

WINIPT

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WHAT'S NEW IN
PROCESS TECHNOLOGY

AUTOMATION + CONTROL +
INSTRUMENTATION



Level measurement with
bulk solids radar

Looking Forward

VEGA

data to knowledge



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The VEGAPULS 69 radar level instrument for bulk solids operates at a frequency of 79 GHz, which allows improved focusing of the transmitted signal. In containers and silos with many internal obstructions, this enhanced focusing helps reduce the influence of background noise. This means that reliable measurement is more possible even with complex internal structures.

Updated microwave components allow the sensor to detect even the smallest of reflected signals. Even products that until recently were very difficult to measure because of their poor reflective properties (such as plastic powders or wood chips) can now be measured with very high reliability. This considerably extends the application range for radar technology in the bulk solids industry and opens up new application areas as well.

With a measuring range of up to 120 m and an accuracy of ± 5 mm, the sensor has sufficient performance capability even for the out-of-the-ordinary tasks, such as level gauging in mine shafts or distance measurement on conveyor systems. Despite its large measuring range, the sensor is also a suitable solution for small hoppers or containers; the different antenna designs enable the optimum solution to meet the application needs.

Completely unaffected by dirt and build-up, the lens antenna guarantees maintenance-free operation even in harsh environments.

To make set-up and commissioning easier, an intelligent app for smartphones has been developed. It allows quick and easy alignment of the sensor on a swivel holder.

VEGA Australia Pty Ltd
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Looking Forward **VEGA**

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An important step in connectivity improvement



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RELIABLE WIRELESS COMMUNICATION

FOR FACTORY AUTOMATION

Zed Shen, Moxa Product Manager



Although wireless technology is now commonplace, reliable wireless is still somewhat of a Holy Grail for industrial automation applications.

The benefits of using wireless for industrial automation applications are certainly alluring enough in terms of reduced cost, higher mobility and greater scalability. However, the downside of using wireless in industrial applications is that it is much harder to meet the reliability requirements demanded by industrial automation. Whereas a brief, several-second cessation of service for a routine office application might be viewed as a mere nuisance, for critical automation applications the same cessation could cause an unacceptable interruption in a factory's operation.

Modern factories use many types of equipment, including robot arms on the production line, a variety of sensors and actuators for automation, and even unmanned AGVs to increase efficiency. Since much of the equipment is made from metal that protects complex electronics, it's no wonder that this kind of environment creates a number of obstacles to implementing seamless wireless communications.

In particular, operators need to learn how to deal with multipath effects, which can generate interference that causes information distortion or packet loss. In addition, electrical disturbances such as ground loops need to be handled properly to avoid interruptions in wireless transmissions. And finally, when mobility is required for greater efficiency, providing a seamless roaming mechanism is essential to ensure that the moving objects can reliably receive and transmit data.

Multipath effects

Ideally, the radio waves emitted by wireless transmitters will travel unimpeded to the intended receiver, but in industrial automation sites various undesirable effects can occur, including reflections off large objects, scattering due to small objects, diffraction from sharp objects, shadowing from solid objects and Doppler effects from moving objects. When confronted with so many

obstacles, the phenomenon of 'multipath fading' can occur.

Multipath fading occurs when the radio signal is split into multiple signals, each of which is affected by the environment in a different way and each of which could arrive at the intended receiver at slightly different times. The resulting signal could be deteriorated to such a degree that whatever information was present at transmission is no longer decipherable at reception. Multipath fading occurs in factory environments that are subject to multipath effects, and when the radio transmitters and receivers are required to move around. Different versions of transmitted signals will arrive at the receiver out of phase with each other, resulting in a degradation of the radio signal.

Another type of interference caused by multipath effects is 'inter-symbol interference' (ISI), which occurs when different versions of the same signal travel along paths with different lengths, and consequently arrive at the receiver at different times. Since the frequencies of the various signals will be slightly changed, the combined signal will be distorted.

How to handle multipath effects

There are two common ways to eliminate interference caused by multipath effects: OFDM and MIMO.

OFDM

OFDM (orthogonal frequency division multiplexing) works by dividing one digital signal into different parts over lower data rate signal carriers. OFDM uses carriers orthogonal to each other to avoid interference. When the data is spread across different signal carriers the data rate handled by each carrier is reduced. The advantage of the lower data rate is that it makes the interference from reflections less serious.

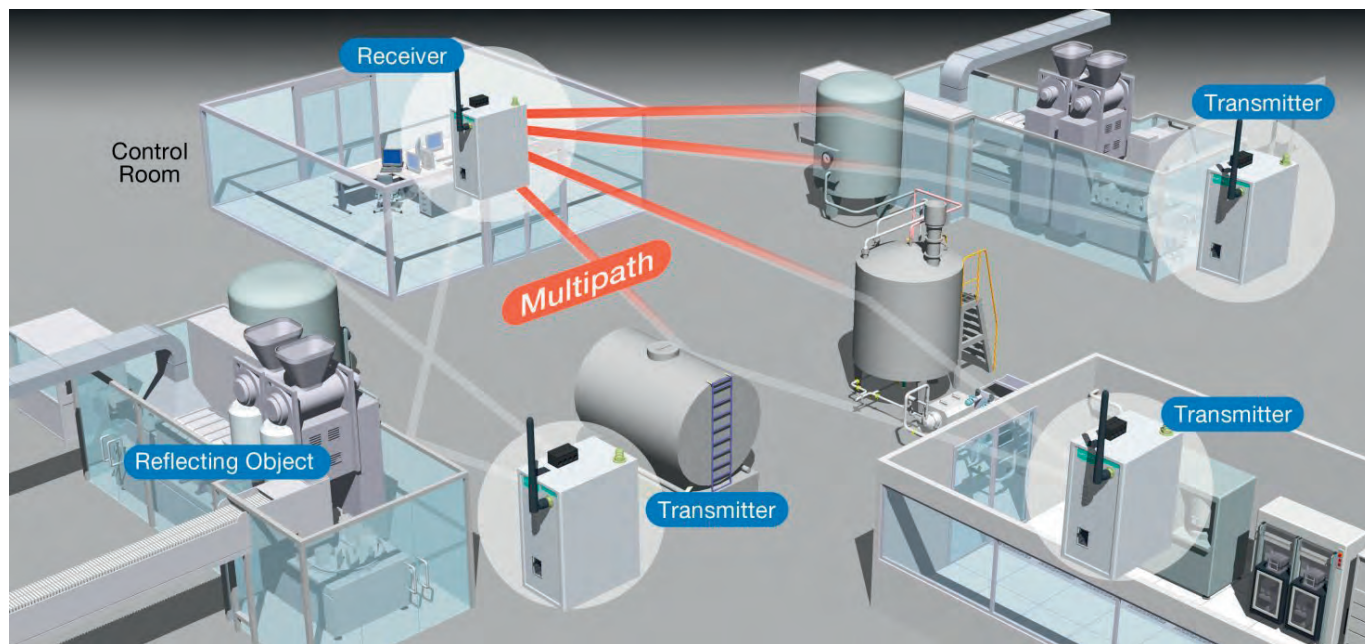


Figure 1: Multipath fading occurs when the radio signal is split into multiple signals, each of which is affected by the environment in a different way.

Distributing data across a large number of carriers in an OFDM signal is paramount to playing the odds. That is, although interference from multipath effects will affect the signal transmitted by some of the carriers, it will only affect a small number of them. In addition, error correction code can be transmitted via a different carrier than the data, which allows data corrupted during transmission to be reconstructed at the receiver end.

OFDM plays an important role in today's wireless data transmission technology. In fact, it is used with 802.11n Wi-Fi, LTE (Long-Term Evolution for 3G cellular communications), LTE Advanced (4G), WiMAX and others.

MIMO

MIMO, which stands for multiple-input multiple-output, uses multiple transmitters and receivers with multiple antennas. When multiple transmitters and receivers are used, simultaneous data streams can be sent, thus increasing the data rate. In addition, multiple transmitters and receivers allow greater coverage and longer distances between devices. The IEEE 802.11n standard uses MIMO to increase wireless data rates to 300 Mbps with two spatial streams and beyond; MIMO technology is also used in LTE and other wireless standards.

