PROCESS TECHNOLOGY

AUTOMATION + CONTROL + INSTRUMENTATION

June 2018 vol.32 no.1

PP100007403

FLUKE TEMPERATURE CALIBRATION SOLUTIONS

Fluke Calibration Dry-Block Calibrators, Micro-Baths, and Temperature Readouts are the standard used in a number of industries worldwide.
Whether you're looking for the stability and uniformity essential in a lab setting or the portability and speed required for a field application, Fluke have a temperature calibration solution that will meet your need.

Contact Fluke Australia for more information

au.flukecal.com ☎ 1300 1 FLUKE ✉ auinfo@flukecal.com

FLUKE®
Calibration

0618

PROCESS TECHNOLOGY
JUNE 2018

CONTENTS

ON THE COVER

Mitsubishi Electric's FX5U range introduces the next generation of the highly successful MELSEC-F compact controller family. First launched over 30 years ago, Mitsubishi Electric has sold over 13 million CPUs worldwide.

The Mitsubishi MELSEC-F series has undergone many advancements in this time, making way for the next-generation MELSEC iQ-F Series, the FX5U and FX5UC, with even greater processing power, enhanced high-speed bus, expanded built-in functions, network compatibility, advanced SSCNET III/H support, and an improved engineering environment with parameter settings in GXW3 engineering software.

From standalone use to networked system applications, MELSEC iQ-F brings your business to the next level of industry.

Mitsubishi Electric's iQ platform brings together a full automation suite, including the GOT2000 range of HMIs, the powerful modular automation controller iQ-R series, the high-performance FR-A800 range of inverters, as well as the high-function MR-J4 servo systems — all developed to provide a next-generation automation environment focused on adding value while reducing TCO.

Mitsubishi Electric is one of the world's leading names in the manufacture and sales of electrical and electronic products and systems used in a broad range of fields and applications. As a global company, we're applying our technologies to contribute to society and daily life around the world.

Mitsubishi Electric Australia
www.mitsubishi-electric.com.au

MITSUBISHI ELECTRIC
Changes for the Better

SMOOTHING OUT INTEROPERABILITY ISSUES IN SMART FACTORIES

Edward Lin, Product Manager, Moxa

Ensuring non-stop connectivity throughout converged networks involves dealing with a hodgepodge of protocols and technologies.

Data mining is transforming the face of factory automation. As factory automation is all about faster, smarter and more efficient production, unlocking the vast, untapped potential of data on shop floors has been the driving force behind factory automation's transformation for some time now. The most striking change on factory floors is the evolution of machine-to-machine (M2M) communication into system-to-system communication. M2M communication still propels automation significantly when it comes to point-to-point communication between hardware, but it takes a back seat to system-to-system communication when data needs to be transferred from sensors and devices to the cloud. Consequently, establishing connections between subsystems in network architectures adds new communications paths and network platforms, bringing new complexities and challenges.

While discussions about the Industrial Internet of Things (IIoT) and its promises of cost-efficient, non-stop operations carry an opportunistic tone among executives, it is system integrators who have to grapple with the reality of figuring out how the different platforms in a network can communicate with each other. What turns a system integrator's world upside down is the hodgepodge of protocols in the three divergent domains of network architecture: operation technology (OT), information technology (IT), and the IIoT. Each domain comes with its own set of protocols that effectively creates non-interoperable silos, making it impossible for useful data to reach those who need it on an enterprise level to make important decisions and leaving system integrators at their wits' end. Matters are further complicated by the fact that both the OT and IT departments are unfamiliar with the protocols used in each other's domains. This trend must be reversed quickly, because as the IIoT makes inroads into automation, OT and IT are converging.

There is good news, though. Solutions are available to bridge these interoperability issues through a variety of protocol conversions. This article sets out to take a closer look at the challenges that system integrators face with OT-to-OT, OT-to-IT and OT-to-IIoT interoperability, as well as the solutions available to ensure non-stop connectivity throughout converged networks.

OT-to-OT interoperability

OT-to-OT communications in factories are not as simple as they used to be. This can mostly be attributed to the IIoT, which has brought a plethora of sensors and machines to the internet on a massive scale. These types of communications are not going to get simpler anytime soon, as the rise in connected IoT devices is expected to continue exponentially. This surge in devices being able to be connected is impacting factory floors in such a big way that M2M communications have evolved into the need for communications between divergent operational subsystems to fulfil data collection and analytics. The snag however is that the heterogeneous systems that fall under OT — such as manufacturing execution systems (MES), supervisory control and data acquisition (SCADA) systems, distributed control systems (DCS), programmable logic controllers (PLCs), and the machines and sensors on the plant floor — all run their own protocols; consequently, the age-old issue of non-interoperability rears its head again and a multitude of protocol conversions are required.

An example of where efficient communications between disparate OT systems on the factory floor benefit operations is having the heater, ventilation and air-conditioning (HVAC) system work in sync with the production system. When the latter's workload increases, it alerts the former to start up to ensure that production will not be interrupted by overheating or freezing temperatures.

Challenge: An alphabet soup of protocols

The growing complexity of operations processes brings more and more heterogeneous systems into the equation. This means more devices and more protocols. Installation and set-up require more time to plan the architecture and perform device commissioning. For system integrators, it is all about saving time and cost. They don't want to spend long hours on device commissioning and configuration, or on protocol conversions. However, it is not

uncommon for them to spend hours on communication and troubleshooting programming when using communication modules or small PLCs. System integrators therefore want an easy way to simplify protocol conversions so that they can better spend their limited time on their core tasks, such as programming the automation system.

More and more operators are taking advantage of industrial protocol gateways to accomplish the mass configuration of devices and protocol conversions between different devices to keep operations running smoothly. For example, in an electricity room, bridging a large number of Modbus RTU power meters to a Modbus TCP network is usually extremely time-consuming due to the configuration of the slave ID routing table. A convenient solution is to include an automatic device routing function in the gateway that automatically detects the commands from a SCADA system and sets up the slave ID routing table. With only one click, this configuration can be achieved within a minute. Furthermore, a ready-to-use protocol gateway that supports the multiple industrial protocols commonly used in OT (such as Profinet, Profibus, EtherNet/IP and Modbus) simplifies protocol conversions, resulting in significant cost and time savings.

OT-to-IT interoperability

Close cooperation between IT and OT professionals is fundamental to leveraging any smart application's IIoT platform. Although the approaches of OT and IT to problem-solving differ vastly, they both work towards the same goal: optimised production. To be successful, both domains need access to industrial data. IT departments, which oversee enterprise resource planning (ERP) and sometimes MES, need to review this data to form the bigger picture and then develop solutions for each of the issues that hamper an operation's reliability. OT professionals are more closely involved with the physical operations on the factory floor and have to figure out how to make all the divergent systems, fitted mostly with proprietary technologies, work together. On the other hand, a positive trend in the era of Industry 4.0 is the OT staff's increasing recognition of the importance and convenience of IT technology as it helps them achieve their goals.

Challenge 1: The big divide

IT departments face an increasing demand to collect production data from shop floors in order to optimise production. For IT staff, this is not an easy task as they are not familiar with the process of collecting data via industrial protocols. At the same time OT staff members face a similar predicament, in that once they have the need to transfer OT data to the IT layer, IT departments often request interfaces they are not familiar with. This can potentially spark a power struggle between the respective domains of expertise over interfaces and protocols. In the age of Industry 4.0, it is not in any organisation's best interest to keep the OT and IT domains apart; therefore, eliminating the knowledge gap between them and aligning them more closely deserves operation managers' undivided attention.

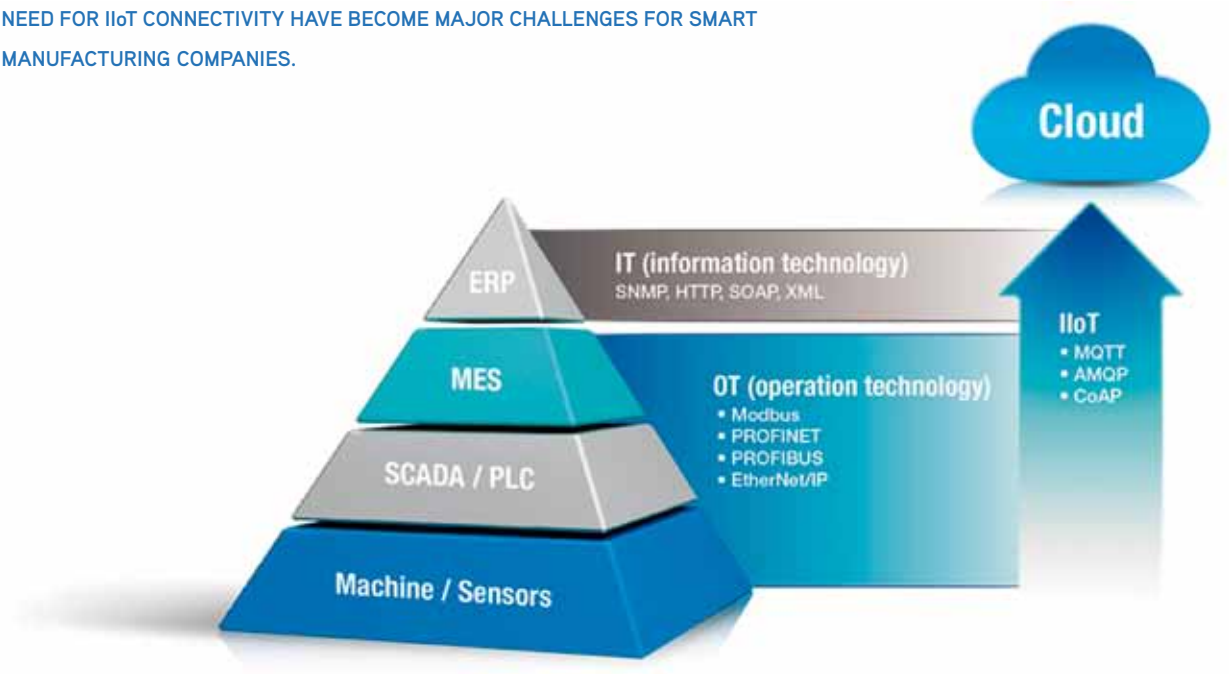
A multiprotocol integrated device will make the lives of system integrators much easier here. For example, a smart I/O device that supports various protocols — such as Modbus TCP and EtherNet/IP for OT engineers, and SNMP and RESTful API for IT engineers — allows communications with different interfaces. This is certainly a step in the right direction to bridge the divide between OT and IT. Such a solution makes it possible for both IT and industrial automation (IA) engineers to conveniently retrieve data from the same I/O device.

Challenge 2: A view to staying ahead

Demonstrating just how much OT and IT are worlds apart from each other is the fact that

© Stock.Adobe.com/au/MORENO SOPPELSA

THE GROWING COMPLEXITY OF OPERATIONS PROCESSES AND THE GROWING NEED FOR IIoT CONNECTIVITY HAVE BECOME MAJOR CHALLENGES FOR SMART MANUFACTURING COMPANIES.



OT networking devices are always treated as transparent, making it difficult to monitor them — even in the case of emergencies. This adds to the frustration of network operators as troubleshooting becomes almost pointless when they are experiencing downtime. Of course, this situation cannot be accepted, as situational awareness is very important for network operators in order to ensure continuous production and prevent abnormal situations. Ensuring continuous visibility of all network devices and the status of a network in a control room is top priority. However, to capture abnormal events on the shop floor and then interpret the information about these perceived events in real time is quite challenging, due to the complexity of the protocols and networks.

For production lines that employ OT protocols, Ethernet switches that support Profinet, Modbus TCP and EtherNet/IP protocols enable engineers to simultaneously view data and the network status at a central site on a control system, or locally on a HMI. If an industrial protocol fails, the switch reports it and the PLC sends an alarm so that the situation can get fixed immediately.

Leveraging IT's expertise and knowledge in the domain of Ethernet networking can speed up troubleshooting, reduce system downtime and increase situational awareness.

OT-to-IIoT interoperability

In boardrooms, executives expect data mining and analytics to pay dividends in reduced operational costs, optimised production and predictive maintenance to minimise downtime. As one would expect, this data needs to be collected from field sites, and it has become the job of OT engineers to transfer this data from the devices in the field to the cloud, where it is stored for analytics purposes. This new addition to their job description takes OT engineers somewhat out of their comfort zones, as they would rather focus on programming and work that adds value to their specific field instead of communications tasks.

Challenge: The need for speed

OT engineers' lack of IT knowledge is definitely their Achilles' heel. As it is, sending data from an edge device to the cloud can be time-consuming, and OT engineers' lack of familiarity with IT technology only compounds the process. In the race to IIoT connectivity, the biggest challenge for them is to cut down on the time to set up and program the networking connections between edge devices in the field and the cloud.

To spare engineers a great deal of programming effort and reduce time and costs, an embedded computing platform that supports versatile interfaces, coupled with a software suite that integrates a ready-to-use Modbus engine and cloud connections such as AWS, enables fast integration between devices in the field and the applications required for the IIoT. Furthermore, for those who want to adopt OPC UA in order to unify automation interfaces, software solutions are available that provide an OPC UA server as well as cloud connection capabilities. The beauty of these types of solutions is that they require no additional costs to implement functionality to enable cloud connectivity.

Conclusion

The growing complexity of operations processes and the growing need for IIoT connectivity have become major challenges for smart manufacturing companies. Installation and set-up require more time to plan the architecture and perform device commissioning, and manufacturers and OEMs alike are plagued by a plethora of communication protocols.

Not only is protocol integration and the need for additional data collection a challenge — for both OT and IT personnel — but there is a corresponding need for greater situational awareness around network reliability for operators in both the field and control room in order to ensure continuous production and prevent abnormal situations. However, to capture abnormal events on the shop floor and then interpret the information about these perceived events in real time is quite challenging.

Fortunately, hardware and software solutions are now becoming available that simplify the task of protocol conversion and provide greater visibility into the data-gathering network function so that faults can be rectified quickly.

MOXA Inc

www.moxa.com

HOT PRODUCTS
ON WWW.PROCESSONLINE.COM.AU THIS MONTH

DC UPS WITH NETWORK INTERFACE

The QUINT4 DC UPS uninterruptible power supply is the first QUINT UPS for integration into established industrial networks.

Phoenix Contact Pty Ltd

https://bit.ly/2LTgEhY

COATING THICKNESS TESTER

The DeFelsko PosiTector 6000 is a ferrous and non-ferrous coating thickness tester with a storage capacity of up to 100,000 readings.

