

THE INDUSTRY 4.0 INTERVIEWS 2020



AN INDUSTRY PERSPECTIVE:
UNDERSTANDING THE CHALLENGES,
BENEFITS AND POTENTIAL OF THE IIOT

Contents

Foreword	3
Farnell <i>Cliff Ortmeyer</i> , Global Head of Solutions Development, and <i>Simon Meadmore</i> , Global Head of Interconnect, Passives and Electromechanical	4
Festo <i>Steve Sands</i> , Head of Marketing and Product Management	10
Molex <i>Jeff Barnes</i> , Distribution Corporate Account Manager for Industrial Europe	16
Omega <i>Thomas Dale</i> , Engineering Manager	20
Panasonic <i>Sara Ghaemi</i> , Key Account Management Team Leader for Automotive and Industrial Systems Europe	24
Schneider <i>Martin Walter</i> , Vice President of Industry	28

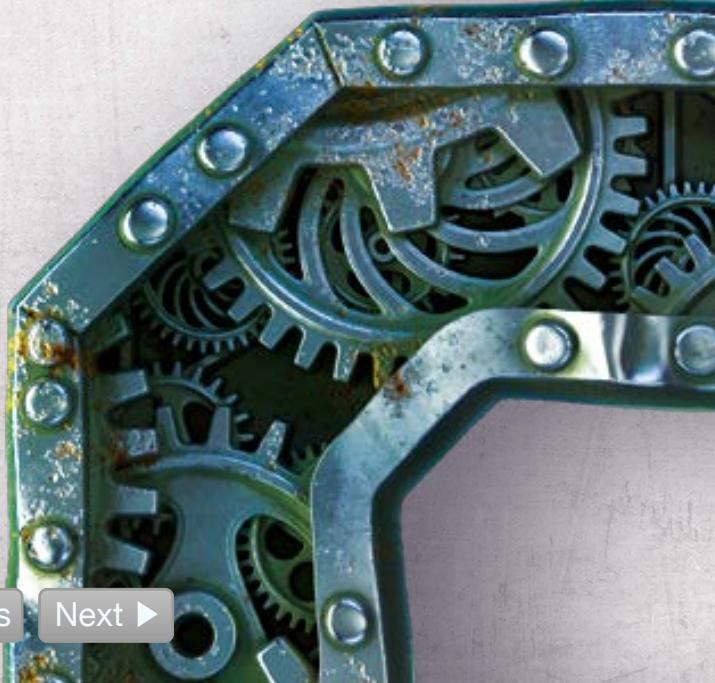


Simon Meadmore, *Global Head of Interconnect, Passives & Electromechanical, Farnell*

Industrial IoT, also referred to as Industry 4.0, is beginning to gain momentum. Whatever you call it, the development of automated technology, along with the connectivity of devices through the Industrial Internet of Things (IIoT) enables manufacturers and engineers to increase productivity, improve efficiencies and achieve a decrease in maintenance costs.

As a leading distributor of components for industrial automation, we have interviewed experts from across the industry to gather their insight into the progress of this fourth industrial revolution. The interviews highlight the benefits of Industry 4.0 and how these leading manufacturers are assisting their customers in implementing new technologies. Our interviewees also reveal the challenges that can be faced by companies looking to adopt Industry 4.0 and offer their insights on how these can be addressed.

We would like to thank our colleagues within the industry who have dedicated their time and knowledge to this book. We are delighted to have uncovered such fascinating insights and hope you find their interviews helpful and interesting.





Simon Meadmore

Global Head of Interconnect, Passives and Electromechanical

Simon joined Farnell in 2004 and runs the global Interconnect, Passives and Electromechanical product segment with

responsibility for supplier and product strategy. Simon was previously Global Head of Semiconductors, and prior to that held supplier facing roles in EMCO and Passive product segments.

Before joining Farnell, Simon spent five years at Pace Micro Technology, a set-top box Original Equipment Manufacturer (OEM), as a senior buyer for memory products and spent nine years working for a small electronics contract manufacturer. Simon is a member of the Chartered Institute of Purchasing and Supply (CIPS).

Cliff Ortmeyer

Global Head of Solutions Development



Cliff has an electrical engineering degree and has worked in the electronics industry for 26 years in a variety of engineering and marketing management positions. He joined Farnell in 2011 and is responsible for global technical marketing as well as marketing for Farnell's North America business, Newark. Previously, Cliff worked for STMicroelectronics and Coilcraft in positions ranging from Applications Engineering to Market and Business Development.

Cliff holds multiple patents and is an electronics enthusiast who has a passion for understanding and leveraging new technologies. His current focus is on the role of new technologies, such as the Internet of Things (IoT) through makers and engineers alike.

Briefly explain your company's approach to Industry 4.0 and IIoT. For example, how do you talk about it with customers?

SM: We aim to be the go-to destination for everything IIoT, whether that is to access the latest products, or educational materials about how to implement IIoT within our customer's business. Farnell carries more than 2000 leading brands across a broad range of technologies. This enables our customers to source everything they need for their IIoT project from us. The industrial automation area on the Farnell website also provides customers with white papers, videos and other resources.

What are the key drivers of Industry 4.0?

SM: Two key drivers for Industry 4.0 are the need to save energy and achieve greater efficiencies.

Energy Saving - The European Union (EU) has committed to achieving a climate neutral economy by 2050. A key contributor to achieving this will be IIoT. Connected devices in industry means that users have better visibility of what is going on within their factories and can manage energy use in real time using data. This means that, for example, a heating, ventilation and air conditioning (HVAC) system could be run flexibly, when and where it was needed in line with building usage, rather than run across an entire building at all times. With Industry 4.0 we will also be able to run motors in line with need, meaning that motors avoid being run at full capacity all of the time. Technology will enable the monitoring of devices within a manufacturing site from a remote site using a PC/tablet or phone, reducing travel costs and increasing efficiency.

Efficiency – One of the biggest costs for any manufacturing site is downtime. With the IIoT users can predict maintenance required on a facility before it breaks down by analysing production data to identify patterns – in some cases this can in fact prevent the need for maintenance altogether. This results in reduced downtime, reduced maintenance time, and increased efficiency.

Why are your solutions unique? What is the “secret sauce” that makes them so good?

CO: We provide our customers with a complete view of what is available from a broad range of suppliers in each area of IIoT or Industry 4.0. That includes hardware such as sensors, wireless modules, connectors and cable, as well as gateways and cloud solutions.

From your customers' point of view, what are the best things about working with you?

SM: We offer 50,000 parts from leading brands with same day despatch. Customers can come to Farnell for everything they need in order to implement IIoT with the same great service and technical support we offer across our entire range.

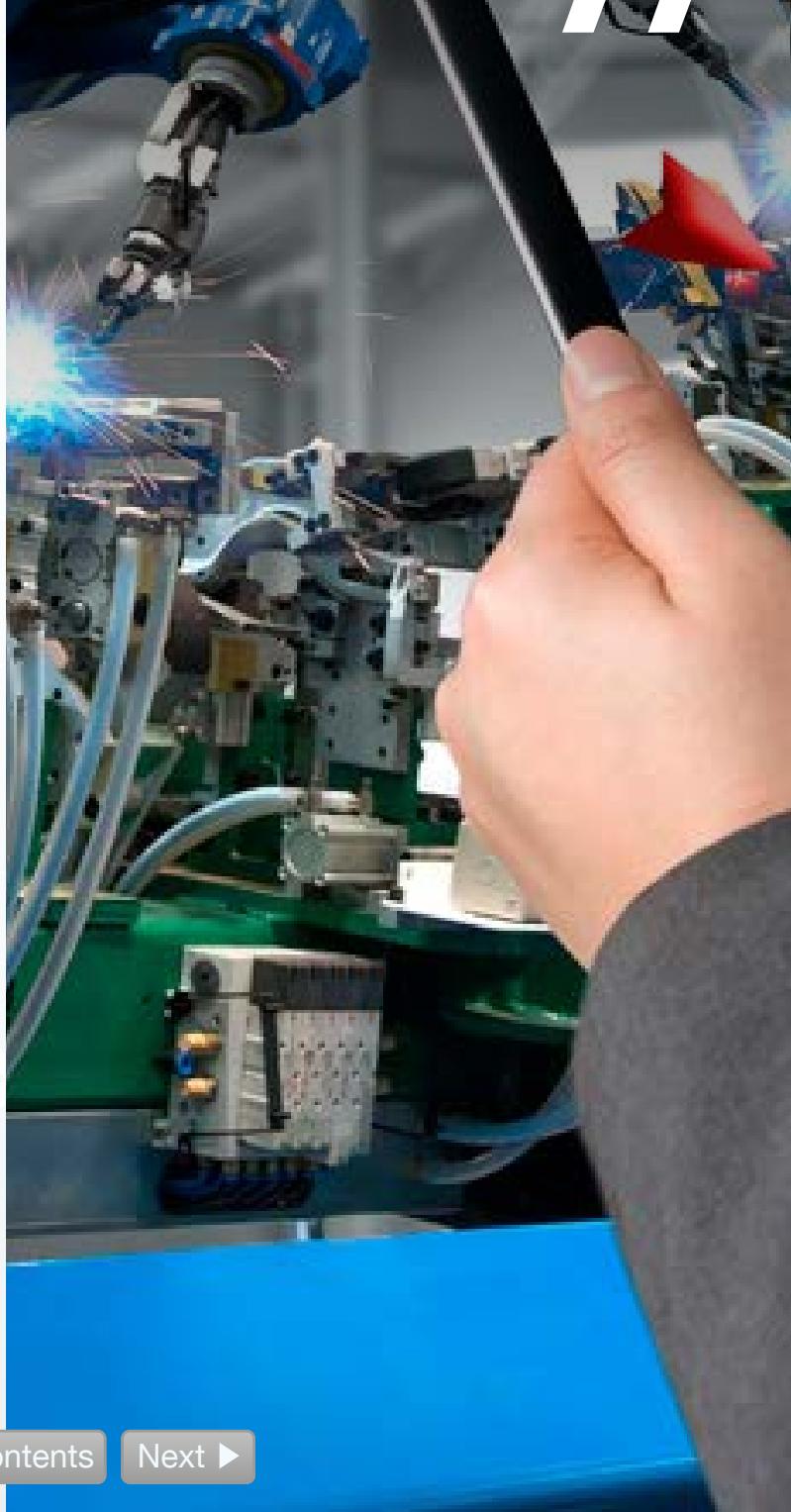
CO: We also have global local language websites, local sales teams and a team of global technical support engineers who can assist our customers in finding the right product for their application. As part of the broader Avnet business, our Avnet IoT team can support customers along any point of their IIoT journey. This support ranges from custom devices, to full scale, secure deployments including full hardware, software and secure cloud solutions if necessary. We also help keep our customers up to date on the latest product and application implementation content through our application portals that include sensing, industrial automation, IoT and IIoT, wireless technologies and more.

Security is an increasingly important requirement for Industry 4.0. In what ways do you address it?

CO: We aim to help our customers understand the challenges and access market leading solutions. Customers can access content and connect with like-minded engineers on our element14 Community, and download white papers from Farnell and leading suppliers on our application portals. Farnell's website also provides information on the latest in secure product solutions, such as the Azure Sphere module which incorporates end-to-end solutions for microcontroller based solutions.

“ CUSTOMERS CAN COME TO FARNELL FOR EVERYTHING THEY NEED IN ORDER TO IMPLEMENT IIOT ”

SIMON MEADMORE



Do you offer your own cloud services for Industry 4.0? If so, why do you think that your cloud solution is better than using a mainstream cloud provider such as AWS?

CO: We offer an IoT cloud solution as part of our overall IoT and IIoT offering. By leveraging Microsoft's enterprise-grade, highly secure Azure hybrid cloud computing service, Avnet's IoTConnect platform enables seamless distribution and analysis of data across cloud and on-premise systems. Users can use the flexibility of the IoTConnect platform to scale their IoT solutions for mass distribution with powerful security and connectivity protocols.