In a typical communication system using antenna diversity or MIMO, four methods are often used to deal with multipath effects in environments that exhibit multipath

fading. The methods include: time diversity, frequency diversity, spatial diversity and path diversity.

IEEE 802.11n technology uses the spatial diversity method to counteract the multipath issue. If a specific antenna in the group suffers a severe transmission disruption, the spatial diversity method singles out the antenna signal that has suffered the least amount of transmission disruption, relatively speaking, and restores its function. The principle of this method lies in the belief that when multiple antennas are functioning independently while located in the same environment, the channels used by each antenna can be understood as uncorrelated with each other. Each channel may be subjected to multiple path or co-channel interferences, but the possibility of them suffering from the same type of variation at the same time is very unlikely.

Electrical disturbances

Three common types of electrical disturbances common in industrial environments are ground loops, interference from DC motors and ESD.

Ground loops

Ground loops, which are caused by unintended variations in the electric potential at different points in the application's environment, can have a negative effect on communication signals and damage equipment. The effects can be particularly noticeable for integrated systems, such as

AGV equipment, in which several different devices are attached to the vehicle. In this case, ground loops could interrupt the vehicle's operation.

Interference from motors

The electromagnets and electrical currents used to rotate motors can cause discontinuous currents and electromagnetic interference (EMI) at the start and transition stages, affecting the quality of the power supply, the surrounding electromagnetic environment and the operation of peripheral appliances.

ESD

ESD (electrostatic discharge), which results from the sudden transfer of static electricity between two objects with different electrical potentials, is also important. Factory workers wearing rubber boots and gloves can easily accumulate high levels of static electricity, and friction between objects rubbing against each other can also cause ESD. Physical contact with wireless devices can discharge several kilovolts of static electricity and permanently damage internal circuitry.

Dealing with electrical disturbances

To ensure that a wireless connection remains active and works properly, wireless devices must be tough enough to withstand all electrical disturbances in factory environments. The effects of these factors can

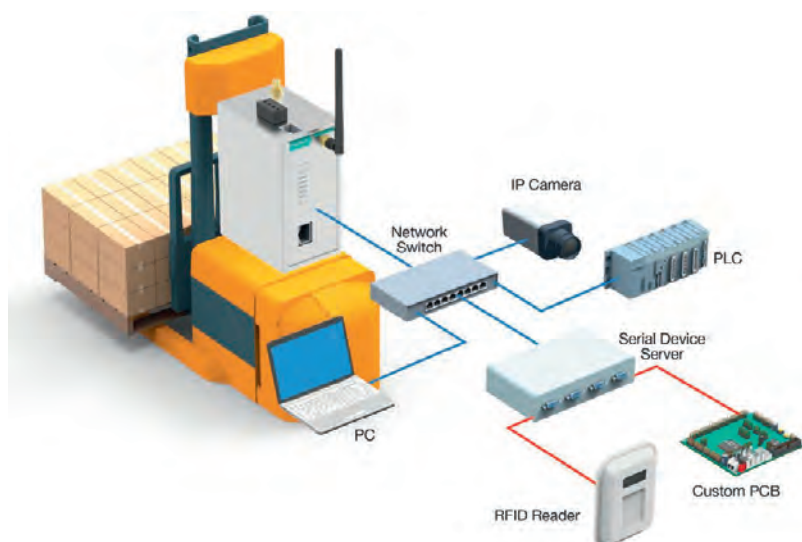


Figure 2: Ground loops can be particularly problematic in integrated systems.

be mitigated by using products designed with galvanic isolation.

Galvanic isolation

Galvanic isolation involves physically separating the electrical current in one part of a device from the electrical current in another part of the device to prevent unintentional interaction between the two parts. Although a variety of methods can be employed to implement galvanic isolation, the goal of all of the methods is to enforce the absence of DC paths between the parts of the system that need to be isolated from each other. In fact, most isolation methods eliminate all DC paths below 100 MΩ. Galvanic isolation provides three major benefits: circuit protection, noise reduction and rejection of common-mode voltage.

Circuit protection

In order to ensure the reliability of your communications system, you should consider using a higher level of EMS protection in your device to guard against electromagnetic disturbances such as ESD, surge and EFT. Industrial wireless manufacturers usually use circuits and component methods to protect interfaces or dissipate energy, but using electrical methods is not sufficient, since the protection components or circuits could be destroyed by the effects of frequent abnormal electromagnetic disturbances. Galvanic isolation uses a physical gap to stop the flow of excess electrical energy. The gap ensures that the input path does

not touch or connect to the output path and provides the most reliable method to protect against ESD, surge and EFT.

Noise reduction

The interference caused by a ground loop or DC motor can be resolved by simply cutting off the ground loop or by blocking the current and noise. Other methods include bundling the cable to reduce the loop or cutting the signal shielding wire or linking resistance, but neither solution resolves the issue completely. The first method cannot indefinitely prevent the occurrence of ground loops and noise, and the second method requires special attention be paid to whether the ground path has been removed, which could result in a floating ground and generate even more noise. We can conclude, therefore, that the best approach is to use galvanic isolation technology. Galvanic isolation technology can effectively remove the grounding line and the signal to prevent the occurrence of ground loops and significantly reduce or completely block off noise while transmitting data.

Rejection of common-mode voltage

For certain low-voltage signals, a specific level of voltage is required for the signal to be detected, and communication can only take place when the voltages are amplified to a certain level. For instance, the common-mode voltage range of an RS485 transceiver is -7 to +12 V, and it will only work when the volt-



Figure 3: Electromagnetic interference and static electricity.

age is in this range. When the common-mode voltage is outside this range, the stability and reliability of the communications will be adversely affected. In fact, the device could be damaged if the voltage reaches a level it cannot handle. Including galvanic isolation in the design of the device's interface is an easy way of providing electrical isolation from the kilovolts of electricity that could occur between input and output, thereby avoiding problems caused by a high common-mode voltage level.

The demands of high mobility

AGVs, unmanned shuttles and other mobile equipment are used in today's factories to increase efficiency. In addition, operators avoid wiring and space constraints by using wireless devices to control and monitor their mobile applications.

For mobile applications that use multiple access points (APs), roaming refers to when a client moves between two or more access points, with the speed of the mechanism used to implement roaming being crucial to maintaining a usable wireless network. As the client physically moves from one AP to another, the signal strength of the first AP will drop while the signal strength of the second AP will increase.

Factors that affect the smoothness of roaming include the topology of the access points, the gain and coverage of the antennas and the roaming threshold settings of the client. To ensure smooth roaming, you first

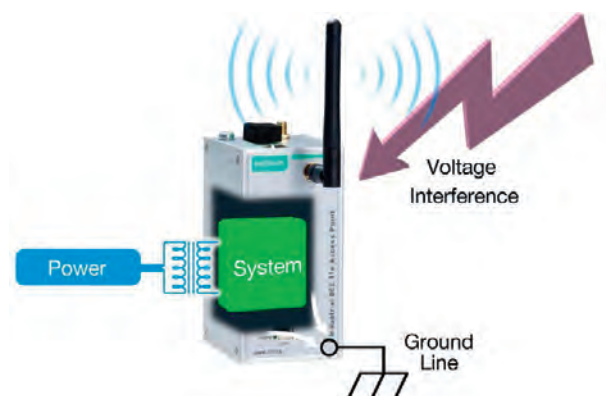


Figure 4: Wireless systems benefit from galvanic isolation between input, output and power supply.

need to take into consideration the route of the moving object, and then carefully plan the wireless AP deployment configuration.

Seamless roaming

The most crucial aspect of mission-critical wireless applications is ensuring uninterrupted communication between wireless clients and access points (APs), even when the wireless client is roaming at a relatively high speed between different APs.