TechRentals

https://bit.ly/2ssYvPW

LIGHT SECTION SENSORS

Based on an innovative combination of light section technology and 2D vision, SmartRunner from Pepperl+Fuchs is a family of high-precision sensors.

Pepperl+Fuchs (Aust) Pty Ltd

https://bit.ly/2xHkbNm

UPGRADED CHILLED MIRROR HYGROMETERS

Michell has relaunched its S8000 precision hygrometer range with improved features and a common user interface.

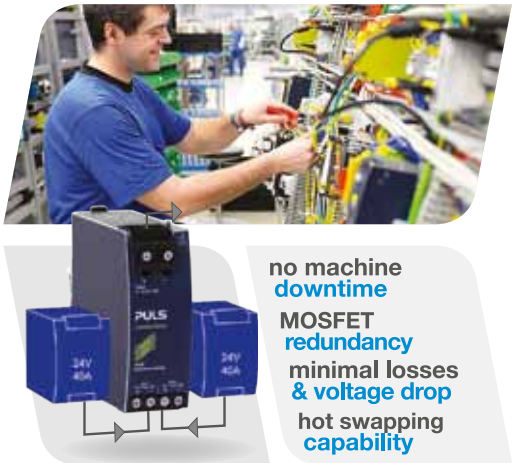
AMS Instrumentation & Calibration Pty Ltd

https://bit.ly/2LkgzTq

PULS

always have a back-up plan

redundant power supply solutions



no machine **downtime**

MOSFET redundancy

minimal losses **& voltage drop**

hot swapping **capability**

Don't let the failure of one DC power supply shut down your production line. The PULS YR Series redundancy modules provide a reliable power delivery designed to increase power availability and machine up-time.

Utilising new MOSFET technology for load currents of 20-80A and input voltages from 12-60V, the YR series decouples and significantly reduces high inherent losses for unrivalled performance that traditional diode based solutions can't match.

With PULS, enable power redundancy easily and load share between power supplies to ensure uninterrupted power to the critical load.

WHEN ONE JUST ISN'T ENOUGH.

for more information call 1800 557 705 or email sales@controllogic.com.au
www.controllogic.com.au

control logic

Coca-Cola Amatil boosts efficiency with robotic mixed pallet technology

Swisslog's fully automated robot-based order picking system, ACPaQ, has been selected by food and beverage giant Coca-Cola Amatil as part of the automation and major expansion of its Auckland distribution centre.

The ACPaQ technology to be installed in Auckland this year is an evolution of Swisslog's advanced automation technology, which combines robotics solutions for palletising and depalletising with Swisslog's CycloneCarrier shuttle technology to create a fully automated process that facilitates high throughput and reliable picking of orders for logistics, distribution, food and beverage and retail applications.

Swisslog and the KUKA Group, of which it is a global member, have combined their robotics and intralogistics expertise to create this fully automated solution that allows customised and scalable pallets to be created.

John Truscott, General Manager – Supply Chain for Coca-Cola Amatil NZ, says the new system will enable the business to keep pace with increased demand along with rising expectations on the quality of customer deliveries.

"We are excited by this technology and the advantages that the fully automated case picking system provides us. This will certainly strengthen our capabilities heading into the 2018 pre-Christmas period," he said. "The whole picking system will be fully integrated using Swisslog SynQ software, which also controls automated delayering of single product pallets into individual cases."

Amatil has been using a fully automated pallet storage system in both Auckland and Northmead since 2007 and the expansion into robotic picking allows the company to meet rising customer demand while reducing costs and improving quality, efficiency and predictability in its operations.

The heart of the new system will be three Swisslog RowPaQ robot cells, which can each handle up to four cases simultaneously and stack up to 1000 cases/h into multiproduct pallet loads ready for customer delivery.

"This is a far higher throughput than existing mixed-case robotic palletisers, which greatly improves operational efficiency," said Sean Ryan, Head of Sales and Consulting, Swisslog. "These robots also have unique grippers designed for fast, gentle and accurate handling of almost any carton, shrink-wrapped or foiled package. The solution is completely scalable and additional RowPaQ cells can be added to the system to increase throughput as required."

The solution also includes Swisslog's multilevel shuttle storage system, CycloneCarrier, which quickly delivers sequenced cases to the robots, all linked with pallet and case conveyors.

The ACPaQ system will be installed this year and replaces a manual, voice-directed picking system but will link with the existing automated pallet store to create a seamless operation.

"Coca-Cola Amatil are leading the way in applying new technology to support their long-term business requirements and we are excited to be working with them," said Ryan. "The modular design of ACPaQ has been specifically developed so that extra capacity can be added with increasing demand."

Swisslog's ACPaQ palletising software allows companies to customise a palletising order to increase efficiency during in-store replenishment. The system can be used in ambient temperature and chilled warehouse zones and can handle almost all types of cartons, shrink-wrapped or foiled packages, and pallet types used in retail and beverage industries.

Benefits include greater efficiency and flexibility. Order picking by robots improves picking quality and quantity, while the special gripper type allows gentle handling of various package types.

The specialised gripper, by allowing the picking of four cases per move, contributes to the greater operational efficiency of 1000 units/h, optimising ROI and reducing labour costs.The flexibility of a modular design means that growing companies can increase their capacity and efficiently handle peak demands. The solution is suitable for small, medium and large companies.

Swisslog Australia

www.swisslog.com.au

Cooperation for safe and simple automation.

We call that teamwork: The collaboration between Siemens and Bürkert resulted in the Type 8647 AirLINE SP valve island, which is compatible with the Siemens I/O system SIMATIC ET 200SP. It is designed not only for fast installation, but also features numerous safety functions for drinking and process water processes, such as the new LCD with real-time status display of diagnosis data - accessible either via the integrated LC display or via the control system. Together with the pneumatic safety functions, this results in a solution for maximum process reliability.

AirLINE SP Type 8647:
So safe. So simple.

We make ideas flow.
www.burkert.com

OPINION

DEMYSTIFYING THE FEARS AROUND COLLABORATIVE ROBOTS

High labour costs mean that to be competitive in local markets, ANZ manufacturers need to apply innovative technologies to streamline their production processes and deliver products to market more efficiently, while maintaining the highest level of quality. Applying automation and computerisation to manufacturing processes is key to achieving just that. With the ability to perform tasks accurately and efficiently alongside humans, collaborative robots — cobots — are helping to optimise manufacturing operations.

As cobots modernise the factory floor, there's a misconception that robotic operations will replace people as the world's primary workforce. However, less than 10% of jobs can be fully automated, therefore limiting the number of human jobs cobots are likely to replace, according to findings from the OECD[1]. Cobots are also easily programmed, cost effective and can be deployed for operations of any scale.

Let's demystify the myths surrounding cobots in greater detail:

Cobots replace jobs

Automation isn't about reducing human staff: it's about integrating new technologies that will support and work alongside existing staff. 52% of CEOs plan on increasing headcount despite increases in automation. This is testament to the fact that cobots don't replace jobs, they create better jobs. They relieve workers from strenuous and repetitive tasks so workers can take on new roles. Such was the case for Trelleborg. More machines and robots have meant more orders and hiring of 50 new employees at the sealing solutions company. With flexible, lightweight robots Trelleborg has optimised production with orders ranging anywhere between a single unit to several million. Remember that human dexterity, critical thinking, decision-making and creativity will never be replaced by machines.

Cobots are dangerous

Direct interaction between humans and cobots in the workplace is changing manufacturing. With this comes a perception that cobots could harm or frustrate humans while carrying out tasks that have traditionally been the domain of people. While most automation solutions require safety fencing so the robot can operate in a closed-off area away from workers, this isn't the case with cobots. They don't need to be caged behind protective fencing, subject to risk assessment. Cobots operate in a realm where human modes of communication and safety are paramount. For this reason, cobots have built-in safety functions that permit them to work safely and side by side with people. Cobots provide ease of use and are able to work closely alongside humans when compared to traditional robotic solutions.

It's a hassle to implement cobots

Cobots don't require specialised knowledge to implement and operate. They're easily programmed or redeployed and require minimal maintenance. Human technicians can easily and quickly learn how to program and operate a cobot — it's as easy as operating an iPad. This saves a business a great deal of time

in the implementation phase and in repurposing the cobots to carry out different tasks. The average set-up time for a cobot can be as short as 0.5 days. In addition, cobot arms can weigh as little as 11 kg. Being compact and lightweight, there's no need to change production layout when switching the cobot between tasks.

Robotic automation is for complex, large-scale operations

Regardless of the scale of output, cobots can be deployed for simple processes that are repetitive, manual or potentially strenuous for workers. A cobot also enables manufacturing companies to combine functions. Talbot Technologies is a good example. The plastic manufacturing company has combined tasks that occurred off-machine and on-machine and others which happen either prior to or post production, helping to streamline the production process.

Cobots are expensive

Cobots can deliver a cost reduction through improvements in quality. Cobots improve the consistency of quality and of flow wherever they are deployed. This allows a company to competitively manufacture products for the global market. There's no variation in output, which means no repeatability through error. The average ROI period is 12 months from implementation, which provides cost-saving benefits that can be redeployed back into strategic business initiatives. The installation of a cobot requires minimal investment as they don't require major infrastructure changes. They can be redeployed to different functions in the production line, and used around the clock.

Debunking the risks surrounding cobots makes it clear that the benefits far outweigh any fears. It's time to acknowledge the fact that cobots function as co-workers rather than threats, often creating better jobs than they replace, as well as improving productivity and increasing competitiveness.

Reference

Arntz M, Gregory T and Zierahn U 2016, "The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis", *OECD Social, Employment and Migration Working Papers*, no. 189, OECD Publishing, Paris 《http://dx.doi.org/10.1787/5jlz9h56dvq7-en》.

Shermine Gotfredsen is General Manager, Southeast Asia & Oceania for Universal Robots (UR). She joined UR in 2011 to spearhead the company's market entry and operations in Asia Pacific. Having previously lived in Denmark, she now lives in Singapore with her husband and two children.

ELBOW FLOW CONDITIONERS

To provide accurate and repeatable flow measurement, electromagnetic and other types of flow metering technologies used in many plants require a specific amount of straight pipe run upstream and downstream from the installed location of the meter. The straight pipe runs create a swirl-free and symmetric velocity profile in the pipe that can be measured accurately over and over again.

The Vortab Company's elbow flow conditioner nearly eliminates the flow meter upstream piping requirements by conditioning the flow stream into a flow regime, mimicking adequate straight run. In addition to conditioning the flow stream, the 90° angle tab-type Vortab elbow flow conditioner eliminates the pipe cost and technician labour for the 5 to 10 upstream and 3 to 5 downstream pipe diameters required by many types of flow metering technologies.

The Vortab Elbow was developed using the same tab-type flow conditioning technology as the straight run Vortab flow conditioners, which have been laboratory proven and successfully installed in hundreds of plants worldwide. To validate the Vortab elbow's design, ball valves, gate valves, out-of-plane and in-plane elbows and swirl generators were installed at the immediate inlet of the Vortab elbow and tested in state-of-the-art gas and liquid calibration facilities.

AMS Instrumentation & Calibration Pty Ltd
www.ams-ic.com.au

INDUSTRIAL UPS RANGE

Gutor PXC is Schneider Electric's first standardised fully industrial UPS for harsh environments. Designed into a strong and robust LV Switch Gear cabinet, its high efficiency, ease of deployment and compact (3:3 and 3:1) three to three and three to single phase power protection integrates into the electrical physical and monitoring environments of heavy industrial applications in oil and gas, electrical utilities, mining, water and wastewater, transportation, marine, health care and other industries.

The unit is easy to deploy, install and maintain to secure industrial business areas. Different from other Gutor UPS systems, the range has been standardised for short delivery times, ensuring fast deployment and installation.

Schneider Electric
www.schneider-electric.com.au

THERMAL IMAGING CAMERA

The FLIR E75 is a handheld infrared thermal imaging camera that offers high sensitivity and a true 24° field of view. This easy-to-use camera can identify even the most subtle indications of building deficiencies and moisture intrusion. It is available to rent from TechRentals.

The E75 has an IR resolution of 320x240, a temperature range of -20 to 650°C and multiple image modes including infrared, visual, MSX and picture-in-picture. It also features a 4″, 640x480 optically bonded PCAP touchscreen with 1–4 continuous zoom.

This thermal imager has a fast and precise laser-assisted autofocus and its grip, trigger and buttons have been designed for seamless one-handed operation.

TechRentals
www.techrentals.com.au

SecurityBridge protects Pilz controllers

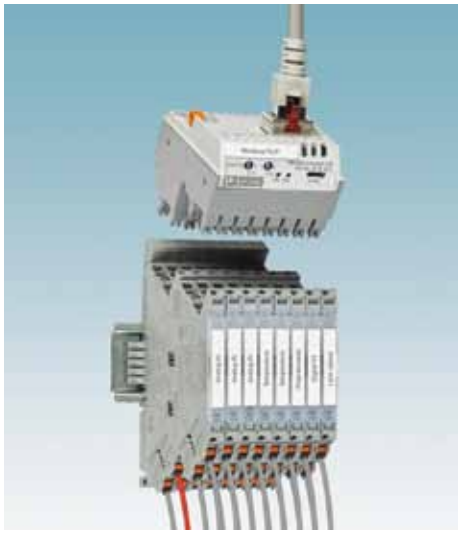
PILZ
THE SPIRIT OF SAFETY

Your benefits at a glance

- TÜV-certified and developed in accordance with IEC 62443-4-1 and IEC 62443-3-3
- Protection against manipulation of data through authentication and authorisation management
- Increases plant availability because only required data (authorised configuration and process data) is transferred
- Forwarding of low-latency process data
- Reveals unauthorised changes to the project by monitoring the check sum (CRC)
- Prevents unauthorised access because downstream devices are in a protected network
- Only suitably authorised users can make changes to a project's configuration

ALL IN ONE
SAFETY & AUTOMATION

Melbourne · Sydney · Brisbane · Auckland
Ph: 1300 723 334 Ph: 03 9560 0621 Fax: 03 9574 9035 www.pilz.com.au safety@pilz.com.au



SIGNAL CONDITIONERS

The Mini Analog Pro signal conditioners from Phoenix Contact feature bus and network connection, allowing users to combine the advantages of safe electrical isolation and digital communication.

With an overall width of less than 50 mm, users can transmit up to eight field signals to industrial networks, while benefiting from safe electrical isolation. The easy-to-attach gateways enable users to integrate any MINI Analog Pro signal conditioner with current or digital output into their network in a space-saving way. Signal-specific input cards are no longer required.

