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Micropilot FWR30
The cloud connected
radar level sensor

Endress+Hauser [EH]

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ON THE COVER

Ever had issues with running out of stock of what was stored in an IBC, storage drum or remote tank? Has this caused you major disruptions to your production, urged costly replenishment, or even caused an unplanned shutdown? These types of storage vessels have historically been a challenge to continuously monitor. They are often located in remote locations, scattered across the site and almost never have easy access to power.

The Micropilot FWR30 combined with digital services is the world's first wireless, battery powered, GPS enabled, 80 GHz IIoT radar sensor. No cabling required. It has been developed to help manage inventory in remote and mobile applications and designed with simplicity in mind. This smart level transmitter unifies high-end technology in a cost-effective sensor. Its simplicity and essential features save time, ensure continuity and optimise logistics and storage processes.

The level data measured is pushed into the cloud where it can be viewed anytime, anywhere and on any device through the Endress+Hauser Netilion solution. The FWR30 can be integrated into Netilion with a few clicks and provides the user with dashboards, values, historical data, and notifications using a very simple user interface.

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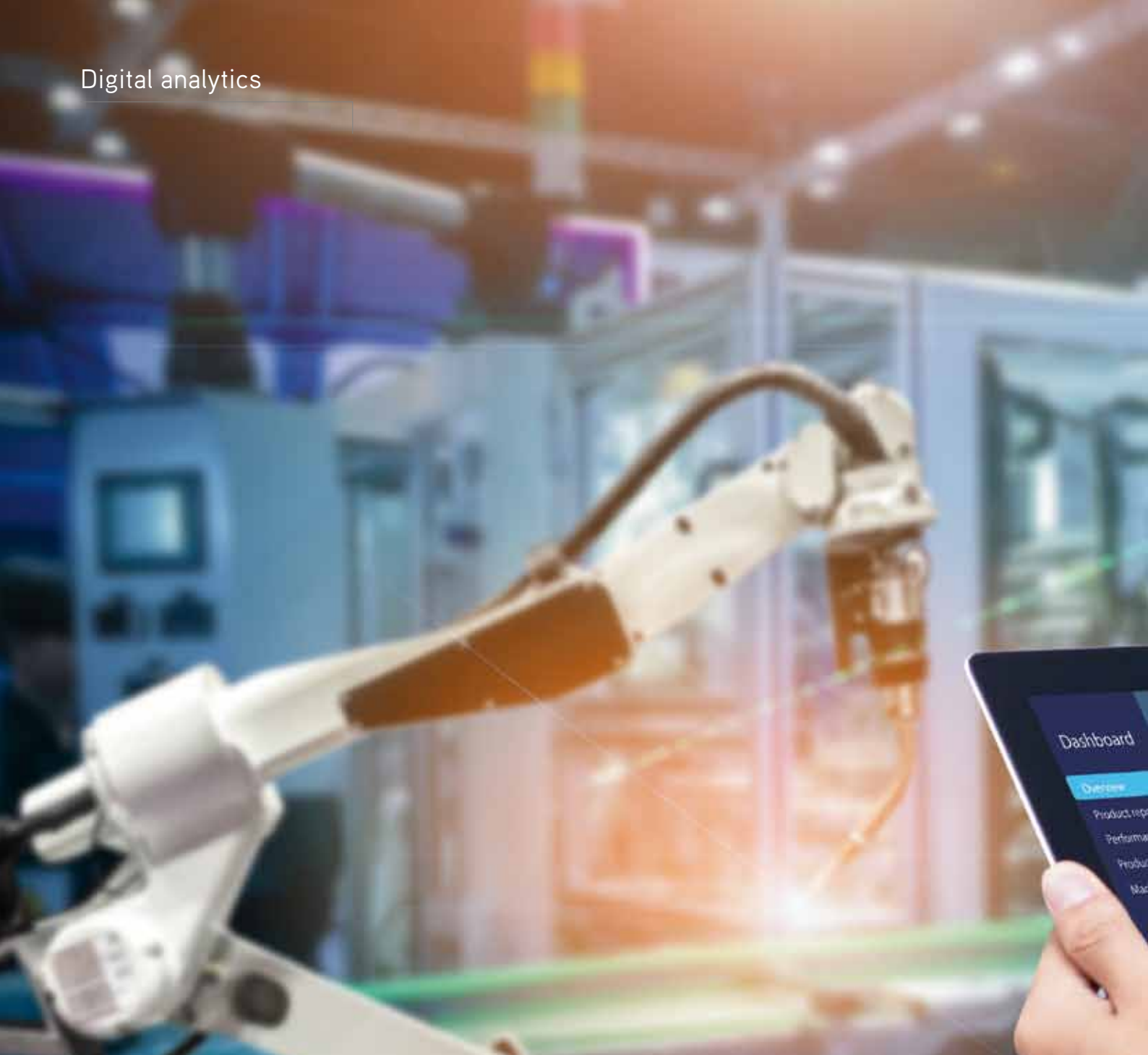
THE DIGITAL TRANSFORMATION OF INDUSTRY

PREDICTIVE MAINTENANCE WITH INDUSTRIAL ANALYTICS

Dr.-Ing. Rolf Sohrmann, VP Global Segment Management, Weidmüller

Digitalisation offers machine builders and manufacturers opportunities to increase their productivity and differentiate themselves from competition through data-driven services.

Nowadays, machinery and plant are optimised to the extent that they can guarantee comparably low downtimes and the high quality of end product. However, new market requirements, such as customised production and increasingly shorter product lifecycles mean that manufacturing companies are faced with the task of further optimising processes in order to hold their own and advance in the face of international competition. Digitalisation offers machine builders and manufacturing companies new opportunities to increase their own productivity levels and differentiate themselves from the competition through data-driven services.

Artificial intelligence (AI) and the resulting data analysis methods open up a new approach to problems and product developments. They also form the basis for service-oriented business models. Predictive maintenance is a solution that is already available today and that creates considerable added value by reliably predicting machine behaviour.

Knowing what is going to happen: predicting errors with analytics

The existing sensors in machinery and plant record various measured values, such as temperature, pressure, energy consumption and vibrations. This data can create clarity with regard to individual procedures as well as the entire process — provided that the company is able to evaluate all the relevant information. Self-learning AI modules use recorded data to automatically generate models that are used as a reference for real-time operation. With the right approach, it is possible to detect even minor deviations from a machine's normal behaviour that may point towards future problems. Depending on the complexity of the machines, the desired predictive quality and the forecast lead time, 95% prediction accuracy and 24-hour forecast lead times can be achieved through the use of trained analytics models.

Project workflow

To successfully implement predictive maintenance, a consistent and collaborative project workflow is required, from data acquisition via analytic modules to visualisation. Figure 1 explains the interaction between the individual process steps.

Within the scope of the implementation, a decision must be made as to whether the different processes are to take place locally or in the cloud. Hybrid solutions are also possible.

The data required for the AI model are acquired directly at the machine. The existing infrastructure is used to record and transfer the required data. If necessary, this can be supplemented by additional measuring points and interfaces. To optimise computing power and the amount of data, data selection and processing should be done locally if possible.

The self-learning model design based on the recorded data can take place either onsite or in the cloud. The same applies to the model application and visualisation. The decision regarding the point at which the modules should be executed for a predictive maintenance solution depends on the existing infrastructures, the datasets, security requirements and costs. Generally, users opt for hybrid solutions, with the proportions of local and cloud-based applications varying

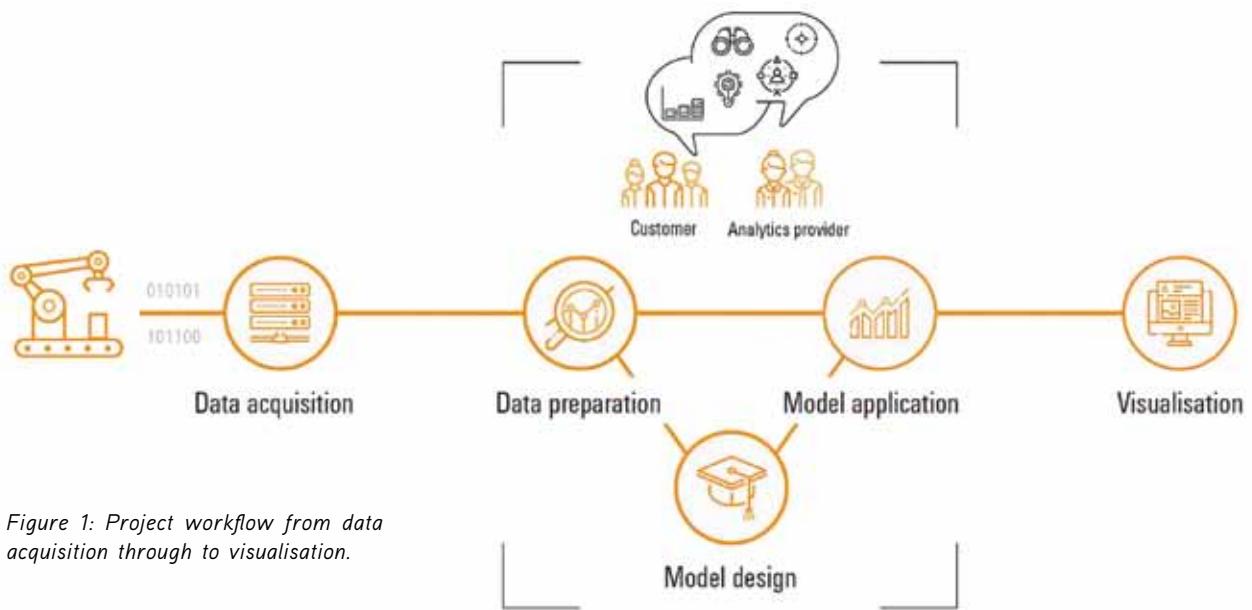This issue is sponsored by — **Endress + Hauser** — www.endress.com **5**

Figure 1: Project workflow from data acquisition through to visualisation.

considerably. An analytics project should be conducted within a well-organised workflow. In practice, there is a proven five-stage procedure (see Figure 2). At the start of the project, the focus is on analysing the problem and defining the objective. During this phase, developers and users define, among other things, which specific failures it should be possible to predict. During the subsequent exploration phase, checks are carried out to see whether a defined error can be detected on the basis of the collected measured values or if a higher data quality is required. With the proof of concept (PoC), a statistical model is developed to automatically detect the error. Thus the technical and economic feasibility is checked on the basis of the previously recorded data (offline analysis). During the pilot phase, a functioning prototype is executed on an IoT platform in real time (online analysis). In doing so, findings and experience values are collected, which are implemented in the final analytics solution during the last phase. This solution can be applied to an unlimited number of machines of the same type.

The success prospects of an analytics project can and should be re-evaluated after each phase, to ensure that the final solution meets the objectives defined at the start. The duration of such a project is reasonable: two to three months are usually required from the start of the project through to the successful PoC. In order for the project workflow to be successful, the data scientists must have a deep understanding of the machine construction technologies. There must also be close exchange with the future user.

However, the creation of reliable analysis processes alone does not generate sufficient economic added value. Thanks to analytics solutions such as predictive maintenance, machine manufacturers can benefit from new business models in the service area and gain a competitive edge through new functions. The economic aspects with the creation of a cost/benefit analysis are also part of the project schedule.

Step by step towards predictive maintenance

In order to be able to predict machine behaviour and the quality of the end product through predictive maintenance, a number of steps need to be taken.

Visualisation

The first step on the way towards predictive maintenance is the importing, evaluation and illustration of the relevant data. Readability and quality are checked using sample data. In parallel, the recording frequencies are checked and adjusted, if necessary. The checked data are transferred in time series and should subsequently be illustrated in informative diagrams. The visualisation of all relevant data series in one single image enables initial findings on correlations between the sensor data.