A standard roaming mechanism only starts scanning for the second AP when the first AP disconnects, which can take 3-5 s or more to process, which is too long for critical industrial mobile applications. Such a long handover time can result in packet loss, which in turn can cause unmanned AGVs to temporarily lose contact with their control signal and then veer off course.

Ideally, mission-critical mobile applications require roaming times under 150-300 ms to ensure seamless wireless transmissions. Industrial wireless technology designed for mobile roaming applications should therefore implement a faster roaming mechanism. An example is the proprietary client-based roaming mechanism developed by Moxa: to avoid packet loss, the wireless client actively searches for APs emitting a stronger signal, without waiting for a complete disconnection. This pre-emptive type of roaming mechanism can react faster to the roaming event and hence provide a much shorter roaming time compared to standard roaming.

Conclusion

With so many critical factors associated with factory environments, system integra-

“THE MOST CRUCIAL ASPECT OF MISSION-CRITICAL WIRELESS APPLICATIONS IS ENSURING UNINTERRUPTED COMMUNICATION BETWEEN WIRELESS CLIENTS AND ACCESS POINTS (APS), EVEN WHEN THE WIRELESS CLIENT IS ROAMING AT A RELATIVELY HIGH SPEED BETWEEN DIFFERENT APS.”

tors are always on the lookout for the best comprehensive solutions to ensure wireless network reliability. Wireless devices must support several crucial features to ensure reliable wireless transmissions:

- 802.11n MIMO technology to improve the transmission and reception of multiple data streams. Not only can MIMO handle multipath effects, it can also increase the data rate up to 300 Mbps.
- Galvanic isolation for both the power source and antennas, since many different kinds of electrical disturbances can jeopardise devices and affect connectivity.
- Seamless roaming to ensure a smooth wireless handover from one AP to another in under 150 ms.

Madison Technologies
www.madisontech.com

NEW PRODUCTS



STEAM/WATER MIXING VALVE

The M-144 low-pressure steam/water mixing valve from Strahman MG Valves has a specially designed safety valve system that will mix plant steam with low-pressure water (as low as 20 psi), but can still offer a full safety shut-off system to reduce the risk of steam injury.

This system is designed for food production plants that due to their location have either poor water pressures or cannot provide normal water pressures when all cleaning operations are underway. The Strahman M-144 can also be optioned with any one of a range of water-saving washdown guns and hose swivel options.

SprayNozzle Engineering also supplies the sanitary valve range, which includes a design that is self-pigging, preventing foreign matter from collecting in the recess cavities of the valve interior. The sanitary valve is suitable for food and beverage applications including hydrogenated oils, margarines, flavouring and food additives, or anywhere high sanitary conditions are necessary. Custom valves are also available on request.

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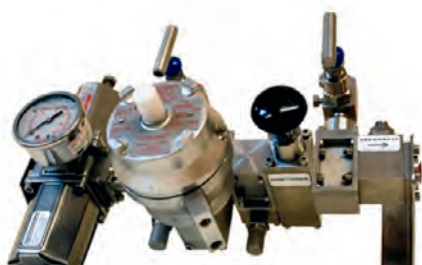
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ACTUATOR CONTROL MANIFOLDS

Rotork Midland's IMPACT high-integrity 316L stainless steel pneumatic direct-mount actuator control manifolds for oil and gas platforms and pipelines are claimed to be lighter, stronger, more compact and less expensive than conventional panel accessory mounting.

The IMPACT fits most pneumatic actuators, is fully customisable for even intricate control systems and offers lower installed cost by eliminating conventional panels, pipes and fittings.

Employing field-proven valves, filter regulators and components, with a universal connection interface, the IMPACT is also offered with ATEX approval for hazardous area uses.

Each manifold is factory preassembled and tested ready to install.

Rotork Australia
www.rotork.com

WET CHEMICAL PROCESS ANALYSER

The ADI 2045TI is a wet chemical analyser for process lines. The analytical system uses high-quality Metrohm analysis modules including the Metrohm Titrando range of titrators.

The ADI 2045TI can be configured for a wide range of applications. With a wide range of available modules (Metrohm burettes, pumps, vessels, valves, loops and digesters, for example) there is an analyser for each specific application problem.

The control software allows the user to program sequences of methods, set conditions and alarms, and to manually control the analysers. The results are displayed numerically as well as graphically. All results are stored in a database.

The ADI 2045TI can be programmed for titration for a broad range of applications:

Karl Fischer titration for water determination in liquid streams (oil, solvents, glycol, etc); colorimetry for quality analysis of water and various process solutions; dynamic standard addition for ion-specific analysis that uses ion-selective electrodes; and direct measurement for measuring physical parameters such as pH, conductivity and temperature.

The ability to choose a combination of methods means that in many cases a single ADI 2045TI will fulfil all analysis requirements. In addition, the option for simultaneous analysis can increase response times.

MEP Instruments Pty Limited
www.mep.net.au



ELECTROHYDRAULIC ACTUATOR

Emerson Process Management has expanded its process valve automation range with the release of the Bettis EHO actuator. The EHO is a robust electrohydraulic actuator that couples proven technologies from the company's valve actuation range to handle critical shutdown situations where dependability is a must.

The actuator is suitable for a diverse range of applications, from topsides valve automation on offshore platforms to remote pipelines where operational upsets can cause safety and environmental hazards, as well as costly production losses. To help operators counteract these challenges, the EHO provides a compact design with actuator and control components from Emerson that have been field proven in critical service.

The actuator is available in either spring-return or double-acting configurations. Torque outputs can handle valve sizes from 6 to 60".

The actuator operates on utility electrical power or optional solar power for remote areas where electric power is not available or not reliable. The EHO is operable in temperatures ranging from -40 to +60°C, and its fail-safe capability is reliable with fast close or open stroke times, suitable for emergency shutdown in oil or gas service.

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AMS Instrumentation & Calibration Pty Ltd

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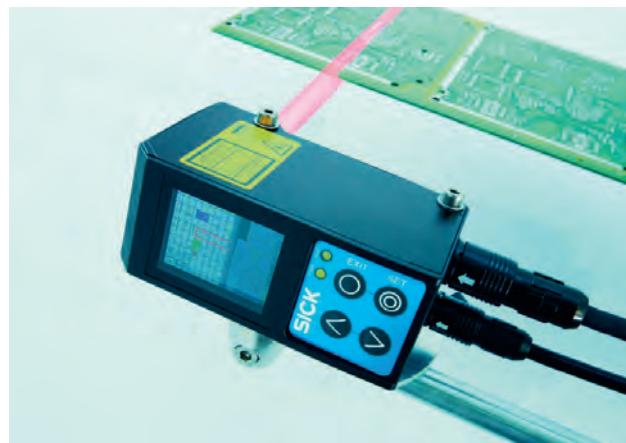


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FIRMWARE UPDATE FOR WIRELESS GATEWAY

Firmware v4.5 for Smart Wireless Gateways streamlines the wireless network interface, security set-up and field device configuration.

Emerson Process Management

<http://bit.ly/1EbHrNZ>



SAFETY HINGE SWITCHES

Schmersal has released the TESK series of safety hinge switches, featuring freely adjustable switching angles and the option to select up to four contact configurations with cable or plug connections.

The construction of the TESK series allows it to be mounted on the hinge side of the rotating guard, replacing the need for a conventional hinge and helping to monitor the position of the guard. Additionally, as the safety switch is not visible to the operator, the TESK series offers high protection against tampering. For machine builders, it is a major benefit as the majority of machines and enclosures are constructed with the commercially available aluminium profile systems.

The sleek appearance of Schmersal's fourth generation of safety hinge switches is a suitable solution for the position monitoring of protection doors including double swing doors on design-oriented machines.

Control Logic Pty Ltd

www.control-logic.com.au

PRIMARY BELT CLEANER

The K-Smartscraper primary belt cleaner is claimed to be a highly effective concept in belt cleaning. It is lightweight in construction (9 kg) and is a high cleaning performance alternative to conventional tungsten carbide blade-style belt cleaners. The cleaning edge of the K-Smartscraper is made up of a series of high-quality, abrasion-resistant, ceramic tips that have a 92% alumina content, giving them a hardness rating of approximately 9 on the MOHS scale. In comparison, diamond has a hardness rating of 10.