Achieve space-saving network integration from freely combinable signal conditioners by means of compact gateways. The highly compact modules with an overall width of just 6.2 mm provide users with all conventional signal transmission functions: analog, temperature, frequency or switch signals are processed safely and transmitted to output signals. The new plug-in gateways digitise this output data and send it directly from the interface level to the control system or PLC via a serial communication protocol such as Modbus or Profibus.

In certain circumstances, converting to a modern controller generation can involve significant risks and challenges for system operation. Signal conditioners with bus and network connection provide support for system migration and extension. Thanks to the fast, error-free bundling of signals in one network cable users can remain flexible and compatible with almost every controller. This offers safe electrical isolation right to the CPU, even between the individual channels. Up to eight signal conditioners with current or digital outputs can be combined as desired. As signal-specific input cards are no longer required, this enables previously unachievable modularity and space saving.

Phoenix Contact Pty Ltd
www.phoenixcontact.com.au

ETHERNET SWITCH

The EKI-2525LI is an unmanaged, 5-port Ethernet switch that comes in an ultrasmall palm size. This makes it a suitable solution for environments with limited space, such as electronic boxes, cabinets and high-density plants.

Compact devices such as PLCs typically have a height of only approximately 10 cm. Conventional Ethernet switches, however, are usually taller than this, resulting in a waste of space. The EKI-2525LI overcomes this and can be easily fitted into a rackmount cabinet to maximise space utilisation, thus offering an easy and immediate upgrade for Industrial IoT applications. The product can also be fitted into any already wired electronic boxes or shelves where extra connectivity and communication services are required, but space is limited, therefore aiding businesses with key infrastructure upgrades.

The EKI-2525LI can serve as an embedded device in any working equipment such as kiosk, AGV and CNC machines. This ensures smooth data transmission between embedded devices and thereby promotes seamless information communication.

Advantech Australia Pty Ltd
www.advantech.net.au

WLAN ACCESS POINTS

HMS Industrial Networks has introduced two Anybus WLAN Access Points, designed to be industrial-grade infrastructure hubs for long-range WLAN connectivity. The APs are suitable for collecting data wirelessly from any machinery or system, especially those equipped with Anybus Wireless Bolt or bridge.

The access points allow users to set up an industrial wireless infrastructure for multiple wireless clients. Available in two different versions, one for IP30 applications and one for IP67 (outdoor and water resistant), both devices feature the same characteristics in terms of range and functionality.

The access points enable high-performance wireless connections to a multitude of wireless clients. By supporting up to 1000 Mbps wired Ethernet LAN connection and up to 300 Mbps wireless connections, high data throughput is ensured for each client. Configuration is done via a web-based interface and secure wireless connections are achieved due to support for WEP/WPA/WPA-PSK(TKIP,AES)/WPA2/WPA2-PSK(TKIP,AES)/802.1X.

The access points offer a wireless range up to 400 m and PoE for the IP67 version.

Global Automation Asia-Pacific
www.globalautomation.com.au

PHOTOELECTRIC POSITION ENCODING

Photoelectric position encoding systems such as the Pepperl+Fuchs WCS are used for precise position feedback of shuttle cars and conveyor vehicles. The latest version, WCS Outdoor, is optimised for automation in outdoor environments such as ports, offshore installations, ships or waste incineration plants.

The WCS Outdoor position encoding system is enclosed in an IP69 protective housing designed to withstand aggressive substances like salt water, saline air, acids or alkalis. It offers high shock resistance, making the system nearly invulnerable to possible damage from typical outdoor obstacles like falling branches or hail. Even in snowfall and at temperatures down to -40°C, the WCS Outdoor operates smoothly due to its integrated heating. In daily operation, the protective housing does not cause any constraints, as the display and status indicator LEDs are clearly visible through the translucent housing material.

When it comes to installation, the system comprises two components: the read head, including a protective hood, and a code rail with openings that allow non-contact and wear-free vehicle position encoding. Additionally, since the WCS outdoor version is compatible with earlier systems, it is also suitable for upgrading an existing installation.

Pepperl+Fuchs (Aust) Pty Ltd
www.pepperl-fuchs.com

REVOLUTIONISING ASSET MANAGEMENT

IN THE OIL AND GAS INDUSTRY

Richard Irwin, Senior Product Marketer, Bentley Systems Inc.

The industrial world is awash with data and new information from sensors, applications, equipment and people. But the data is worthless if it is left untouched or not used to its full potential to gain insights and make improved decisions.

To make the most of big data, oil and gas leaders should implement machine learning alongside accurate engineering models linked to the IIoT. This will leverage the digital DNA of the asset to take advantage of the increased insight engineering information can bring to the operation regarding performance and reliability. Using reality-modelling technologies to capture existing asset conditions, applied together and working in tandem with the IIoT and machine learning, companies can reap the rewards of cost savings and improved uptime.

Demystifying machine learning

We have all experienced some form of machine learning, from streaming movie recommendations, to banks that monitor spending patterns to detect fraudulent activity. Now, the industrial arena is moving quickly towards using a type of artificial intelligence to leverage the Industrial Internet of Things.

As a greater variety of data becomes available through advancements in sensor technology to monitor just about anything, machine learning is being applied to efficiently manage increasingly large and fast-moving datasets. Previously, organisations with predictive analytics could use big data (current and historic) to attempt to predict the future — with reasonable results. What machine learning brings is a more accurate prediction using algorithmic models to deliver more insight.

Machine learning can handle large and complex information, from sensors, mobile devices and computer networks, to discover hidden patterns or trends in the data. It can then learn these patterns and apply it to new, real-time data to detect similar patterns in the future. For example, through modelling the performance of a piece of equipment, such as a pipe, in relation to the temperature of its surroundings, machine learning can be taught to see what normal and abnormal behaviour looks like, and by applying the model to current data, can identify events, such as when the pressure within the pipe increases while the temperature remains the same. The system can then predict, from existing knowledge, that something isn't right and prescribe actions. The more data that is analysed, the more accurate the predictive model.

Machine learning techniques — two paths to choose

Part of the implementation process is understanding how machine learning works and the number of techniques involved. Your software service provider or machine learning expert will recommend which techniques to use and when. The most common techniques are:

- **Supervised machine learning:** The program is trained on a predefined set of test data comprising historical or similar data to the real thing, which then facilitates its ability to reach an accurate conclusion when given new data.
- **Unsupervised machine learning:** The program is given a mix of data and must find patterns and relationships therein with no training whatsoever, without any specific target or outcome.

So, it comes down to knowing what you want your data to tell you and understanding the data you have available.

Machine learning strategy — questions to consider

When implementing machine learning within an operation, certain considerations must be taken regarding the data, the insights that are sought and how they can be applied within the business. Five questions to ask are:

- **Question the data** — What isn't being seeing that it is hoped the data can provide?
- **Clean the data** — Is the data validated and can it be labelled easily?
- **Choose a platform** — Has interoperability been considered?
- **Hire a data scientist** — Does the company have a machine learning engineer, and can they collaborate with a subject matter expert?
- **Share the learning** — Plan ahead to leverage the technology across the enterprise.

We need machine learning to stay competitive

Unlike business intelligence and predictive analytics methods that require a significant amount of manual labour and time, machine learning automatically produces insights at a consistent and accurate rate. It can then apply the learning to new, real-time data for future predictions and more reliable decision-making.

In the oil and gas industry, the ability to recognise equipment failure, and avoid unplanned downtime, repair costs and potential environmental damage, is critical to success across all areas of the business, from well reservoir identification and drilling strategy, to production and processing. This is even more relevant in today's turbulent times. With machine learning, there are numerous opportunities to improve the situation. Some forms of predictive analysis machine learning can deliver to the oil and gas industry include:

Predictive maintenance

One of the most applicable areas where machine learning can be applied within the industrial sector is predictive maintenance. Predictive maintenance is the failure inspection strategy that uses data and models to predict when an asset or piece of equipment will fail so that maintenance can be planned well ahead of time to minimise disruption.

Predictive maintenance can cover a large area of topics, from failure prediction, failure diagnosis, to recommending mitigation or maintenance actions after failure. The best maintenance is advanced forms of proactive condition-based maintenance. With the combination of machine learning and maintenance applications leveraging IIoT data to deliver more accurate estimates of equipment failure, the range of positive outcomes and reductions in costs, downtime and risk are worth the investment.

Reservoir modelling

There is some question as to how reliable estimations are, when calculating how a reservoir reacts to fracture treatments. Machine learning makes the process more reliable with decisions made more quickly by providing the reservoir with data that recognises patterns for history matching. The models used will then be robust enough to help improve the accuracy of the predictions of reservoir properties.

Video interpretation

As well as the many sensors that are part of the continuous monitoring process of a platform or plant, video technology used in the down-hole drilling environment can benefit from machine learning.

Machine learning can be applied to interpret video data through anomaly detection to provide accurate assessment wherever video technology is applied for sensing tasks, therefore improving safety, costs and efficiency.

Case-based reasoning

Frequent operational and reliability problems are still common within the oil and gas process, with well blow-outs, leakages and production issues being some of the serial offenders. The reason they are common is the number of complex parameters that can cause many outcomes.

With case-based reasoning, a current problem or case is compared to historical cases to find similarities that could provide clues to help identify the actions or behaviours to take that could help overcome the current situation. This could include analysing data such as weather conditions, depth, equipment used, costs and more. Case-based reasoning is not a new approach in the oil and gas sector, but the process can be significantly sped up using machine learning.

Other examples

Other examples where machine learning can be used within the oil and gas industry, particularly within down-hole drilling, is optimising the rate of penetration, path and angle correction, to determine the best drilling pattern for the terrain and conditions that will minimise equipment failure.

Accurately forecasting natural gas and oil markets to predict the supply and demand price would also give operators the competitive edge they need to maximise the supply demand price. It would provide them with the information they need to meet customer demand by anticipating future demand or consumption.

Visualisation bridging the gap between real assets and virtual assets

As already seen, machine learning capabilities will help organisations to realise insights from the large amounts of data provided by sensors and the IIoT. Bringing it all together is visualisation through engineering models for structures such as offshore platforms and onshore processing plants.

An engineering model is the computerised 3D version of the physical asset, which maps everything associated to the physical asset using sensors to represent near-real-time status, such as condition, performance and location. Where 3D models do not exist, users can create them with 3D reality modelling software, even utilising drones to capture high-resolution photographs, from which engineers can create digital engineering models for offshore structures, refineries, etc.

Photographs are transformed into detailed, comprehensive 3D models of all infrastructure data — in a less labour-intensive, cheaper and more efficient manner when compared to traditional methods.

IT/OT convergence has become an accepted practice, with operators gaining new insight from known information. But misalignment in corporate strategy still results in silo building across many areas, especially within engineering technologies (ET), where engineering models often remain stranded, inhibiting the ability to leverage this information to optimise operations. They should be included within the existing IT/OT conversation, driven by the IIoT as well as machine learning.

Designing and testing new products, systems and even plants in a virtual environment makes a compelling case, particularly from a cost perspective. Virtual models can tie these domains together over the whole life cycle of an asset using its embedded digital DNA. From an asset management perspective, it's about predicting a problem before it occurs and enabling maintenance to be performed at optimum rates and costs. This will be accelerated with the application of machine learning to make the decision-making process smarter, faster and, more importantly, in context.

> UNLIKE BUSINESS INTELLIGENCE AND PREDICTIVE ANALYTICS METHODS THAT REQUIRE A SIGNIFICANT AMOUNT OF MANUAL LABOUR AND TIME, MACHINE LEARNING AUTOMATICALLY PRODUCES INSIGHTS AT A CONSISTENT AND ACCURATE RATE.

Continually modelling an oil field or installation means that personnel can survey the asset throughout its life cycle, from initial design to current condition, applying the difference in data to maintain up-to-date information on the equipment's condition along the way. These models become the context within which oil and gas operators can design, build and operate their infrastructure projects. Reality modelling can link engineers in the field directly to the office, sharing information and data collaboratively. With the use of IIoT data provided by the images in the building of 3D models, machine learning algorithms provide even greater context, a predictive capability and deliver more informed business insight to the user, resulting in faster and more reliable decision-making.

Digitalisation and machine learning

While machine learning gives the impression that human involvement is minimal, this is not the case. It gives the user more intelligence, context, and insight to make the decision-making process easier and improve productivity.

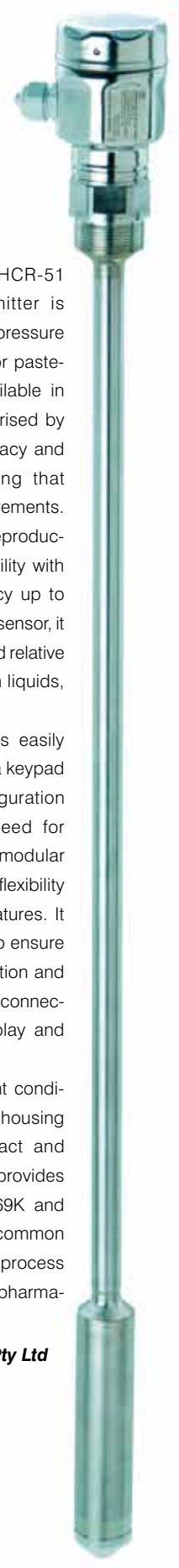
For those adding machine learning to their asset management journey, the next logical step is to go model-centric, by adding visualisation dashboards, cloud-based IIoT data, analytics and reality models to machine learning. A machine learning strategy will give companies unprecedented insight into their operations and lead to significant benefits in efficiency, safety and optimisation, as well as the speed in which decisions can be made.

Conclusion

With the arrival of the IIoT, data is growing and becoming more accessible. With the ability to acquire more data, more advanced technologies are required to scrutinise and filter out the important information and the value held within. But, it can only be exploited by identifying what works well and what does not. Machine learning features complex algorithms to sort through large amounts of data, identifying patterns and trends within it, to make predictions.

The use of machine learning in oil and gas doesn't have to stop at just exploration and production, but can be applied across the whole operation, where algorithms are used to continually improve the overall performance across the whole facility and the equipment within it. By combining these machine learning practices with the IIoT and visual operations, they will bring, as it matures, significant benefits. The IIoT, engineering models and machine learning should no longer be considered just buzzwords. Instead, when combined, they can be an organisation's number one priority for achieving operational excellence.

Bentley Systems Pty Ltd
www.bentley.com/en-AU



PRESSURE TRANSMITTER

The Pepperl+Fuchs LHCR-51 series pressure transmitter is suitable for hydrostatic pressure measurement in liquids or paste-like media and it is available in a rod type. It is characterised by high measurement accuracy and a stainless steel housing that satisfies all hygiene requirements. The LHCR-51 has high reproducibility and long-term stability with a high reference accuracy up to ±0.075%. With a ceramic sensor, it measures the absolute and relative pressure (up to 10 bar) in liquids, and in paste-like media.