Learning patterns and recognising anomalies

During operation, an analytics solution compares the previously automatically learned reference models with the real-time data of the machines. The AI modules are able to detect even minor deviations

from the learned normal behaviour during operation. Due to the simultaneous consideration of all sensor data, errors and faults are determined that are not registered through rules-based systems. Future problems with the machine can be identified at an early stage.

Anomalies are evaluated according to the level of deviation, which is expressed via the anomaly index. Smaller deviations can be suppressed using a definable threshold for the anomaly index calculated by the system, so that messages are only issued for more serious discrepancies. Additionally, an accumulation of minor errors can trigger a message. Using anomaly detection, errors and abnormal behaviour can be detected earlier than with rules-based condition monitoring. The system also recognises such errors that are not usually registered by condition monitoring systems. As a result, machine operators and service technicians are able to rectify errors at an early stage and ensure the seamless operation of the production processes.

Classifying anomalies

The detected errors are mapped in an anomaly sample and split into categories (important - unimportant). This classification is carried out in collaboration with data scientists and machine experts. The samples classified as important are assigned to reasons for failure, which are automatically detected in the system application. This means there is no need to spend lots of time searching for the source of an error when it occurs. Quicker diagnosis leads to noticeably shorter downtimes and thus optimised

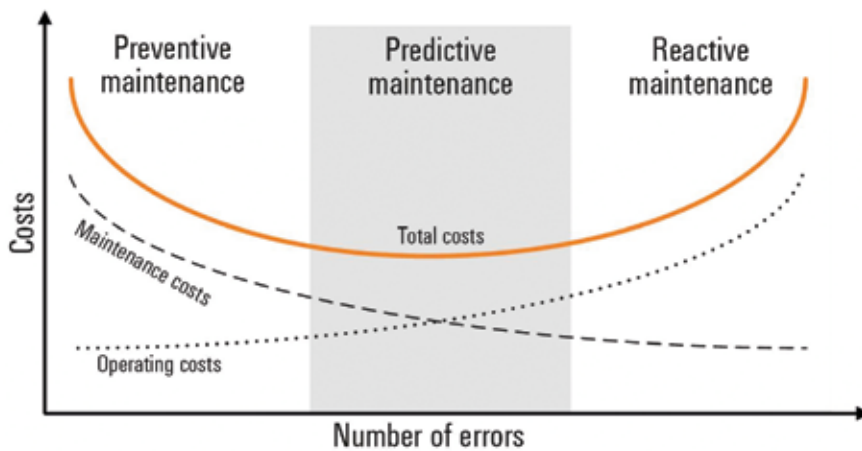Figure 2: The phases of an industrial analytics project.

Figure 3: Anticipated cost saving through predictive maintenance.

production performance and reduced costs. Furthermore, the user can adapt and supplement the classification. As a result, the systems improve over time and predict errors with greater precision.

Predictive maintenance

Traditionally, maintenance intervals according to operating hours or quantities are applied. However, with this comes the risk of unnecessary service interventions or unexpected machine failures. Therefore, maintenance costs are a considerable factor that is difficult to calculate in relation to the overall operating costs of machinery and plant. With a predictive maintenance solution, the intelligent analysis of data generates knowledge of future errors or undesired states. This enables maintenance to be planned on a needs basis and to reduce the service costs (see Figure 3).

Depending on the requirement and available infrastructure, predictive maintenance software is able to display forecasted errors directly on the machine, in the machine builder's service centre or the operator's control room. The time it takes until a message regarding an anticipated error is issued varies with the cause of

error and the anomaly classification. By notifying the responsible area, repair and maintenance processes can be shortened and planned in a targeted manner.

Predictive quality

Due to the seamless monitoring of sensor, condition and process data, the quality of a product can be predicted across the individual production steps, therefore increasing the quality. Detailed reference models are developed for this purpose on the basis of historical data. These models are also used to identify previously undetected problems. The software enables quality problems to be identified during an ongoing process. By adjusting the production parameters early on, this secures the quality of the end product and reduces the scrap rate. As this requires interventions on the machine control and the operating procedures, it is carried out in close coordination with the machine builder and operator.

Summary

Existing machine data has the potential to generate considerable added value for machine builders and manufacturing companies. The key here is the profitable

analysis and use of this data with an industrial analytics solution. There is no standard concept that suits all users — individual solutions are required that are developed in close coordination with the future user. The successful implementation of analytics projects requires that certain key criteria are met:

- Areas of application should be selected on the basis of a cost/benefit analysis at the start of the project.
- The machine know-how of the analytics experts is combined with the application knowledge of the user in order to develop a needs-based solution.
- The data infrastructure and data platform must be analysed, defined and supplemented, if necessary, in order to guarantee an end-to-end process.
- It should be possible to adapt the software and the user interface to the user's requirements.
- The planning and execution take place collaboratively with the involvement of the analytics provider, the machine builder and the machine operator.
- The aim should be to establish a long-term partnership between the user and the developer in order to generate long-term added value from the analytics solution.

Specific examples from industry demonstrate that the use of analytics solutions, such as predictive maintenance, results in new business models, improves service concepts, generates additional revenue and reduces costs. Furthermore, previously undetected findings with regard to machine behaviour are leading to new product developments and the optimised use of sensors.

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Interworld Electronics and Computer Industries

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The R2300 3-D LiDAR sensor is equipped with pulse ranging technology, which provides precise measurements with high accuracy and short response times.

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OPINION

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ECONOMIC CHALLENGES: NOW IS THE TIME FOR INNOVATIVE IDEAS

Australia and the world is currently facing one of the toughest economic climates ever. For a country that wasn't impacted as severely by the Global Financial Crisis, COVID-19 is our biggest challenge yet.

Two big focus areas for businesses have been re-inventing the supply chain and digital transformation. At no point has our access to goods and services been reviewed as much as it is now. And at no other time have we relied on digital technology as much as now. From web conferences and meetings to remote work and digital management of workflows, digital technology is front and centre for every organisation. While it would be safer to place broader and deeper digital transformation strategies on the backburner until the economy is more stable, following through with innovative ideas could be what gets many companies through these tough times and prepared for other future uncertainties.

But what should manufacturers change and to what degree? A Siemens paper titled 'The Race to a Digital Future' that surveyed and evaluated US manufacturers' digital capabilities across a few core dimensions states that manufacturers fell into two camps of adoption: the 'Efficiency Experts' and the 'Revenue Re-inventors'. Both groups use digital technologies to improve productivity and efficiency, but the latter is leading the way in exploring how digital transformation can be progressed even further — to transform business models and unlock new markets.

Firms in the Revenue Re-inventors group are more likely than Efficiency Experts to say that their financial performance is ahead of their peers. In particular, Revenue Re-inventors are more likely to create new revenue streams from the provision of digital services — as Rolls-Royce has done through its Engine Health Management service, which uses onboard sensors and live satellite feeds to track the health of thousands of aircraft engines operating worldwide.

I often hear that innovation takes time, and I agree that it does. But I also have found that innovation can take much longer than it needs to. What are the factors that slow down innovation? We live in a world where computing capabilities such as Cloud and Edge make computational tasks faster and more flexible than ever.

We have software solutions to help streamline data across an organisation — from product design and recipe formulation all the way through to full-scale production and batch records of workflows. So the inertia in implementing digital transformation is not a technological issue. It is humans that slow down innovation and digital transformation. It is the tendency to conform to the 'normal' way of doing things.

Which is why the best time to revaluate digital transformation is during these uncertain times — when our 'normal' has been turned upside down.

While organisations have so far taken incremental steps towards digital transformation, now is the time to look at unlocking the full potential of the technologies available to us and push the boundaries so there can be more examples of Revenue Re-inventors in the Australian manufacturing sector.

This step needn't be giant. Small scalable solutions could work just as well. Digital transformation is a scalable exercise that is accessible to companies of all sizes and budgets. Companies just need to move from being risk averse, to being risk aware.

Even though you want to start relatively small, it's still important to build a coalition to support the initiative. Change management succeeds by having supporters from various levels within your organisation — so think non-linear. Such a coalition can help craft, evaluate and communicate digital transformation initiatives and will aid leading by example.

If unsure of where to go to build your coalition, remember that this can include engaging with vendors, machine suppliers, integrators and even your own customers to drive the momentum forward. For example, at Siemens Digital Enterprise we are working together with manufacturers to provide consulting services that map out the digital transformation journey that is right for their situation and can be implemented in such a way that risk is constrained, but unlimited success is possible.

Leonie Wong is Head of Siemens Digital Enterprise. She facilitates ideation and co-creation workshops with her clients to define strategies for implementing digital transformation in new and existing facilities. She has a diverse client base encompassing food and beverage, manufacturing, chemical, water and wastewater markets.

AIR VELOCITY TRANSMITTER

The Series AVPT pencil-style air velocity transmitter uses thermal anemometer technology to provide stable air velocity measurements in imperial and metric units across ranges of 5, 10, 15, or 20 m/s. The series can be configured with either a voltage output or BACnet MS/TP communication to provide universal inputs to a variety of monitoring equipment. Models are available with fixed cable lengths of 50 or 200 cm with flying leads or a 5-pin M12 connector on a 60 cm cable. Probes are available in lengths of 15 or 30 cm. A mounting flange included with the product provides the ability to vary insertion depth.

Models are available in 3% or 5% accuracy to suit a variety of applications, while the optional BACnet MS/TP communication protocol allows units to be daisy-chained to provide access to all of the velocity and temperature measurements.

Dwyer Instruments (Aust) Pty Ltd
www.dwyer-inst.com.au

VALVE ISLAND

The Bürkert Type 8653 AirLINE Field valve island has been especially developed for the requirements of process automation. Updated diagnostic functions can be visualised at the LC display, both in clear text as well as symbols. This makes it easy to relate to the shown messages and helps to save time during start-up and maintenance.

Furthermore, the diagnostic message is also available at the control, enabling a fast overview of the plant status.

The hardware structure is optimised for installation close to the actuator due to its IP65/67 degree of protection, and an intelligent mounting system offers various installation solutions. It is also possible to fix the AirLINE Field to the top hat rail. In addition, key pneumatic functions ensure increased process reliability. For instance, the non-return valves in the exhaust air ducts make sure there is no unplanned actuation due to pressure peaks.

Fieldbus interfaces for CANopen, IO-Link and büS (Bürkert System Bus) are supported.

Burkert Fluid Control Systems
www.burkert.com.au

CUSTOM INSTRUMENT PANELS AND SYSTEMS

Moore Industries is offering turnkey custom solutions for process, automation or SIS monitoring, and control applications. The company designs and builds compact and modular solutions used to monitor temperature-, pressure-, level-, flow- and safety-related processes with high-performance instrumentation and components.

Moore Industries can supply and assemble ready-to-install instrument subsystems with instrumentation, cabinets, wiring, tubing, relays and power supplies. Custom instrument panels, enclosures and systems eliminate the need to specify, procure and assemble multivendor instrumentation and hardware. The company also offers pneumatic interface panels featuring rugged DIN-style I/P and P/I converters, solenoid valves and pressure alarms.

The company stresses that its expert assembly is combined with the highest quality fittings, tubing, wiring and gauges to ensure maximum performance with a long service life. Complete documentation is provided, along with technical assistance and the assurance that complete and thorough testing has been performed on all custom instrument panels and cabinets.

Moore Industries Pacific Inc
www.miinet.com

FIELD SERVICE SOLUTION

Verizon Connect has announced the launch of Verizon Connect Field Service Dispatch for Australia. The solution is said to make it easy for dispatchers to efficiently schedule and communicate job information to technicians and customers throughout the day, in near-real time.