Are new partnerships emerging between electronic component manufacturers and data analytics partners?

SM: Absolutely. Schneider recently acquired a stake in Aveva who offer a visual front-end system to any connected site. Siemens offer their Mindsphere software which collects and analyses all kinds of sensor data in real time, and have partnered with AWS, Microsoft Azure and Alibaba Cloud to give choice to customers.

What are the most common challenges/pitfalls when customers try to move to Industry 4.0 systems? How do you help your customers avoid them?

SM: It's a big step for any customer and there is a lot of information out there – but it can be hard to know where to start. At Farnell, we have a technical team covering all major markets who can help businesses on their journey. We also have strong relationships with leading suppliers for IIoT and can visit a customer together to help them identify and specify their needs.

A key emerging trend is the ease of use of products from adoption through to roll-out. How important is ease of use to your customers?

CO: Ease of use is paramount to our customers as many technologies contained within the IIoT spectrum can be quite overwhelming when you don't have a background in things such as Artificial Intelligence (AI), security or even the best methods

for wireless implementation. This is why Farnell seek to provide a range of modular devices that can support design engineers at every stage, even when their experience of specific technologies is limited. This ranges from building-in AI at the edge with the Avnet SmartEdge Agile, to the Avnet SmartEdge Industrial IoT gateway, powered by Raspberry Pi and set to simplify and accelerate the adoption of IoT applications.

We've picked up on a theme that plant managers and operators don't understand Industry 4.0 or its potential to transform operations. How do you overcome that resistance?

CO: The key to overcoming the resistance that is still seen on the factory floor is about information. Case studies are a great way to start, as it can help visualise the benefits of IIoT implementation in real scenarios. Farnell provides modular solutions and a wealth of online content to support the IIoT journey. Customers can also benefit from support from parent company, Avnet's, IoT group, which delivers IoT solutions that scale to help customers and partners grow their business. This means providing faster time to value, simplifying the complex, and offering secure and complete solutions:

Faster time to value: in-house, end-to-end expertise, can scale globally with our partner ecosystem, provide building blocks (boards, starter kits, smart solutions (SaaS) modules, utilise an enterprise platform (IoTConnect), show early proof of value, and new routes to market.

Simplifying the complex: customised solutions, pre-packaged solutions, early proof of value, advisory services (find the right technology for you), expertise (trusted for almost 100 years, 2500+ engineers around the world), security, one enterprise platform (IoTConnect), partner program, communities, part of our overall ecosystem approach to simplify the complexity of product development through one partner.

Secure and complete: security (across the chain), global, support anywhere along your journey, one-stop shop (from software and hardware to cloud and manufacturing, IoT managed services, enterprise platform, world-class supply chain), ideas/silicon to insights and new routes to market.

AI and machine learning have led to increased capabilities with predictive maintenance; is this application something that your products can be used with? What sort of advances have you seen?

CO: We are seeing products come to market that allow users to get started by integrating AI into their designs to enable predictive maintenance. One such product is the SmartEdge Agile from Avnet. This allows engineers to get started with a single device that incorporates an easy to use training mechanism and cloud-based dashboard that can be attached to a wide variety of machine types.

If you had a magic wand, what would you change that would make it easier for companies to benefit from your Industry 4.0 solutions?

CO: Our magic wand comes in the format of Avnet's IoT group, which is dedicated to helping customers design and implement end-to-end IoT solutions.

What do you think will be the biggest trend in IIoT/Industry 4.0 in the next year?

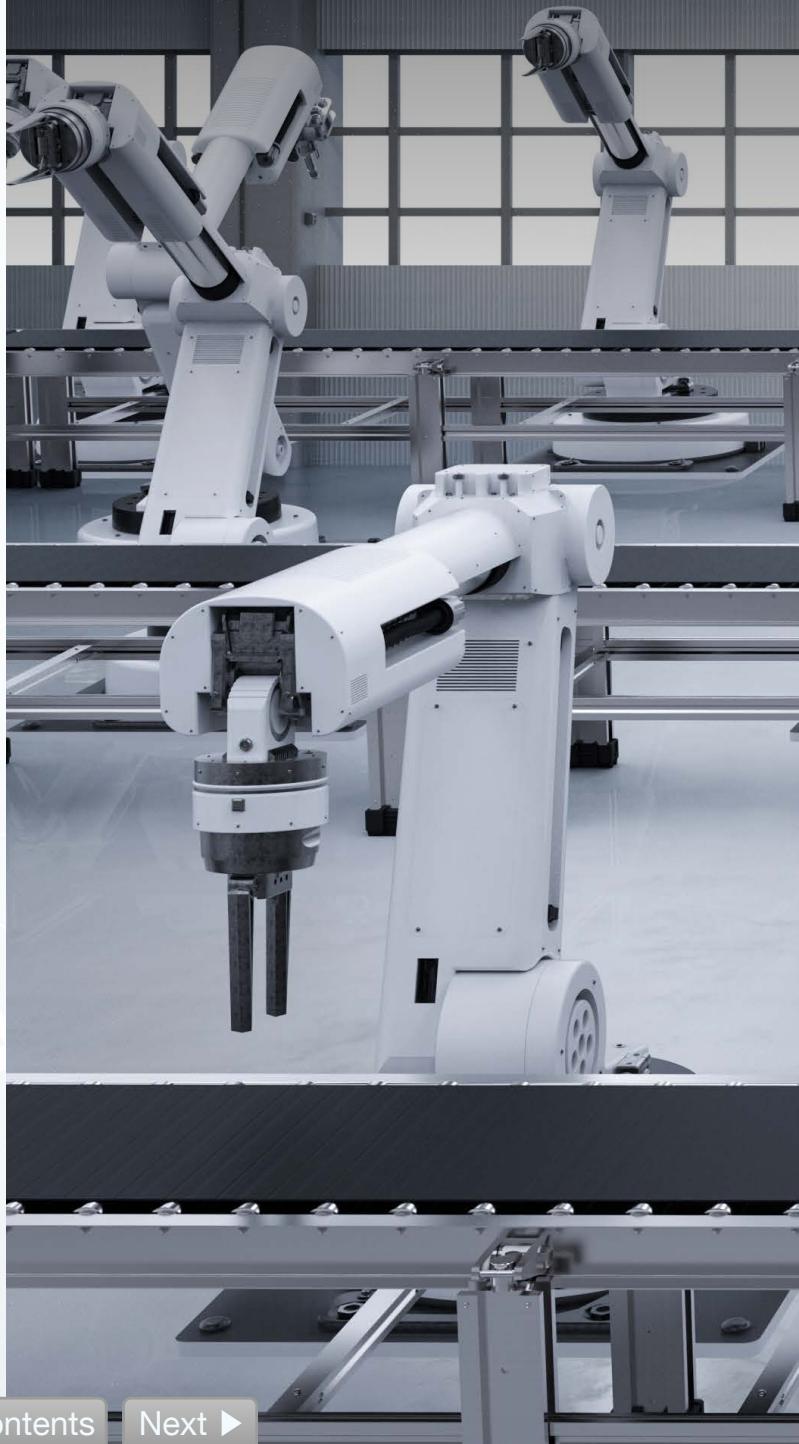
SM: We believe that the addition of sensors to gather data on a production line will be a major trend in the next 12 months. We're already seeing customers move in this direction and it represents the start of the journey to full Industrial IoT. It is estimated that there will be 25 billion connected devices by 2022 and most of which will have some form of sensor. In anticipation of this trend we have invested heavily in our sensor range to provide a market leading line card for customers. Key brands include Honeywell, Telemecanique (Schneider), Omron, Panasonic and SICK.

How do you think IIoT/industry 4.0 will change in the next five to 10 years?

SM: IIoT and Industry 4.0 was nothing more than a concept a couple of years ago. Now engineers are beginning to make this a reality

“ WE HAVE INVESTED HEAVILY IN OUR SENSOR RANGE TO PROVIDE A MARKET LEADING LINE CARD FOR CUSTOMERS ”

SIMON MEADMORE



and we have seen a range of early adopters using it to their advantage. In the next five to 10 years, I think we will see the majority of manufacturing sites using IIoT in some way. Software will continue to develop, making it increasingly straightforward for engineers to monitor their data, similar to what we have seen in the connected home market with the likes of Nest and Hue.

Please would you describe a couple of the most interesting Industry 4.0 projects your customers have completed.

CO: We have some excellent examples from Avnet's IoT group who work with customers to deliver solutions that scale, supporting growth for their business and a strong benefit case for customers. Capstone enables municipalities in the United States to save water with a little help from the IoT – and Avnet's IoTConnect platform and Partner Program. Capstone's IntelliH2O® intelligent water meter monitors municipal assets such as utility meters for US cities. These cities can lose as much as 38 percent of their water during transmission, and Capstone's smart, connected product limits the amount of water wasted through leaks, waste or theft. As a small company looking to scale their differentiated product, they knew they needed an efficient, scalable and secure IoT platform as well as a partner who could support them as they grew. With Avnet's IoTConnect platform and Partner Program, Capstone was able to scale their meter installations faster than before, moving from 1,000 installed meters to a projected 35,000 by the end of 2020. Now, not only is Avnet's Partner Program helping Capstone stay ahead of the competition, it is transforming the company from an OEM to a systems integrator with multiple recurring revenue streams.

In Europe we have worked with Sweden's largest PC manufacturer. The manufacturer ships ruggedised vehicle-mounted computers, tablets and handhelds globally, but their revenue opportunities ended with the sale and maintenance of these devices. With Avnet's help, the customer leveraged the IoTConnect platform to achieve a complete, edge-to-cloud solution. Building on our customisable, market-ready SaaS smart applications, they were able to jumpstart deployment of a warehouse and fleet-focused IoT solution to meet their customers' needs. Asset monitoring, predictive maintenance and

advanced analytics were all enabled via a user-friendly dashboard, granting their customers the power to enhance service levels, improve return on investment, reduce operational costs, streamline workflow and productivity, optimise asset utilisation and more. All of this amounts to new monthly recurring revenues for our customer, and at high margins. Through these steps, our customer has already sparked the interest of a major client, who plans to scale with them after POC deployment in June.

It's not just traditionally tech-based companies that are benefitting from IoT solutions. Avnet have collaborated with Microsoft to connect a well-known global coffee retailer with predictive maintenance for their brewing machines. The immediate objective for this IoT implementation is to reduce and/or eliminate machine downtime. Eliminating just one service call per year, per store will cover the cost of the IoT implementation. The project leverages Microsoft's Azure Sphere solution, securing their IoT endpoints from the intelligent edge to the cloud.

If you could change one thing about the automation industry, what would it be?

CO: Farnell's role is to provide ways to access these new technologies to support customers as they begin their journeys. The one change that I would make would be to raise awareness and understanding of how to implement these new technologies. We are still towards the beginning of this journey, but there is huge potential that can bring benefits that scale beyond even individual businesses and industries.

What is the role of the distributor?

SM: We see our role as one of education and service. To get started, and along the way, we offer technical support 24/5 as well as hosting a wealth of white papers, videos and datasheets in the industrial automation area of our website. We sell over 50,000 industrial automation products from the market's leading manufacturers, all fully authorised and traceable. Furthermore, with same day despatch, customers can order from their laptop or mobile device and rely on us to get the products to them when they need them.

“ FARNELL’S ROLE IS TO PROVIDE WAYS TO ACCESS THESE NEW TECHNOLOGIES TO SUPPORT CUSTOMERS AS THEY BEGIN THEIR JOURNEYS ”

CLIFF ORTMAYER

Bearing 1

41°

Stator 3

39°

Stator 4

42°



Steve Sands

Product Management and Marketing Manager

Steve is the Head of Marketing at Festo and responsible for Product Management focusing on activities in the corporate and tactical B2B marketing of industrial automation. With a background in production engineering, Steve enjoys combining his technical and marketing expertise.

Briefly explain Festo's approach to Industry 4.0 and IoT.