The LHCR-51 series is easily configured by the use of a keypad or with PACTware configuration software, without the need for an operating tool. The modular design permits maximum flexibility and offers a range of features. It is designed as modular to ensure optimum process adaptation and offers a variety of process connections, a replaceable display and universal electronics.

For aggressive ambient conditions, a robust aluminium housing is available. The compact and light pressure transmitter provides ingress protection to IP69K and can be supplied with all common and small, flush-mounted process connections for food and pharmaceutical applications.

Pepperl+Fuchs (Aust) Pty Ltd
www.pepperl-fuchs.com

POWER SUPPLIES

Phoenix Contact's Quint Power power supplies now offer high system availability in the power range up to 100 W. Preventive function monitoring and high power reserves are now also available for applications in the low-power range.

The dynamic boost can be used to supply up to 200% of the nominal current for 5 s to start up heavy loads. For 1.3 and 2.5 A devices, a static boost that continuously provides up to 125% of the nominal current is also available to easily extend the system. The preventive function monitoring provides early warning for system-specific, critical operating states before faults occur. Selectable power thresholds or DC OK signalling enable output parameter monitoring that is adapted to the application.

All Quint Power power supplies under 100 W have a high efficiency of up to 93.7% and a long service life, with low power dissipation and low heating. The slim and flat design with a depth of 90 mm makes these devices space-saving, enabling them to fit in smaller control boxes. These small Quint Power power supplies are available in three performance classes (24 VDC output voltage with 1.3, 2.5 and 3.8 A) with either push-in or screw connection. In addition to a wide AC input range of 85–264 VAC, their wide DC input voltage range of 88–350 VDC and wide temperature range of -40 to +70°C ensure a high degree of implementation flexibility.

Phoenix Contact Pty Ltd
www.phoenixcontact.com.au

AWS-BASED ANOMALY DETECTION

Progress Software has announced the availability of the Progress DataRPM self-service anomaly detection and prediction option for the Industrial Internet of Things (IIoT) market. It is designed to empower R&D and innovation groups with better decision-making capabilities for IIoT proof-of-concept (POC) and pilot execution.

Hosted on Amazon Web Services (AWS), AWS will also offer free trials of Progress DataRPM cloud instances for qualified manufacturers with connected sensors and the ensuing time series data. The trial will allow companies to load their data securely on AWS, detect equipment anomalies, predict failures before they occur and validate against failures — both known and unknown — thereby confirming proactive steps that should be taken in advance to avoid unplanned downtime and unscheduled maintenance.

Through the Progress DataRPM anomaly detection and prediction option, industrial decision-makers, data scientists, heads of innovation, R&D and machine learning and big data decision-makers now have access to self-service through the end-to-end automation of the steps from data ingestion and analysis to insights visualisation. Users can easily upload sensor data, map the attributes and click 'run'. The entire cognitive flow works in a fully automated fashion to show near-immediate results. Results are shown in 'stories', in a human-readable format that highlights patterns and anti-patterns in the sensor data. Using drill-down and filters, users can gain a better understanding of the behaviour of assets and most important sensors for predicting the most likely failures states.

Progress Software Pty Ltd
www.progress.com/au

THE HIGHFLIER IN
OBJECT DETECTION.

THIS IS SICK

Sensor Intelligence.

In challenging situations, flexibility is what counts. The new W16 and W26 photoelectric sensors from SICK now offer everything you need to make your job easier and your machine more reliable – each and every time. The “Blue Pilot” user feedback display combined with a buffet style feature portfolio makes short work of all kinds of applications. What’s more, new groundbreaking optical performance makes detection of shiny, uneven, perforated, and transparent objects more reliable than ever before. Maximum performance while keeping you in the pilot seat. For anything that comes your way. We think that’s intelligent. For more information please visit www.sick.com/highflier or call 1800 334 802 (Tollfree).

Pinnacle Midstream futureproofs Texas oil and gas operations

Pinnacle Midstream was formed by a group of seasoned oil and gas executives who have a vision for changing the profitability dynamics of the midstream oil and gas market and believe technology will play a significant role. Pinnacle focuses on installing and operating value-added solutions that free midstream production facilities to focus on continued development of field oil and gas assets while benefiting from the economies gained by extending oil and gas gathering systems to neighbouring producers. Pinnacle tailors each customer solution for compression, treatment, processing or dehydration of a producer's oil and gas to derive the highest market value.

When Pinnacle set out to add new delivery points in West Texas, the company turned to Meers Engineering, a Texas-based systems integration firm that was already implementing Inductive Automation's Ignition SCADA interface and management software for it. Together, Pinnacle and Meers concluded that a long-term strategic plan for control automation — one based on the most modern industry standards and protocols — would establish the foundation they needed to accommodate anticipated growth. Pinnacle's philosophy of leveraging cutting-edge technology led Meers to conclude that the Bedrock system was the right answer for its automation controls. Bedrock's open, secure automation platform not only offered the best combination of efficiency, flexibility and reliability for Pinnacle's current pipeline control and safety needs, it could easily scale to meet future needs, including a potential future transition to a DCS application.

Meers felt that Bedrock's list of advanced features would help Pinnacle futureproof its approach from the beginning, and there was also a need to overcome the challenges posed by remote and rugged locations, as well as the demand for high performance and secure reliability.

"Bedrock's construction makes it ideal for very, very rugged conditions," said David Ibach, a Meers Automation principal. "The completely enclosed metal cases provide critical protection in these very sandy, dusty areas. Then there are the extreme temperatures — which can really pose a problem with control systems. Lightning is a real problem out here as well, so Bedrock's EMP resistance is a big deal. Pinnacle actually had some equipment go out due to lightning in the past, which poses a significant safety concern."

Bedrock's ability to lock down system cyber-vulnerability — given that concerns around potential attacks on critical infrastructure assets continue to escalate — was also a welcome aspect of Bedrock's value proposition, according to Ibach.

The platform's overall efficiency helped complete the picture for Pinnacle. "Features like the universal, software-configurable I/O represent big savings because Pinnacle will need to buy fewer I/O modules for the same applications," Ibach said. "Being able to put any I/O point anywhere is really nice — and enabling them to do that on the fly with software changes the game entirely."

The solution manages midstream crude that's being held in storage tanks and subsequently transferred into trucks and pipelines. That means controlling the flow of the oil into the tank, out from the tank and into trucks and pipes as well.

Pinnacle and Meers both felt Bedrock offered superior flexibility compared to other potential solutions. "We are able to store data in the processor," Ibach added. "That allows us to log data, events and sequence of events right in the controller. It also minimises bandwidth requirements that would otherwise be needed to push that data to other applications."

Pinnacle's implementation in its current configuration populates the Bedrock pinless backplane with 10 I/O modules, including 10-channel universal I/O modules and a 5-channel Ethernet module. The universal I/O modules connect to the field computers, which control flow at each storage tank. The Ethernet I/O connects with IIoT edge devices and applications to mine data for subsequent planning and operational improvement.

The solution was commissioned in January 2017 and is fully operational. Ibach feels it was very easy to implement with a short learning curve, which from a start-up perspective is a huge time saver. He cites ease of use, the IDE's intuitive interface and power, and the ability to software configure the system as competitive differentiators.

"We are expanding to the meet the growing need for midstream services and need a secure way to centralise flow control amongst our facilities, said Mike Hillerman, VP of Engineering and Operations for Pinnacle "The Bedrock system provides an economical solution in a small, easy-to-implement system that can coordinate edge control today, while also scaling easily and economically to the full DCS functionality we expect to need in the future."

A slightly longer version of this article can be read online at: https://bit.ly/2MioGkw

ESM Australia
www.esm.com.au

COMPRESSORS

Kaeser Compressors has announced its latest generation SM series rotary screw compressors. For maximum efficiency, the SM 13 and SM 16 compressor models are now equipped with a Super Premium Efficiency IE4 motor. Current Australian regulation introduced in January 2015 only require the use of IE3 Class motors.

For greater intake volume and efficiency, the latest generation of SM series rotary screw compressors are also equipped with the SIGMA 06 screw compressor block, featuring further-refined Sigma Profile rotors. Together with the IE4 motor, Kaeser has been able to reduce the energy requirement of these compressors by up to 13%.

All SM series compressors incorporate a Sigma Control 2. With this internal controller, compressor performance can be precisely adjusted to match respective compressed air consumption for optimum efficiency. The control unit features an easy-to-read display, allowing all information to be viewed at a glance.

All maintenance work can be carried out from one side of the unit. The housing cover is easily removed to allow component accessibility. There is no need to remove the housing cover to inspect fluid levels or drive belt tension, as these can be checked via a convenient inspection window. Sound levels as low as 62 dB(A) ensure quiet performance, making the units a suitable choice for point-of-use applications.

The rotary screw compressors are available with drive powers of 5.5–9 kW and produce flow rates from 0.59–1.62 m^3/min, at pressures of 7.5–15 bar.

Kaeser Compressors Australia
www.kaeser.com.au

IICA CELEBRATES 75 YEARS

This year the Institute of Instrumentation and Control Australia (IICA) is celebrating its 75th anniversary. First established in 1943 as the Australian Society of Instrument Technology (ASIT), the organisation is focused on the promotion and development of the interests of individuals and organisations involved with the use and production of industrial instrumentation and control technologies in Australia.

In the early 1940s, Paul Crivelli, at that time General Manager of ABACUS Instrument Co., arranged a regular monthly luncheon with a number of people in Melbourne that were involved in instrumentation. Eventually, on 24 August 1943, the Australian Society of Instrument Technology (ASIT) was formed, and is believed to be the first national technical society in the world to be formed specifically to deal with instrumentation only.

The meeting elected as President, Dr P L Henderson, Chief Chemist, Monsanto (Australia) Pty Ltd, and as Vice President, Dr N B Lewis, Chief Chemist, Kodak (Australasia) Pty Ltd. Mr P A Crivelli was elected as Honorary Secretary.

In 1944, several members travelled to Sydney and formed the Australian Institute of Instrument Technology (AIIT). The two organisations subsequently agreed to produce the *Australian Journal of Instrument Technology*, management of the journal being arranged by ASIT. Over time, a South Australian division was also formed, and in November 1957 it was decided that the separate organisations were amalgamated to create the Society of Instrument Technology Australia (SITA). The two founding bodies ceased to exist on 1 January 1959 and Mr R B Pearson of ICIANZ became the first President of the new amalgamated SITA.

On 10 November 1966, the name of the amalgamated body was officially changed to the Institute of Instrumentation and Control Australia (IICA).

The IICA is an open arena for members to build their network and knowledge, to enhance their professional career and make some lifelong friendships. Among its many purposes is the promotion and encouragement of technical education in the science of instrument technology and to establish events and exhibitions aimed at the advancement of the knowledge of instrument technology and the latest advancements in the field.

As such, it holds regular technology expos in each state, TÜV training courses, technical evenings, site visits and social events by which members can stay up to date and network.

Standardisation efforts

The IICA also aims to promote, support and encourage the standardisation of scientific and industrial instruments and accessories, and as such, the IICA is playing an active part in the development of Australian Standards.

Those efforts include promoting the standardisation of measuring instruments and determination of standard technology, and promoting improvements in Australian Standards affecting the practice of instrumentation and control. It is currently involved in more than 10 Standards Australia working committees.

Supporting ongoing education

Continuous education today is a must-have part of any career and the IICA assists professionals involved in instrumentation and control in three areas:

- **Assisting in professional development:** Fostering high standards for the design and manufacture of instrumentation and control techniques.
- **Providing a knowledge base:** Encouraging education in the theory and practice of instrumentation and control, and allied studies.
- **Keeping up with future trends:** Furthering the science and practice of measurement, instrumentation and control.

Functional safety

The IICA also provides functional safety training though its Functional Safety Engineer SIS training course, which has been developed for automation and control professionals and risk engineers in the process industries. IICA is an accepted course provider in the TÜV Rheinland FS Program, and TÜV Rheinland will award qualified participants who pass the exam at the end of the course an FS Engineer (TÜV Rheinland) certificate.

ISA training

The IICA also offers a range of 1-day ISA (International Society of Automation) Professional Development Courses. These internationally recognised courses, updated to Australian Standards, are offered by accredited instructors with industry experience, non-biased and vendor-neutral.

Seminars

The IICA also runs seminars Australia-wide in capital cities and regional areas, providing technical presentations and workshops in a friendly, relaxed environment, interspersed by networking opportunities with other members and registered non-members.

The seminars are open to all, including managers, engineers, apprentices and students. The technical presentation, presented by an industry expert, is followed by an optional workshop in the afternoon.

During its 75th year, IICA will continue holding its regular technology expos in each state, TÜV training courses, technical evenings, site visits and social events, culminating with a gala black tie event in October.

Longevity is often associated with success and there is no better time to be an IICA member than now.

IICA (Institute of Instrumentation Control & Automation)
www.iica.org.au

INTERVIEW WITH IICA PRESIDENT ERNST KRAUSS

Process Technology magazine recently conducted an interview with Ernst Krauss, President of the Institute of Instrumentation, Control and Automation (IICA) on the occasion of its 75th birthday, to see what the future holds for the organisation.

In its 75th year, how is the IICA responding to the rapid technological change in the automation industry at present?

We traditionally have been more focused on instrumentation, but over the last few years we have put the focus more on the automation and control. For some reason this has still to filter through to our members and those interested in the IICA, so we have been focusing on all the new technology such as the Internet of Things, digital training and the opportunities that arise from the Industry 4.0 initiative.

Most of the changes we see are in the process control arena, apart from the more (for many) esoteric developments we are seeing with the internet technologies. We are trying to focus more interest on the manufacturing area, with the Industry 4.0 initiatives, and trying to catch up and keep people's interest.

Also, we are preparing for the next generation — who will take our place, what should the IICA look like in the future and how we create a portal for students and others working in automation and control to get in touch with industry.

So what can we expect to see from the IICA in those areas in the near future?

Our technical presentations and exhibitions will focus more on those technologies that support automation and control. We fortunately already have a healthy range of subscribers to our technical expos, and we have increasing numbers of exhibitors and patronage, so the people interested in those technologies get more of an opportunity to see what is happening out there. We are also starting to get in closer contact with universities, and offering students more opportunities to get access to industry. This latest effort has already started in WA and Queensland and slowly we are expanding around the country.

There has been the impression over the years that the IICA members were mostly vendor organisations. Is that changing?