Verizon Connect Field Service Dispatch works with the Verizon Connect Reveal platform to combine both vehicle location data and technician status. This helps operation managers make faster, more informed decisions and provide better service from a single application without having to switch between telematics and field service solutions.

Key features of Verizon Connect Field Service Dispatch include simple scheduling (view available technicians and vehicle location, and schedule jobs in an easy-to-use calendar) and easy dispatching (quickly assign and dispatch jobs to notify one or more technicians that a job is scheduled).

A real-time notification feature automatically sends booking confirmations and reminders to users, and a technician's mobile application allows the technician to easily add notes, photos and signatures from the job site via the mobile app to keep the office up to date. Live Map integration makes it possible to view a technician's real-time vehicle location, schedule information on the Live Map and make more informed scheduling decisions.

Verizon Connect Australia Pty Ltd
www.verizonconnect.com.au

3D PRINTING FILAMENTS

Treotham has announced that igus 3D printing filaments are now available in Australia from Imaginables. Along with providing the materials, they also offer a custom printing profile developed by igus.

Imaginables is a supplier of desktop 3D printers and digital fabrication equipment, and is the Australian distributor for both Ultimaker and Dremel Digilab 3D printing products. The lightweight and durable wear-resistant igus filaments are made of tribologically optimised polymers and are said to be up to 50 times more abrasion-resistant than standard 3D print materials. With two lubrication-free iglidur materials to choose from, users can produce 3D printed functional prototypes quickly and cost-effectively.

Imaginables application engineers are available to review and analyse existing work processes, to assess how additive manufacturing can improve a business's workflow.

Treotham Automation Pty Ltd
www.treotham.com.au

HTML5 WEB HMIs

The Beijer Electronics X2 web HMIs within the X2 pro and X2 extreme range are designed for enterprises and users who want to utilise HTML5 web technologies in industrial environments. The X2 web HMIs offer visualisation with Chromium Kiosk mode operation of single browser window web pages from SCADA systems, PLCs or other devices with built-in web servers. They enable users to visualise the same web content across different target platforms such as HMI, mobile, tablet, PC, etc without any conversion or re-engineering.

The X2 web HMIs have the same industrial-grade hardware as the iX-based X2 pro and X2 extreme HMIs offering extensive certification and environmental durability. HTML5 is a next-generation web coding language that appears the same across all platforms and browsers, simplifying coding and with a faster and more adaptive response. HTML5 includes detailed processing models to encourage more interoperable implementations; it extends, improves and rationalises the mark-up available for documents. HTML5 is also a candidate for cross-platform mobile applications, because it includes features designed with low-powered devices in mind.

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

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HOW TO PREDICT AND PREVENT CSOs AND SSOs

Analytical systems that capitalise on existing wastewater collection infrastructure can help avoid the negative impacts of sewer overflows.

Combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs) are natural hazards for wastewater collection systems. Without a comprehensive solution to monitor troublesome conditions, overflows can be triggered with little warning and lead to expensive and embarrassing situations. Fortunately, versatile analytical systems that capitalise on existing wastewater collection infrastructure hold promise for avoiding such negative impacts.

Collecting, formatting, and analysing data from a variety of sensor and data storage sources relieves management from much of the time and effort required to exercise insight and creativity. Here are several approaches to predicting and preventing CSOs and other drainage system issues.

Identifying the roots of the problem

Whether collection systems constitute sanitary sewer, stormwater sewer, or combined sewer flows using shared infrastructure, multiple issues contribute to overflow conditions. Smart solutions fed by multiple data inputs can keep both obvious and less-than-obvious problems from causing the following costly, destructive events.

Blockage impacts
Accumulation of debris over time can result in slowly diminishing flow rates or flow rates that lag behind diurnal water usage patterns, for a number of reasons:
- **Routine blockages:** Monitoring solutions that use data from flow meters, rain gauges, and lift-station level gauges can help to identify trending flow problems in any type of sewer or stormwater collection system.
- **Storm-related blockages:** Large debris deposits left by the most recent storm surge can affect drainage in upcoming storms, even though they have not yet caused a visible overflow event.
- **Fatbergs:** Certain areas of a sewer system — such as those around heavy industry or a downtown restaurant district — can naturally accumulate grease and oil that coagulates into sticky 'fatbergs'. Unless detected early, these accumulating problems can eventually grow large enough to lead to SSOs and CSOs.

Rainfall-induced impacts
Concentrations of water resulting from wet weather events can exert a series of negative influences on storm-sewer and combined-sewer systems.
- **Inflow:** Combining normal sanitary sewer flow with inflow from storm drainage places increased demand on wastewater treatment capacity and cost.
- **Infiltration:** Depending on the age and condition of a sewer system, an unpredictable volume of underground stormwater can infiltrate a sanitary sewer collection system.
- **System bypass:** Whatever the source of increased flow, if the cumulative volume exceeds WWTP capacity and cannot be diverted to storage for subsequent treatment, raw sewage discharges that bypass treatment altogether can risk fines.
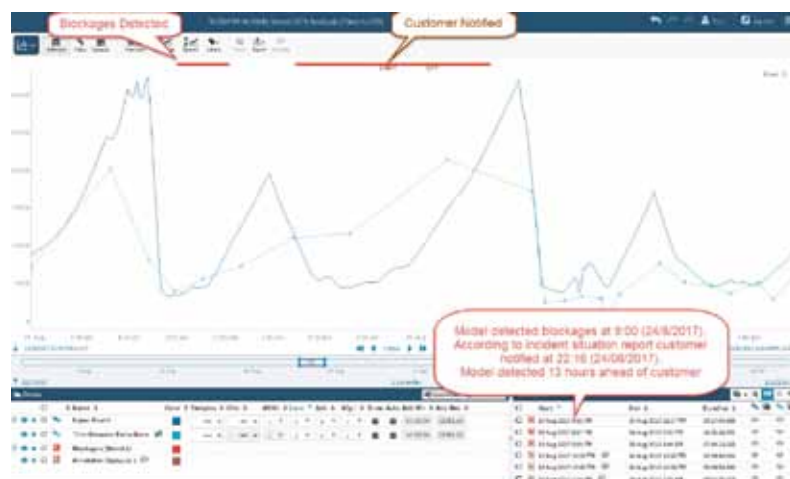

Figure 1: Using an analytics program to monitor sewage pump station operation and sound an alarm when the downtime between pump activity exceeded normal limits enabled one wastewater utility to respond to blockage situations up to 13 hours before an actual CSO event occurred.

Figure 2. An example of a TasWater monitoring dashboard, using PI Vision, OSIsoft's flagship data visualization tool, to gain insight into their critical operations and processes in real-time, in this case for a Sewage Treatment Plant.
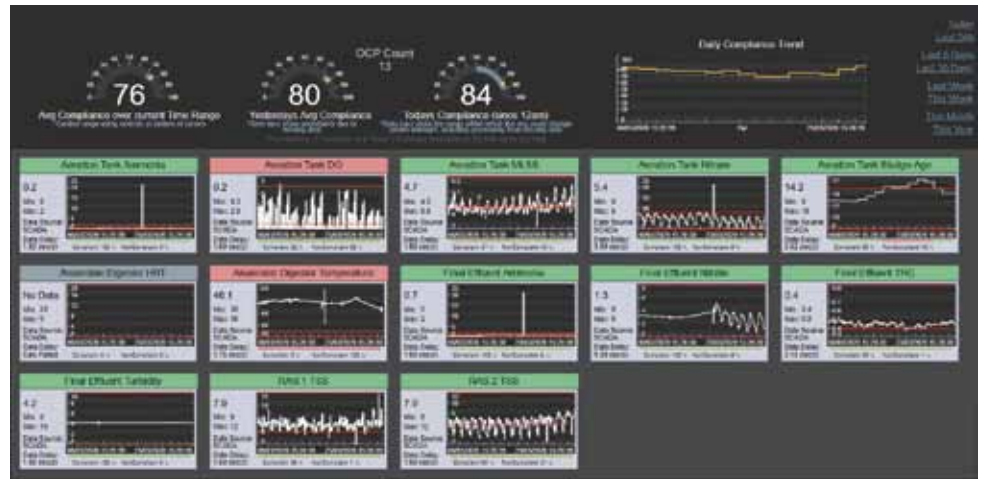
Sowing the seeds of a solution

A good analytics system makes it possible to stay ahead of unseen blockages and heavy rainfall events to prevent CSO occurrences. A solution that monitors precipitation forecasts, real-time rain gauges, IIoT devices or sensors, and flow rates in a GIS mapping system with corresponding elevation readings makes it possible to spotlight discrepancies between rain gauge readings and anticipated sewer flow rates. This means being aware of potential overflow conditions in time to do something about them.

Monitor flow rates

Collecting data from existing level detectors and flowmeters, then comparing it against historic performance under similar conditions, provides a good appreciation for stormwater situations as they evolve. The ability to incorporate future precipitation data, such as BoM forecasts into the model can refine sewer flow forecasts even more to support better planning of how to minimise stormwater impacts on wastewater collection and treatment systems. For example, one utility created a series of evolutionary artificial neural networks to forecast CSO-chamber water levels six hours into the future — with 97% accuracy.

Reduce underground blockages before the storm

Comparing sewer system flow rates and level readings against historical trends can also highlight below-average or irregular flow rates indicative of potential hidden blockages. Helping maintenance crews locate those blockages in time to clear them before the next storm event can prevent costly CSOs or SSOs.

Plan for excess flows

Gaining better insight on stormwater flows from an analytics system makes it easier to plan for both short-term challenges and long-range infrastructure planning. Response options can include:

- **Advance treatment:** Knowing the timing and volume of precipitation expected can guide management choices on how to clear up as much WWTP capacity as possible in advance of the storm — through maintenance, emptying of basins, cleaning of storm screens, etc.
- **Stormwater storage:** Real time monitoring and timely precipitation forecasts can provide insights on how to allocate stormwater storage just before a storm arrives, then meter that stored water back into the system once the initial demand peak on treatment capacity recedes.
- **Overflow forecasting:** In a worst-case scenario, knowing where the heaviest drainage impacts will occur can provide time to issue CSO warnings and minimize negative impacts to the public and the environment (see Figure 1).

- **Maintaining good will:** In addition to averting fines, avoiding the negative embarrassing impacts of high-profile events can also help to maintain good consumer relationships.
- **Upgrade savings:** Charting historic performance provides more knowledge for planning better infrastructure expansion based on actual hydraulic performance in the targeted geography. This can save millions of dollars on capital expenses (CAPEX) and operating expenses (OPEX) for over-engineered stormwater systems.

Predictability beyond CSOs

The same analytics capabilities used to provide insights for CSOs have value throughout water treatment, distribution, and wastewater collection applications — and beyond. For example, Tasmanian Water & Sewerage Corp Pty Ltd uses sewage pump station (SPS) data to spot and respond to blockages and spills in ecologically sensitive environments. By analysing just a single data point, whether a pump was running or not, TasWater discovered that the 'time to fill' or time between pump runs was the key determinant of a station's operating profile. When the time between pump runs goes beyond what is normal, it suggests that the wet well (which collects the incoming water from the sewer system) is taking too long to fill and a blockage may be occurring upstream. TasWater created models of normal pump behaviour. Then they used Asset Framework, a part of the OSIsoft PI Server, to set up events and notifications for out-of-bounds conditions.

Using the templates feature of Asset Framework, TasWater quickly expanded the pilot project from the initial pump station to all of the SPS sites in the Midway Point region within a month, and since implementation, the PI System has rapidly expanded in both users and data. All 900-plus employees have view access to PI Vision and more than 240,000 data streams, supporting a range of business and stakeholder requirements.