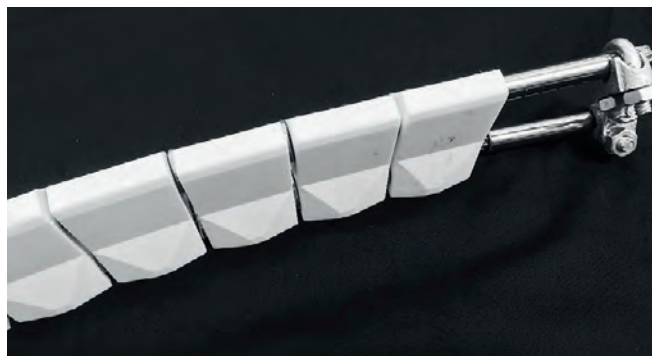
The ceramic tips are angled to skim clean the conveyor belt closely and efficiently, removing 90% of the carry back into the material flow and stopping the need to allocate resources to labour-intensive clean-up work in awkward, confined places on the conveyor structure as well as the surrounding area. Even if the belt is worn in the centre, or a crowned pulley is used to drive the belt, the cleaner is capable of maintaining effective belt-cleaning levels.

The device's spring-tensioned mounting system is self adjusting and so reduces the need for further ongoing maintenance. From a personnel safety perspective, the cleaner removes the hazard of working closely with moving conveyor machinery parts.

The K-Smartscraper is said to be straightforward to install, usable for all belt widths, and is suitable for wet, powdery, sticky and high-temperature materials including iron ore, limestone, coal, sinter, quarried products, clay, fertiliser and clinker. Mounting options include the cross type (standard), V type and paired.

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AMS

Qenos makes a step change with adaptive process control

Qenos, Australia's leading manufacturer of polyethylene (PE), is focused on increasing commitment to further plant optimisation, reduced pressure on skilled operators and a greater return on investment for all stakeholders. This is made possible with the upgrade from an advanced process control (APC) strategy to the adoption of an adaptive process control environment with AspenTech's Aspen DMC3 software.

The Qenos Altona site is the largest production centre for petrochemicals and plastics in Australia. Their products support a range of industries, including food packaging, water conservation, waste management, mining and agriculture, and they also supply a diverse range of specialty polymers.

According to Richard Wawrzon, Process Engineering and Control Team Leader, at the Qenos Altona plant, "There are that many disturbance variables in a typical refinery or chemical plant - such as changing environmental conditions (temperature, humidity), changing product demand, changing feedstock composition - that it is virtually impossible to drive the process at optimum productivity without the use of an advanced process control tool."

Wawrzon reiterated that, "Optimising a process plant often requires the operators to drive the process variables close to the plant equipment limits, which can result in process instability. Operators are expected to operate away from plant alarms, and possible shutdown, due to the shutdown cost, inconsistency of product quality and loss of reputation. The implementation of an APC handles these issues in the background and the plant can perform at close to 100% capacity without the risks and costs of an unplanned shut."

"The bottom line is that conventional APC has limitations that make meeting the new challenges unsustainable over the long term," he added.

According to Wawrzon, "In reality, if the APC underperforms, the operators will disable critical and high-value-adding APC applications and revert to degraded conventional operator controls. Typically this reduces the efficiency of the plant, increases the risk of inconsistent product and adds costs."

Understanding these issues, Qenos has realised the limitations of conventional APC and committed to upgrade from AspenTech's DMCplus to the new adaptive process control environment, Aspen DMC3.

Plant operators are not in a position to manually react to changes and conduct corrective actions on a minute-by-minute basis and in an optimal way. APC gives manufacturers like Qenos the solution to these issues, reducing cost, maintenance time and disruption through real-time asset optimisation, delivering improved visibility and decision support. It has been a crucial innovation for process industries in the past few years, delivering the necessary plant optimisations - pushing throughput to the maximum while saving energy costs, meeting



operational constraints, addressing the depleting skilled operator pool, increasing plant utilisation and, in fact, maximising plant profitability.

As process plants age, however, many of the underlying assumptions about the control strategies become redundant, or ineffective. The consequence is reduced efficiency, productivity and profitability. Wear and tear, fouling, reduced skills pool, ageing workforce, changing financial modelling, are some of the factors that are not considered in the as-built controller set-up.

Now, with a completely redesigned modelling environment and the introduction of AspenTech's adaptive process control, the chemical plant operators have a new tool to manage their operation with

greater control that will deliver greater operational profitability. Aspen DMC3 provides a complete range of economic trade-offs for managing step testing and model construction. Essentially, that eliminates the need to approach APC maintenance as a project, usually requiring a plant shutdown, and creates a continuous background process of assessing model quality, collecting current data and generating new models as the behaviour of the plant changes over time.

The key advantages of adaptive process control, over traditional (sustained value) approaches, are that it incorporates features that ensure the controller model is continually analysed for accuracy, poorly performing areas of the model are identified, non-disruptive background testing collects new process data while the unit is being optimised and new data is monitored in real time and bad data is automatically identified and removed.

By making it easier to generate data, manage step tests and produce results, APC becomes more accessible and efficient. The need to assemble skilled resources to rebuild controllers is significantly reduced and this enables the operators to focus on more added-value optimisation.

Richard explained, "There is a crucial difference between the traditional approach to controller maintenance (sustained value) and adaptive process control. With sustained value, revamping the controller is typically carried out as part of a lengthy and costly project, with planned operations disruption. Under adaptive process control, however, the clever controller is modified over time in a background process that is not disruptive to plant operations ...We all are aware that quicker and more efficient control projects improve the return on investment and, therefore, adaptive process control opens up new opportunities to implement APC with this clever approach."

A slightly longer and more detailed version of this article can be read online at http://www.processonline.com.au/case_studies/71097.

Aspen Technology Australia Pty Ltd
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2 wire intrinsically safe isolator

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Weidmüller have many solutions for hazardous area connectivity to IECEx standards. Among them is our intrinsically safe isolator range ACT20X. Our newest model, the ACT20X-HUI-SAO-LP provides a universal input for all passive process signals with a 2 wire, 4-20mA loop powered output. This reduces wiring costs and easily integrates into most control systems. The universal input accepts mA, mV, V, Tc, RTD, Ω , or Potentiometer. The 2 wire, 4-20mA output can be adjusted for direct or reverse operation and up to 101 point non-linear curve.

A new output clamping feature allows users to limit the output range between 3.5 to 23 mA, ensuring suitability to all control system alarm parameters. With a housing width of 12.5mm, the ACT20X-HUI-SAO-LP is simply programmed by free software using the CBX200 USB-Serial converter. Suitable for inputs from Zone 0, 1, or 2 with Zone 2 mounting approval, the ACT20X-HUI-SAO-LP can be used in gas, petrochemical and coal mining applications ... Let's connect.

ELECTRO-HYDRAULIC SAFETY VALVE ACTUATOR

The Rotork Skilmatic SI self-contained electro-hydraulic valve actuator is said to combine all-electric simplicity with the precision of hydraulic actuation and the reliability of mechanical failsafe operation. Typical applications for Skilmatic actuators include functional safety-related emergency shutdown (ESD) and remotely operated shutoff valve (ROSoV) duties.

The updated SI actuator will consist of four models with multiple actuator sizes, enabling Rotork to offer quarter-turn failsafe actuation from 65 Nm up to 600 kNm for functional

safety applications. Safe valve positioning is selectable for failsafe to open, failsafe to close or lock in position on either loss of power or a range of programmable ESD signal options.

The SI control module facilitates simple non-intrusive commissioning by means of an intrinsically safe handheld setting tool with infrared and

Bluetooth interfaces. Settings including internal hydraulic pressure, position, limits, control, alarm and indication functions can be accessed and adjusted using user-friendly menus.