Festo committed to Industry 4.0 at a very early stage. The term Industry 4.0 was coined in Germany following the downturn in the manufacturing industry in 2008/2009. The German government were keen to secure the future of what is a very important industry sector for them - automation and production manufacturing. They identified the critical trends going forward and then identified Industry 4.0 as a key enabler for future success. It was a very clever initiative.

Industry academia and politicians were brought together to set up a vision, framework and a roadmap. Then key representatives from within the industry, including Siemens, Deutsche Telekom, SAP, Festo and Bosch, were asked to sit on a steering committee to make sure it went in the right direction. The initiative was then launched at an industrial trade fair, the Hannover Messe in 2011.

One of the things I think is quite important to remember with Industry 4.0 is that the roadmap stretches for 25 years from 2010 to 2035. To people asking if it's all rolled-out, the answer is no. It's still in the early days of the roadmap and lots of things still need to be done. You can implement parts of Industry 4.0 now, but we can't achieve the whole vision yet because lots of work is still going on. A lot of people who want to now start doing projects around digitalisation are only really taking advantage of what Industry 3.0 currently offers. Automation using robotics is an example, but I think that's far more part of Industry 3.0. Industry 4.0 is about the total interconnectivity and services that you generate from that.

Do you think there's a difference between Industry 4.0 and IIoT?

Industry 4.0 and Industrial IoT are slightly different interpretations of the same thing that are working towards a common goal. I see a high degree of collaboration between these different initiatives. The Industry 4.0 initiative quickly changed from a German to a European initiative, and then very quickly became a global initiative. If you want to stitch a factory together, or series of factories together, it becomes an issue of international standards and connectivity.

What are the key drivers for Industry 4.0 and the IIoT?

Productivity. I think higher productivity and new business opportunities are created through Big Data, and what we can do with that information. There's a lot of enablers in place. For example, there are the sensing technologies, the communication technologies, and cloud computing capabilities which have come about in the last few years. Then, because all of this is happening at the same time, we have the opportunity to really bind them together.

If we didn't have this push for Industry 4.0, I think everybody would be pursuing their own vertical integration, and still not enabling integrators of equipment to put things together easily. Anybody who has worked in software automation will know: when you connect

different people's equipment together, that's when the 'fun' begins.

What makes your solutions unique?

Festo has expertise in connectivity from the field up to the cloud. We haven't just been a pneumatics company. We were very early in developing Fieldbus-type connectivity and so I think it is very natural for us to go from the field to cloud. We already have smart devices that have sensing, onboard intelligence and communication built-in and they can talk through standard bus systems, such as Ethernet and IO-Link.

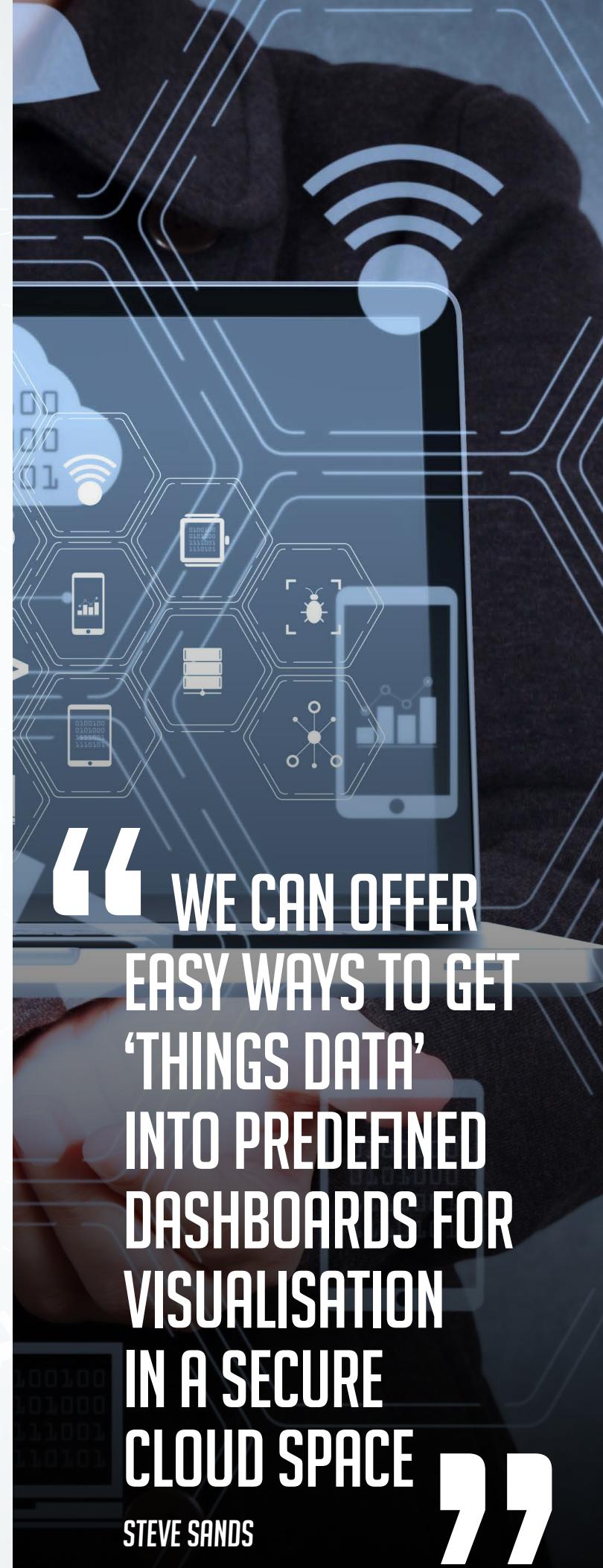
Our company is also divided into global focus industry sectors, like food, packaging, automotive, electronics, semiconductor, etc. We can offer Industry 4.0 to machine manufacturers primarily in these areas and provide them with insight and greater productivity. With a better understanding of these machines comes far better opportunities.

There are other companies who have a lot of controls and connectivity knowledge, but what they don't know about are the failure modes of actuators, the early indicators of failure and how to use AI to predict problems based on these indicators. We can use AI to really understand the whole application rather than simply looking at the higher levels of the control architecture.

From your customers' point of view, what are the best things about working with you?

We've got some out-of-the-box solutions which enable people to get started in a very easy way. We can offer easy ways to get 'things data' into predefined dashboards for visualisation in a secure cloud space, such as Microsoft Azure, and make it very easy to do. For example, we can help someone connect to an intelligent air preparation unit monitoring compressed air energy flows within 15 minutes.

Some people are just getting started with this level of connectivity. But at the same time, they don't just want to know data from Festo components, they want to know about the way the whole machine is operating and lots more. We help them to set up a demonstrator or a proof of concept. If they then want to turn that



into an Industry 4.0 machine, then we can provide them with a toolkit where they've got far more flexibility and can decide which cloud environment they want to send data to and how they want to see it.

How do you see concerns over security affecting take-up of Industry 4.0?

What holds some people and companies back is fear about cybersecurity and how they can be sure they have a secure interface when they are using the cloud. Many companies have concerns about any data in cloud being accessed outside of the company. They've got the responsibility of setting up firewalls and protecting their company. You can't implement an Industry 4.0 solution without the IT department being totally involved in the project. You must have real cross functional teams, working within the clients. It takes longer to get people and departments to work together than it does to get the machines to talk to one another.

Do you offer your own cloud services for Industry 4.0? If so, why do you think that your cloud solution is better than using a mainstream cloud provider such as AWS?

The Festo cloud environment is on Microsoft Azure. We also have a standard offering utilising MindSphere and FactoryTalk, but we're always open to offering open interfaces to other vendors. It comes down to where you are in the world as this impacts the options available. At Festo, we ensure it's simple. If customers want to come to us, then the predefined cloud space, connectivity, bandwidth, and everything else is all set up for them. They get their own secure area. Customers can take control of it all themselves, but that can only be done if they know how. Festo adds simplicity to the process.

What are the most common challenges/pitfalls when customers try to move to Industry 4.0 systems? How do you help your customers avoid them?

That all depends on what the customers are trying to achieve. The easiest Industry 4.0 implementation projects to date have been around energy efficiency. It's really easy to calculate: if you use Industry 4.0 to increase transparency and control of energy costs, you will see a return on investment payback.

Predictive maintenance is another area where you can see a clear return on investment.

It doesn't make sense to invest in Industry 4.0 to find out what the outcome will be. You've got to know the benefits you are seeking to achieve. There are two ways, of course. First of all, you have to understand what the technology can offer you and then say, "Does that solve any problems I've got?" or if you have a problem, then you take it back the other way and say, "How can Industry 4.0 solve my problem?" No matter if it's manufacturing costs or downtime, or time to fix, there's lots of opportunities to look at.

A key emerging trend is the ease of use of products from adoption through to roll-out. How important is ease of use to your customers?

It's quite important in helping board-level decisions. Some of our out-of-the-box dashboard solutions are a quick and easy way for companies to show what Industry 4.0 can offer. Using those solutions, they can demonstrate how cloud visualisation dashboards can provide services like the notification of anomalies and energy monitoring.

We've picked up on a theme that plant managers and operators don't understand Industry 4.0 or its potential to transform operations. How do you overcome that resistance?

Yes, you can definitely still see and feel that resistance and scepticism. Initially, Industry 4.0 was seen as marketing jargon that was coming out of Germany and it seemed to have little to do with anybody else. Then it got picked up outside of Germany but I think it was misused by some companies who just tried to put a sticker on the side of the components stating that it was Industry 4.0. The umbrella term is so broad that it was difficult for people to pick up on something tangible and say, "Okay, so what am I going to do?"

The German government has been far more supportive of initiatives to get Industry 4.0 rolled out through lighthouse installations and made more grants available. They also brought in education and skills right at the start of the initiative. Money was spent on education in colleges and universities, on training equipment and developing skills to make



people aware of Industry 4.0 technologies. We are starting to see that in the UK, but we're about five years behind Germany.

There is also a skills shortage, particularly with an ageing engineering population, which was always going to create problems. Now to resolve this, we don't just need electrical engineers, mechanical engineers or production engineers. We need people with data science and IT security skills that need to be combined and there's still a lot of traditional engineering courses at universities that aren't equipping people for these new technologies.

AI and machine learning have led to increased capabilities with predictive maintenance; is this application something that your products can be used with? What sort of advances have you seen?

About two years ago, Festo bought an AI company called Resolto providing the AI algorithms and experience to run anomaly detection and then make sense of this information to the outside environment. Another linked advance for us is a tool called Smartenance. It is a smart maintenance tool that enables the customer to build up maintenance logs on tablets and similar devices. Maintenance teams can record their work schedules here instead of the old-fashioned printed-out Excel sheets. We developed this because if you start doing anomaly detection using AI, you need to feed that information into somebody's maintenance schedule.

The information can be sent to the person trained on the machine so they can then fix it based on the prediction being made. We've also been developing digital logs so that you've then got the history of machines and any breakdowns enabling a structured maintenance regime.

On top of this, the person trained on the machine then needs to think about if something goes wrong, what caused it, and how was it fixed. This can then be combined with the AI to make better informed predictions. For example, AI could predict that there's a 60 percent

“ YOU'VE GOT TO KNOW THE BENEFITS YOU ARE SEEKING TO ACHIEVE ”

STEVE SANDS



probability that the same fault is going to occur again within some time period. You also need to keep a human in the loop to work alongside the AI, to check the algorithms and adjust them so that the AI learns and progresses.

If you had a magic wand, what would you change that would make it easier for companies to benefit from your Industry 4.0 solutions?

It would have to be money being made available for companies to invest, for example, the government's support through taxation. In Germany, there is a well-established structure creating a bridge between innovation and manufacturing and establishing routes which enable people to access information. In the UK, there are still a lot of different people who are providing support but actually finding a grant to help companies to invest is not easy. In the North West, this has been made easier through the Made Smarter initiative which came from the Made Smarter review 2017.