"The success of the system is attributed to sound governance measures including the establishment of a dedicated Steering Committee, the development of data and system standards and a 5-year roadmap," said Anthony O'Flaherty, Manager Asset Information Quality & Systems. "The Roadmap outlines business projects and general timelines all the while allowing for flexibility and maximising our innovative potential. This approach enables our ability to work effectively with our stakeholders such as shellfish growers for better outcomes."

OSIsoft

OSIsoft Australia Pty Ltd
explore.osisoft.com/l/water-utilities

Upgrade improves reliability and optimises WWTP performance

SA Water's three major metropolitan wastewater treatment plants at Bolivar, Glenelg and Christies Beach process more than 250 ML of sewage every day. That's about five full baths every second. Established in 1966, the Bolivar Wastewater Treatment Plant (WWTP) is the largest of the three plants, treating approximately 70% of metropolitan Adelaide's wastewater and serving approximately one million customers.

The original parts of the Bolivar treatment plant, such as the pumping and power stations and inlet works, were built approximately 45 years ago. As such, the equipment was reaching its end of useful life and a comprehensive and staged upgrade of the SCADA, PLC and communication networks was ultimately required for the entire plant.

The Bolivar catchment covers an extensive area, with 156 pumping stations connected to the treatment plant though a series of gravity and rising mains. It is designed to treat an annual average flow of 165 ML/day and a peak wet weather flow of 500 ML/day.

Critical infrastructure, such as the Bolivar WWTP, needs to be in operation 24 hours a day, seven days a week. This requirement makes downtime, as a result of equipment failure, a situation that is best avoided. Upgrading legacy equipment at the plant was a priority project that required a staged approach.

SAGE Automation was contracted by SA Water to upgrade the site facilities. Barry Higham, Senior Project Manager, SAGE Automation, stated that as a first step, design workshops were conducted to assess the current functionality and then establish what was required. The workshops also provided a valuable opportunity to help establish a collaborative culture within the integrated team, which lent itself to an outcome-focused solution.

At the heart of the plant's existing control system were legacy PLC-5 controllers that are no longer supported but were responsible for the automatic control of wastewater treatment that complies with the Environment Protection Authority's requirements for a licensed wastewater treatment facility.

Given the importance of maintaining uptime at the plant and the risks involved with legacy equipment, the PLC-5 controllers were upgraded to Allen-Bradley ControlLogix with the provision for redundancy. PowerFlex drives were used to power the pumps and the field devices were controlled using the Allen-Bradley CompactLogix controllers. "Our scope was to fully rewrite the PLC logic for all required functionality and install new redundant ControlLogix processors," Higham said.

As part of the update, the legacy ControlNet adapters for the FlexI/O were replaced with EtherNet/IP adapters. "This simplified the process and reduced project risks as the I/O wiring was not impacted or interfered with for this network change," Higham explained. "By using ControlLogix and CompactLogix controllers, we were able to develop the new PLC logic in the RSLogix 5000 environment. Using Add-On Instructions that were defined during earlier stages of the upgrade works, there was no need to develop new code for subsequent stages of the upgrade, which proved to be a great timesaver. FactoryTalk View was used for the HMIs, providing premier integration and the ability to see the entire plant."

A spokesperson from SA Water explained that a key challenge for the project from inception was the ability to transition from the old control system to the new.

"Apart from the complexity behind the wastewater treatment process, transitioning from the old to the new system posed a high risk in terms of plant performance and operability. In order to avert a potential sewage overflow, the cutover process was meticulously planned, reviewed, quality assured and monitored."

One of the biggest challenges encountered during this project was deciding how to respond to a PLC failure. As there are many areas of the plant linked to each other, opening and closing valves has sequential consequences for downstream processes. To address this, each and every possible scenario was considered and, based on this, the resulting outputs decided.

For improved uptime, the plant can be separated into two separate plants with a redundant link between the two. Therefore, if there is an issue with a switch in one part of the plant, connection can be maintained. The diagnostics are available via the controllers through EtherNet/IP and alarming is notified through SCADA so any problems can be fixed with ease to minimise downtime at the plant.

The new system has proved to be significantly more reliable, flexible and robust. With improved diagnostics and feedback, any failure in the plant can be quickly addressed so the plant is up and running again with minimal downtime. This is a noteworthy achievement, especially given the size of the plant, which consists of approximately 5000 I/O.

For a longer and more detailed version of this story, go to: https://bit.ly/2w08h0W

Rockwell Automation
www.rockwellautomation.com/en_au

MULTIFUNCTION CALIBRATOR

With the ability to generate temperature as well as to measure and simulate temperature and electrical signals, combined with pressure calibration capabilities and field communicator functionality, the MC6-T from Beamex offers broad functionality in one device, making it possible to carry and maintain less equipment.

The active multi-zone (triple/dual) temperature control technology ensures a quality temperature gradient and compensates for the heat loss caused by the temperature sensors installed in the insert. The MC6-T is designed for demanding industrial environments, and to minimise the effects of varying environmental conditions, typical in process industry field conditions.

The calibrator includes a built-in multifunctional process calibrator, based on the Beamex MC6 technology. The process calibrator can calibrate temperature, electrical and pressure signals. It can also simulate RTD and thermocouples signals, for calibrating temperature transmitters and other temperature instruments. It can also measure and generate various DC electrical signals, and as a documenting calibrator, communicates with the CMX calibration software enabling a digitalised and fully paperless calibration process.

The MC6-T includes a field communicator for HART, FOUNDATION Fieldbus H1 and Profibus PA instruments. With the help of the built-in communicator, users can calibrate, configure and trim/adjust smart instruments with a single MC6-T without the need to carry a separate field communicator.

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

NEW

HI510 Universal Process Controller

HI510 is an advanced universal process controller that can be configured for many applications requiring monitoring and/or control of process parameters. This controller features a digital probe input that will automatically detect and update the meter with the parameter that it measures. The HI510 offers wall, pipe and panel mounting options. HI510 is designed to adapt to a user's unique process control requirements. To get to know our full range of products, please visit us at hannainst.com.au

I/O FOR THE IIoT

Opto 22 has announced groov RIO, a range of intelligent, distributed I/O for IIoT and automation applications. groov RIO is said to provide the ability to quickly connect traditional wired switches and sensors directly to Ethernet networks, software applications and cloud platforms without intermediary control or communication hardware, such as PLCs, PACs or PCs.

The first shipping version of groov RIO is the GRV-R7-MM1001-10, a standalone, 10-channel, multi-signal, multifunction I/O unit for signals including thermocouples, integrated circuit temperature devices, voltage inputs, current inputs, millivolt inputs, discrete DC inputs, self-wetting discrete inputs, discrete DC sinking outputs and Form C mechanical relays. In addition, two channels provide special features like pulse counting, on- and off-time totalisation, software latching and frequency measurement. The GRV-R7-MM1001-10 is completely standalone and software-configurable through a browser-based interface.

Although many smart wireless sensing devices have begun appearing at the edge, the majority of I/O switches, sensors and transmitters use wired connections. Traditional remote I/O requires an industrial controller or gateway in order to propagate these signals to other systems, which limits their availability to enterprise consumers. By contrast, a groov RIO unit can be installed and operated independently, using its embedded software tools and protocols to share data instantly across the organisation.

Systems 22 Pty Ltd
www.systems22.com.au

CLOUD IoT SERVICE

Available to all Keller AG customers, the KOLIBRI Cloud has been developed to fill the needs of users that want to access their data anytime and from anywhere. People who want to remotely track pressure measurements such as fill levels or monitor limit values can now do it with the KOLIBRI Cloud.

With SSL encryption, the KOLIBRI Cloud enables secure and convenient ac-

cess to measured data. Measurements can be graphically displayed in real time and an export function allows the users to export the data into Excel and CSV formats. The integrated alarm system enables the monitoring of all measuring points — for example, if the water level is high or the battery level is low, a warning message will be sent by email.

During development all aspects of security have been considered, including authentication and encryption based on best practices and standards. The KOLIBRI Cloud API allows custom software to retrieve metrics via HTTPS in a standardised JSON format. In this way, the measurement data can be forwarded to on-site systems, and visualised or processed further on local display software. Open source software and documentation also help users to build their own cloud solutions with KOLIBRI cloud as the basis.

KOLIBRI Cloud is compatible with all KELLER IoT devices: all GSM and ARC series as well the latest remote data transmission units based on IoT protocols such as LoRaWAN.

Bestech Australia Pty Ltd
www.bestech.com.au

MOTORLESS ELECTRIC ACTUATORS

Filling the technology gap between complex, conventional electric actuators and standard air-operated cylinders, SMC's range of motorless electric actuators, the LE series, is said to offer a range of performance benefits.

From installation ease and enhanced flexibility to improved performance, the range is a suitable solution for applications with existing motor platforms that now require a customised solution.

The motorless option is available for a range of electric actuators within the LE series, including the LEFS Slider Type, LEFB Slider Type, LEJS High Rigidity Slider Type, LEY Rod Type and LEYG Guided Rod Type. The LE series is compatible with 16 motor manufacturers, some of which are Rockwell, Mitsubishi, OMRON, YASKAWA and Beckhoff.

In addition, SMC's step motor controller solution, the JXC91 series, can be used to integrate EtherCAT, EtherNet/IP or Profinet communication. It is easy to install, easy to use and requires less labour due to reduced wiring.

SMC Australia | New Zealand
www.smcanz.com
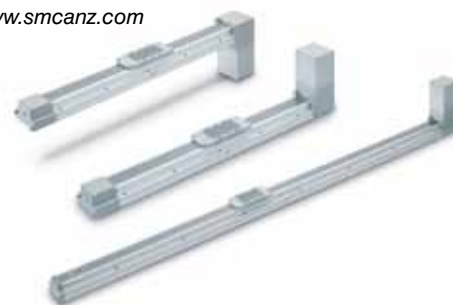
LEVEL SWITCHES FOR SOLIDS

The vibrating fork, paddle, capacitance and vibrating rod switches within the latest Rosemount range are designed to ensure reliable monitoring of solid materials such as powders, grains and pellets in all silo types across industries including food and beverage, agriculture, chemical, power, cement, mining and plastics.

The switches can be used to provide standalone point level monitoring to help optimise filling and emptying cycles. They can also be deployed within an overfill prevention system, helping to prevent wasted materials, environmental impact, high clean-up costs and damage to the silo.

In applications involving light, fine-grained and powdered materials where high measurement sensitivity is required, Rosemount 2511 and 2521 vibrating fork switches provide a cost-effective solution. European Commission ATEX certification permits installation in explosive areas, and all wetted parts are made from corrosion-resistant stainless steel, making them suitable for use in hygienic applications. The Rosemount 2501 rotary paddle switch can be used as a full, demand or empty detector in storage silos or process vessels. The robust paddle design can withstand heavy loads and extreme temperatures of up to 1100°C.

The Rosemount 2555 capacitance switch can be installed in pipes as a limit switch and spillage detector. The switch is suitable for use with materials that have dielectric values as low as 1.5 and is designed to prevent material build-up in applications where there is a risk of coating. The Rosemount 2535 vibrating rod switch provides high chemical resistance due to the fact that it is completely made of food-grade stainless steel.

Emerson Automation Solutions
www.emerson.com/au/automation

TRANSFORMATION OF THE EDGE

ARCHITECTING YOUR INFRASTRUCTURE FOR PERFORMANCE AND RELIABILITY

For most OT professionals long responsible for edge-based computing systems in their organisations, the evolution of the edge may seem like a moving target.

Many companies are looking to their edge computing systems for improvements in the way they collect and process data resulting from the explosive growth of internet-connected devices. Yet for most operational technology (OT) professionals who have long been responsible for edge-based computing systems in their organisations, the evolution of the edge may seem like a moving target.

As business and technology trends continue to reshape how computing happens at the edge, many companies are searching for the best way to select, implement and capitalise on the opportunities that futureproof edge computing strategies offer today.