Data from the actuator can be transferred to a PC for storage and analysis by means of Rotork Insight2 software. The actuators can be integrated into the majority of digital bus control systems, including Pakscan, FOUNDATION Fieldbus, DeviceNet, Profibus, Modbus and HART.

Designed for functional safety applications to SIL2 (1oo1) and SIL3 (1oo2), the actuators are also offered with enhanced partial stroke testing, enabling valves to be function tested without affecting the process.

All actuators are available with hazardous area certification encompassing ATEX, IN-METRO, IEC, FM, CSA and GOST. The double-sealed electric enclosure is watertight and dustproof in ratings up to IP68.

Rotork Australia
www.rotork.com



ANALOG LASER SENSORS

The OptoNCDT LD1610 and LD1630 analog PSD laser sensors are replacements for the previous LD1607 model.

The LD1610 has a 10 kHz frequency response while the LD1630 can operate up to 100 kHz. The signal-to-noise ratio of those sensors has also been improved significantly. Digital systems require an extremely high sampling rate in order to reach results similar to those obtained with these analog PSD sensors.

The LD 1610 and LD1630 also have automatic light intensity control for changing and difficult surfaces, and two adjustable switching levels for thresholds. An ethernet interface is also offered as an option.

Bestech Australia Pty Ltd
www.bestech.com.au



MODULAR ETHERNET SWITCH

Belden has redesigned its Layer 3 modular gigabit switch to create a new version, the MSP30-X Modular Switch, which is more suited to extreme environments. The switch not only maintains its modular and flexible design but, with enhancements, it saves costs and space by offering the ability to be placed near harsh environments.

This Hirschmann switch has a combination of Layer 3 features, including time synchronisation for time-critical data and wall-mounting capabilities, bringing advantages to the industrial market and their ability to keep networks up and running at all times.

Approved by global GL standards for Environmental Category D, the MSP30-X is suitable for engineers, integrators, machine builders and plant operators in the transportation, machine building, power transmission and distribution, oil and gas, mining, wind power and other hazardous industries.

Some important features of the MSP30-X switch include Precision Time Protocol version 2 for real-time data, Layer 3 routing capabilities for network extensions, an operating temperature range from -40 to +70°C and up to 100% relative

humidity, and a high number of security features to protect and facilitate maximum network availability. It also has additional brackets for mounting of modules on the main device body and Ethernet cables that can be tightly screwed onto the module using M12 connectors.

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COMPACT SIGNAL CONDITIONER

The Mini Analog MCR-SL-IDS-I-I output signal conditioner with a narrow 6.2 mm design transmits and electrically isolates 4-20 mA signals from the controller to a load in the field, such as I/P converters, control valves or displays.

The electrical isolation is between the input, output and supply. In addition, HART data protocols can be transmitted bidirectionally in order to obtain or transmit additional information from the field device. The modules can be supplied with a voltage of 19.2 to 30 VDC via the connection terminal blocks or in combination via the DIN rail connector. When supplied via the DIN rail connector, they can also be used on a termination carrier. This system cabling

solution enables up to 16 output signals to be quickly and smoothly connected to control systems.

The narrow design of the Mini Analog signal conditioners means significant space savings and therefore lower costs. Modules with screw or spring-cage connection technology are also available.

Phoenix Contact Pty Ltd
www.phoenixcontact.com.au

DISTANCE SENSOR

The DT50-2 Pro distance sensor is based on HDDM time-of-flight technology to provide precise and reliable measurement, with ranges of up to 10 m on black targets and up to 30 m on white targets. The Dx50-2 product family is claimed to be unaffected by mechanical stresses, ambient light or extreme temperatures.

The Dx50-2 sensors feature either an LCD or an integrated Wi-Fi interface. Both versions have been designed with focus on a simplified and intuitive user experience, saving time during installation, commissioning and maintenance. The high output rate of the sensors delivers up to 3000 distance values per second for maximum throughput and process quality. The Dx50-2 sensors have a rugged housing and provide reliable operation despite extreme temperatures and harsh ambient conditions. Since the settings for speed, sensing range and repeatability can be adjusted to meet current requirements, the Dx50-2 sensors can be customised to suit every possible application.

SICK Pty Ltd
www.sick.com.au



WIRELESS REMOTE DATA LOGGER

SCADAPack 50 is a wireless remote data logger designed for monitoring applications when power and network access is either unavailable or prohibitively challenging.

Compact and self powered (offering up to five years' autonomy), the device monitors and logs analog, discrete, and Modbus process inputs.

Benefits include easy interfacing to SCADA hosts, since any 3G GSM modem compatible with Hayes commands can be used on the host end, and five-year maintenance-free autonomy once the SIM card is activated and configured. The robust enclosure is IP68 rated.

Quick installation enables cost-effective deployment. Process data is monitored and stored locally in the device and transmitted to the host according to user-configurable requirements. Configuration can be easily done either locally through the infrared data port or remotely.

Applications include monitoring and metering applications in fresh-water distribution systems; pressure and flow monitoring in gas distribution networks; and power system monitoring applications.

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Masoneilan

Simulation tool helps Byrun the robot to walk, jump and hop

In movies, robots can walk, talk and even pretend to be human. Their real-life counterparts are considerably more limited. But this gap is closing, and Engineered Arts, a UK robotics company, is seeking to bring reality closer to fiction.

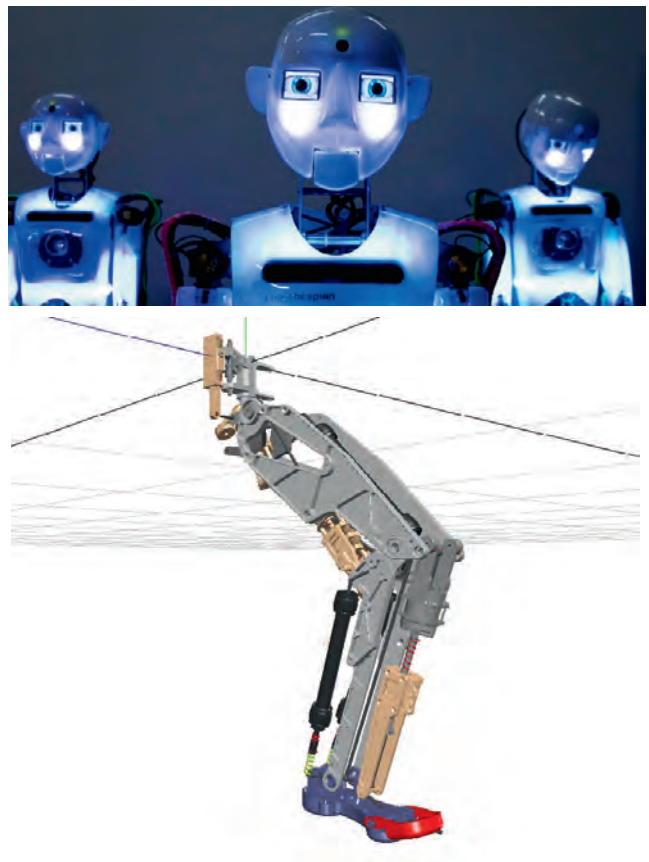
Engineered Arts' current flagship product is RoboThespian, the robotic actor. A full-sized humanoid with a biologically inspired design, RoboThespian is used by research and education centres to inform, to entertain and to investigate new developments in robotics. Institutions in over 20 countries, including NASA Kennedy Space Centre (USA), Gazientep Planetarium (Turkey), Questacon Science Centre (Australia), and numerous universities worldwide are using RoboThespian every day. Maplesoft technology was used in the design and modelling of balancing and talking RoboThespian robots. MapleSim, the system-level modelling and simulation platform from Maplesoft, was used to design the biologically analogous humanoid robot leg integrating a novel actuator, studying its static and dynamic stability, and building the designed leg to determine strategies for its control. However, RoboThespian, for all his conversational appeal, is largely static. His legs are powered, but he can merely squat and stand in place, never moving from a fixed location.