What do you think will be the biggest trend in IIoT/Industry 4.0 in the next year?

It will be AI, but what we need to be really careful of is not making claims before we can deliver – which causes people to become sceptical and delays the implementation process. AI is going to be a very big thing, but we can't put an AI sticker on everything, there has to be the right application for it.

Please describe a couple of the most interesting Industry 4.0 projects your customers have completed.

The key ones so far have been around energy, with a focus on the ability to map energy usage down to either large machines or lines of machines. In the past, energy monitoring has been done in the compressor house, so companies know what they've been producing and what they've been sending out. Very rarely are we able to map where they're actually using it and when. If you create a heat map from that, then we can see where they're actually using energy across the plant and can use a normal Pareto 80/20 rule to see which areas have maximum impact. Once you solve those you can see the return on investment and then go onto the next stage. It can be rolled out across the factory and you can see the payback as you go along so people don't have to pile all their

money in to begin with. They pilot it and gradually see the return. Some of our end users have been doing just that.

If you could change one thing about the automation industry, what would it be?

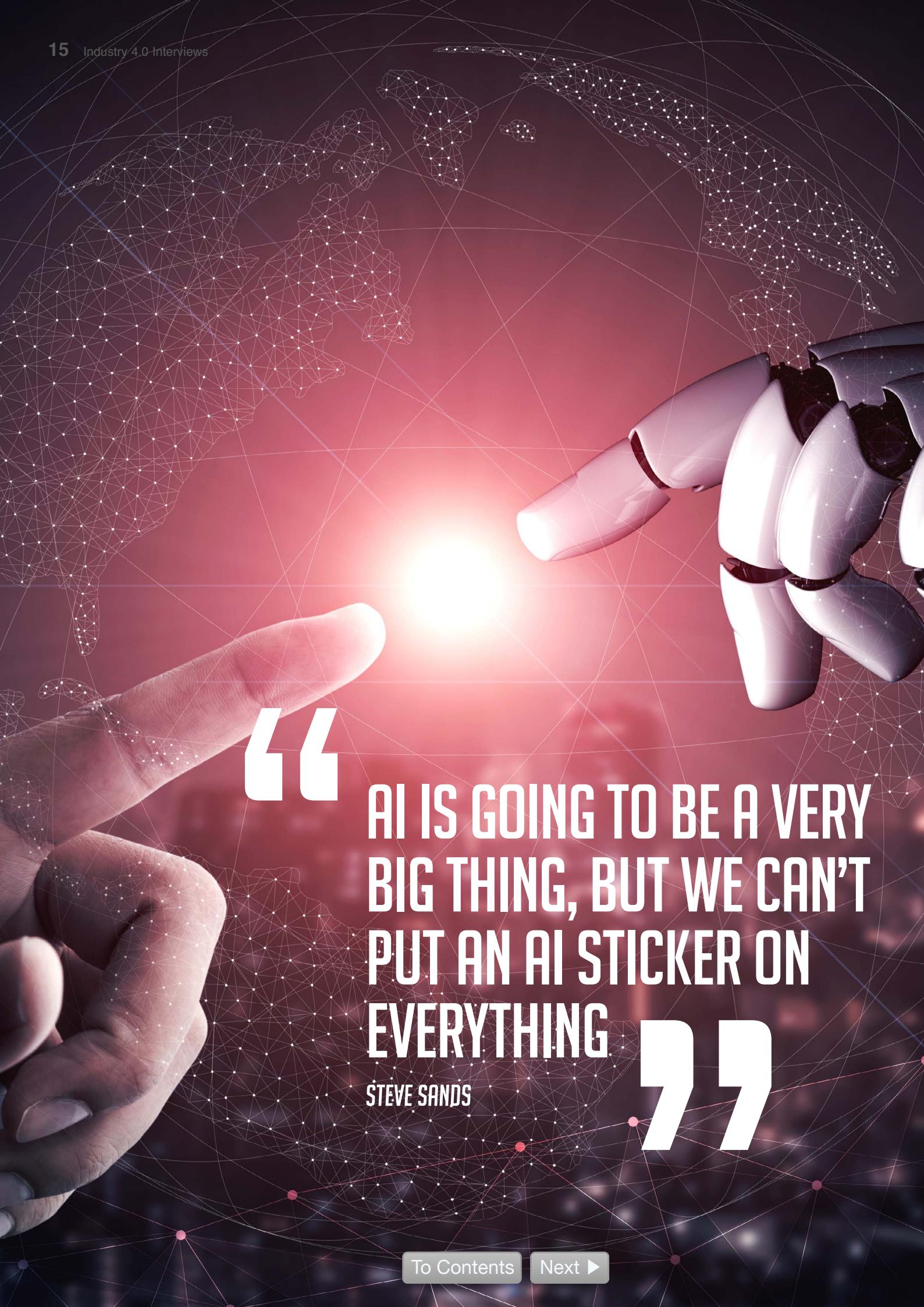
The ability for easy connectivity. We've become so used to a USB connection; you plug in a headset or a mouse or a keyboard and it just recognises the device. It works, it predicts when the battery is running down, amongst other things, and you don't have to look at a manual. You cannot do that with connected automation devices and even if you've got manuals, they describe things in slightly different ways depending on which manufacturer it is from, which always takes more time and makes it harder.

What's the best thing about working in the automation industry from your point of view?

The variety – and it's always changing. It keeps you on your toes and every day is different. For example, each time you go to Hannover Fair, you see a whole load of new things going on. It's constantly evolving.

Is there anything else you would like to add that we haven't covered?

5G will have a major effect on automation. At the moment, many people are sceptical of wireless. It won't solve everything. We still need power to most of our devices so the fact you can cut out two bus connections doesn't actually make you independent of cables. 5G has so much potential – great bandwidth, speed, latency. It has massive potential. For control, many engineers will remain conservative for a long time but from a monitoring point of view, visualisation, data transfer, this type of thing, I think it will become the norm.



“ AI IS GOING TO BE A VERY
BIG THING, BUT WE CAN’T
PUT AN AI STICKER ON
EVERYTHING ”

STEVE SANDS



Jeff Barnes

Distribution Corporate Account Manager for Industrial Europe

Jeff Barnes is the Distribution Corporate Account Manager at Molex. Having spent several years focusing on aerospace engineering, Jeff then went on to study Mechatronics which has contributed to his success across business development, team building, and sales within the automation, control and safety industry in his position as a highly motivated and driven Technical Sales Manager at Molex.

Briefly explain your company's approach to Industry 4.0 and IIoT and do you think there's a difference between the two?

There are a number of terms used at the moment that are part of the same movement. Industry 4.0 refers to the fourth industrial revolution as the next phase of digitisation of the manufacturing sector. It utilises a wide range of technologies designed to revolutionise automation in part by leveraging the IIoT. In its simplest sense, IIoT is about enabling the smart factory with device connectivity and with open, flexible interoperable networks to control shared information within different areas of the factory.

For example, Molex is focusing on developing an Industry 4.0 ecosystem designed for distributed control and intelligence by connecting all network devices encompassing multiple layers in information technology (IT), edge, operational technology (OT), engineering tools and operational applications. Our intent is to provide Molex customers with the tools they need to transition beyond the limitations of proprietary solutions in favour of more open platforms.

What are the key drivers of Industry 4.0?

There is increased demand for devices to be connected and exchange data and information. This can only be achieved when we use devices that can communicate with each other in real-time over a variety of different networks in an operationally safe, secure and efficient manner.

Before the evolution of Industry 4.0 technologies, industrial automation systems required a great amount of human interaction with a high potential for human error. Today, this can be minimised or eliminated altogether. For example, a robot can now talk to the conveyor, which will in turn communicate to the system that ensures all elements of an order are brought together and that the order is addressed and filled correctly – all without human intervention.

Why are your solutions unique? What is the “secret sauce” that makes them so good?

Molex is heavily focusing on the development of a full-scale engineering solutions platform that will take industrial connectivity to a new level. During this development phase, we aim to provide an open architecture for distributed control and orchestration of devices – from sensors to machines to enterprise and cloud applications. With this platform, we address the need for modular building block approach for machine builders and end users, who will be able to connect one or more devices and ramp up at the pace and scale they choose.

From your customers' point of view, what are the best things about working with you?

Molex collaborates closely with our customers. With our fully-integrated engineering and application experience, we ensure a smooth design cycle and enable Molex customers to take advantage of the benefits of Industry 4.0. These benefits include

an open and flexible network infrastructure, M2M communication, safety, security and cloud connectivity. We aim to develop highly customisable and scalable solutions tailored to our customers' needs. This way, they can effectively implement Industry 4.0 technologies and design machines and systems that are easy to configure, use and maintain over time in an ever-changing production and standards environment.

Security is an increasingly important requirement for Industry 4.0. In what ways do you address it?

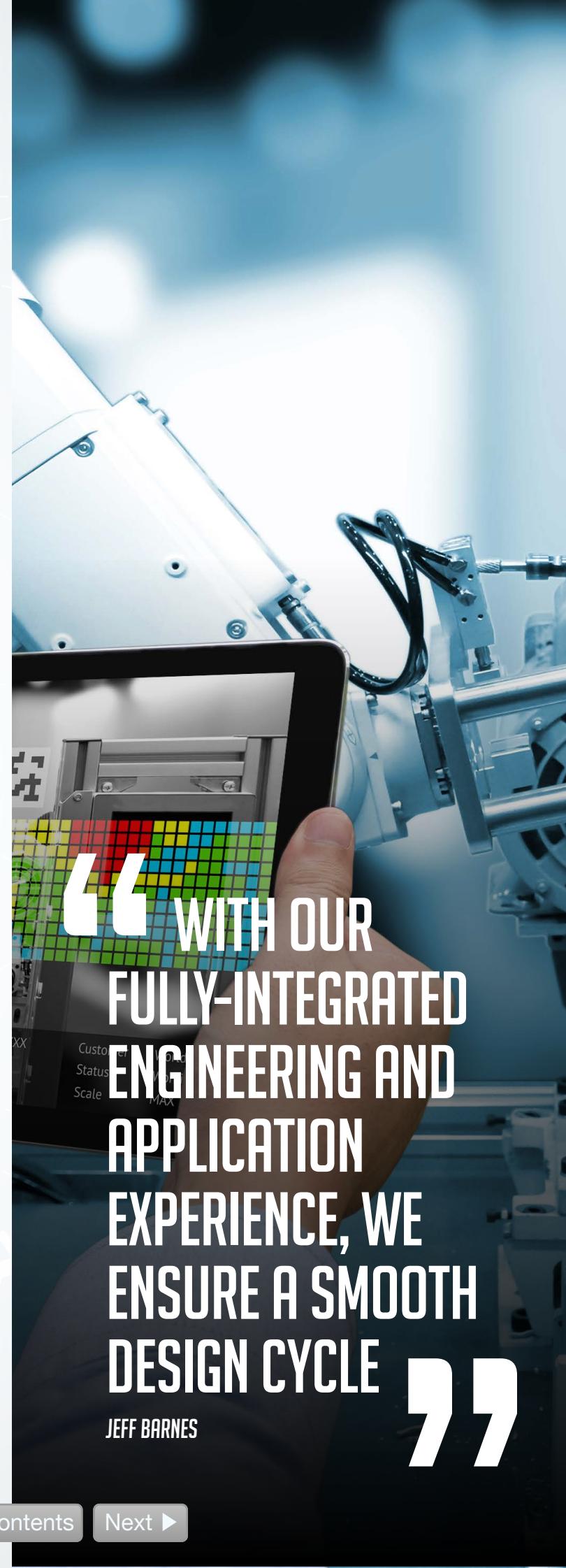
Security becomes an integral part of any Industry 4.0 system with interconnected devices sharing information via the internet. If you increase connectivity, you increase vulnerabilities and the potential for cyberattacks. Molex industrial automation solutions seek to address security at every level from the earliest phase of design. This includes having a dedicated security team and support system to address individual products and customer use-cases. In addition, we are continuously following leading security standards, including IEC 62443.