Membership started as being for instrument engineers initially, and gradually changed more to vendors and suppliers. Now slowly individuals are coming back and wanting to see more and get more information. We are therefore working on a new membership model. For example, in order to improve those relationships we are working on a model for IICA student ambassadors, where we let a few students from universities dive deep into what we do and bring that message back to their peers. Through industry connections we hope to offer them the right portal to get in touch with industry and to increase their understanding of what industry requires. By that I mean that we work with our corporate members that are interested in offering students work experience, or want students to come in and work on ideas etc. In this way we are creating connections between the universities and industry.

How are you dealing with the generational change issue?

We are not alone as a professional organisation in seeing a change in membership structure, and we are still struggling a bit to adjust the way we create membership or deliver value to members, so there are a few strategic ideas we are working on that hopefully, over the next year or two, help to increase the profile of the IICA — changing the way we deal with industry, and the people that are traditionally our members. That includes, of course, the owners of instrumentation and control systems and the people working within them.

Does that mean we can expect to see new types of events and training in the future?

Presently our functional safety and certified Functional Safety Engineer courses are fairly popular, and we want to expand them to technician training as well. We also want to offer courses that go beyond FS — in this we are a little bit dependent on our suppliers to help us to bring new technologies into the automation and control training, and see how we might provide additional courses for those already in industry.

You also have a partnership with the ISA?

Yes, and we also have a partnership with the ITEE College of Engineers Australia (Information Technology and Electronics Engineering), with which we have established a mutual support agreement. They are more focused on computer networks, all types of communications, broadband, Ethernet, WANs and LANs etc, so we are really broadening our reach and interest.

Is this part of trying to get more involved in the area of IT/OT integration?

Well, that as well, but we have so many common interests with the IT area that it would seem silly to be separate. We see benefits from, and for, both sides, and I think it will be very successful in the future.

There are many, many issues that we are only just starting to realise exist. In Europe there is a far stronger emphasis on these things, and you can see new issues arising from the new European privacy laws for example: issues of who owns data — if I analyse something for you in the cloud, do I own the data or do you own the data? These are prevailing questions on top of all the technical issues.

Do you have any general opinions about the future of the industry, and the IICA's role?

In the IICA we are really getting a future focus. We need to look towards the future, and not live in the past. We are developing a future-looking outlook, and all the branch chairpersons are onboard with that. The committees are thinking about how to improve the future for us. The general idea of automation and control will be stronger and stronger in the future and will penetrate right into our homes. We are already seeing this in small ways, but it will increase in the future. Wider automation and reduction in physical effort to do things will require more people who understand how automation works. We can't continue to be a throwaway society — we have finite resources — and this is all playing into our minds in relation to how we will plan for the future.

IICA (Institute of Instrumentation Control & Automation)
www.iica.org.au

IICA 75 YEARS

IICA is proudly supported by our Corporate Industry Partners

Networking **Education** **Benchmarking**

www.iica.org.au

AIRFLOW AND PRESSURE VALVES

SMC AS-R and AS-Q flow and pressure valves are designed to reduce energy consumption in air systems by cutting internal air consumption by up to 25% when using the AS-R pressure valve and an AS-Q flow valve on their cylinders.

The valves help to shorten the response time of the return stroke and harmonises stroke movements to prevent a harsh jerky start.

SMC's range of pressure and flow valves includes six AS-R and five AS-Q models. SMC supplies these in R1/8, R1/4, R3/8 and R1/2 connection sizes and for hose diameters ranging from 6 to 12 mm.

Users are able to choose between the latest AS-R series with its fixed 2 bar supply pressure and the older AS-R valves with fixed or variable set pressures, depending on the application.

The pressure valve and flow valves are mounted together on cylinders. The AS-Q flow valve is installed on the working stroke side and the AS-R pressure valve on the return stroke side. Both valve series have similar designs: the pressure valves consist of regulator, with a check valve and a throttle check valve. The flow valves in the AS-Q series contain a quick supply valve, an exhaust valve and a throttle check valve.

The valves are recommended for cylinders with a diameter of 32 up to 125 mm bore and an inlet pressure of at least 3 bar. Efficiency increases with larger cylinders or higher air consumption levels, and larger pressure differences between the working and return strokes.

SMC Australia | New Zealand
www.smcworld.com

ULTRASONIC THICKNESS GAUGE

The Olympus 38DL Plus Ultrasonic Thickness Gauge performs non-destructive measurements. Depending on the material and transducer selection, the gauge has a thickness range from 0.08 to 635 mm. It is supplied with transducers to measure the thickness of steel, cast iron, corroded steel, rubber, fibreglass and composites. It is available to rent from TechRentals.

The 38DL Plus comes with dual- and single-element transducers including D7906-SM, M1036 and M2008 M109-RM (including delay line M202-RM) and is capable of THRU-COAT and echo-to-echo measurements on painted and coated surfaces. This handheld device is commonly used to measure the remaining thickness of pipes, tubes, tanks, pressure vessels, hulls and other structures affected by corrosion or erosion.

The colour transflective VGA display provides high readability in both bright and poorly lit environments. It features a sealed, ergonomic and colour-coded keypad with tactile and audible feedback. This instrument is enclosed in an impact- and water-resistant, gasketed case with sealed connectors, designed for IP67.

TechRentals

www.techrentals.com.au

LOW-VOLTAGE POWER SUPPLIES

The Dimension CP series of low-voltage power supplies from PULS range in power from 5 to 20 A. The electronics in the CP range have a unity power factor that emits minimal heat loss and has low inrush current. Features include an operating temperature range of -25 to +70°C, remote shutdown capabilities and variants that include conformal coatings, medical approvals and wide AC/DC input voltages to cater for the transport industry.

The range is able to provide five times the current limit in short bursts for solenoids and to ensure high inrush current devices can deliver. Smart, self-protecting Safe Hiccup Overload Recovery and Easy Fuse Breaking features protect adjacent circuits from voltage dips during overcurrent load faults and shorts.

Control Logic Pty Ltd

www.control-logic.com.au

INDUSTRIAL LoRa NODE AND GATEWAY

Advantech in partnership with Semtech has expanded its line of wireless products with the launch of the Wzzard LRPv Node and SmartSwarm 243 LoRa Gateway.

LoRa is a proprietary chirp spread spectrum radio modulation technology for low-power WAN (LPWAN, also referred to as a low-power network) applications. An LPWAN is a type of wireless telecommunication WAN that is designed for long-range, low-bit-rate communication for the IoT.

Advantech's Wzzard LRPv Node can connect up to four sensors simultaneously. It is suitable for production lines that have many sensors or for applications where there is limited space for additional devices. The software is specifically designed to be customisable so as to accommodate more sophisticated monitoring plans. The Wzzard LRPv Node offers high flexibility in both hardware and software aspects, therefore it frees users from having to deploy an infrastructure-heavy wireless network, meaning that resources can be allocated to other more critical investments.

Two modes are supported: sleep mode (for when the node is idle) and operation mode (for data transmission). An embedded alarm system notifies users when a threshold has been exceeded so that action can be taken.

With an IP66 rating, both devices are protected against ingress from dust and powerful water jets. Furthermore, their dual-power design (BC/battery for the Wzzard LRPv Node and solar/battery for the SmartSwarm 243 Gateway) provides multiple deployment options.

Advantech Australia Pty Ltd
www.advantech.net.au

C-PROGRAMMABLE DEVICE SERVER

Artila Electronics has launched the Aport-214PG FreeRTOS programmable device server. The device is powered by a 32-bit Atmel SAM4E16E 120 MHz Arm Cortex-M4 processor, 256 KB SRAM, 3 MB Flash and the FreeRTOS real-time operating system. It features a 10/100 MHz Ethernet port, two RS-485 ports, four isolated digital input channels, two relay output channels and a microSD socket.

The C-programmable device is shipped with a FreeRTOS+lwIP board support package (BSP), device manager utility and example programs. Users can download the toolchain, Atmel Studio, from the Atmel website. Web configuration and I/O controls are available in the Aport-214PG application development kit. The device manager utility featuring device discovery, network configuration, the user's web page and firmware upload is also included, which makes programming easy.

The role of a programmable device server is to proactively poll the serial devices and then buffer the data for an Ethernet-based master's inquiry or push the data to the server via MQTT.

Micromax Pty Ltd
www.micromax.com.au

PILZ SECURITYBRIDGE OFFERS INDUSTRIAL PEACE OF MIND

When you think of hackers it conjures up visions of dark figures stealing money from your bank account or MasterCard, but that's a very limited vision. Hackers can very easily occur in industrial settings and cause far more disruption as well as compromise the safety of innocent workers.

Keeping staff, plant and machinery safe is not an option, it's a must, but the security must offer flexibility of use and a holistic approach to safety and security.

Nowadays networking plant and machinery using Ethernet-based standards in IT is increasing, therefore so is the need for securing these systems against potential external or even internal manipulation; that is where Pilz SecurityBridge does its job.

SecurityBridge is certified by TÜV in accordance with IEC 62443-4-1 and IEC 62443-3-3 so you can be comfortable in knowing that it's a well-designed product.

Using Pilz SecurityBridge protects control systems such as PNOZmulti and automation system PSS 4000 from manipulation through unauthorised access. In simple terms, it stops hackers from invading your industrial systems and manipulating settings that could harm your machinery, or more importantly, could compromise the safety of your staff.

Pilz SecurityBridge protects connections between the programming and configuration tools and the hardware controllers from unauthorised manipulation — it acts as a firewall. However, unlike many firewalls it does not need complex configuration as Pilz has designed an application-specific default setting that is easy to commission using a plug-and-play system.

SecurityBridge is placed upstream of the PNOZmulti or PSS 4000 controller and acts like a VPN (Virtual Private Network) server where one or more clients can be configured into the system. As such, the connection is protected and only suitably authorised users can make changes. Unauthorised access is prevented and the result is that hackers can't tap into it and change settings or your programs.

The VPN server establishes a VPN tunnel for safe data transfer.

SecurityBridge also controls the data traffic. It monitors the integrity and safety of the system by implementing these parameters:

- TÜV-certified and developed in accordance with IEC 62443-4-1 and IEC 62443-3-3
- Protection against manipulation of data through authentication and authorisation management
- Increases plant availability because only required data (authorised configuration and process data) is transferred
- Forwarding of low-latency process data
- Reveals unauthorised changes to the project by monitoring the check sum (CRC)
- Prevents unauthorised access because downstream devices are in a protected network
- Only suitably authorised users can make changes to a project's configuration.

SecurityBridge is designed to detect threats to configurable small control systems and automation systems to protect them from espionage and manipulation. Using SecurityBridge guarantees the safety of employees and the availability of your machines.

To enable easy access, the system employs a web-based user interface which is simple to configure, with easy-to-run diagnostics and maintenance. Connection with the central authentication system is completed using RADIUS.

Continuous updates are available independent of the control system so you can get them without interfering with the running of the program or of the plant and machinery. LED displays show error messages and display diagnostics. An integrated USB interface is employed for protecting and re-establishing the configuration by means of a USB memory stick.

The unit also includes configurable digital inputs and outputs, so you can incorporate a key switch for activating the VPN tunnel, and signal to higher level control system if the CRC has been changed (eg, by someone connecting locally to the controller).

In the future Pilz will release further products connected to security within the industrial space taking into account threat scenarios, strengths and weaknesses of protocols or encryption methods to deliver security, machinery and human safety.

These technical innovation measures will only work with the right training and so must be done hand in hand with the comprehensive training that Pilz offers.

Pilz Australia Industrial Automation LP
www.pilz.com.au

NEW PRODUCTS

PID CONTROLLERS

Red Lion Controls has announced additional features for its PXU series of proportional–integral–derivative (PID) controllers, including ramp/soak, CT input, second analog input and second analog output. The series is designed to enable tight control over a wide range of processes, including temperature, flow and pressure, from a single model.

Production engineers and machine builders now have the opportunity to select from a wide range of controllers with varying capabilities and in three sizes (1/16, 1/8 and 1/4 DIN models). Integration with Red Lion's Crimson-enabled hardware provides a complete indication, data acquisition and control solution for many applications.

The additional features allow customers to use one source for their process control needs. For example, for processes requiring different temperatures, the ramp/soak capability allows timeline versus temperature programming for the process that will automatically be run by the PXU. With the CT input, high-current signals can be transferred to lower ones in order to be safely accepted by a PID controller or panel meter. For remote changing of a PID controller's setpoint value, the second analog input allows modification from an external device.

Control Logic Pty Ltd

www.control-logic.com.au

SIGNAL SPLITTER/DUPLICATOR

Acromag has released the uBSP signal splitter/duplicator. The uBSP acts as a carrier for the microBlox line of plug-in signal conditioning modules to drive two scalable 4–20 mA or 0–10 V control outputs and an auxiliary 5 V third output from a single input. Users can select from more than 10 miniature signal conditioning modules to process inputs from RTDs, thermocouples or two-wire transmitters as well as a variety of current or voltage sources. The interchangeable input modules snap into the uBSP carrier which provides input and output terminal blocks plus a USB port for easy software configuration from a Windows PC or Android mobile device.

With the plug-in microBlox modules, users can change the input type quickly and inexpensively as requirements change. 1500 V isolation safely separates the input from each output circuit to prevent damage to other instruments from surges. Two-wire transmitter input modules provide field excitation for the transmitter. RTD input modules support 2-, 3- or 4-wire sensors with excitation, linearisation, lead-wire compensation and break detection functions. Thermocouple input modules support types J, K, R, S, T and E with linear or non-linear output.

Units are highly immune to electrical noise and operate from -40 to 75°C. Power sources from 6–32 VDC are supported to simplify battery and solar-powered applications. Units mount securely on a DIN rail with 25g shock and 4g vibration resistance. Hazardous location approvals are pending for UL/cUL Class 1 Div 2 and ATEX/IECex Zone 2 standards.

Metromatics Pty Ltd

www.metromatics.com.au

THz IMAGING CAMERA

The Tera-4096 terahertz imaging camera from Terasense has a large 4096 pixels (64 x 64 array) imaging sensor. The camera comes with a pixel size of 1.5 x 1.5 mm, responsivity of 50 kV/W, noise equivalent power 1 nW/√Hz, a certified frequency range 50–700 GHz and is 5 V USB-powered making it a suitable terahertz imaging camera where high-speed image acquisition rates of up to 5000 fps are required.

There is an increasing interest in THz imaging technology in the industrial areas of manufacturing process control, product and material inspection, food inspection, hidden defects inspection, petrol and oil quality control, as well as OEM applications.

It can also be used for detecting the contents of packages or sealed documents, the detection of concealed weapons and explosives, evaluation of biological threats and airline passenger screening, as well as environmental sensing, pollution detection, plasma diagnostics, and chemistry and biochemistry applications.