Enter Byrun, the latest Engineered Arts endeavour. Using MapleSim, Byrun's designers and engineers have developed a biologically analogous leg design that will give Byrun the ability to walk, run, jump and hop. Byrun will be a new kind of full-scale dynamic humanoid that will take social robotics to the next level. With a faster, stronger, more dexterous upper body, a virtually infinite array of facial features (courtesy of his projective head display) and the same speaking and singing abilities as his predecessor, RoboThespian, Byrun is claimed to have the potential to revolutionise human-robot interaction.

According to Guillaume Hirohide Sasagawa, an engineer at Engineered Arts, "In Byrun, we want to integrate more human-like dynamics into the mechanical design. Using a human-inspired approach at a hardware level makes walking, running and jumping possible without rigid, robotic-looking motion." MapleSim assisted in Byrun's design by allowing engineers to simulate complex, nonlinear, compliant components such as his pneumatic muscles and parallel springs. These are used for safety compliance, shock absorption, energy efficiency and human-like smooth motion curves.

Engineered Arts specialises in unconventional actuation solutions, chosen to best suit the application. Motors are fast and precise, but inefficient and rigid. Pneumatic actuators, on the other hand, are powerful and energy efficient, but difficult to control. The conventional approach in robotics is to use a single actuator for a single joint - Byrun will use a parallel electropneumatic design, where multiple actuators control single joint actions. This approach utilises the best facets of both types of actuation, while compensating for their drawbacks. Conversely, some actuators will generate coupled motion across several axes, to imitate (for example) the organic design of the human shoulder. This makes for more natural-looking motion, but can be potentially difficult to control. Here, once more, Maplesoft has provided advanced solvers that can tackle the difficult multivariant control equations used to develop Byrun's motion algorithms.

By creating virtual prototypes of each design phase in MapleSim, Byrun's engineers can investigate the feasibility of mechanical



solutions without needing to create a laborious series of prototypes. "The software helps us to create the design parameters in a very fast virtual environment," explained Guillaume. "We are no longer required to rebuild the robot for every design iteration, which saves us significant time and cost, and allows us to explore more radical options. As well, complex kinematics can be easily simplified with the use of Maple - this is a powerful tool as the resources required for the project are considerably reduced."

The team at Engineered Arts has also found MapleSim useful for its ability to simplify complex calculations. "MapleSim's ability to automatically generate complex mathematical models, such as the leg dynamics, is outstanding. Different parameters can be altered at different stages to reduce the complexity of calculations," Guillaume said. "In the case of Byrun, we were able to dramatically simplify the leg dynamics, making the computations much faster. This is extremely powerful and has real impact on our project timelines and deliverables."

In addition to designing Byrun's electropneumatic hybrid legs and upper body for fully mobile walking and running, the engineers at Engineered Arts are also developing a robotic hand with the same principles, creating a compact, highly efficient, compliant manipulator.

Robots like Byrun are setting a new standard for both humanoid and more general robotic design. "To be worth its cost, this robot must perform something never seen before. If it can do just 10% of John Travolta's walk, Margot Fonteyn's dance and Julia Roberts' smile, we have a winner," William Jackson, director of Engineered Arts, said.

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COMPACT ROBOT CONTROLLER

ABB has released the IRC5C, its second-generation compact industrial robot controller. A fully fledged member of the IRC5 family of industrial robot controllers, the IRC5C comes equipped with the majority of the functionality and benefits of its larger counterpart but in a smaller footprint (310 x 449 x 442 mm).

The IRC5C is more compact and therefore easier to integrate, allowing for 25% smaller rack-mounted solutions. It also offers a user-friendly control panel with easily accessible cabling and connectors, as well as new functionality which results in greater productivity.

The new IRC5C's operator panel has been simplified, and its cable connections have been improved for greater ease of use and intuitive operation. For example, there are external connectors for all signals and a built-in expandable 16-in, 16-out I/O system.

Despite its small size, the IRC5C retains the motion control capabilities of its larger counterpart. This motion control technology, featuring TrueMove and QuickMove, is central to ABB Robotics' performance in terms of accuracy, speed, cycle time, programmability and synchronisation with external devices. The controller also makes it very easy to quickly integrate additional hardware and sensors, such as ABB's Integrated Vision.

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PORTABLE ULTRASONIC THICKNESS GAUGE

The Olympus 27MG is a portable ultrasonic thickness gauge, suitable for inspectors and maintenance engineers taking measurements from one side of internally corroded or eroded metal equipment. It is available to rent from TechRentals.

Designed for one-handed operation with a weight of 340 g, the 27MG is battery operated and utilises auto-zero compensation (for hot surfaces), gain adjust (for sound attenuating materials) and has a large, easy-to-read backlit display.

The 27MG features a range 1 to 500 mm, with a resolution 0.01 mm, and has an operating temperature range of between -20 to 150°C.

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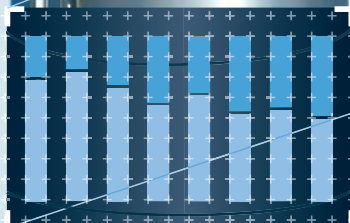
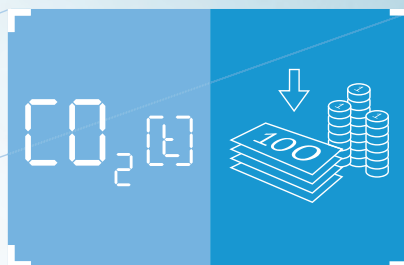







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COLLABORATIVE ROBOTS: THE SMARTER WAY FORWARD

Shermine Gotfredsen, General Manager, APAC, Universal Robots

Robots that can work side by side with humans are changing the way manufacturing is done.



the factory to carry out different tasks, helping to reduce costs related to downtime. In the future, human and robot teammates could even swap tasks to learn each other's preferences, resulting in a process that gets the job done more quickly.

Until relatively recently, the enthusiasm for this new collaborative approach has been hampered by concerns about man and machine working in such close proximity. This was in part due to safety concerns, outdated regulations and product misconceptions. However, during the past two years, significant headway has been made on all of these fronts.

The rise of the cobot

Collaborative robots aren't the first technology to deal with largely unfounded concerns around safety. Looking back through history, fundamental technology shifts have repeatedly found similar challenges.

When the first automobiles began travelling almost at walking pace along roads that were not as developed as they are today, Britain introduced the Red Flag Act, requiring a man bearing a red flag to walk in front of every vehicle to ensure that no passers-by might be injured by this marvellous but dangerous new development in the history of mobility.

Clearly, however, it was neither practical nor feasible on a large scale to deploy such flag bearers. And if no-one had dared to dispense with them, the automobile would quite possibly never have progressed beyond the status of a rich man's toy - despite the manifest need for mobility.

We have seen similar developments and innovation in the industrial robotics industry. It has now been 60 years since the father of modern industrial automation, George Devol, unveiled his vision of a robotic workplace, patenting the first true digital industrial robot, the Unimate, in 1954.²

Today, the rise of the cobot is proving a real game changer for the industry. Right now, cobots are redrawing the robot landscape that has existed to date and are ushering in a new way of working.

The demand for flexible and cost-effective robotic solutions has carved out a place for collaborative robots on the factory floor. However, building a safe robot is critical to the success of cobots; especially if they are going to operate in close quarters with human employees. As a result, the robotics industry globally is committed to developing new standards that include the appropriate regulations for collaborative lightweight robots to ensure businesses gain the maximum value from the technology.

Safety first

Collaborative robotics has created an environment where human employees can now work safely alongside their robot colleagues.

Advanced safety features, such as using sensors to detect an opposing force or obstruction to the robot's line of movement, ensure robots can function safely and efficiently without putting their human colleagues at risk. Cobots can also operate in a reduced mode when a human colleague enters the work cell, and then resume to full speed when they leave again - alleviating safety concerns.

In a collision, collaborative robots can deliver less force than the 150 N regulatory limit (EN ISO 13850), so depending on the application, the robot may be able to operate without an enclosure.