Do you offer your own cloud services for Industry 4.0? If so, why do you think that your cloud solution is better than using a mainstream cloud provider such as AWS?

In general, we don't offer cloud services. However, our service offerings vary for different solutions and depends on our customer requirements. Our platforms are cloud agnostic and we follow our customers' needs.

What are the most common challenges/pitfalls when customers try to move to Industry 4.0 systems? How do you help your customers avoid them?

Among the primary challenges is helping customers understand the strengths and limitations of Industry 4.0 solutions and how best to leverage new technologies to meet their objectives. This shift does not need to be an all-or-nothing approach. Rather, our focus is on utilising tools that improve their productivity and visibility by adhering to standards that



**“ WITH OUR
FULLY-INTEGRATED
ENGINEERING AND
APPLICATION
EXPERIENCE, WE
ENSURE A SMOOTH
DESIGN CYCLE ”**

JEFF BARNES

ensure seamless and secure connectivity. Molex helps customers achieve their objectives by offering custom Industry 4.0 solutions that flexibly fit their needs and enable them to go at their own pace to prevent potential pitfalls.

A key emerging trend is the ease of use of products from adoption through to roll-out. How important is ease of use to your customers?

Customers care about ease of use, particularly when it comes to commissioning machines, which can be quite labour-intensive. As connectivity has dramatically transformed the way all of us live and work, engineers and managers entering the field today are more tech savvy than any past generation. These digital natives intuitively navigate the world via connected devices, and they definitely want ease of use and a high level of access to manufacturing data with actionable intelligence. In following that trend, Molex specialises in customising industrial automation solutions and applications to wirelessly bridge communications between devices and promote ease of use.

We've picked up on a theme that plant managers and operators don't understand Industry 4.0 or its potential to transform operations. How do you overcome that resistance?

In many cases, managers might believe that their factories are working just fine. However, as they start to look into the cost effectiveness and flexibility of their operations, they understand that more must be done to remain competitive but may not necessarily know what to do.

Molex overcomes that resistance by emphasising that Industry 4.0 does not require an all-or-nothing approach. For example, machine builders and automotive manufacturers can benefit from IT/OT integration to help manage plant floor activities such as maintenance. Rather than dispatching maintenance engineers worldwide, a machine can be equipped with Industry 4.0 solutions to monitor, identify and address issues remotely and in conjunction with plant personnel.

Well-developed IT solutions are being adapted to industrial automation applications or OT. Customers

can utilise and benefit from this IT/OT integration, which eases their path toward digital transformation.

If you had a magic wand, what would you change that would make it easier for companies to benefit from your Industry 4.0 solutions?

Progress seldom comes without challenges. An open mindset is perhaps the best "magic wand" – or tool – for leveraging Industry 4.0. In the industrial arena, things are often done a particular way simply because that's how it has always been done. An engineer may receive pushback if they challenge the use of legacy equipment or labour-intensive practices, such as hardwiring, that still exist in plants. Yet, many companies would greatly benefit from being more open to newer technologies.

We encourage customers to explore their options and make informed decisions going forward, keeping in mind that any solution worth the investment should be customisable, flexible and scalable over time. Industrial companies can no longer afford to be confined by expensive and rigid platforms.

What do you think will be the biggest trend in IIoT/Industry 4.0 in the next year?

Standardisation will be the most vital and important trend. Increasingly, standards and safety controls are being integrated within a single platform, yet more must be done to fully ramp up to Industry 4.0. The standardised and modular approach to customise control and functional safety in robotics, machines and assembly lines has gained traction—and will serve the industry as it progresses to full-scale Industry 4.0 initiatives.

How do you think IIoT/Industry 4.0 will change in the next five to 10 years?

Today, most industrial automation systems rely on centralised control strategies. PLC-centric solutions provide limited remote access, no security or M2M communication and separated safety control. In the upcoming years, the next phase for the industry will move away from centralised, top-down control in favour of distributed control architectures with embedded safety and security.

By integrating distributed control architectures with embedded security, factories will be able to move safety and intelligence closer to the point of need

and enable dynamic real-time processing. A higher level of intelligence per device eliminates the need for costly central controllers by distributing logic among devices.

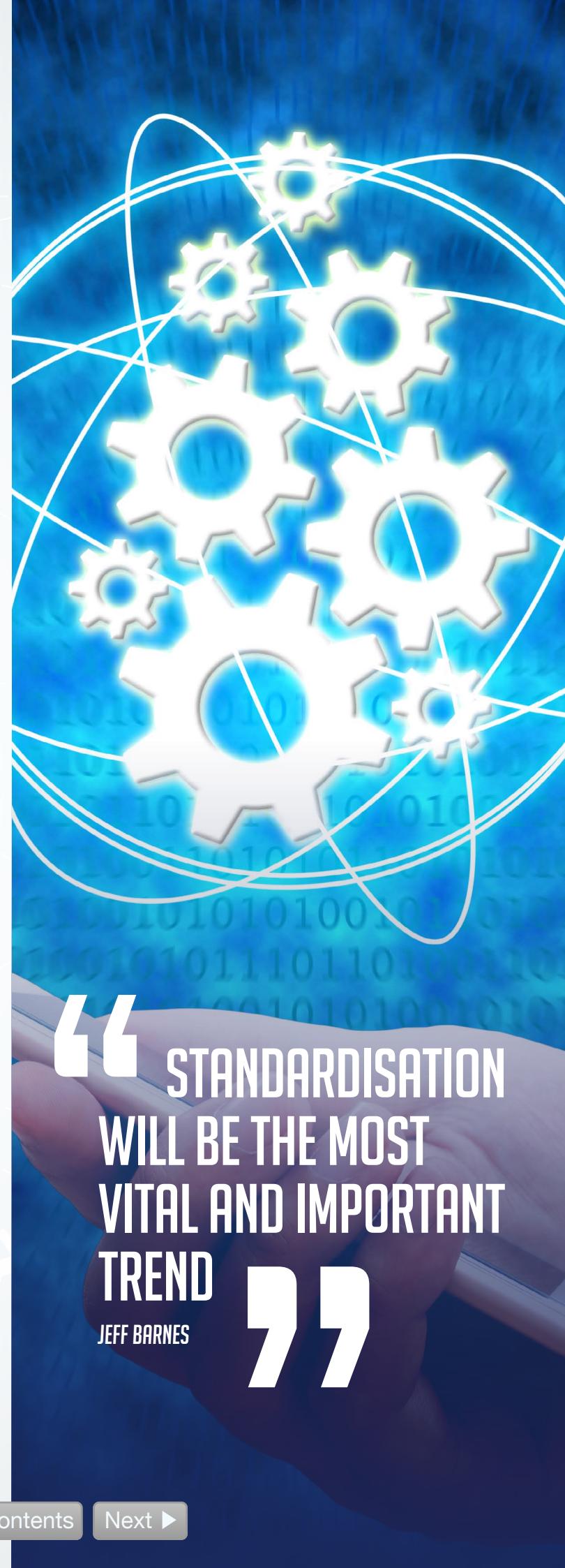
Significant strides have been made within the industry to enable decentralised control with secure remote access to control functionality on the production line and throughout the plant. As a result, we will see plants increasingly replacing conventional Fieldbus networks with Ethernet-based networks. Innovative early adopters of new technologies will help spur wider adoption of IIoT/Industry 4.0 solutions in the near future.

If you could change one thing about the automation industry, what would it be?

Machine builders and manufacturers should not be locked into proprietary/semi-open solutions. Dynamic automation requires open and interoperable networks. Therefore, if there is one thing about the automation industry that can be improved it is to adopt a willingness to embrace change for strategic growth and to allow for wise investments. Automating a factory comes with significant costs, and investments require looking beyond initial capital outlay or seeking the lowest possible cost. This merits both a cost-benefit analysis and a long-term vision.

What's the best thing about working in the automation industry from your point of view?

At Molex, we love working with machines, understanding how things work and seeing how people and technologies come together to solve problems in innovative ways. Ultimately, we aim to give customers the knowledge and industrial automation tools they need to solve their toughest challenges while remaining agile on the journey to Industry 4.0.





Thomas Dale, Engineering Manager

Tom has worked in the semiconductor and industrial controls industry, serving in a multitude of roles including sales management, application engineering, product design and strategic development. His areas of expertise include hardware, firmware and software product development.

Tom's career began in the mid-70's working with the emerging semiconductor industry at Microsystems International and later Intel. Tom founded several technology companies with a focus on industrial control, distributed processing and connectivity. Following a 10-year hiatus Tom rejoined the industry and now serves as a Principal Engineer with Omega Engineering, Inc, a Spectris company.

Tom received a Bachelor of Applied Science from the University of Waterloo.

Briefly explain your company's approach to Industry 4.0 and IIoT. For example, how you talk about it with customers?

The term Industry 4.0 is not used as much in the US market, where the focus is more on IIoT and industrial automation. As a company, we have dedicated IIoT products that address plant-floor applications and environments and it is a significant focus of ours. We also have significant investment in commercial IIoT: building management, asset monitoring and tracking, among others. Products for this sector share a lot of infrastructure and commonality with our plant-floor products. We differentiate both products from the IoT applications that are focused more on the home space or personal health monitoring. Those are the types of applications where we don't really play.

Is there a difference in the use of Industry 4.0 and IIoT?

I think the terminology for Industry 4.0 is more Eurocentric. There is discussion of it in the States but I think the term IIoT is a role grasped by Americans and how it applies to Industry 4.0 rather than headlines focusing on Industry 4.0 itself.

What are the key drivers for Industry 4.0?

The key drivers are access to data and the insights you can obtain. Another driver comes from the requirements to maintain regulatory compliance. Predictive control and monitoring will have an impact, showing correlations in data that were not realised before. Process efficiency will also drive Industry 4.0, particularly when it comes to adoption by large enterprises and global management teams.

Why are your solutions unique? What is the "secret sauce" that makes them so good?

We are fundamentally a sensing company: we grew out of thermocouples for temperature measurement applications before evolving to connectivity, control and ultimately IIoT. In the late 70s and 80s, mostly in the US and less so in Europe, everybody who went to university or to a trade school learned about temperature sensing through the Omega catalogue. It became the bible on how to measure temperature. Since then, it's been expanded into a wider range for data acquisition, monitoring and control. We have become well known for having very accurate standard measurement equipment.

One of Omega's core skills is measuring properties such as temperature or velocity and linearising the measurement into some type of engineering unit. It's something we're very good at doing with high accuracy. We had the ability to display the information through a whole family of panel meters. We also had the ability to communicate data through wireless products, Ethernet products and products with serial interfaces. Then the third piece was controlling something, so we had a family of PID loop controllers and other monitoring and control boxes. We didn't offer end solutions but you could buy the pieces: a thermocouple, wireless connectivity products, PIDs loop control. These were Omega's strength.

However, over the past five years there's been a shift towards more of a solution sale where we focus on what customers are really trying to accomplish. For example, customers don't want to measure the temperature of their oven, they just want to make the best pizza. So the mindset changed. We're in the process of narrowing down some of the scope of our offerings to focus more on what the customer is trying to accomplish and the job that needs to be done.

From your customer's point of view, what's the best thing about working with you?

We focus on what the customers care about. A customer doesn't care about monitoring the oven temperature, they care about the pizza in the oven or what their energy bill was at the end of the last month.

Security is an increasingly important requirement for Industry 4.0. In what ways do you address it?

It's a huge issue. We discuss security with customers. How do you protect the data so people can't extract or change data that they shouldn't get at? Why would somebody take that data? Is it to gain a competitive edge? Is it to steal intellectual property? Is it to inject false data into the system? Is it merely a method to get into your system so that they can do other nefarious stuff in your financial system? We spend a lot of time talking about security. It's a key issue.

Do you offer your own cloud services for Industry 4.0? If so, why do you think that your cloud solution is better than using a mainstream cloud provider such as AWS?