Welcome to the new edge

Today, many critical operations and processes take place at the edge of an organisation's network, such as unmanned machinery, public safety systems, and power and energy production.

These operations, and the equipment they rely on, are connected to a rapidly growing number of IoT devices. These sensors and devices collect real-time data that can be used to streamline production cycles, improve product or service quality, or shorten response times. As a result, better management of edge data can help the entire business improve critical processes, reduce costs and gain a significant competitive advantage.

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generally have limited or no connectivity to a remote data centre or the cloud. Edge data may be processed directly at the point of origin or it can be sent to a gateway networking device or intermediary server. But either way, the usefulness of the data is often constrained by the scale and capacity limitations of hardware — sometimes 30 years old — that make up most edge infrastructure.

Edge computing today is going through significant changes, starting with increased usage. This offers new pressures as well as new opportunities that together are driving the rapid transformation of what is happening at the edge.

For organisations that capitalise on these opportunities, the payoff can be tremendous. For example, applications related to analytics, vehicle-to-vehicle communications, power production and manufacturing equipment benefit from improved edge computing infrastructure that more effectively processes and uses streaming data from IoT devices and sensors. In these cases, these applications can improve predictive maintenance to prevent defects and optimise production.

Changing requirements of edge computing

Edge systems are usually deployed in remote locations beyond the typical data centre or, by definition, up to the very edge of computing networks. Simplicity is key at the edge, but so too are elements such as serviceability and usability. As talented people become increasingly scarce, edge environments can often only afford to rely on OT professionals that may not be IT-specialised but are still able to get the product serviced and up and running quickly.

Many new edge applications are either holding a significant amount of data or streaming data to other locations, which makes data integrity extremely important. Any failures could cause a break in the data stream, presenting several issues for existing processes or compliance efforts.

Also, applications at the edge generally do not get updated very often. This means companies need technology with a service model and tools that enable them to deploy the system and essentially leave it alone for a very long time. In addition, in many manufacturing environments, edge systems are now being deployed with the intent of keeping them in place for 10 years or more. This contrasts with a traditional data centre where hardware infrastructure tends to be refreshed every three to five years, and its applications and middleware are routinely updated.

Yet reaping these benefits is more difficult than it might appear, especially when attempting to process and manage edge data through centralised cloud-based applications or on-premise data centres. While these computing models have their advantages, they are not particularly well suited to supporting environments where IT staffing is limited, connectivity is poor or expensive, and operations are especially time-sensitive. All of these conditions are usually found at the edge.

The potential of the edge

To overcome such inherent challenges, many organisations have begun to rethink their edge computing infrastructures, which

New trends, complications and opportunities

Organisations computing at the edge today may believe that their existing approach is sufficient — for now. However, many
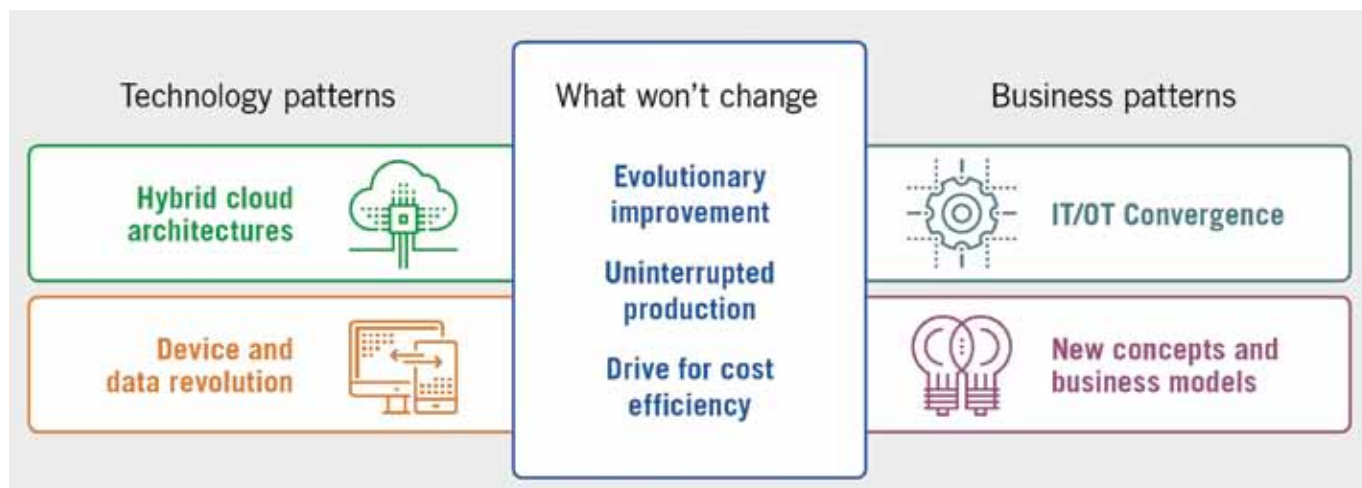
Figure 1: Emerging edge forces affecting industrioal automation.

trends and shifts are occurring in technology that will require them to change how they think and act about edge computing:

- **Device evolution:** Increased volumes will drive down unit costs, making IoT devices cheaper, more capable and standardised. For example, PLCs are already becoming more intelligent, open standards-based and much more cost-effective.
- **OT will evolve:** The OT role will continue to evolve because IT departments are already stretched too thin, and the edge is simply not a top priority for them. OT will assume more responsibility for those technologies that are critical to them, such as edge computing.
- **Increasing machine-based automation:** Emerging technologies such as real-time analytics and AI will increase the criticality of edge data. Automation will become increasingly fast and much more capable, even surpassing the limits of human ability.
- **New vendors and new business models:** New technological solutions, such as AI, machine learning and advanced analytics will continue to drive innovation, agility and capital efficiency. Organisations must consider partnering with vendors, technology and solutions that are best suited to their long-term strategies.

Clearly, operating at the edge will continue to require new ways of thinking and acting. These trends must be carefully evaluated by any organisation deploying an edge computing strategy.

Today's solutions fall short

There is widespread recognition that today's edge-based systems need new enabling technologies to meet changing demands. However, the supply of such technologies lags behind the need.

There are computing/communications technologies available that address the industrial automation (IA) sector. However, they tend to focus on the needs that IA end-user customers have had for decades, rather than on edge-specific pressures (such as the need to perform predictive maintenance or integrate with big data analytics) that are driving the IA field today. As such, they represent a suboptimal combination of capabilities and deficiencies.

Examples of these technologies include:

- IA network computers from traditional data-centre vendors can collect data from sensors or devices on the edge and send it to a data centre or public cloud. They are less expensive than other classes of edge solutions, but do not scale up well, and do not provide continuous availability or operational simplicity — both of which are essential on the edge.
- Hyper-converged platforms integrate data capture, control, compute and storage capabilities in a single hardware device. They emphasise operational simplicity and can perform real-time analytics at the edge, but at the sacrifice of continuous availability and affordability.
- High-availability solutions rely on virtualisation to deliver higher levels of availability at acceptable cost, but sacrifice operational simplicity by requiring IT-level skill sets. Many also lack the computational strength and performance required for real-time data synthesis and analysis.

Clearly, the 30-year-old industrial control systems that are still the norm in many manufacturing and IA settings need a substantial upgrade to move towards the Industrial IoT, pervasive clouds and fog computing. However, a rip-and-replace approach will not work. The challenges facing these companies during their transition to the edge includes continuing to collect data from their legacy systems, extending the lifecycle of those systems where possible and incrementally adding capabilities.

Additionally, not all companies need to move all the way along the continuum of the edge. Their business needs will dictate how much of an edge transformation they require. Yet in order for any organisation to reap the maximum benefits that the evolving edge can deliver to its business, a new technology approach is needed.

The ideal solution

To overcome these shortcomings, an ideal solution would satisfy enterprise edge needs for reliable, scalable, high-performance computing. Furthermore, it would deliver these near-term benefits, and meet current requirements, as well as accommodate an evolving edge infrastructure.

Figure 2: New considerations for edge solutions.

More specifically, the essential attributes for a move to the edge include:

• Operational simplicity that provides low-touch to zero-touch operation, serviceability and usability — all critical since IT resources are scarce at the edge or on the plant floor.

• Uninterrupted production for no unplanned downtime, plus the assurance of data integrity, since newer edge applications either hold large volumes of data or stream data to remote locations (such as the cloud).

• Virtualisation and reliability capabilities that enable manufacturers and industrial automation organisations to deploy highly available — yet highly efficient — business-critical systems and databases.

• Interoperability designs that leverage current standards (eg, operating systems) as well as emerging standards that will enable devices and systems to operate with each other.

• Cybersecurity, including built-in protection of all components of the edge computing system, the data they handle and their communications with each other and externally.

An example of edge-optimised architecture and delivery

Today, industry-leading technology vendors are delivering an innovative new edge infrastructure approach that incorporates all the attributes described above. More, this solution is comprehensive — a complete, turnkey computing platform that enables IA companies to update ageing systems, virtualise industrial control applications and increase operational efficiency.

This new edge approach consists of three essential elements:

• **Zero-touch computing platform:** An automated, fully integrated and self-protecting industrial computing platform that reduces the need for IT support while increasing operator efficiency and lowering downtime risk.

• **Software-defined edge infrastructure:** A single interface to a full stack of essential applications, including virtualised compute, storage and networking; cybersecurity; IoT gateways; VPNs; routers; analytics; and artificial intelligence.

• **Proactive managed services:** A revolutionary approach to deploying, monitoring and maintaining edge solutions and infrastructure. Unlike yesterday's reactive service, such a proactively managed service can be easily overseen by OT professionals, executed by the system itself and supported by a single, locally based service provider.

The combination of all three elements — a zero-touch computing platform, the software-defined edge infrastructure and proactive managed services — creates a new infrastructure solution that is optimised for organisations at the edge.

Key advantages of the optimised solution are:

• It is suitable for running business-critical industrial applications quickly and reliably in remote, locations with limited or no IT resources.

• It increases operational efficiency with pre-installed virtualisation software and intuitive, user-friendly configuration and management tools.

• It is easy to deploy and can be installed quickly by users, reducing the time it takes to get critical applications up and running.

• It reduces IT's burden with self-monitoring and self-protecting capabilities that make it useful for unmanned facilities.

• It predictively prevents unplanned downtime, via redundant on-premise systems backed by a managed service cloud.

• It supports multiple ecosystems — a wide range of architectures and applications, without modification.

Such a comprehensive edge platform satisfies the essential requirements of the today's edge environment, including operational simplicity, virtualisation, uninterrupted production and interoperability.

Stratus Technologies Pty Ltd
www.au.stratus.com

Cobots improve palletising and ergonomics at Unilever

Unilever is one of the world's largest companies within the fast-moving consumer goods (FMCG) industry and the owner of around 400 brands, available in over 190 countries. The company has four production plants in Poland. One of them, in the town of Katowice, specialises in packing tea delivered to the factory in 25 kg sacks.

The plant employs around 400 people working in two production halls. Dariusz Ratajczak, Automation Senior Specialist at Unilever, explained that for a long time the company faced difficulties in keeping and finding employees for monotonous, manual tasks related to packaging and palletising — tasks that were often also strenuous due to the product sizes handled. Unilever needed a solution automating these processes; however, finding a flexible robot with appropriate payload and reach, as well as intuitive handling and programming was challenging. Particular tasks were to be divided into sub-processes in order to systematically automate individual phases, freeing people from strenuous tasks and involving them in more value-added ones.

"Each year a decreasing number of people apply for positions related to palletising but in our plants this is a key process which has to be performed efficiently," Ratajczak explained. "For packaging we needed a robot with enough reach of the arm. The task that the robot needed to fulfil consisted of picking various boxes with tea and placing them on a pallet."