The detectors are fabricated with a GaAs high-mobility heterostructure in the standard semiconductor cycle using conventional optical lithography. The detection mechanism is based on excitation of plasma oscillations in a two-dimensional electron system with subsequent rectification. The rectification takes place on special defects made in the electron system.

The camera is an active detecting device and requires an external THz source. Terasense offers sub-terahertz wave sources based on IMPATT technology using 100 GHz compact IMPATT-diode generators with an output power up to 100 mW as an illumination source.

SciTech Pty Ltd

www.scitech.com.au

NEW PRODUCTS

OPC SERVER FOR ALLEN BRADLEY PLCs

The Allen Bradley OPC Server from MatrikonOPC enables OPC access to PLC5, SLC500, Micrologix and ControlLogix, the most popular Allen Bradley PLCs. It is designed for those who are integrating their Allen Bradley PLCs with historians, HMIs and other OPC-enabled applications or devices without the need for any third-party applications.

This Allen Bradley OPC Server securely communicates over Ethernet, Serial, and 'Blue Hose' to many Allen Bradley protocols such as DF1, DH+ (also known as Data Highway Plus), DH485 and Ethernet/IP (Allen Bradley CIP).

Unlike other Allen Bradley to OPC interfaces, the MatrikonOPC Server for Allen Bradley can grant and deny access to tags based on user login, enabling secure access to control and automation systems, as well as opening up new connectivity possibilities with other parties' equipment.

The OPC Server for Allen Bradley PLCs includes time-saving features such as automatic detection of PLC configuration changes; optimised performance and memory utilisation; loading of device configuration files .l5k, .pc5 and .slc; bit writes through OPC tags; and automatic discovery of devices. It also supports device-level redundancy through fail-over channels.

Matrikon Asia-Pacific
www.matrikon.com

LASER BARCODE SCANNERS

SICK's CLV6 series laser barcode scanners are suitable for use in food production processes where hygiene is crucial, including wet areas. Their tough, stainless steel housings have an IP69K rating and can withstand harsh conditions.

The stainless steel housings are resistant to chemicals and corrosion, as well as being fully leakproof. The design includes a low level of surface roughness; smooth, rounded edges; and special housing and fastener shapes, meaning no residues can form on the outside of the scanners.

An additional double sheath protects the cable entry points and plugs. Even sudden reductions in temperature do not affect the scanners.

The CLV61x, CLV63x and CLV65x product families are fitted with heaters and the CLV69x models have a heated front screen. The devices can operate without problems at average temperatures of -25°C. When a scanner is exposed to constantly changing temperatures, the front screen heater prevents the reading window from misting up.

Their reading performance makes the barcode scanners with integrated heaters suitable for use in frozen food production processes. They have a good depth of field, which is further increased in the CLV65x and CLV69x model ranges by a real-time autofocus function.

Because of the scanners' wide aperture angle, one device can cover the majority of conveyor belt width. Their reading properties and a fast reading rate help to ensure that the data is safely captured, even when the print quality of the barcodes is poor, the codes are damaged or films or other reflective surfaces have been applied over the top of them. Their high scanning frequencies of up to 1200 Hz allow for fast processor speeds.

SICK Pty Ltd
www.sick.com.au

HART COMMUNICATOR APP

ProComSol's DevCom app replaces a dedicated HART Communicator by turning a smartphone or tablet into a HART communicator at a lower cost. The app is available for Android and now for Apple (iOS) users. All that is needed is a licensed copy of the app and a Bluetooth modem or access to a WirelessHART gateway to facilitate the instrument connection.

The app uses the native Device Descriptors (DDs), supported by FieldComm Group, so the user has full access to every parameter and method in the device. New DD can also be sourced from the manufacturer and added by the user. Using native DD means it can perform full configuration of valves and multi-variable devices, as well as complex devices such as radar level instruments and Coriolis flow meters.

In addition to viewing and changing configuration variables, the app allows HART device configurations to be saved and printed to PDF for validation or archival purposes. User safety and comfort is also improved with the Bluetooth wireless interface eliminating the tangle and trip hazard of wires and connections. Full configurator bundles are also available including a tablet or smartphone and modem.

Transtek Pty Ltd

www.transtek.com.au

ELECTROSENSITIVE PROTECTIVE DEVICES FOR SAFE MACHINES

PART 2

Otto Goernemann and Hans-Joerg Stubenrauch, SICK AG

The optoelectronic technologies available for machine safety protection are nowadays very diverse and provide advanced functions not only to protect workers, but to improve productivity at the same time.

The measures and products for implementation of machine safety requirements have become more diverse over the years. The goal is ever better integration of the functional safety in machines and systems for safeguarding. Various technologies for implementation of protection measures are now available. In Part 1 of this article the main types of electrosensitive protective devices (ESPDs) were introduced. In this part we look at problems associated with multiple ESPDs in close proximity and how to prevent interference between them, and examine some more advanced functions of ESPDs that enable greater productivity.

Important factors that influence reliable ESPD protection

In Part 1 of this article, minimum distance and stopping/run-down time were explained. But there are some other serious factors that also need to be taken into account when implementing ESPDs.

Preventing reflections from AOPDs

For AOPDs, the light beam is focused from the sender. The aperture angle of the lens is reduced as far as possible such that an operation free of false trips can be ensured even in the event of small alignment errors. The same applies to the aperture angle of the receiver (effective aperture angle according to IEC 61496-21). Nevertheless, even with smaller aperture angles, there is the possibility for the sender's light beams to be deflected, leading to detection failure (Figure 1). It is therefore necessary that all reflective surfaces and objects (eg, material containers, reflective floors) must be at a minimum distance from the protective field of the system (see Part 1, Figure 3). This minimum distance depends on the distance D between sender and receiver (protective field width). It must be maintained on all sides of the protective field.

Prevention of mutual interference between AOPDs

If several AOPDs are operated in close proximity to each other, the beams from one system (S1) can affect the receiver of the other system (R2), creating the risk that the affected AOPD provides no protection. Installation situations of this kind must be avoided or suitable measures must be taken, such as mounting opaque partitions or reversing the direction of transmission of a system. Type 4 AOPDs either have to have suitable extraneous sender detection and change to a safe state (outputs in the OFF state) when affected or have technical means to prevent the interference. Beam coding is normally used, so that the receiver only responds to light beams from the assigned sender that is coded the same (Figure 2).

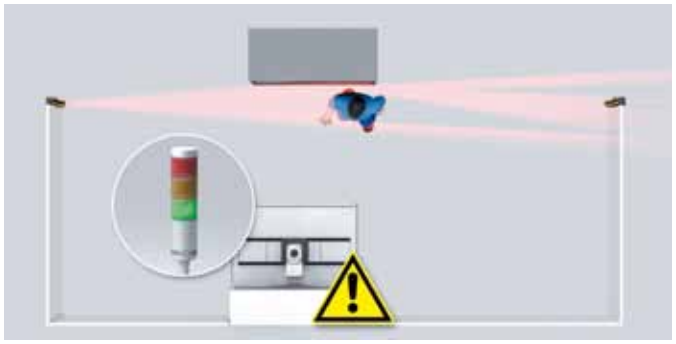


Figure 1: How a reflection can nullify the protective effect of an ESPD.

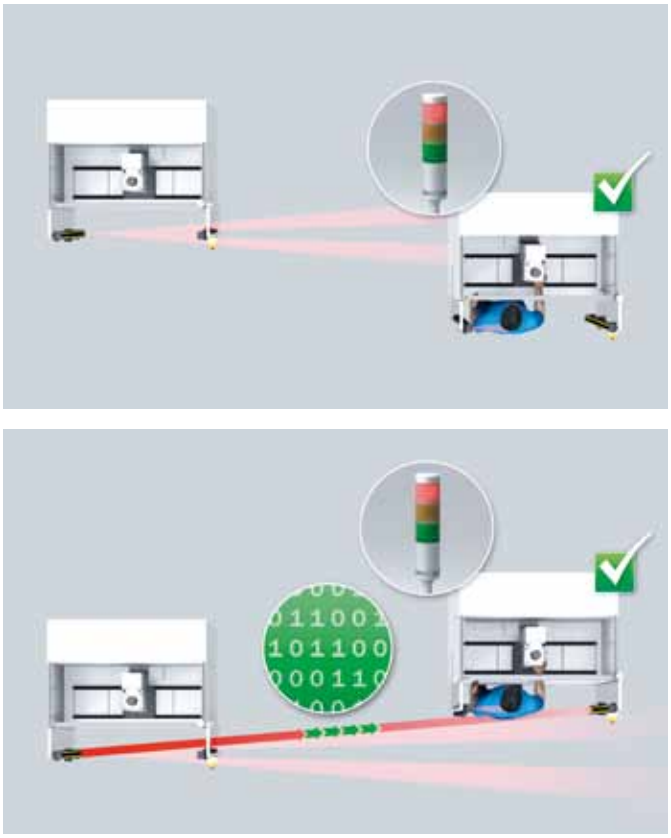


Figure 2: Avoiding mutual interference by encoding or by adequate spatial arrangement.

Automatically ignoring material passing through ESPDs

The following safety functions can be supported through the logic unit or directly through a suitable ESPD.

Temporary deactivation (muting)

The muting function allows temporary deactivation of the ESPD's protective function. This is necessary when material must be moved through the protective field of the protective device without stopping the machine operation. It can also be used effectively to optimise the machine operation (eg, muting a safety light curtain during the safe run-up of the die in a power press, making it easier for the operator to remove work pieces).

Muting is only allowed when access to the hazardous point is blocked by the material passing through (Figure 3) or when no hazardous machine functions are occurring. This condition is assessed by muting sensors and muting signals.

For the muting function, great care is necessary when selecting and positioning the muting sensor. The following conditions are to be met to implement a safe, standardised muting function:

- During muting, a safe state must be ensured by other means, ie, the hazardous area must be inaccessible.
- Muting must be automatic, not manual.
- Muting may not depend on a single electrical signal.
- Muting may not entirely depend on software signals.
- An invalid combination or sequence of muting signals shall disallow the muting state.
- The muting state must be ceased immediately after the material passes.

To improve the quality of differentiation, additional limits or signals can be used, including:

- Direction of movement of the material (sequence of the muting signals).
- Limiting of the muting duration.
- Material demand by the machine controller.
- Operational status of the material handling elements (conveyor).
- Material identification by additional properties (such as barcode label).

Safety light curtains with entry/exit function

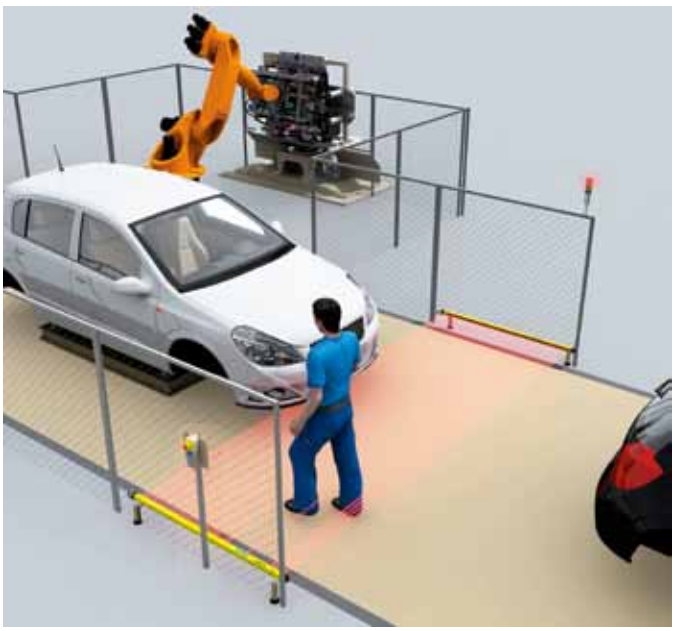
Another possibility for transporting material in a protected area is through active differentiation between man and material (known as an entry/exit function). For this application, horizontally arranged safety light curtains are used. The possibility of evaluating each light beam is used to differentiate the interruption pattern of the material or material carrier (eg, pallet) from a person. By using self-teaching dynamic blanking, as well as other differentiation criteria such as direction of movement, speed, entry and exit position in the protective field, a safety-relevant distinction can be made. In this way, undetected entry into the hazardous area by persons can be reliably prevented (Figure 4).

Safety laser scanners with protective field switching

An additional possibility for transporting material through a protected area is via switching the protective fields. For this application, safety laser scanners are normally used with vertical (and slightly angled) protective fields. The appropriate protective

Figure 3: Muting function with a safety light curtain and muting sensors on a wrapping machine.

> FOR MANY AOPDs, CONFIGURATION OF THE DETECTION CAPABILITY OR PROTECTIVE FIELD CAN BE SET SO THAT THE PRESENCE OF ONE OR MORE OBJECTS WITHIN A DEFINED SECTION OF THE PROJECTIVE FIELD DOES NOT TRIGGER THE SAFETY FUNCTION.



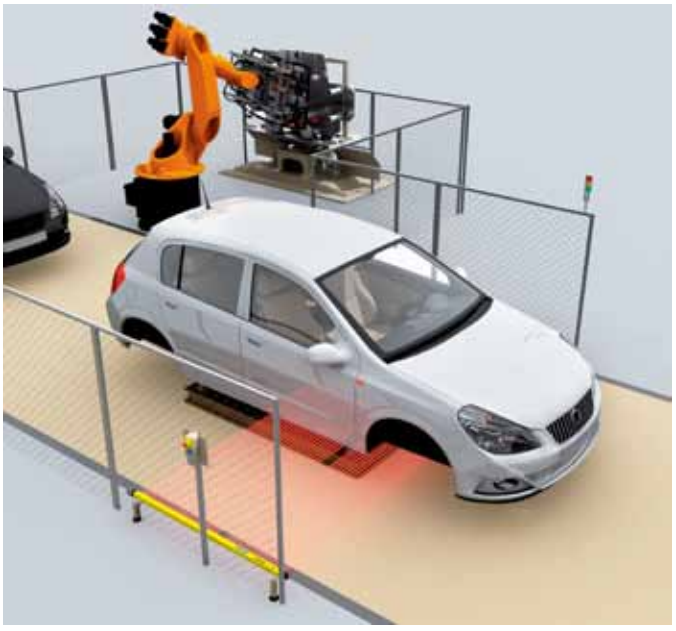


Figure 4: Entry/exit function with horizontally arranged safety light curtain.

field is activated from a series of preprogrammed protective fields, by adequately positioned sensors and appropriate signals from the machine controller. The contour of the protective field is programmed so that passage of the material does not cause the protective device to activate, but unmonitored areas are small enough to prevent undetected entry into the hazardous area by anyone.

