industrial emitter of carbon, even more than the chemical industry itself.

Civil unrest is increasing. The unprovoked Russian invasion of Ukraine has caused two years of famine because Ukraine was one of the largest grain producing countries. The dislocations caused by the war are not limited to crops. Ukraine was a significant center of technology innovation and software production. In the United States, one presidential candidate and his political party, have continued to make threats of civil unrest in the event that they lose the elections in November. The United States is far from alone. Many other countries face the same turbulence. This can and will cause economic dislocation, contribute to food uncertainty, and health care issues. If you can't get to work, or the plant is closed by damage, this

INSIDER

INDUSTRIAL AUTOMATION & PROCESS CONTROL

has cascading economic effects. These effects have collateral issues like increasing civil unrest. It is a vicious cycle.

Cyber incidents are increasing in severity and frequency on a daily basis. They are affecting the financial industries, the healthcare industry, the manufacturing industries, and the transportation industries. Since these incidents are primarily funded by nation states such as Russia, China, North Korea, and others, it has been impossible to stop them and eradicate the attackers.

The Age of Electricity was supposed to be accompanied by enlightenment and economic increase. Right now, managers and tech workers need to look at how to survive the coming dislocations.

As governments fail, it may be companies that must care for their workers, provide housing and health care, and retirement benefits for them, to cover the lack of those benefits from governments around the world. Of course, that may come at the loss of liberty and social benefits for workers, and lead to the increase of “slave labor” factories, in the Chinese manner.

Each of us must choose what we will do in the future.



WALT BOYES is a principal with Spitzer and Boyes LLC. He is a Life Fellow of the International Society of Automation, a Fellow of the Institute of Measurement and Control, a Chartered Measurement and Control Technologist, and a member of the Association of Professional Futurists. From 2003 to 2013 Walt was Editor in Chief of *Control* magazine, and from 2014 he has been Editor and Publisher of the INSIDER. From 2016 to 2022 he acted as Editor of the alternate history magazine, *The Grantville Gazette* and as Editor in Chief of *Eric*

***Flint's Ring of Fire Press*. He recently joined Top of the World Publishing, along with Joy Ward, as SFF/Alternate History Editors for their *Novus Mundi Publishing* imprint. Walt “pays it forward” as Vice President and Director of The Heinlein Society.**

Walt is available for consulting and for speaking engagements both in person and online. Contact him at waltboyes@spitzerandboyes.com or waltboyes@gmail.com , or by phone at +1-630-639-7090.