Unilever automation specialists had considered a ready-to-use solution such as palletising robots. Taking the pros and cons into consideration, the team decided that cobots would be more flexible and easier to use — and would deliver a quicker return on investment.

"We considered many solutions, but finally we decided to test robots by Universal Robots," said Dawid Mroczek, Automation Specialist at Unilever.

The UR10 cobot, with a reach of 1300 mm and payload of 10 kg, was comprehensively tested in the Unilever plant. While performing the task of tea packaging, a vacuum gripper was used. The tests went well and so the company decided to go ahead and deploy them. Implementation of the first cobot was done by the Biuro Inżynierskie IEC company and took around three weeks. The basic training for the automation team of Unilever related to programming of robots was given by the local distributor of UR cobots, Encon-Koester.

Unilever fully automated two production lines in Katowice where six UR10 robots now handle tasks related to packing of the tea. Before implementing automation, all these tasks had been performed by a human. Operators spent around 70% of the time packaging and 30% palletising. With the palletising now entirely automated by the cobots, the operators have been freed up from 30% of the tasks. Cobots perform the most tiresome work and are also very efficient, palletising around 1100 boxes during an eight hour shift.

"Implementation of the first UR cobot took about three weeks," Mroczek recalled. "Now it can be deployed in just a few hours. The programmer's task is to define the boxes' picking points and boxes' sizes."

The robots' programming depends on the shape and size of cardboard packaging. However, in all cases this process is similar. After reaching the specified number of boxes on the pallet, the UR10 starts the next layer. The pallet usually contains six to 10 layers and has 10 to 21 boxes in each layer. When the packaging process on one layer is completed, the cobot calculates the new height and marks the starting point for the next one. When the operator notices that the UR10 begins to stack cartons on the next pallet, he departs with the already loaded pallet. Completing the pallet takes a cobot about 20 to 30 minutes.

"My first experience in robot programming was achieved through the UR Academy website," Mroczek said. "In our team, we exchange experiences and systematically increase the complexity of the functions used with more advanced scripting programming. Programming at the basic level is extremely intuitive. Currently, we use mainly advanced scripting programming, because it allows us to speed up and unify the creation of programs which is achieved by defining ramps and sizes of boxes in the program."

"Deployment of UR10 cobots enabled us to reduce the packaging time while improving the work ergonomics considerably," Ratajczak said. "Before automation, employees had to perform monotonous tasks involving bending over to place boxes on lower layers of the pallet. This most difficult activity was totally eliminated by the UR robots."

Implementation of collaborative robots is also being considered at other Unilever plants with automation specialists from Katowice willing to share their experience, explaining how they solved the palletising problem with cobots. The Katowice team also works on automating the process of depalletising, enabling the cobots to pick materials for production.

Universal Robots
www.universal-robots.com

HIGH-SPEED CAMERAS

The i-SPEED 220 and i-SPEED 221 from iX Cameras have a high-resolution 1600x1600 CMOS fast-transfer sensor allowing for the imaging of minute details even when zoomed in. The maximum full frame rate of 600 fps with both a global exposure shutter and optional G-shock housing makes this a high-speed camera suitable for application in fields such as robotics, auto-crash testing, graphics inspection, 3D biomechanics and web inspection.

The i-SPEED 220/221 high-speed cameras fit in a briefcase, consume little power and create images that can be zoomed and analysed. Image transfer is simple via Ethernet. The 1 h battery that comes standard on the model 221, coupled with a standard laptop, makes this camera suitable for portable field work. Extra durability can be added with the optional Hi-G shock package.

The cameras provide a variety of storage levels of 2, 4, 8 and 16 GB, allowing for everything from discrete transient event capture to extended full resolution record times of over 11 s. The cameras come in either a monochrome or colour version.

Control 2 Series software provides a user-friendly interface for recording, playback and editing of i-SPEED 2 high-speed videos.

Other features include certification to 100g shock, 10g vibration and long recording times with up to 16 GB memory (Model 221 only), and the small package fits on microscopes and in tight spaces.

SciTech Pty Ltd
www.scitech.com.au

VARIABLE AREA FLOWMETER WITH HART

The Krohne DK32 variable area flowmeter is now available with an electrical signal output. The updated version DK32/ESK3x with 4–20 mA/HART 7 communication can be used for continuous monitoring, logging or control of low flow applications with liquids and gases.

Being in the Krohne range for over 60 years, the DK32 series is designed for small flows, typically used in 4–12 mm pipelines, with local indication of current flow via the mechanical scale. It features a compact design, no need for straight inlet and outlet sections, and an adjusting valve for flow regulation. With available hazardous area approvals, typical DK32 areas of application include process or carrier gases, dosing of chemicals or additives, vessel inertisation, purging, monitoring of analyser sample flow or seal gas/barrier fluids.

While previously only MIN/MAX limit alarms were possible in these applications, the updated version DK32/ESK3x can now transmit the current flow to a control system via 4–20 mA/HART 7.

KROHNE Australia Pty Ltd
www.krohne.com.au

LOCKOUT DEVICE FOR SAFETY SWITCHES

The Pizzato NS series of safety switches make it possible to achieve maximum PLe and SIL3 safety levels by installing just one device on the machine. This avoids additional wiring and allows for quicker installation.

The LK S lockout device for the NS series safety switches is of metal construction and is attached laterally to the holes on the NS device, without any auxiliary fixing plate or support.

The red sliding plate, in addition to mechanically closing the actuator entry hole, also functions as a shield for the RFID receiver antenna on the NS switch, therefore ensuring an additional level of protection against accidental closure of the guard and untimely restart. This is particularly effective for machines with an installed low-level coded actuator, making any attempt to bypass the switch impossible. When the door is raised a ring emerges on the top of the device, allowing insertion of up to five padlocks.

The shape of the sliding plate that seals the actuator hole allows the lockout device to be used on both hinged and sliding guards and on both left and right sides.

Leuze electronic Pty Ltd
www.leuze.com.au

RUGGED TABLET

Dell has announced the Latitude 7220 Rugged Extreme tablet, which has been built to meet the demands of workers in harsh environments.

The lightweight and rugged 12″ tablet is designed to provide the mobility, durability and connectivity required to help field users and mobile workers stay productive.

Updated features include an enhanced 1000 NIT FHD display with antiglare coatings, allowing users to access their work even when out in direct sunlight. The screen is also glove responsive and multitouch capable, ensuring ease of use while on the job.

The tablet can be configured to individual user needs, with options including the latest 8th Generation Intel Core Processors with up to 2 TB of PCIe solid-state drives.

The tablet has passed MIL-STD-810G/H testing and is also IP-65 rated for protection against dust, dirt and water ingress, along with hazardous location Class 1 Div 2 certifications. It has been drop tested from 1.3 m and tested to withstand -28 to +60°C temperatures.

Optional dual hot-swappable batteries and on-the-go charging help to achieve uninterrupted operation, while 802.11ax Wi-Fi, global 4G/LTE broadband and assignable RF pass-through options for WWAN, WLAN and GPS mean users can easily stay connected wherever they are.

Dell EMC
www.dell.com

CONVEYOR ROLLER MODULES

G20 ZPA roller modules from Pepperl+Fuchs are designed to offer simplicity and flexibility. Integrated logic allows the modules to independently control 24 VDC motor rollers in conveyor systems without a higher-level control system.

Application-specific settings can be made directly on the modules and operation is simple. All settings required for operation can be made using a rotary switch on the back of the module. Eight speeds, five start/stop ramps in combination with the conveying direction and seven application-specific operating modes can be set quickly and easily.

The module's compact design enables space-saving, tool-free mounting directly onto conveyor line support rails — required connection cables are already integrated into the module. This is designed to make connecting the motor rollers and sensors and wiring the module especially easy. The intelligent modules operate using neighbourhood detection and are immediately ready for operation once connected. With the G20 ZPA roller module, the infeed of packages on conveyor belts can be adjusted to match the rate of packages leaving the conveyor belt — individually and without time-consuming programming. The module operates without a fieldbus infrastructure, control system, special tools or additional cables.

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

OPINION
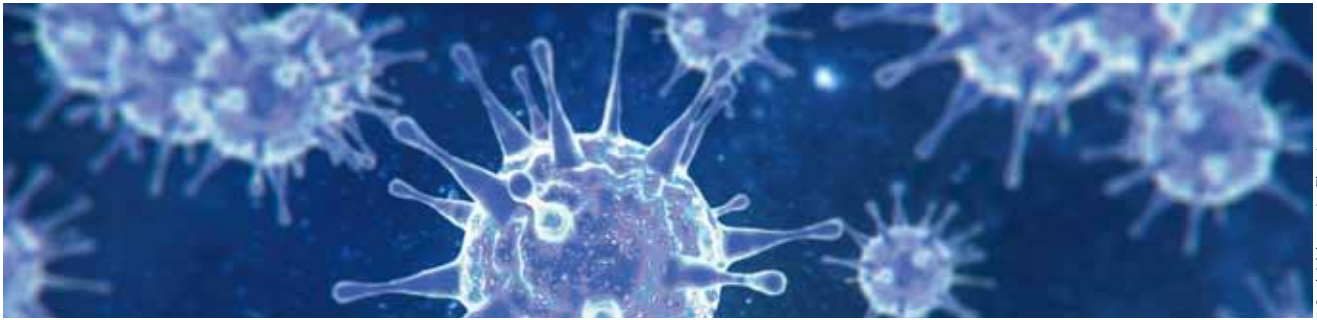
HOW THE CORONAVIRUS PANDEMIC CAN DELIVER NEW OPPORTUNITIES FOR AUSTRALIAN INDUSTRY

Global industry has been hard hit by the coronavirus pandemic, with many Australian businesses now struggling to survive. In many sectors, businesses have had no alternative but to close their doors.

The next few months will bring high levels of uncertainty, with disruptions certain to continue, before government recovery programs start to gain traction.

These tough times are obviously a worry for many organisations, but it could also be a period of new opportunity for others. Supply chains that are agile enough to react quicker than those of their competitors, or those with more robust risk management plans, might find themselves gaining greater market share as a result of this crisis.

For many businesses, the coronavirus crisis has pushed automation to the top of the agenda. Once again, it brings into focus the imperative to increase automation in the logistics and delivery chain.

In a global pandemic such as COVID-19, technology, AI and data science have become critical to helping societies effectively deal with the outbreak. In several countries the healthcare sector has been deploying mobile robots to complete vital tasks such as cleaning and sterilising and delivering food and medicine to reduce the amount of human-to-human contact. And most importantly, supercomputers are working globally in a race to find a coronavirus vaccine.

The crisis has put a spotlight on how automation can help smart companies to survive in these challenging times. Now, more than ever, companies are seeing the need to embrace Industry 4.0 technology incorporating the IIoT and AI systems.

But the IIoT works best when it's fully integrated within the automation system. This means one total automation solution, involving control, motion, safety, machine vision systems and, of course, robotics.

One of the advantages gained from IIoT is the data it amasses. This data can be analysed and trawled through by high-powered computers to find anomalies, which in turn can lead to improvements in production.

Smaller scale systems can hold the data they generate into a locally maintained database, and from there it can be analysed, displayed and archived, as required. However, facilities within the cloud need to be utilised for larger-scale production systems. The data generated is often referred to as "big data", because of its enormous size.

But the cloud offers far more than massive capacity. Data storage costs are lower, and systems are easily scalable. Also, high performance can be maintained and this is not dependent on the amount of data stored.

To analyse big data requires very sophisticated BI (business intelligence) tools. These are usually integrated with the services provided by the cloud vendor. Microsoft's Azure, Google Cloud and Amazon Web Services are three such providers. However, data of this magnitude can only be generated effectively when it comes from one homogeneous control system that automates the entire process. It needs to be responsive to the interactions between the different aspects of the processes.