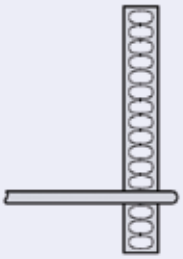
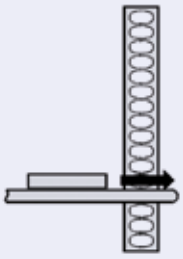
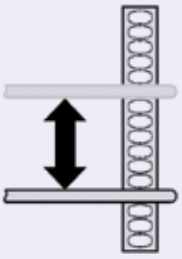
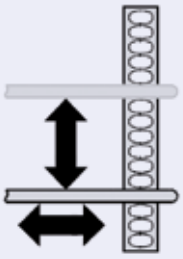
Fixed blanking		Floating blanking	
Fixed blanking	Fixed blanking with increased size tolerance	Floating blanking with complete object monitoring	Floating blanking with partial object monitoring
An object of *fixed* size *must* be at a specific point in the protective field.	On one side of the fixed blanking an object of *limited* size is allowed to move through the protective field.	An object of *fixed* size *must* be within a specific area of the protective field. The object is allowed to move.	An object of *limited* size is *allowed* in a specific area of the protective field. The object is allowed to move.
			

Table 1: Criteria for fixed and floating blanking.

Additional functions of ESPDs

Blanking

For many AOPDs, configuration of the detection capability or protective field can be set so that the presence of one or more objects within a defined section of the projective field does not trigger the safety function (OFF state). Blanking can be used to allow specific objects to pass through the protective field (eg, hoses for cooling lubricant, a slide or carrier for work pieces).

For fixed blanking, the blanked area is precisely defined in size and position. For floating blanking, only the size of the blanked area is defined, but not the position in the protective field (Table 1).

To prevent gaps in the protective field, the presence (or, in some cases, a change in the size or position) of an object can be used to trigger the safety function (OFF state).

Presence-sensing device initiation (PSDI) mode

Use of the protective device to trigger the machine function (cycle reinitiation) is described as PSDI mode. This mode has its advantages when work pieces are manually loaded or unloaded at each machine cycle. Conforming to standards, PSDI mode can only be executed with Type 4 AOPDs with an effective resolution d ≤30 mm. In PSDI mode, the machine waits at a defined position for a specified number of interactions by the operator. The AOPD releases the dangerous movement automatically after this specific number of interruptions.

The ESPD has to be reset under the following conditions:

- When the machine starts.
- On restart when the AOPD is interrupted with a dangerous movement.
- If no cycle initiation was triggered within the specified time.

It is necessary to check that no danger to the operator can arise during the work process. This limits the use of this mode to machines in which the hazardous area is only accessible through the protection field of the AOPD or through interlocked guards, and it is not possible for the operator to remain undetected between the protective field and the machine.

Single-break PSDI mode means that the AOPD triggers the machine function (next cycle) after the operator has completed one intervention (interruption).

Double-break PSDI mode means the AOPD locks the machine function after the operator's first intervention (eg, removal of a work piece). Only after the operator has completed the second intervention (interruption) will the AOPD release the machine function (eg, feeding of a billet).

PSDI mode is often used on presses and stamps, but can also be used on other machines (eg, rotary tables, automatic assembly systems). When using PSDI mode, it shall not be possible to trespass the safety light curtain. For presses, special conditions apply for PSDI mode.

Conclusion

Due to their mode of action, their functional flexibility and the various application possibilities for safeguarding machines, electrosensitive protective devices have many advantages. Special optoelectronic protective devices have been established in the automation world for many years. While their design requirements are defined in product standards, their application is stated in different machinery-specific standards. Due to the optical principle, the design engineer has to take special care when planning the application of AOPDs with a machine. The support of unhindered workflow and the resulting positive impact on productivity are important arguments for using optoelectronic protective devices.

Because a slowdown in the work process is virtually non-existent, the manipulation of protective devices by the machine operator is not very common. Therefore, the creation of a potential risk of injury due to such manipulations — the manipulating person being aware of the risk or not — is hardly relevant for electrosensitive protective devices. In addition to the required safeguarding of operators, the achievable productivity improvement is an important advantage of electrosensitive protective devices.

Reference

1. International Electrotechnical Commission 2013, *IEC 61496-2:2013: Safety of machinery — Electro-sensitive protective equipment — Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs).*

SICK Pty Ltd
www.sick.com.au

HEAT EXCHANGERS FOR HIGH FOULING PRODUCTS

The Unicus from HRS Heat Exchangers has been specifically designed to provide effective heat transfer with a wide range of difficult materials across a range of industries, particularly those which have a high fouling potential (therefore limiting heat transfer) but at the same time require delicate handling to preserve fragile product integrity. A process of continual improvement means that the heat exchangers are available with a wide range of scraper types, providing more choice for applications from food pasteurisation to biomass pretreatment.

The series, which is designed for industrial and hygienic applications, is based on traditional shell and tube heat exchangers, with the addition of a stainless steel scraping mechanism which is hydraulically moved back and forth within each interior tube. This movement performs two key functions. Firstly, it minimises potential fouling of the product by keeping the tube wall clean. Secondly, the movement creates turbulence within the material. Both of these actions help to increase heat transfer rates; together, they create an efficient heat transfer process that is suitable for viscous and high fouling materials.

Another benefit is the fact that the separate hydraulic action means that the speed of the scrapers (which are available in a number of different designs) is controllable and can be optimised for the product being processed. This means that materials which are susceptible to shear stress or pressure damage can be handled gently to prevent such damage, while still providing high levels of heat transfer.

HRS Heat Exchangers Australia New Zealand

www.hrs-heatexchangers.com

UNIVERSAL CONTACTORS

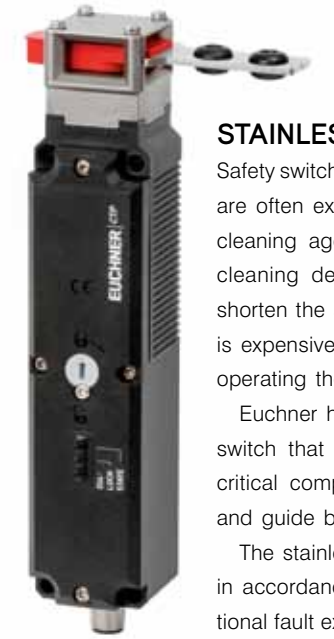
Traditionally, contactors have been used to switch electrical loads in numerous applications, such as motors, fans and pumps. However, large contactors are increasingly used in applications to isolate or bypass these loads and for switching of resistive loads. To accommodate this change, the Allen-Bradley Bulletin 100-E IEC contactors feature a universal coil, which offers operators more flexibility when controlling with multiple voltages.

The contactors can be controlled with 40 to 50 different voltages, ranging from 24 to 500 V, with only four different coil options.

Previous options were available in multiple voltages and often required an AC or DC coil to control applications. With the introduction of the universal coil, operators can more easily control voltage on multiple applications with fewer parts, according to Rockwell Automation.

The contactors replace the Allen-Bradley Bulletin 100-D IEC contactors and increase the available current range to 116–2650 A. They have a 25% smaller footprint than previous product lines.

Rockwell Automation Australia
www.rockwellautomation.com.au



STAINLESS STEEL SAFETY SWITCH

Safety switches for the packaging and food industries are often exposed to harsh conditions. Aggressive cleaning agents, acidic liquids and high-pressure cleaning devices can wear out parts faster and shorten the safety switch replacement interval. This is expensive and time consuming for the company operating the machine.

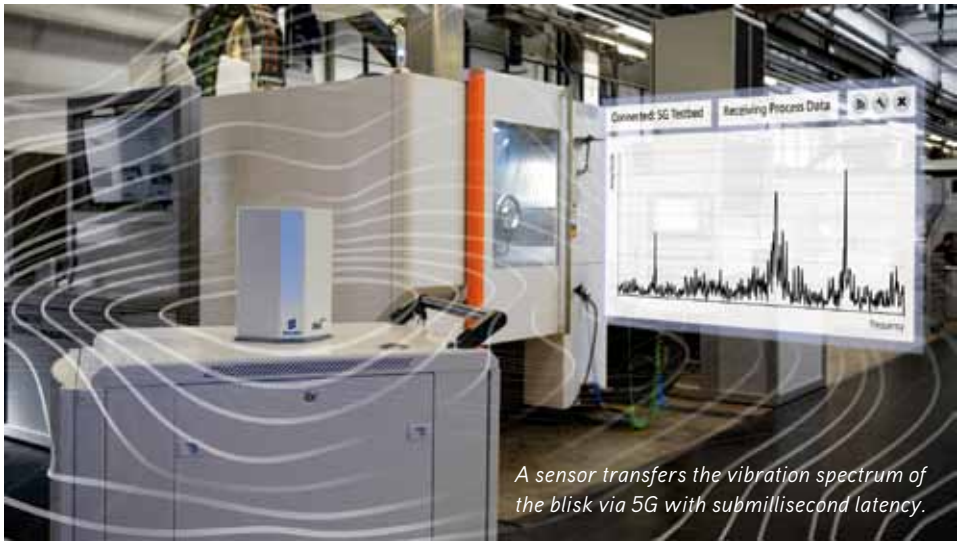
Euchner has released a variant of its CTP safety switch that utilises high-quality stainless steel for critical components such as plugs, cover screws and guide bushes.

The stainless steel CTP achieves category 4/PLe in accordance with EN ISO 13849-1, without additional fault exclusion. It complies with all the requirements of EN ISO 14119. With its high degrees of ingress protection (IP67 and IP69K) and a locking force of 3.9 kN, the CTP is suitable for demanding environments.

Treotham Automation Pty Ltd
www.treotham.com.au

Transmitting measured data by wireless in real time

In manufacturing plants everywhere, sensors continuously record measurements in plant and machinery to check that everything is running according to plan and to enable any errors in the industrial production environment to be recognised at an early stage. However, as a rule, evaluation of the data is decentralised and takes place after a time lag. In contrast to this, the 5G wireless standard permits direct, wireless measurement in real time. Fraunhofer in Aachen has teamed up with Ericsson to offer a unique test environment for 5G applications in industry.



A sensor transfers the vibration spectrum of the blisk via 5G with submillisecond latency.

© Fraunhofer IPT.

A good example to test with is the production of aircraft engine components.

The production of aircraft engines is a complex and expensive business. The whole manufacturing chain of a compressor component known as a blisk (blade-integrated disk) can cost up to €200,000. The highest levels of safety and quality must be observed and computer-controlled machine tools have to be programmed to ensure that the components are produced exactly as stipulated in the design plans. Sensors mounted on plant and machinery monitor the production process continuously.

"There is always a certain element of residual risk because the quality analysis is decentralised with a considerable time lag," said Dr Sascha Gierlings, head of Prototype Manufacturing at the Fraunhofer-Institute for Production Technology IPT. "The natural frequencies of the thin-walled blades present a particular problem in production as any uncontrolled vibration has adverse effects on the quality, which have to be corrected via time-consuming manual operations afterwards."

A combination of the latest sensor technology and rapid data transfer rates such as those provided by the future mobile communication standard 5G seems to be a promising solution to this problem. In the specific case of blisk production, the Fraunhofer IPT has attached a specially developed sensor directly to the component. This transfers the vibration spectrum of the blisk via 5G with submillisecond latency to software that recognises immediately whether the vibrations exceed the permitted maximum or have reached critical frequencies — and adapts the production process accordingly without delay. An additional advantage of the rapid data transfer is that it allows a digital twin, the virtual reflection of a component, to be generated. This twin helps to answer important questions relating to the production process at the computer, before the process begins.

The live transfer of component data was developed by the Research Institute in Aachen in collaboration with Ericsson, the Swedish technology provider in the High Performance Center Networked, Adaptive Production. The partners unveiled their solution to the public for the first time in a live demo at the Hanover Fair at the end of April: the researchers from the Fraunhofer Institute transferred the vibration spectrum of a milled blisk via 5G technology in real time directly from the sensor to a display unit.

"We hope that we can encourage all interested companies to visit us in Aachen so that they can profit from the unique test environment we have here for 5G applications in industry," added Niels König, manager of the Production Metrology Department and coordinator of 5G activities at the Fraunhofer IPT. "Blisk production is only one of many conceivable fields of application. Its complexity, however, makes it particularly suitable for use as a demonstrator."

"Examples of applications such as blisk production highlight the fact that there is no way round 5G for those striving to futureproof their production," explained Stefan Koetz, CEO of Ericsson. "Of course, when you are creating solutions to connectivity as part of Industry 4.0 it is essential to work side by side with a solid partner with a track record of integrity as well as with unsurpassed standards in quality and reliability."

Plans are already well underway to introduce 5G as the new mobile communication standard by 2020. In addition to low latency times, it promises high data transfer rates of up to 10,000 Mbps and allows for numerous devices to be operated simultaneously in closely linked small radio cells. For the first time ever, 5G technology will accommodate the use of wireless sensor connections for real-time data analysis and adaptive control of production processes with short reaction times. "The greatest challenge facing mobile communications providers from now until 2020 will be to continue to reduce the size of transmission units," said König. "From laptop to smartphone or chip size, if possible."

Fraunhofer-Institute for Production Technology IPT

www.ipt.fraunhofer.de/en.html

POWER AND CONTROL CABLES

The latest ÖLFLEX power and control cables from Lapp Australia provide additional protection valuable to projects including production automation, robotics, energy management, data distribution, intelligent manufacturing and process engineering.

The ÖLFLEX 408 P and ÖLFLEX 409 P control cables offer increased mechanical and chemical resistance for tough conditions ranging from outdoor use through to indoor environments involving chemicals, cleaners and temperature variations. Applications range from materials handling through to food and beverage processing, water and wastewater, and HVAC and refrigeration systems.

The cables' outer sheath material is made from polyurethane, is abrasion and notch resistant, and gives both cables high oil resistance.

The cables are manufactured with an interstice filler functional layer based on special PVC. The outer sheath is inseparably connected to the functional layer. Due to the improved mechanical tear behaviour of this interstice filler, the cutting depth when stripping can be reduced. The other typical problems that occur during sleeve processing can also be counteracted. Cutting and removal of the sleeve, both mechanically and manually, can thus be made simpler and safer.

The cable design can reduce damage to the core insulation as a result of improperly stripped cable sections. The design also reduces material waste.

LAPP Australia Pty Ltd
lappexpress.com.au

HEAVY-DUTY GEARBOXES

Bonfiglioli is introducing additional sizes for its HDO drives to enhance flexibility and durability in heavy-duty applications such as mining, bulk materials handling, building and construction, food and beverage, and water and wastewater recycling.