Around 30 percent or 40 percent of our customers want nothing to do with the cloud for multiple reasons, including security. We haven't released anything from Omega yet, but we are very much looking at cloud services and are working on customer trials. We were not going to host our own server farms. It made no sense when Microsoft has all those services combined with a global footprint. We're in the process of introducing a system that goes from a sensor up to the cloud. Sensor level activities happen in the sensor and cloud level activities happen in the



**“ WE FOCUS ON
WHAT CUSTOMERS
ARE REALLY TRYING
TO ACCOMPLISH ”**

THOMAS DALE

cloud. There's an intermediate layer – the gateway or an aggregator – which is an enterprise level device and that is needed as well.

A key emerging trend is the ease of use of products from adoption through to roll-out. How important is ease of use to your customers?

The term plug-and-play is grossly overused, but it's got to be plug-and-play. Ease of use and ease of installation drives adoption and acceptance.

Ease of use and ease of installation drives adoption and acceptance. If the installation is "finicky" then this results in a loss of trust. No plant engineer wants to feel like a fool for not understanding the product. Additionally, once installed, navigation must be intuitive and the ability to add or modify features and capabilities must be in the hands of the user. PCs were adopted and accepted once everyone could easily manipulate spreadsheets to derive information and easily manipulate documents to make them look like they wanted to without needing to call on the IT department. It will be the same in industry.

We've picked up on a theme that plant managers and operators don't understand Industry 4.0 or its potential to transform operations. How do you overcome that resistance?

Personally, I see Industry 4.0 as very much a marketing term. It's one we don't really use. What all of our customers care about is how can I simplify their lives, save them money and help them achieve their goals. We focus on becoming customer centric to achieve that for them. At the end of the day, our customers don't necessarily want to automate their bakery or even find a better way to measure temperature, they want to make better bread and so we focus on providing that for them.

AI and machine learning have led to increased capabilities with predictive maintenance; is this application something that your products can be used with? What sort of advances have you seen?

There's a process here where you learn trends from the data. Then you can apply that knowledge at a local level. If you look at what some of the

semiconductor companies are doing: they recognise there is a learning process, working on Big Data sets with large amounts of compute power. But once you have the model, you can use that to take over the job of doing real time-monitoring, real-time analysis of that data and then report by exception rather than every measurement.

For example, I know that under normal operating conditions, temperatures should be within an acceptable range. If I start to see that temperature go up quickly, or I see anomalies with that temperature, then I can pass that information up to a higher-level controller. I don't need to keep telling the cloud that the temperature is 27 degrees. This means comparatively little information is being passed on by the sensor most of the time.

If you had a magic wand, what would you change that would make it easier for companies to benefit from your Industry 4.0 solutions?

Ease of deployment. That's what is important for adoption of our solutions, so we need ease of deployment.

What do you think will be the biggest trend in IIoT/Industry 4.0 in the next year?

IIoT is kind of the evolution revolution. Back in the late '90s, the internet was a thing but you had to be technically astute and really go out of your way to play. Now it's used by everybody. IIoT is going to make that same transition from being an objective to being just part of what it takes to stay in the game. Think about five years ago, if someone said we could have a box in the kitchen that we can talk to and have it put something on our shopping list for when we go to the store, we'd say, "No way can it do that!". The intelligence will grow into being something we hope will do what we want and it will work as we expect.

What do you think will be the biggest trend in IIoT/Industry 4.0 in the next five to 10 years?

There will be a big push to move intelligence down to the sensor level. There will be a focus on fully deployed distributed-processing capability, where decisions are based on widely dispersed information and done at the sensor/controller level.

Please describe a couple of the most interesting Industry 4.0 projects your customers have completed.

I can't talk about specifics. Part of Omega's vision is the three tiers of data usage. The first level is very localised. For example, with a pizza oven, I measure the temperature and control the heat and other parameters. The next level is the enterprise level. I could have 10 pizza ovens and each one has its own localised control, but the ability to communicate between those pizza ovens becomes important. It allows me to load different recipes remotely and to do innovative things like load shedding and energy sharing so that each oven optimises its energy profile. At that level, I need to focus on enterprise capability and not necessarily the cloud.

Then the third level is focusing on the cloud. This is where I would now have a fleet of pizza restaurants straight across the city that deliver. I have on time delivery. I want to optimise cooking my pizza based on demand. If bad weather moves in, people are more likely to want more pizza delivered rather than going out for food. I could then look at optimising my cooking cycles based on weather patterns and moon phases. At Omega, we recognise these three unique uses and we have to support all three seamlessly. We have to make sure we've covered everything from how accurate the data is to the equipment reliability, when was it last calibrated and so on.

If you could change one thing about the automation industry, what would it be?

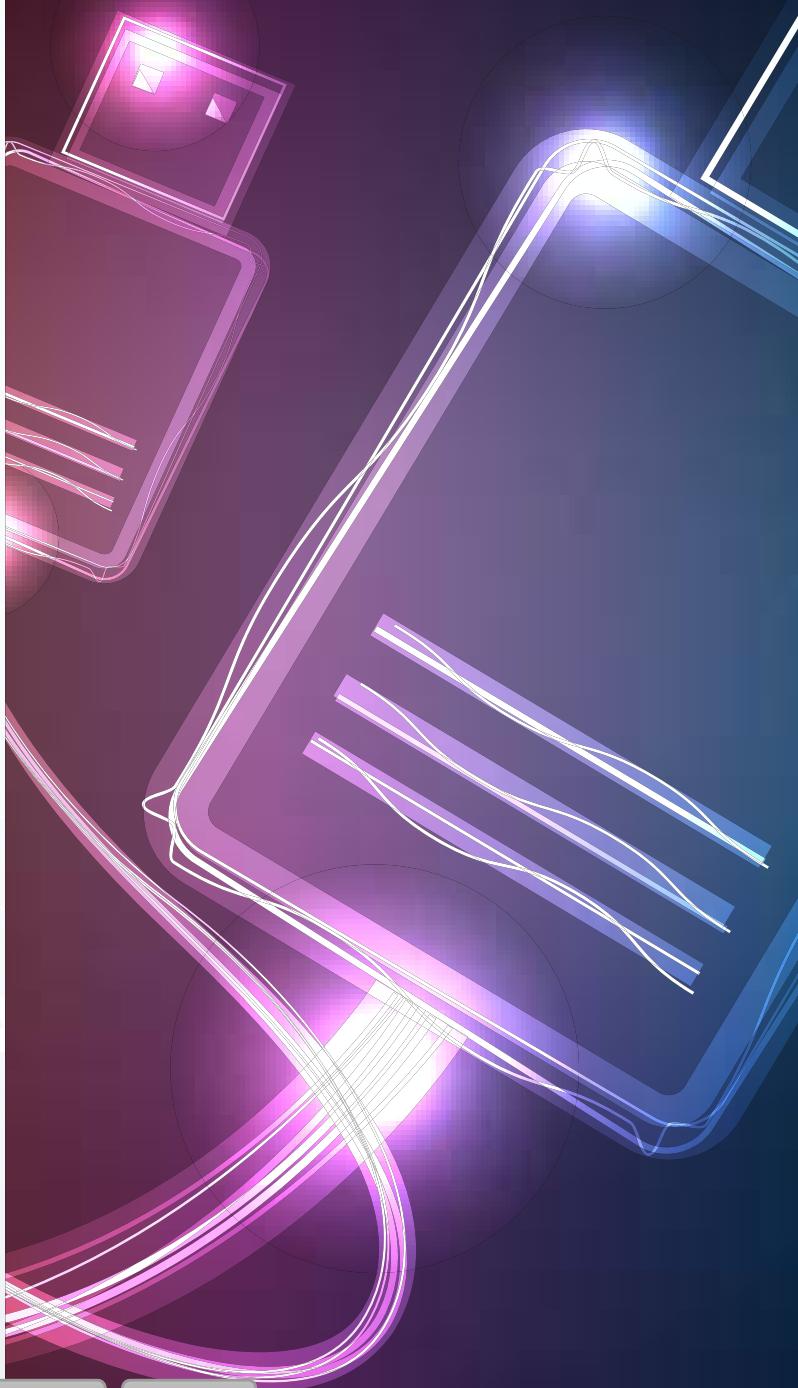
It's a great career, but there are definitely challenges with the development of it. I would change the top-heavy standards that introduce barriers to trade and innovation because of the technical and specification complexity they often have and make them easier for all to adopt.

What's the best thing about working in the automation industry from your point of view?

It's really cutting edge. It's transformational. I joined the industry before Intel had invented the first microprocessor and it's absolutely transformational when you apply it to industry. There are very visible and tangible results which give instant gratification.

“ THE TERM PLUG-AND-PLAY IS GROSSLY OVERUSED, BUT IT'S GOT TO BE PLUG-AND-PLAY ”

THOMAS DALE



Panasonic INDUSTRY



Sara Ghaemi,
Team Leader Business Development for IoT at Panasonic Industry Europe GmbH

Dr. Sara Ghaemi leads the business development team at Panasonic where she is responsible for overseeing all aspects of Distribution EMEA business development for IoT products. Specifically, she is focused on short range wireless connectivity and innovative IoT solutions. Prior to this role, Sara was business development manager for MEMS.

Since 2007, Sara has been involved in implementing digitalisation concepts in smart metering, grids, buildings and cities in various national and international industrial research projects in Europe. She holds a PhD in electrical engineering from Technical University of Vienna and MBA from WU Executive Academy in Vienna.

Briefly explain your company's approach to Industry 4.0 and IIoT. For example, how you talk about it with customers?

We strongly believe in the potentials and possibilities of Industry 4.0 which not only helps digitalisation of value chain but will also revolutionise product and service portfolios in companies. Our approach at Panasonic Industry is focused on accompanying our customers from the beginning at the concept development to the end of their journey. We are not just providing a part of the solution, we are offering end-to-end solutions so the customer can integrate their end product to Industry 4.0 or IIoT. We also use partnerships with other big companies to help our customers with data analytics or cloud solutions or cyber security.

Is there a difference in the use of Industry 4.0 and IIoT?

I believe Industry 4.0 is a subset of the fourth industrial revolution in which the focus is on digitalisation of factories. However, IoT, IIoT, cloud service as well as augmented reality and AI are all tools within Industry 4.0 to make industrial processes more efficient.

What are the key drivers for Industry 4.0?

Every industry is aware of the importance of IIoT and the ability to connect everything to everything. A big driver is that people can see the advantages of the connection, and why they should use it in their end products. People are also driven by ensuring they are compatible with the long-term needs of their customers.

Why are your solutions unique? What is the “secret sauce” that makes them so good?

At Panasonic, our corporate vision is a “better life, a better world”. This vision is also reflected in our products, their quality and the outstanding services and support we offer our customers. Our connectivity products are uniquely designed, produced, tested and verified in Europe which enables us to conform with local legal requirements - and first and foremost stay flexible to support local customers ranging from big companies to start ups.

From your customers' point of view, what are the best things about working with you?

Besides the products and technologies we're bringing to the market, I'd say they think the best thing is that we do not let them feel alone on their journey. For technologies where we're not pioneers, we will bring our partners in to help out our customers. In an era of fast digital transformations, it can be confusing so we are there for customers every step of the way.

Security is an increasingly important requirement for Industry 4.0. In what ways do you address it?

Security is a big concern for everybody because they are trying to send their data, monitor machines, analyse data, and so on.

Cybersecurity is a big concern, in particular. To cover the need of our customers, we work together with our partners and suppliers to integrate the highest security standards into our products and offer services to our customers. We understand the importance of these subjects and we are trying to support and cover our customers.

Do you offer your own cloud services for Industry 4.0? If so, why do you think that your cloud solution is better than using a mainstream cloud provider such as AWS?

We don't reinvent the wheel. Panasonic focuses on the hardware solutions we are offering to enable the connectivity and IoT-isation. However, in order to support our customers on their way to IoT, we connect them to our partners with comprehensive expertise in cloud solution. We use a number of approaches because we have such a large portfolio. There are a lot of providers outside of Panasonic and we are using partnerships with companies such as IBM in some areas. For industrial automation products, we are offering a cloud solution named Corvina.