By reducing, or in most cases eliminating, the need for safety guarding, robotic and human employees are now able to work side by side, sharing the load of work tasks together. This also means there is often no need to invest in safety shielding and devices which need constant maintenance, providing a friendlier and more

Collaborative robots could soon be a common sight in Australian and New Zealand factories as robots increasingly move out from behind the cage and take their place alongside workers.

Known as cobots, these robots are machines designed to interact with human employees in close working quarters. For example, during the manufacturing process, robots can undertake the physical and repetitive labour while its human counterpart simultaneously performs quality control inspections.

By collaborating with human workers, robots can provide a way to combine the benefits of automation with those of human ingenuity and handcraft. In most cases it results in a faster, cheaper and more flexible work approach - with cobots able to reduce worker idle time by more than 85%.¹

Unlike their big industrial brothers working behind cages at automotive plants and other big assembly lines, collaborative robots can easily be moved or repurposed to new workstations in



flexible work environment. Of course, end effectors and other environmental conditions could create a hazard, and a risk assessment should be done with any robotic industrial motion control application.

Collaborative robots can also help to significantly reduce the risk of employee injury. Manufacturing roles consist of labour-intensive manual tasks that can potentially be highly dangerous for employees; however, the reality is that for many workers these tasks will make up a large part of their working day.

Injuries related to both repetitive manual handling and workplace accidents cost the Australian economy millions of dollars every year. Packing and production lines in smaller operations are particularly at risk. However, in contrast to traditional industrial robots in the market, small and lightweight robots can work collaboratively with staff and take over the more repetitive and dangerous jobs, reducing the risk of staff being seriously injured while at work.

Safety in manufacturing is paramount and organisations in countries like Australia are working hard to maintain safe environments. Today, the Australian manufacturing industry is currently below the country's average for workplace fatalities.³

For cobots to gain a foothold on the factory floor, it is critical that they maintain a high level of safety. Fortunately, new technological developments have helped this, and collaborative robots are now being considered a safe automation technology option for manufacturers of all sizes.

Giving SMEs the opportunity to grow

Collaborative robots are dramatically increasing productivity at small or medium-sized companies, providing them with the flexibility they need to grow and transform their business.

Results have shown that workplaces that encourage collaboration between humans and robots are experiencing higher levels of productivity than teams that simply consist of either humans or robots alone. This increased efficiency is creating strong growth opportunities for business and providing those, particularly in the SME sector, with the chance to drive cost down and revenue up.

Collaborative work approaches are also helping organisations maintain competitiveness in today's global business landscape, without forcing them to take on a massive financial risk.

Making workers more productive, not unemployable

Despite the benefits of collaborative robots, there is still a strong perception within the workplace that cobots are actually going to take human jobs.

This view is completely misguided, as the need for humans on the factory floor is not going to go away. While collaborative robots are able to take away some of the more repetitive and mundane jobs from their human colleagues, they don't have the ability to fulfil the critical roles that humans play when it comes to completing the more nuanced tasks.

Collaborative robots need to be viewed by their human teammates as a tool that can help them drive efficiency - not a technology that is going to lead to job cuts.

Today, collaborative robotics is providing human workers with the opportunity to expand their job role by freeing them up to perform more skilled activities that are more interesting and challenging.

Collaborative robots in action

Volkswagen is one company which has integrated collaborative robots at its engine production plant in Salzgitter, Germany. The collaborative robots work alongside Volkswagen staff in the cylinder head assembly section, without any safety guards, to handle delicate glow plugs. With an area of 2,800,000 square metres, Volkswagen's Salzgitter plant is one of the largest engine production plants in the world, with some 6000 employees manufacturing approximately 7000 petrol and diesel engines in over 370 variants every day.

The automotive company uses its cobots as assistants to human workers during manufacturing, often taking charge of ergonomically unfavourable work to place the glow plugs in difficult-to-reach holes in the cylinder heads. An employee then takes over from its robotic coworker, checking placement, fixing the plug and insulating the cylinder head.

The close proximity to the cobot means the employee can keep a constant watch over the assembly process and quickly intervene if necessary. Volkswagen spent more than two years working on the project to perfect the collaborative working approach.

Conclusion

History has shown that industrial robotics can quickly revolutionise manufacturing and production, once initial business concerns are eased. The original industrial robots helped turn Japan into an automotive and electronics superpower in the 1960s and 70s, once they were able to see past initial concerns about having robots on the factory floor.

By embracing cobots today, both large and small manufacturers could derive a similar first-mover advantage. It has already been proven that pairing man and machine will deliver significant benefits to businesses.

Importantly, now that we have addressed these initial hesitations, we now have the freedom to pursue even greater collaborative opportunities - making the working relationship more productive and innovative.

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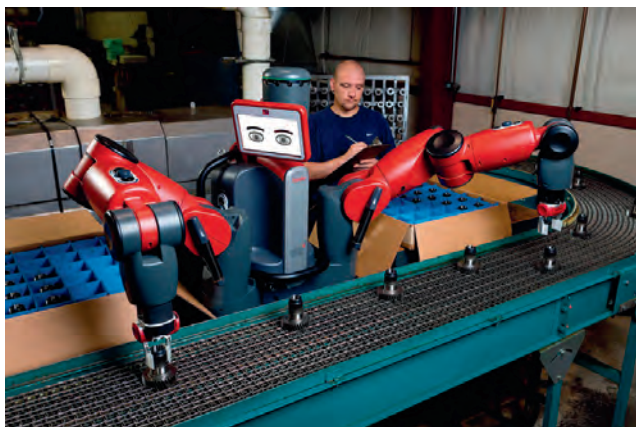


Computer scientists enhance robotic manufacturing

Some industrial robots are hulking, highly specialised pieces of machinery that are cordoned off by cages from human factory workers.

But manufacturers have also begun experimenting with a new generation of 'cobots' designed to work side-by-side with humans, and University of Wisconsin-Madison researchers are playing an important role in making these human-robot collaborations more natural and efficient.

Bilge Mutlu, an assistant professor of computer sciences, is working with counterparts at the Massachusetts Institute of Technology (MIT) to determine best practices for effectively integrating human-robot teams within manufacturing environments. Their research is funded by a three-year grant from the National Science Foundation (NSF) as part of its National Robotics Initiative program.



Furniture maker Steelcase, a global company headquartered in Grand Rapids, Michigan, is also a partner. "Working with world-class research universities like UW is critical to our strategy to evolve our industrial systems and develop industry-leading capabilities," said Steelcase's Edward Vander Bilt. "Our hope with this research is that we will learn how to extend human-robot collaboration more broadly across our operations."

In recent years, the robotics industry has introduced new platforms that are less expensive and intended to be easier to reprogram and integrate into manufacturing. Steelcase owns four

next-generation robots based on a platform called Baxter, made by Rethink Robotics. Each Baxter robot has two arms and a tablet-like panel for 'eyes' that provide cues to help human workers anticipate what the robot will do next.

"This new family of robotic technology will change how manufacturing is done," said Mutlu. "New research can ease the transition of these robots into manufacturing by making human-robot collaboration better and more natural as they work together."

Mutlu directs UW-Madison's Human-Computer Interaction Laboratory and serves as the principal investigator on the UW side of the collaboration. He works closely with Julie Shah, an assistant professor of aeronautics and astronautics at MIT.

Mutlu's team is building on previous work related to topics such as gaze aversion in humanoid robots, robot gestures and the issue of 'speech and repair'. For example, if a human misunderstands a robot's instructions or carries them out incorrectly, how should the robot correct the human?

At MIT, Shah breaks down the components of human-robot teamwork and tries to determine who should perform various tasks. Mutlu's work complements Shah's by focusing on how humans and robots actually interact.

"People can sometimes have difficulty figuring out how best to work with or use a robot, especially if its capabilities are very different from those of people," said Shah. "Automated planning techniques can help bridge the gap in our capabilities and allow us to work more effectively as a team."

Over the summer, UW-Madison computer sciences graduate student Allison Sauppé travelled to Steelcase headquarters to learn more about its efforts to incorporate Baxter into the production line. She found that perceptions of Baxter varied according to employees' roles.