"Social isolation" is now the norm throughout society and this includes factories. In response, manufacturers are now looking to utilise robotics to overcome shortages of staff, who must be kept in isolation. Simple warehousing tasks, such as material transport from one area to another, can now be implemented easily by mobile robots.

Today's mobile robots can reliably convey loads of several hundred kilos, at around the same speed as humans walking. They can detect obstacles and navigate around them by automatically re-routing from a map that's stored internally. They no longer require tapes on the floor or beacons in the air — the inclusion of onboard scanner systems ensures safety is not compromised. Mobile robots can truly work collaboratively with humans.

Conventional fixed- 'mounted pick-and-place robots have also provided many years of faithful service to food manufacturers in particular. These will continue to operate regardless of the virus!

A more recent development in the pick-and-place market has seen the emergence of cobots, specifically designed to work side by side with humans, without putting them in any danger.

Also, in coming months, expect to see more machines deployed in hazardous environments including the healthcare sector to protect workers from risks, such as infection.

This pandemic has also highlighted the need for greater hygiene in the workplace — particularly in the food and beverage, hospitality and pharmaceutical sectors — where human contact must be minimised.

Companies can better prepare for future supply chain risks by investing in capability, big data analytics and technology, like the IIoT. While it's impossible to predict the ultimate cost of this pandemic, business should take COVID-19 as an opportunity to learn from the dire consequences caused by under-preparation.

The big question is whether Australia's $100 billion manufacturing sector will take advantage of the opportunities that will eventually flow. Companies that can provide high-tech, automated solutions will be well placed to gain a competitive edge.

Harry Mulder is Engineering Manager, Omron Oceania, and has been working with industrial control systems for almost 30 years.

PRESSURE CONTROLLER FOR DOSING

When dosing quantities of very small amounts as well as managing the pressure differences between dosing cycles, closed-loop control becomes a challenge.

The Bürkert Type 8763 pressure regulator has been specially developed for low flow rates and the resulting small dosing quantities. The device is characterised by short response times and precise closed-loop control of pressure. There are no down times or rejects at the beginning of dosing cycles. The digital interface makes it possible to access the various parameters at any time in order to change settings and read out data. Whether operating filling systems or machines for genetic analysis and synthesis, a good valve alone is not enough. Precise pressure regulation is also essential for accuracy in time-pressure dosing. Only in this way can accurate dosing be implemented.

The Type 8763 offers repeatable and accurate dosing of liquids in the μL range, with a response time in milliseconds and active pressure relief for optimum control performance. Digital communication permits easy integration into a fieldbus network, and extended functionality is available through an additional sensor input and actuator output for pump or additional pressure sensor. An active vent valve also helps to minimise the consumption of costly carrier gas.

Burkert Fluid Control Systems
www.burkert.com.au

DATA STATIONS AND HMI PANELS

Red Lion's Crimson 3.1 range of data stations and operator touch interface panels for multi-vendor cloud connectivity offer 300 industrial built-in protocols including MQTT, SQL and OPC connectors.

The Crimson 3.1 configuration platform offers simplified drag-and-drop development. It solves the remote firmware, configuration and version tracking problem that Linux OS boxes often suffer from, and its compatibility with other manufacturers such as ABB, Emerson, Rockwell Automation, Schneider Electric and Siemens makes the Red Lion Crimson 3.1 platform a suitable option in many environments.

The Crimson 3.1 platform exposes PLC and machine data beyond the operational environment, enabling enterprise business systems to achieve a smooth transition of direct access to real-time and historical operational data using MQTT.

Control Logic Pty Ltd
www.controllogic.com.au

WIRELESS DIFFERENTIAL PRESSURE MODULE

The Dwyer Series DP3 wireless differential pressure module is a compact auto-ranging differential pressure module suitable for low flow applications. The Series DP3 is used in conjunction with the Dwyer Mobile Meter application software to view pressure drop across filters, static pressure in ducts and velocity pressures from pitot tubes or air flow stations. Its auto-ranging technology is designed to maintain optimal performance down to 0.1″ H20, and the unit can be mounted on both the pitot and velocity grid.

Over-the-air updates ensure the module has the latest firmware, and the rechargeable battery allows for a 10 h battery life. The one-button design allows for easy operation and simple logging, and the unit can automatically correct the pressure reading depending on the inclination of the module.

Applications include building commissioning, HVAC test and balance, industrial process verification and instrumentation validation.

Dwyer Instruments (Aust) Pty Ltd
www.dwyer-inst.com.au

ADHESIVE GRIPPER

OnRobot has launched a compact, single-pad version of its Gecko no-mark adhesive gripper. The Gecko Single Pad (SP) gripper brings the same capability to automation applications with small footprints and lower payload.

The Gecko SP is available in three sizes (SP1, SP3 and SP5) named after the gripper's payload in kilograms, and features the ability to lift a wide range of flat, smooth, shiny or perforated surfaces. Because the technology doesn't mark even high-shine surfaces, it eliminates the need for a cleaning step in manufacturing processes, saving time and improving output. The product can also grip perforated workpieces such as printed circuit boards, aluminium mesh or head gaskets.

The Gecko gripper technology uses millions of microscaled fibrillar stalks that adhere to a surface using Van der Waals forces — the same way that geckos climb. The technology requires no compressed air or external power, saving costs and maintenance, and can be implemented quickly and easily through OnRobot's One-System Solution platform with little or no programming on any major collaborative or light industrial robot arm.

Scott Automation & Robotics Pty Limited
www.scottautomation.com

Ex d CABINETS

Stahl's EXpressure technology is hoping to revolutionise the science of flameproof enclosures. EXpressure safely dissipates explosive pressure inside the enclosure outwards via flow channels in a multi-layer stainless steel grid wire cloth. The wire mesh absorbs the heat energy and dissipates the pressure inside to less than 1 bar, restricting the explosive energy away from the external hazardous environment. This technology means wall thickness is reduced to just 2 mm, resulting in EXpressure Ex d cabinets being 50% lighter than traditional solid 30 mm cabinets.

The design enables low lead times in cabinet production and fast project engineering of explosion-protected control panels and distribution boards. What traditionally was housed in a 2 m-wide cabinet is now able to fit in a 1 m-wide EXpressure cabinet. The pressure venting technology enables the manufacturing of larger box volumes and removes the need for multiple small conventional cubicles. An option for double-winged doors additionally reduces installation and commissioning labour time by the removal of the centre door bar, increasing work area access and a 25% greater installation footprint.

Control Logic Pty Ltd
www.controllogic.com.au

POSITIONING SENSOR FOR HIGH-BAY STORAGE

The IPS 400i camera-based positioning sensor is designed for optical compartment fine positioning in high-bay storage devices.

The previous model IPS 200i camera-based positioning sensor was designed for single depth high pallet racks and small-part container storage. In contrast, the IPS400i detects round holes or reflectors not only in single-depth, but also double-depth bars and thus determines the position deviation relative to the target position in the X and Y directions. This makes the sensor particularly suited to use in double-depth pallet high-bay warehouses.

A model with integrated heating for use in refrigerated warehouses down to -30°C is also available. Both variants — IPS 200i and IPS 400i — offer the user simple and fast commissioning and operation. The sensors are put into operation using a web-based configuration tool with a user-controlled installation assistant. Printed configuration codes are read in without a PC via Code Generator, which means that configuration adjustments can be made directly on the high-bay storage device. An alignment system consisting of four feedback LEDs further facilitates the commissioning process.

Due to its ambient-light-independent IR LED lighting, fault-free use in warehouse technology is possible with one single device for a working range of up to 2400 mm. With the integrated TCP/IP interface and Profinet RT, the IPS 400i can be directly integrated into the network environment and enables quick, location-independent diagnostics. Condition monitoring and predictive maintenance take place using a quality score that detects deterioration in the reading performance of the sensor at an early stage.

Leuze electronic Pty Ltd

www.leuze.com.au

DATA GATEWAY

The WISE-710 Data Gateway is a solution for connecting legacy equipment to mesh networks. It is powered by an NXP i.MX 6 DualLite processor and equipped with two Gigabit Ethernet ports, three COM ports, four digital I/Os, a micro-USB port and a microSD port.

Aimed at harsh industrial environments as well as in-cabinet applications with limited space, the WISE-710 terminal features a compact form factor and wide operating temperature range (-20 to 55°C). To enable remote management, the device supports a wide range of Wi-Fi, 3G, 4G/LTE and NB-IoT wireless modules that facilitate long-distance data transmissions, over-the-air (OTA) updates and real-time communication.

The WISE-710 is also equipped with Advantech's WISE-PaaS/EdgeLink protocol conversion software, which supports more than 200 communication protocols (including Modbus, DNP3, OPC-UA, MQTT and IEC-60870-5-104) to enable data collection from legacy devices. In addition to facilitating data integration, WISE-PaaS/EdgeLink supports user-defined data acquisition periods for each input interface, thereby reducing the volume of data transmitted and stored on the cloud. This combined with the software's plug-and-play functionality dramatically reduces programming and ensures easy application development and deployment.

Considering the importance of cybersecurity amid the rise of the IoT, the WISE-710 terminal is also embedded with a Microchip ATECC508A security chip that provides ultra-secure hardware-based protection and security for cloud service data operations.

Advantech Australia Pty Ltd

*www.advantech.net.au*

THIN CLIENT COMPUTERS

The Pepperl+Fuchs BTC14 box thin client is said to meet all the requirements for an ultra-rugged industry thin client. The compact, ruggedised IP4x aluminium housing can withstand the stress of challenging ambient conditions in process industries. With an extended temperature range of -20 to +60°C and a fanless design, the BTCs can be flexibly installed in extreme temperatures and stowed in cabinets, drawers or containers. Users of the industrial box thin clients will benefit from long-term availability of both hardware and software.

Pepperl+Fuchs' thin clients are based on industrial components that are available for a long period of time and ensure high reliability. The pre-installed VisuNet RM Shell 5 firmware is based on Microsoft Windows 10 IoT Enterprise LTSB, which includes long-term support by Microsoft.

The BTC12 is equipped with two DisplayPort interfaces, while the BTC14 comes with four DisplayPort interfaces that support up to four Ultra HD monitors with 4K resolution at 60 Hz. The pre-installed VisuNet RM Shell 5 firmware simplifies configuration and set-up of box thin clients so that the BTC12 and BTC14 can be set up within minutes. Combined with the additional VisuNet Control Center software, users can efficiently and conveniently configure and manage all VisuNet thin clients.

Pepperl+Fuchs (Aust) Pty Ltd

www.pepperl-fuchs.com
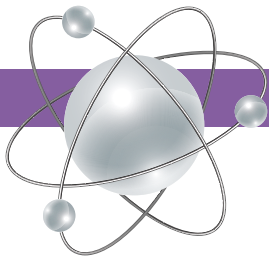
Condition monitoring and data analysis in the cloud

Machine tools are precision apparatuses. They mill, turn and grind workpieces with micrometre accuracy. This precision can be achieved only when mechanical parts are working together perfectly and nothing vibrates. Vibrations can be transmitted to the tools and ultimately lead to errors and inaccuracies in the finished workpiece. When things go wrong, complaints follow and hit the manufacturer financially. That's why it's important to recognise damage or wear in machines at an early stage, and for this reason many machines are monitored by sensors that can recognise that a component is slowly becoming worn. The sensors can issue a warning signal that the part should be replaced before damage occurs. There are now numerous such predictive maintenance systems on the market.

Generally, however, predictive maintenance systems remain standalone solutions. Although they issue a warning so that a component can be replaced, this valuable information is rarely put to further use. Experts from Fraunhofer IPK in Berlin have now developed a system that does much more with predictive maintenance. They integrate the sensor technology into an internet platform that stores the full life cycle of one or more machine tools. This paves the way for comprehensive data analysis, which can be used to optimise machines or entire work processes.