What are the most common challenges/pitfalls when customers try to move to Industry 4.0 systems? How do you help your customers avoid them?

The challenge we often see is finding a solution for every part of Industry 4.0. It ties in Big Data, factory solutions, advanced analytics, IoT and even WiFi connectivity. We support customers with as many solutions as we can by offering the various components, devices, machines and software solutions. We try to be the one-stop shop for companies looking to implement Industry 4.0.

We've picked up on a theme that plant managers and operators don't understand Industry 4.0 or its potential to transform operations. How do you overcome that resistance?

There is always some resistance to new technologies coming in. The more we talk to our customers, the more we are seeing that they

“ WE WORK TOGETHER WITH OUR PARTNERS AND SUPPLIERS TO INTEGRATE THE HIGHEST SECURITY STANDARDS INTO OUR PRODUCTS ”

SARA GHAREMI



are trying to comprehend the new technology and overcome resistance to it because otherwise they will be left behind as the market they work in moves on.

I believe that once we show our customers our reference designs and the applications and the business we are in, and also show them the next generation solutions we offer, they get much more interested because they can see it is just making their life easier. Once they understand the value of the solutions they are offered, they're getting very interested. We can overcome resistance by showing them the benefits in real world applications and move them away from the fear of using a new technology.

Education will also play a factor to shift things in the right direction. In smaller companies, they sometimes don't have an engineer who is an expert in integrating connectivity or using a specific automation protocol, and so they need to educate their engineers to understand the integrated connectivity in order to take the company in the right direction.

AI and machine learning have led to increased capabilities with predictive maintenance; is this application something that your products can be used with? What sort of advances have you seen?

Predictive maintenance is essential in understanding what to expect from every year or in the specific stage of life or the machine. It will help you analyse the data gathered through the connectivity and make sense of it. The systems can predict what they expect will happen and how far away the machine is from expectations. Using that, we can take action and correct it. AI is going to play a very important role in this part of the market and there'll be many more advances here. We will make the use of these tools easier for the end engineer or the company.

If you had a magic wand, what would you change that would make it easier for companies to benefit from your Industry 4.0 solutions?

In bigger companies, it would be good to have an Industry 4.0 Manager who connects all the activities of IoT, such as connectivity data exchange, within a company to take it in the right direction. There would

be a nominated person to act as an Industry 4.0 champion for the company.

What do you think will be the biggest trend in IIoT/Industry 4.0 in the next year?

Augmented and virtual reality are becoming more and more integrated into IIoT/Industry 4.0 solutions. AI will also become a bigger thing in the next year. Other things that will be major areas of focus are HMI and predictive maintenance.

How do you think IIoT/Industry 4.0 will change in the next five to 10 years?

The change that was expected to come in the next five years is already here in parts. We already have predictive maintenance and that's going to get much more intelligent because there will be much more access to the data through IoT and intelligence of the machine through AI. I believe the focus will be more on Big Data analytics and convergence as well as secure data share.

Please describe a couple of the most interesting Industry 4.0 projects your customers have completed.

We support many small, medium and big sized companies to successfully overcome their connectivity challenges. Since we can't make most of our activities with our customers public, I unfortunately cannot name them here.

If you could change one thing about the automation industry, what would it be?

Accelerating the process for further implementation of the technology, especially AI and automation. Once these are accelerated, they can live up to their potential for the good of the economy and society.

What's the best thing about working in the automation industry from your point of view?

I am very much in love with the dynamics of the changing technologies in the industrial market. You become tied to them. It's gone from new technologies coming to the market every two years to new technologies coming every six to nine months. Before each one is fully integrated and implemented into the end product, a new technology has come out and this makes the market more dynamic. A while ago, I was very interested to hear

about 5G so I asked an expert from a renowned company in this field. I asked what the advanced steps with this technology were and what was going to come next, and he looked at me in a very strange way and said, "5G is now closed off" and they were working on 6G.

This fast-moving market brings more comfort, efficiency and flexibility to our everyday lives.

“ AI IS GOING TO PLAY A VERY IMPORTANT ROLE IN THIS PART OF THE MARKET ”

SARA GHAEMI

77





Martin Walder,

**Vice President of
Industrial Automation**

Martin is the Vice President of Industrial Automation at Schneider Electric and has been in the automation supply industry for over 30 years. With a BSc Hon in Electrical and Electronic Engineering, Martin is also the Chairman of EAMA (Engineering and Machinery Alliance), an umbrella organisation of trade associations which represent circa 2,000 companies across the mechanical and electronic engineering space.

Briefly explain your company's approach to Industry 4.0 and IIoT

We use the term IIoT daily talking about digital transformation using our Ecostruxure framework for factories and buildings as part of that journey. Industry 4.0 often comes up when we talk to clients because people read about it, although the level of understanding of what it can offer is very variable. What does bring it to life, however, are the tours we do for customers in our own manufacturing plants where we have deployed a lot of Industry 4.0 concepts and techniques.

The majority of factories in Western Europe are brown-field installations so you can't just replace them: it's not practical. We're therefore looking at how we move brown-field facilities further forward on the digital journey. This tends to be supporting smaller incremental projects to help move them closer, step by step, to what a full Industry 4.0 digitised model may look like.

Why are your solutions unique? What is the “secret sauce” that makes them so good?

One thing that stands out is the breadth of our offering. From the point we take power off the grid, through to low-voltage power distribution and protection systems, right down to the automated machines and equipment, Schneider Electric can offer the full portfolio. Then come the building and the environments, and the lighting and heating that go with them. Almost everything that consumes power, right down to retail socket dimmers in offices could be Schneider. The one thing that has been driven hard from the top of the company is digital systems and digital offers, including IIoT connected devices and Ecostruxure – all divisions have to produce the latest compatible technology. I haven't seen another company be so joined up.

Every business providing technology into the space, whether it's for the building, environmental controls, automation for the factory or all the power distribution, has to put in IIoT connected technology from day one. From the point that power comes in, I can monitor and control medium-voltage switchgear breakers. I can do the same to coordinate low-voltage systems. Then every device that we bring to the shop floor, from simple sensors and switches to edge controllers, which tend to either run a machine or run a process line, are all fully interconnectable with embedded-web protocols. These sorts of things are now all standard, right through to the apps and analytics which sit above the machine in the plant.

Those apps and analytics also do more than just work in a local environment. They are designed to work on an enterprise level and extend into cloud-based systems so they can share data with other systems and use aggregated historic and real time data to make more informed decisions. Everyone on the journey in Schneider has to work to that model, so we have probably the most digital breadth of any supplier.

From your customers' point of view, what are the best things about working with you?

Not that many people have really grasped the full extent of Industry 4.0. What we tend to do is try and break the digital transformation down into manageable bits and show people practical examples of how to deploy the technology, showing the benefits of the investment in terms of performance. We allow clients to move at their own pace, incrementally gaining confidence and building to bigger projects over time unlike some of our competition who have a big bang approach.

Security is an increasingly important requirement for Industry 4.0. In what ways do you address it?

We still see a lot of factories which are frightened of connecting because they're not really on top of whole-network and security management of their shop floor operational networks.

It tends to be the control and engineering teams who have built those networks up over time, linking islands of automation with proprietary and more recently Ethernet networks that suddenly offered much greater scope. But these networks typically haven't been developed in a traditional, secure IT framework and just connecting these to the outside world without remedial work could really expose the business. This is why it's so important that factories get expert help and advice to help make sure the networks are secure. You can't just tap into it all over the place. A large proportion of manufacturing operational technology today is not in a position where it can be connected at-will and that's probably the biggest challenge.

Firewalls can stop certain people getting in and out but with an open access network, when someone passes the firewall, they can often easily hop to other equipment too. You need to secure the base system before you start providing controlled access, otherwise, you will have one controlled access point, with lots of weak ones. It is vital that access to the networks internally is well controlled before you start providing firewalls and remote access points for third parties via the web.

“ SCHNEIDER ELECTRIC CAN OFFER THE FULL PORTFOLIO ”

MARTIN WALDER



Do you offer your own cloud services for Industry 4.0? If so, why do you think that your cloud solution is better than using a mainstream cloud provider such as AWS?

Some of our customers make machines and they want us to start monitoring their machines wherever they are around the world so they can sit in their facility looking at the state, productivity and throughput of each one. We provide tools which include cloud support. We tend to use the Microsoft Azure service; so customers pay us for the service to include the infrastructure and the software license. But they can also buy products from us and buy and use their own servers. It can work both ways.

If someone has networked operational equipment but they are not sure if they dare connect their facility to the web and connect the data to the cloud, they come to us. They ask if we can help them assess their current systems and provide recommendations to bring them up to the required level. We look at both physical and procedural systems, the whole structure of the networks, the internal access points, the readiness for remote access and who and how they might gain access and to what.

What are the common challenges/pitfalls when customers try to move to Industry 4.0 systems? How do you help your customers avoid them?

I wouldn't say pitfalls as such – but what I would recommend is tackling digital transformation to Industry 4.0 in bite-sized stages, starting in a very small way to get people familiar and then accelerating as fast as you feel comfortable. Industry 4.0 is not just about the people that are implementing it; it's also about the people that are operating and working with it. If you don't get people tuned into it and onboard, then they'll probably fight against it and that can be a challenge. If operators are not with you and working with you, they can fight against the changes and actually turn projects from successes into failures.

I would always recommend doing a few small pilots to get people comfortable and so that those who are uninitiated in the digital world start seeing the power of it. Frequently operators and maintenance staff are blind to what is actually going on in a piece of electronic equipment. For example, If you run a pilot with an IIoT connected variable-speed drive that

powers a pump, you can demonstrate without any effort in a few minutes how to vary its speed from your phone or your PC and then to start optimising the performance of the pump with inbuilt algorithms.

Whether the worker is sitting at home or in an office, they can see when the pump has stopped. They can ask themselves: "What could I do if I knew this or I knew that". By doing that, you're getting everyone involved in terms of the operators, the engineers, the people who are leading the facilities. You start leading them on the journey. Then you start biting off bigger projects until you get the chance to start a new line and go the full hog.

A key emerging trend is the ease of use of products from adoption through to roll-out. How important is ease of use to your customers?

Each product is smart in its own right. They have the ability within themselves to let you know when they have a problem, a trip, or a safety incident, for example, and some of the larger ones will dynamically generate a QR code on an onboard display as well. By scanning that QR code with your phone, an app can work out what the issue is and pull up all the details related to the problem and how to rectify it with the appropriate manuals. Historically, you'd have had to hunt around to work out why a product had stopped or what the problem was, and you may not have been able to do this on your own. Then you'd need to be on the phone to someone else to get help or you'd be searching for your manuals. With Industry 4.0 this is simplified and you can cut to the chase in seconds. There are also apps for new products, readily available on app stores like anything else, so you can turn the app on and instantly see all the points explained in simple language.

One of the very powerful tools we have is the Ecostruxure Augmented Operator Advisor. It is an augmented reality tool which typically runs on an iPad or a similar tablet. It enables an operator to recognise a machine, what's inside it, the health status, and everything else that goes with it, simply by pointing the tablet at the machine. Added to that are complete guidance notes in terms of setting the machine up, including both controls and mechanics. You can guide the operator through health and safety requirements, protection and everything else. You can put the machine through a set of tests and

send results back to servers. Tools like this can be really tuned in to the level of the operator, although we're not an expert on every operator and plant, so some of this has to be tuned in locally. To get to that point, we need to speak the operator's language, so we do a lot of research with the customers as we're going in to new technologies to get a flavour of how to tailor the tools in each factory, depending on what the skill level is and what the mindset of each operator is.

We've picked up on a theme that plant managers and operators don't understand Industry 4.0 or its potential to transform operations. How do you overcome that resistance?