The added HDO sizes — 71, 81, 91 and 95 — complement the existing Bonfiglioli range from HDO 100–180, which cater to torque requirements from 31,790 to 209,900 Nm. The smaller sizes have torque outputs from 6800 to 23,200 Nm and are made from a monobloc housing design for added rigidity. The HDO drives also use case-hardened gears, which are strong and durable.

The HDO is a rectangular bevel helical gearbox, as opposed to square helical bevel gearboxes used in less demanding applications. The backstop (or anti-runback) is positioned on the outside of the HDO drives, which makes it easily accessible for maintenance. The whole drive does not need to be dismantled to access it.

Another feature of the HDO gearboxes is their symmetrical design. They are designed with both horizontal and vertical symmetry for ease of installation in a wide variety of customer applications.

Applications that will benefit from the smaller HDO sizes include floating cells, apron feeders, conveyors, cranes, bucket elevators, asphalt and other mixers, aerators and band screeners.

The HDO drives will also come with an ATEX-certified option for use in explosive atmospheres, the HDO-EX. This option comes with compliance certificates for painting, surface protection, mounting and sensors, along with ATEX application verification.

Bonfiglioli Transmission Pty Ltd
www.bonfiglioli.com.au

MPLS-TP BACKBONE SWITCHES

Belden has released an MPLS-TP-based backbone switch range, the Hirschmann DRAGON PTN with HiProvision. The backbone network device efficiently transports mission-critical data and ensures bandwidth in wide area networks through its support of MPLS-TP technology.

Ethernet-based technologies are simple, interoperable and predictable compared to complicated legacy solutions such as SDH/SONET, making MPLS-TP a suitable choice for large-scale networks. The DRAGON PTN with HiProvision enables users to predict the behaviour of data as it goes across the network, ensuring bandwidth and uninterrupted communication.

Ensuring bandwidth with the same deterministic behavior as SDH/SONET while eliminating their disadvantages for packet-based communication, MPLS-TP technology equips network architects to design efficient networks and provide a migration path for legacy equipment. With DRAGON PTN and HiProvision, engineers get a fully integrated Ethernet-based backbone transmission system that allows them to seamlessly integrate with legacy systems through multiple modular, redundant interface options and port types.

Users can secure a complete, integrated solution for provisioning and managing large networks from one vendor, making upgrades and implementation efficient and streamlined. Redundant networks can be created, integrating best-of-breed technologies from wide area networking and industrial Ethernet networking.

The switch range is suitable for applications that rely on mission-critical data transfer, including harsh industrial environments. Examples include power transmission and distribution as well as oil and gas applications.

Belden Australia Pty Ltd
www.belden.com

REMOTE ACCESS SOLUTIONS

Tosibox Oy's TOSIBOX offers easy and secure remote access through a scalable, secure VPN connection.

Using 'plug and go' technology, TOSIBOX is said to allow users to build a secure network in under 5 min. Using a direct VPN tunnel between devices, only trusted devices can access the network through a physical key that delivers military-grade security. Designed to save time and money, the range of products is scalable to enable real-time data collection and provide an easily expandable solution to grow when needed.

The ease of implementation negates the need for the traditional resource overheads required to maintain remote access solutions.

Control Logic Pty Ltd

www.control-logic.com.au

IIoT FOR WIRELESS PRESSURE GAUGES

Emerson has announced a Plantweb Insight application for wireless pressure gauges that displays data in an easy-to-understand dashboard for maintenance leads and instrumentation and electrical (I&E) personnel. An entire suite of Plantweb Insight applications is available to collectively help users quickly make sense of plant data and drive overall enterprise profitability.

This IIoT application delivers field data from a fleet of wireless pressure gauges as frequently as once per minute. By keeping operators updated on changing conditions remotely, the app allows personnel to make fewer manual rounds and minimise their exposure to hazardous areas.

The gauge itself, a WirelessHART pressure gauge, utilises Rosemount pressure sensor technology to deliver reliable pressure readings. It provides up to 150x overpressure protection compared to traditional gauges using bourdon tube technology, and two layers of process isolation for a safer field environment. The gauge, which has a 10-year life, also reduces maintenance costs by eliminating common weak points found in mechanical gauges.

The application is the latest addition to Emerson's Plantweb digital ecosystem, a scalable portfolio of technologies, software and services that take advantage of IIoT innovations to extend the benefits of automation beyond process control to the entire enterprise, improving operations, strengthening decision-making and institutionalising best practices.

Easily integrated with a variety of WirelessHART gauges and remote field sensors, Plantweb Insight applications combine continuous, real-time data with predictive analytics to give maintenance and operations personnel actionable, up-to-date process information in any location, improving reliability, safety, production and energy management.

Emerson Automation Solutions

www.emersonprocess.com.au

REGISTER NOW www.safety-connect.com.au

SAFETY CONNECT 2018

Incorporating the National Safety Conference

29–30 AUGUST 2018 Brisbane Convention & Exhibition Centre

SPEAKERS INCLUDE

MARK REGGERS
Occupational Hygienist/ Senior Application Engineer, 3M Aus/NZ

ADAM WATSON
Head of Operations & Emergency Management, WorkSafe Victoria

KEYNOTE SPEAKER
ELDEEN POZNIAK
CEO, Pozniak Safety Associates (Canada)

KEYNOTE SPEAKER
PROF. ANDREW HOPKINS
Emeritus Professor of Sociology, ANU

MARTINE BRIERS
Group Manager – HSEQ, Coates Hire

VICKY BARTOLACCI
Managing Director, Kineo APAC

PLATINUM SPONSOR

kineo
A City & Guilds Group Business

GOLD SPONSORS

Blackwoods

AVERY DIY INDUSTRIAL LABELS

Interested in exhibiting or sponsoring?
Contact Narelle Granger:
ngranger@wfmedia.com.au 02 9487 2700

SPONSORS

AMP FIBIAN · A-SAFE · CHORCK · Dropsafe · LADDER LOCKDOWN · FIRE & SAFETY AUSTRALIA · NSCA National Safety Council of Australia · KINNECT · ROOBUCK Light Years Ahead · SafetyMate · Tunstall

ENHANCING THE FUTURE FOR HEALTH & SAFETY PROFESSIONALS

ORGANISED BY

NSCA Foundation Ltd

wfmedia connecting industry

MEDIA PARTNERS

National Safety — PROTECTING YOUR MOST IMPORTANT ASSET: PEOPLE

safety solutions | health & safety at work

PAC PROGRAMMING SOFTWARE

Opto 22 has released its PAC Project Software Suite R10. The release supports its *groov* EPIC system, adds eight updated control commands, and provides the ability to designate individual I/O and variable tags as public access for read-only or read-write use in IIoT data communications via MQTT/Sparkplug. As in previous versions, HMI programming is included, and it uses the same tag name database as the real-time control engine, creating automatic integration between the two functions.

In the past, many process automation projects were solely focused on real-time control, but nowadays operator interface and data handling are often just as critical, sometimes more so. Therefore, it's important for programming software to include not only a powerful real-time control engine, but also closely integrated HMI and data handling functions, all in one integrated development environment.

Opto 22's industrial controllers — SNAP PAC programmable automation controllers and *groov* EPIC edge programmable industrial controllers — are typically programmed using the PAC Project Software Suite. PAC Project Basic includes flowchart-based control programming with optional scripting, a configuration utility and HMI development. PAC Project Professional adds an OPC server, database connectivity, PC-based control configuration and support for legacy Opto 22 I/O units.

The suite's control programming software, PAC Control, is full featured and easy to use, with more than 450 commands in plain English, plus graphical PID tuning and debugging.

Systems 22 Pty Ltd
www.systems22.com.au

GENTLE GRIPPERS

Sometimes mechanical, robotic or automated materials handling systems used in the food, beverage, electronics and plastics industries, for example, may lack a degree of sensitivity needed to manipulate delicate products or packaging containers.

The Firestone AirPicker and AirGripper ranges comprise precision-engineered rubber product handling devices that inflate gently and evenly to manipulate delicate products or containers, giving that degree of touch or sensitivity required.

The end effectors combine pneumatic pressure control with the physical attributes of rubber. The result is a gripper that can give robotics or mechanical handling systems an important degree of touch and allow products to be handled securely and gently.

AirPicker end effectors are inserted into a product while deflated, then inflate outwardly to grip the product's interior walls. The AirGripper end effector collars around the product, then the sleeve inflates inwardly to form a grip around the product's exterior.

Models are available with various inflation pressures to handle light to heavy loads, typically from 50 g to more than 20 kg. This cushioned transporting can help eliminate damage, breakage and other processing problems.

The end effectors are suitable for use in many types of assembly, loading, shifting, conveying and other manufacturing operations.

Air Springs Supply Pty Ltd
www.airsprings.com.au

AS I SEE IT

CONSUMER ELECTRONICS EXPECTATIONS MEET INDUSTRIAL CONTROL

Having been greatly involved with the distribution of industrial operator touch panels, I see there are major changes coming in the way we develop, program and deploy industrial automation control systems — a change that has been a long time coming.

When I meet customers at exhibitions or doing sales presentations, one of the first actions I see people do when playing with our operator panels is to perform a pinch-and-zoom gesture as you would on a smartphone or tablet.

It is of course natural that there should be a user expectation that an industrial operator panel should work like a smartphone or a tablet, because a smartphone or tablet is just another human-machine interface!

We all think we are pretty smart when using our smartphones and tablets. We download apps from the internet, we watch them being installed automatically, we surf the internet and communicate digitally with each other using all type of social media apps, we do our banking, we watch TV and movies, etc. But most of us, including industrial automation engineers, installed them ourselves. So these devices, and the technology used in them, has a huge impact on the expectations we have of technologies used in other programmable devices such as industrial operator panels and controllers.

The challenges for a manufacturer of industrial control devices such as industrial programmable HMIs and controllers is this growing expectation that these devices should be as easy to program as downloading an app on a smartphone or tablet. New software developments are seeing this concept becoming a reality.

Could you imagine an industrial controller or operator panel, or even an entire control system, being programmed by simply downloading apps from an internet automation store? Well it's time to start thinking about it seriously, as it has arrived — albeit on a small scale. It won't be too long before it's taken up by the majority of industrial control manufacturers and widely used.

Imagine PLC and HMI code integrated into a single smart object that is traded via a global smart store (app store) and using rapid engineering software to be implemented and deployed into control hardware in a manner of minutes. Sounds familiar, but I would think this will raise lots of questions! What level of engineering skill would you need? Who would commission the control application? Who owns the intellectual property? And the list goes on.

Along with the smart objects will be cloud connectivity and centralised remote engineering access, allowing configuration and commissioning services to also be traded like objects or apps from a web store.

It's very clear that there are challenges for technology developers to maintaining this innovation in line with the consumer electronics market; however, the biggest challenge will be the automation engineering sector.

What are the implications for an industry and the economy if automation engineering is seen as commodity to be traded on a global scale and the implementation is no harder than downloading and installing an app on a smartphone? How does the supply chain and distribution of this revolution make money in this new economy?

Who are the winners and who are the losers? The winners are the software and hardware manufacturers and the end user: the potential losers are those in the middle!

John Thomson-Dupere is the Managing Director of Global Automation Asia-Pacific. Born in Adelaide, John started his career as an automation electrician at Mitsubishi Motors in Tonsley Park, South Australia. Established in 1997, Global Automation's first product distributorship was the Beijer Electronics AB Cimrex Operator panels from Sweden. Global Automation continues its relationship with Beijer some 20 years later.

wfmedia
connecting industry

Westwick-Farrow Media
A.B.N. 22 152 305 336

www.wfmedia.com.au

Head Office
Cnr. Fox Valley Road & Kiogle Street,
(Locked Bag 1289)
Wahroonga NSW 2076
AUSTRALIA
ph: +61 2 9487 2700 fx: +61 2 9489 1265

Editor
Glenn Johnson
pt@wfmedia.com.au

Publishing Director/MD
Geoff Hird

Art Director/Production Manager
Julie Wright

Art/Production
Colleen Sam, Wendy Blume

Circulation
Dianna Alberry, Sue Lavery
circulation@wfmedia.com.au

Copy Control
Mitchie Mullins
copy@wfmedia.com.au

Advertising Sales
Industrial Group Sales Manager
Nicola Fender-Fox – 0414 703 780
nfender-fox@wfmedia.com.au

Sandra Romanin – 0414 558 464
sromanin@wfmedia.com.au

Tim Thompson – 0421 623 958
tthompson@wfmedia.com.au

Subscriptions
For unregistered readers price on application.
If you have any queries regarding our privacy policy please email
privacy@wfmedia.com.au

Audited Media Association of Australia
cab

September 2016 total CAB audited circulation (Aust + NZ)
5,598 readers (73% personally requested)

Contact the editor

Printed and bound by SOS Print+Media Group
Print Post Approved PP100007403
ISSN No. 0819-5447

SYDNEY | BRISBANE | MILES | PERTH | MELBOURNE | ADELAIDE | AUCKLAND | NOUMEA | MANILA

POWERFLO SOLUTIONS

Carraro Regulators for

- PRESSURE REDUCING
- PRESSURE RELIEF/BACK-PRESSURE REGULATION
- DIFFERENTIAL PRESSURE CONTROL
- TEMPERATURE CONTROL
- GAS BLANKETING
- VACUUM BREAKING

CARRARO

- ½" to 20" (15mm to 500mm NB)
- ANSIC Class 150# to 1500#
- Temperature range-196 deg.C to +540 deg.C.
- Standard and special materials including Titanium, Hastelloy C, Duplex/Super Duplex, Inconel etc
- Wide range of elastomeric and thermoplastic seals
- Extended bonnet designs
- Low noise and anti-cavitation trims
- Fully sealed construction for dangerous media
- Metal and soft sealed designs for Class VI Shut-off

ASSEMBLED, SOLD AND SERVICED THROUGHOUT THE PACIFIC REGION BY: **POWERFLO SOLUTIONS PTY LTD**

1300 658 701
sales@powerflo.com.au
www.powerflo.com.au

Cost-effective thermal imaging

A wide variety of cameras, lenses and specifications to suit your application requirements.

High thermal sensitivity of 0.08K with a measuring range from -20 to 1500°C. Lightweight, robust and compact.

High resolution of 382 x 288 pixels with a measuring range from -20 to 1500°C. Smallest camera in its class.

Full range: www.bestech.com.au/pt

BESTECH
Sensors & Teaching Equipment

Global Technology, Local Support

enquiry@bestech.com.au | 03 9540 5100