Headed up by Claudio Geisert, Deputy Head of the Production Machines and System Management department at Fraunhofer IPK, the team chose to demonstrate their work using a key component of a machine tool: a ball screw drive, which moves a workpiece carrier in the machine extremely precisely back and forth on a spindle.

Such spindles can wear out over time, which leads to unwanted vibrations that can create faults in the workpiece. At the heart of the smart maintenance system developed by Fraunhofer IPK is a sensor circuit board that contains a commercially available sensor chip known as a microelectromechanical system (MEMS). These MEMS are small silicon components that accommodate various interconnected technological modules on their surface. In this way they can, for instance, measure environmental stimuli, such as vibrations, which can be analysed by a connected processor. The MEMS and processor together form a sensor node.

"Millions of MEMS like these are fitted in cars and smartphones today. They are cost-effective and yet sufficiently precise for our purposes," said Geisert.

An important element is that the processing of the sensor signals takes place directly on the sensor node. Consequently, the processor recognises a fault by itself and can pass this information on.

The information is transmitted to an IoT platform, which sends an alarm to the service headquarters, which then decides what to do. For example, it might set a suitable date for replacing the spindle to avoid production downtime due to machine stoppages. In addition, this IoT platform contains a digital twin of the machine tool — a digital copy that contains the history of the machine and all conditions and operating parameters. If, in the end,

Demonstrator set-up with two recirculating ball spindles.

Image ©Fraunhofer IPK.

the defective spindle is replaced, the digital twin also receives the information that it now includes a new component.

"Replicating the actual condition of machine tools facilitates comprehensive analysis," explained Geisert.

The operators of the machines would be able to recognise, for example, whether certain processes on the machines significantly increase wear, enabling work processes to be adapted accordingly. And the manufacturers of the machine tools can gain valuable indications for further optimising their systems.

"Ultimately, this lets you call up and analyse the history of an entire fleet of machines to find possible weaknesses," added Geisert.

But connecting the real machine with the IoT platform also has advantages for the on-site staff who service the machine. In the IPK solution, technicians first scan a QR code on the machine in order to verify that they are working on the right machine. This is particularly important in companies that have entire machine fleets. The component can also be scanned and compared against the data in the digital twin — to ensure that another component isn't replaced by accident. In addition, employees can use a tablet computer to call up instructions for fitting and removing a component. Once the repair is done, they can start a test run directly from the machine. If everything has gone well, they press an OK button to give the signal to update the component in the digital twin as well.

"By connecting the machine and the sensors to the IoT platform, we now get, for the first time, a holistic picture of a machine or an entire fleet," said Geisert. "This will enable large companies to monitor their full fleet of machines across individual locations."

The IPK solution is already so far developed that it can be used in industrial applications. It offers the possibility to adapt these technologies to the specific needs of various users.

Fraunhofer Institute for Production Systems and Design Technology IPK
www.ipk.fraunhofer.de/en.html

DISTRIBUTION BOARDS

The DB Ultimate range of distribution boards from APS Industrial is purpose-built for compatibility with Siemens circuit breakers, with an enclosure by Rittal, KATKO switching technology and Weidmüller surge protection.

The DB Ultimate, part of the 'DB family' of distribution boards, also features a removable one-piece gear tray assembly that enables full assembly and wiring independent of the enclosure. This feature provides higher flexibility in design, assembly, installation, commissioning and future retrofitting.

Suited to high-end industrial applications, the DB Ultimate is an industrial distribution board designed for heavy-duty environments and comes standard with a Rittal IP66/IK08 rated enclosure, removable top and bottom gland plates, dual earth neutral bars, and top and bottom DIN rails.

The enclosure has continuous poured door seal, a removable hinged and reversible escutcheon and door, a semi flush Rittal swing handle and a 3-point locking system. In addition to the core set of standard features, the DB Ultimate range offers a full complement of accessories.

APS Industrial
www.apsindustrial.com.au

EDGE COMPUTER

The HYDAC Data+ edge computer is described as a flexible, expandable and customisable device designed for fast data processing and control at the edge. The system runs a Linux OS and it is therefore possible to add functionalities as required.

The Data+ edge computer has a software platform pre-installed so that no software is required to get it going. This also ensures that all of the software and functionality of is fully maintained within the Data+, and the data can be stored locally on an SD card.

In terms of communication, the data can be sent to a higher-level system via an Ethernet connection, utilising Modbus TCP, Profinet, TCP/IP, UDP/IP or OPC UA. Sensors are accommodated via IO-Link masters or other remote I/O modules via Modbus TCP, Profinet or CANopen.

For visualisation, a software framework is included that offers web visualisation capabilities, as well as a database (up to 128 GB) and database extensions to view, manage and control data effectively and easily. Node-Red provides the user with a graphical interface to manipulate data.

All parameters and sensors that are being monitored can have customisable alarm settings, which can be modified via the web visualisation HMI.

The device has an IP65 protection class and also offers a USB 2.0 port. Bluetooth and Wi-Fi are available as options. Operating temperature range is -20 to +85°C.

HYDAC International
www.hydac.com.au

RUGGEDISED GPU COMPUTING PLATFORM

The Neousys Nuvo-7166GC Series ruggedised GPU computing platform supports NVIDIA Tesla T4 and Intel 9th/8th-Gen Core processors with dual PCIe.

The NVIDIA Tesla T4 inference accelerator can provide 8.1 TFLOPS in FP32 and 130 TOPs in INT8 for real-time inference based on a trained neural network model. Powered by an Intel 9th/8th-Gen Core 6/8-core CPU and 64 GB DDR4-2666, it is claimed to offer an optimal balance between CPU, GPU and memory performance.

The Nuvo-7166GC utilises Neousys's Cassette Module that has an Air Tunnel Design to guide intake air to flow through the passive heat sink of NVIDIA Tesla T4. The cassette module is equipped with a second fan to deliver air flow for a second performance PCIe card installation. This cooling design permits operating temperatures of up to 60°C with sustained 100% CPU and GPU loading.

The system features an M.2 NVMe interface that supports ultra-fast disk access and USB 3.1 Gen2/GbE/PoE ports for data input. The cassette module also offers an additional Gen3, x8 link PCIe slot for installing a high-performance PCIe card or a variety of sensor or image acquisition cards.

Backplane Systems Technology Pty Ltd
www.backplane.com.au

SWIR CAMERA

Designed for short exposure time applications, the C-RED 3 from First Light Imaging is a fast VGA uncooled camera for short wave infrared (SWIR) imaging. Optimised for low size, weight and power, the camera is based on a TECless InGaAs sensor sensitive from 0.9 to 1.7 μm with more than 80% QE typical response. The C-RED 3 SWIR camera captures full frame images at 600 fps. With <50 electron readout noise, the camera is suitable for applications such as semiconductor inspection, quality and production control, waste sorting, non-destructive testing, environmental monitoring, welding, laser alignment and UAV and security surveillance.

C-RED 3 SWIR camera incorporates a TECless 640 x 512 InGaAs PIN photodiode detector with 15 μm pixel pitch for high-resolution imaging. This detector embeds an electronic shutter with integration pulses shorter than 1 μs. C-RED 3 supports a high dynamic range mode providing 93 dB dynamic range and true 16-bit linear response. The camera can also work in AGC mode (automatic gain control) with standard dynamic range.

The camera is capable of windowing and multiple onboard functionalities. The software allows for real-time applications, and the interface is CameraLink full or USB3. The software allows real-time applications and is suitable for stable temperature environments.

The C-RED 3 SWIR camera also exists in an OEM module for easy integration in larger systems.

SciTech Pty Ltd
www.scitech.com.au

INDUSTRIAL FIREWALL

Belden has released its latest Hirschmann EAGLE industrial firewall to meet the evolving cybersecurity demands of today's industrial automation networks.

Together with the Hirschmann Security Operating System (HiSecOS), the EAGLE40 firewall is said to offer a comprehensive solution to securely monitor communication flow. Specifically designed for OT applications, the device hardens networks at the factory floor, especially those requiring high-performance support, such as within industrial and process automation systems.

The EAGLE40 offers increased performance and security, with more port options, increased bandwidth and encryption capabilities.

It also has improved configurability for all skill levels with a comprehensive graphical user interface, firewall learning mode and deep packet inspection (DPI) modules.

Designed with a convection-cooled metal housing to meet a variety of industrial ratings, the device provides a ruggedised cybersecurity solution for the factory floor without compromising network performance.

Belden Australia Pty Ltd
www.belden.com

HMIs

The Winmate E-series HMI (7″ to 15.6″) is provided with CPU options of ARM Dual-core Cortex-A72 and Quad-core Cortex-A53, Freescale Cortex A9 i.MX6 Dual Core and Intel Celeron Bay Trail for different computing and system needs. It supports Android 6.0, Linux or Windows operating systems.

The HMI has a slim, compact housing that reduces installation space requirements. The P-CAP multitouch screen and IP65 front panel protection allow for a durable, intuitive user experience.

Additionally, support for Power over Ethernet (PoE) meets the demand for reducing cabling costs and power consumption.

Screen sizes available are 7″, 10.1″, 15″ and 15.6″.

Backplane Systems Technology Pty Ltd
www.backplane.com.au

AS I SEE IT

THE STATE OF MANUFACTURING AND AUSTRALIAN REGULATIONS

That the manufacturing industry is shrinking is not entirely true for all industries. Yes, the automotive industry has disappeared from Australia, which seems to be the one that everybody is talking about, particularly with the name Holden disappearing at the end of the year. When these companies closed down it opened many other opportunities for their personnel and other businesses, albeit on a smaller scale.

There are also still other large manufacturing industries that will need to be nurtured, albeit with some government assistance for them to survive. In my view stricter controls on the quality of imported products — particularly from developing countries — need to be employed. So I believe there are still great opportunities in the various manufacturing industries, with other industries with an entrepreneurial spirit sprouting up to support them — particularly in the IT, IoT and smart technology spheres.

The COVID-19 pandemic has shown how much Australia relies on goods manufactured in China. It might therefore now be an ideal opportunity to (re)develop our own manufacturing industry for a range of products and not always rely on the cheaper imports. I am convinced that most of the infrastructure to start rebuilding is still in place and within a relatively short timeframe Australia could start producing goods for the consumer or industrial markets again. All parties, including governments, unions and manufacturers, must take an active role in this and work towards a common goal.

If I look at the companies that I work with I see various differences between the three of them. I can see different approaches with the instrumentation and calibration company achieving better results by moving into different areas — such as the food and water industries — by introducing some newer product lines.

We also have a business that manufactures a range of flowmeters, and we are seeing some growth in interest from overseas markets, which could be an indication of a decline in the Australian manufacturing industry.

Our newer water metering business has been marketing smart water meters to the councils, irrigation companies, etc. I see this as a tremendous growth market, as was the case with the smart electricity meters, which are now common throughout Australia — but the one thing holding this back is Australian regulations, which are totally different than anywhere else in the world. This all seems to be driven by an unyielding bureaucracy in this country that is hell bent on inventing their own regulations, rather than maybe taking a look at other countries where the equipment works all fine and nobody is dying by not having to meet Australia's unyielding approvals. Besides having to go through these regulatory requirements, there is also a great cost involved, which for a start-up company is large burden. It should — and must — be possible to accept part if not all of the approvals from other regulatory bodies overseas as is the case with many of the NATA regulations, which we deal with at AMS-IC.

Dirk Kuiper, CEO of AMS Instrumentation & Calibration Pty Ltd, Trimec Flow Products Pty Ltd and AMS Water Metering Pty Ltd has been in the instrumentation industry for more than 45 years and has worked in various capacities in several countries for a variety of instrument companies, before embarking on running his own companies.

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Contact the editor