When I look at most of our customers, they have grown up with "IT" people working on office IT systems and "controls" people working on operational plant systems. The IT people typically don't have much clue about the manufacturing environment and the controls people have limited knowledge on the IT systems, particularly security. In the future, the companies that are going to thrive in the business are those that actually let the operational parts of the business start driving the IT agenda more, enabling IT people and OT people to really collaborate together. They will need to have a combined strategy, because the strategy has to be combined right now if you're going to move forward with Industry 4.0 technology.

At Schneider, we've progressed faster due to the Aveva Software acquisition (Aveva is a FTSE100 software company 60 percent owned by Schneider Electric), especially when it comes to taking cyber services out into the customers. The real challenge in most parts is that the world is short of the skills needed today. Everyone that's grown up in IT has grown up around Microsoft applications, standard network and remote access. There are very few people that really understand the operational side and the operational world. Right now, if you're a good cyber professional, your salary is going up and up because everyone's clamoring for those skills. We have a lot of operational skills and coupled with the strong cyber skills we are both acquiring and developing we can offer that

“ WE NEED TO
SPEAK THE
OPERATOR'S
LANGUAGE ”

MARTIN WALDER



service to the end users who want to implement the latest connected solutions from Schneider Electric and other companies.

A lot of our competitors have been trying to scale their Industry 4.0 skills by doing a lot of their own education internally. Within Schneider Electric, we have around 240 manufacturing sites around the world and around five years ago, we were talking about this technology and how could we offer it to our clients if we weren't deploying and using it ourselves. We set out with the aim of fully digitising a number of our own plants including, obviously, all the cyber elements. There's a couple of those now that are recognised as Industry 4.0 lighthouses around the world. We'd picked 12 plants originally and now we're up to 80. Throughout the process, we're learning and developing our skills and then we're offering those skills out to the other users out there.

AI and machine learning have led to increased capabilities with predictive maintenance; is this application something that your products can be used with? What sort of advances have you seen?

In the manufacturing world, we're in the very early phases of the use of AI. If you look in some sectors, for example, car insurance, there is a huge amount of AI running in the cloud and looking at data from multiple vendors' histories. In the manufacturing world, we're still in the early days.

At Schneider Electric, we've embedded AI routines into some of our products. Take some of our machine-advisor products and imagine that you're monitoring mechanically moving parts like robots and linear slides. By monitoring the motors on those devices, you can start understanding how quickly they're wearing. The more you do this, the more you understand about problems and the parameters around them, and then how to maintain them. Those sort of AIs are starting to develop now. Over the years, we've also done a fair bit in the process world where we're looking at advanced process control, having analytics sitting above that, making decisions on how to improve processes.

As more and more of the devices can get connected to the web you can learn more. When you have lots of similar things running around the world, in different environments you can start aggregating information and, in doing so, you can start to see

and compare performances in different conditions, machines running in different temperatures, different humidity, with different lubrication, different running patterns, and maintenance intervals. With this information, you really start understanding what impact these different conditions have on the machines and how long they're going to last and when maintenance should be scheduled. There is so much more scope for this over the coming years. We could be going to greater depths to optimise, not only in terms of the running time or the uptime of equipment, but also the optimisation of the production processes and the yields that you're getting from them.

You could just be running AI in the factory and optimising things locally. But it's when you start aggregating across complete enterprises, across global economies, different businesses that you can start getting the true benefit. This is where the big consulting companies and big IT companies are really seeking out a future. We're collaborating with a number of these companies, for example in our own Schneider Electric factories, we're working with Accenture and Cisco. They're not necessarily experts in IT and OT and the integration there but that's where we come together to look at aggregate data and work on that level. As I say, we are really only on the first rungs of AI in the manufacturing world but there is huge scope.

If you had a magic wand, what would you change that would make it easier for companies to benefit from your Industry 4.0 solutions?

The much wider coverage of low-cost wireless device networks like SigFox could make a massive difference in the UK allowing mass access to device data without having to compromise the local IT systems. All companies could be sampling the benefits of IIoT, aspects of Industry 4.0 today and getting familiar with it. It becomes a question of supply and demand. Think how long it took for us to get the UK covered for 4G. Everything's got time and money in it and its driven by demand. It's a Catch-22 because if you don't deploy it, you're not going to invest more and if you're not going to invest more, then you can't deploy it.

Another thing that holds people back most now is the right level of tech savvy staff with the right mind to try it within major manufacturing companies.



“

IT'S WHEN YOU START
AGGREGATING [AI] ACROSS
COMPLETE ENTERPRISES,
ACROSS GLOBAL ECONOMIES,
DIFFERENT BUSINESSES THAT
YOU CAN START GETTING THE
TRUE BENEFIT

MARTIN WALDER

RR



Too many are still staffed by an older generation uncomfortable with the latest technology. The time is now to bring in a new generation of workers and have them collaborating with the longer serving and experienced staff. Neither set of people on their own will yield the right results for future prosperity.

What do you think will be the biggest trend in IIoT/Industry 4.0 in the next year?

Industry 4.0 is big and all-encompassing. A lot of the fundamental elements of it are key to big companies like Nestle and PepsiCo. They're the companies that are starting to accelerate with more robotised lines. But in general, it's a slow process. I talked to 18 plant managers from one of the national food manufacturing companies about Industry 4.0 and not one of the plant managers had heard of it before, so there is still a lot of awareness and education required.

How do you think IIoT/Industry 4.0 will change in the next five to 10 years?

The UK was pretty slow and somewhat limited on the uptake of the previous industrial revolution 'automation' but that's actually reversing now. We're seeing a massive push with a lot of these national companies to robotise and with the robotisation, you're automatically into digital processes and connected devices. These tend to go hand-in-hand.

Please describe a couple of the most interesting Industry 4.0 projects your customers have completed?

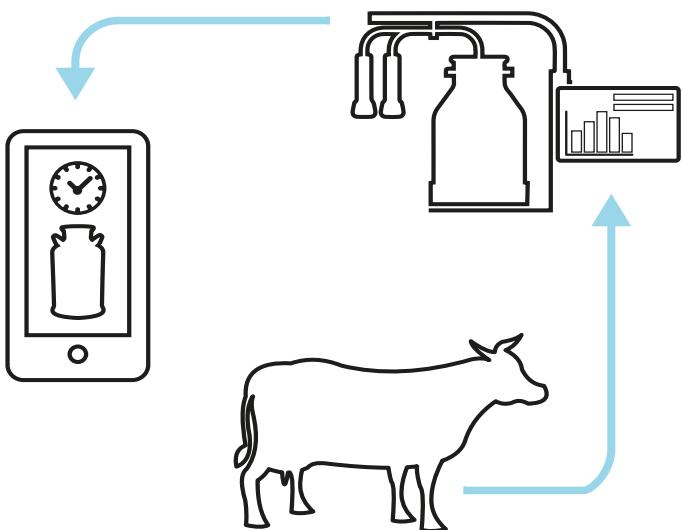
We've got a facility, in Normandy, where we make a lot of our motor starters and contactors. It was already highly efficient but by taking it through this digitisation journey we've moved it on a step and we're taking a lot of clients, thousands actually, through it every year. It certainly brings home a reality about what can be done with Industry 4.0. It's not all about putting in highly automated machines, it is also about the brown-field sites where we're adding on digital techniques to improve uptime and efficiency. We took five senior people from one of the UK food companies to our Normandy facility and they were completely bowled over and now can start understanding what they have to do.

If you could change one thing about the automation industry, what would it be?

Right now in the UK, we've got a massive lack of skills and depth which is really holding us back. It's a Western-economy issue, but it's especially relevant in the UK. We're some way behind Germany and Sweden and others like that. We need a significant influx of digital and engineering skills in the UK today as there's a drastic shortage.

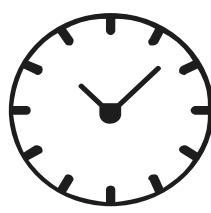
What's the best thing about working in the automation industry from your point of view?

Working in the automation industry, you get to talk to a huge variety of different companies across industries, so it's a wonderful experience. One day you could be working with a nuclear power plant, the next day working with a factory that's producing bread or a Range Rover car. The way technology is at the minute, our industry is using a lot of electrical and automation technologies, as well as an awful lot of digital tools. It is moving faster than it was before. You now move in tech-time, so you get a very engaging tech experience. It's a very rewarding career and I think for female engineers, they've got an even better opportunity.



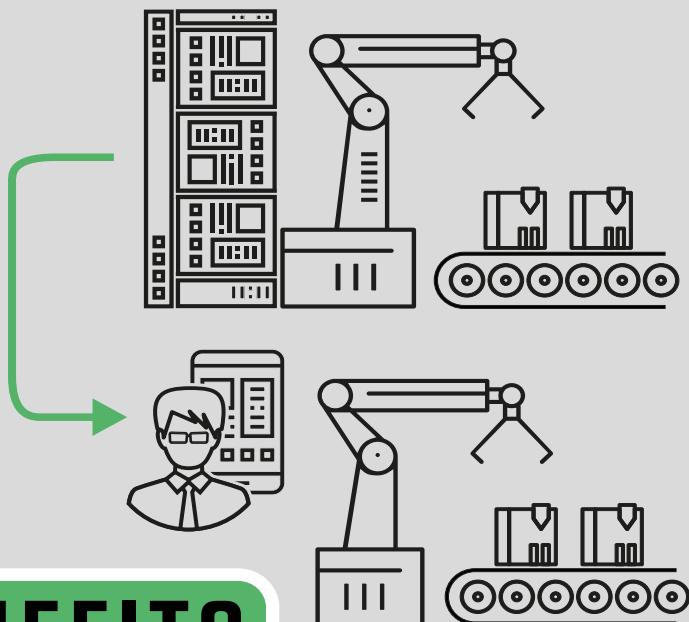
SAVING TIME

Festo created a smart phone app to control and monitor cow milking robots; increasing productivity and efficiency. Each robot is able to milk 70 cows per day!

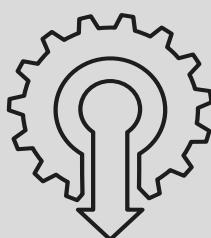


SAVING COSTS

Schneider Electric's EcoStruxure optimised facility management maintenance by 30% with operation and product part savings, and a 10% cost-reduction on solar generated energy.

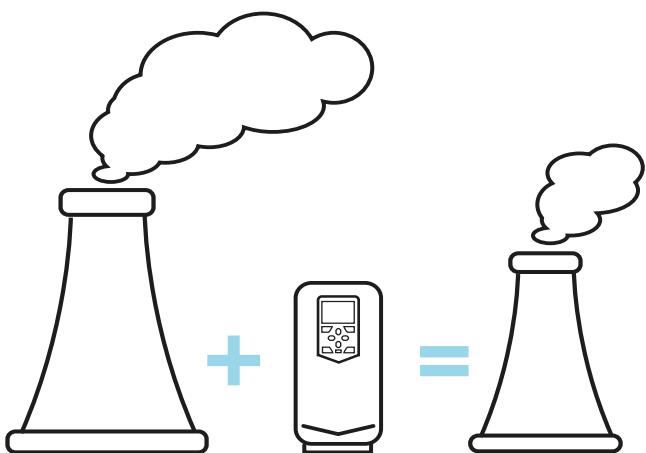


THE BENEFITS OF INDUSTRY 4.0



SAVING MAINTENANCE EFFORTS

Users of Omega's sensors can monitor vibrations, temperature variations and other characteristics to provide insights that can proactively detect future problems, saving on maintenance efforts.



SAVING ENERGY

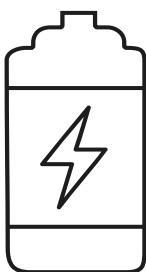


ABB found that variable speed drives enable processes to run based on current demands rather than constantly at full speed. This can reduce energy consumption by as much as 30%-50% across many applications.



Farnell

Registered in England and Wales No. 876412

Registered office: Farnell House,
Forge Lane, Leeds LS12 2NE

www.farnell.com