While managers tended to see Baxter as part of the overall system of automation, front-line workers had more complex feelings. "Some workers saw Baxter as a social being or almost a co-worker, and they talked about Baxter as if it were another person," she said. "They unconsciously attributed human-like characteristics."

University of Wisconsin-Madison

hci.cs.wisc.edu/

**NEW
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SIMULATION SOFTWARE

MathWorks has announced a major release of MATLAB as part of its Release 2014b that includes an updated graphics system, big data capabilities and improved collaboration features for packaging and sharing code, and for source control integration. With these capabilities, engineers and scientists in all major industries can more easily analyse and visualise their data.

The updated default colours, fonts, and styles in the graphics system in MATLAB make it easier to interpret and gain insight from data. Improved syntax for changing properties of graphics objects makes it simpler to customise visualisations. Additional new features include rotatable tick labels, support for multilingual text and symbols, and automatic updating of date and time tick labels.

Additional big data capabilities within MATLAB provide more efficient ways to process data sets that don't fit into memory. These include simplified ways to access and analyse big data text files and databases, and support for the MapReduce programming technique directly within MATLAB. These capabilities also scale for use on the big data platform Hadoop.

MathWorks Australia

www.mathworks.com.au

MOTION CONTROL DESIGN SYSTEM

Rockwell Automation has rebuilt Motion Analyzer software as a web tool. The tool offers updated user-friendly features and an expanded product catalogue to help engineers more easily specify, design and validate complete motion control systems.

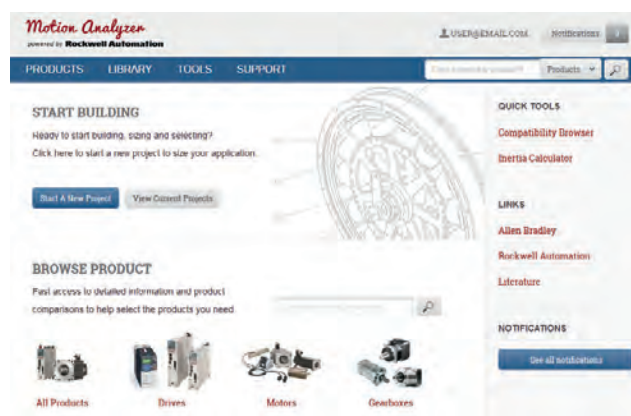
The Motion Analyzer Web tool is cloud based, allowing users to access, update and collaborate on projects stored in a single location, reducing version control issues and the need to share project files back and forth. A cloud-based platform also means users are no longer limited by the processing speed of their computers when designing systems for more complex applications. The tool's new browser-style format allows users to filter, review and compare products and general pricing, similar to search capabilities on popular e-commerce sites.

The Motion Analyzer Web tool provides machine builders access to a wider range of motion control products than ever before. It now incorporates products from nine Rockwell Automation PartnerNetwork Encompass product partners, including STOBBER Drives, NIDEC-SHIMPO, item North America, Tolomatic, Nook Industries, WITTENSTEIN, Exlar Corporation, Bonitron and Elwood Corporation.

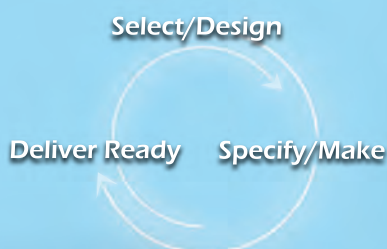
Using the Motion Analyzer Web tool, engineers can determine a system's specifications, evaluate multiple products, finalise the design and create a bill of materials. The tool can help shorten motion system design from a multiday process to a matter of hours. The web tool supports English, German and Chinese languages, and it is compatible with a wide range of computer, smartphone and tablet operating systems.

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POLYMER BEARINGS RECOGNISABLE BY METAL DETECTORS

Plastic bearing manufacturer igus has developed a polymer material that can be recognised by metal detectors for a wide array of industries such as packaging, sports equipment, food processing and automotive manufacturing.

The complete igubal range includes lubrication and maintenance-free rod end bearings and clevis joints, flanged units, press-fit and pedestal bearings. Both the housing and spherical balls are made from detectable plastic.

Standard metal detection systems can detect all potential plastic residues, even down to the tiniest particle, and then select these for rejection.

The self-adjusting bearings are manufactured completely from tribo-optimised polymers. They are easy to install, adjust to all angular misalignments and can replace metallic components in many applications.

The igubal bearings from igus are up to 80% lighter than traditional metal bearings, allowing machines and systems to work more efficiently and the number of duty cycles to be significantly increased.

The detectable bearings are dry running, unaffected by dirt and dust contamination, can operate in liquids and a variety of chemicals, and are corrosion resistant.

Application temperatures can range from 4-80°C. In addition, the components can absorb very high forces due to the fact that the plastic material of the two-part combined bearings can absorb vibrations, in contrast to their steel counterparts.

Treotham Automation Pty Ltd

www.treotham.com.au



CONDITION- MONITORING SOLUTION

NI InsightCM Enterprise is a software solution that helps companies gain insight into the health of their capital equipment for machine maintenance and operations. National Instruments has developed InsightCM Enterprise as its first end-to-end software solution that addresses Big Analog Data challenges and builds on the industrial Internet of Things.

The solution is designed to allow companies to cost-effectively monitor both critical and ancillary rotating machinery, which helps them gain a more holistic view of their fleets and manage operational risk while maintaining profitability and production efficiency. The enterprise solution solves the data management, data analysis and systems management challenges that are common in Big Analog Data applications.

The solution acquires and analyses sensor information, generates alarms and allows maintenance specialists to remotely diagnose machine faults. Ready-to-run condition monitoring systems based on the CompactRIO hardware platform can acquire data from a wide range of sensors for improved fault diagnoses. This hardware and software solution simplifies the configuration of and measurements from thousands of sensors, so users can remotely monitor device health, configure channels and upgrade firmware on deployed systems.

The online condition monitoring solution is suitable for companies in a variety of industries, including oil and gas, power generation, mining, rail and industrial manufacturing, that need to optimise machine performance, maximise uptime, reduce maintenance costs and increase safety.

National Instruments Australia

www.ni.com/oceania

HYGIENIC PUSH-BUTTONS

Schmersal's N-Series range of products has been designed and tested specifically for the food industry and other hygiene-sensitive environments. The product range consists of a large portfolio of command and signalling devices including emergency stop mushroom buttons, push-buttons, illuminated push-buttons and pilot lights, selector switches, main switches and more.

Constructed using hygienic design principles, there are no corners or edges, which prevents contamination and allows the device to be cleaned and maintained easily.

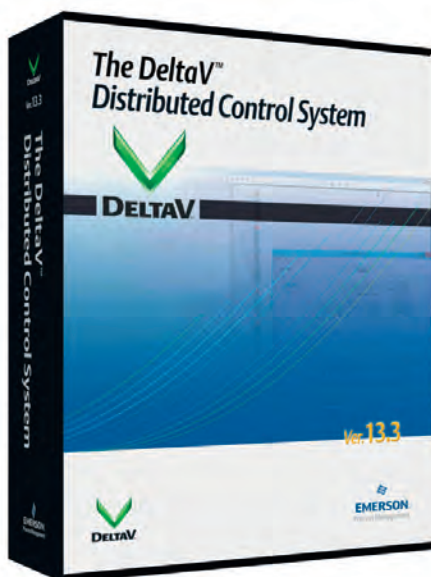
UV and ozone resistant, the N-series is also resistant to cleaning agents typically used in the food processing industry. Special seals extensively prevent the penetration of product residue in the gaps between the fixed and moving parts, effectively preventing the formation of bacteria that are hard to reach for cleaning.

This range includes the NDTP30 and the NDLP30, and features the hygienic mushroom shape push-button technology. These buttons offer an ergonomically improved shape as well as the cost-effective 3-colour LED module. With a single standard command unit (ELDE.N), three different signals or commands can now be displayed at the button head.

Control Logic Pty Ltd

www.control-logic.com.au





DISTRIBUTED CONTROL SYSTEM

Emerson Process Management has released version 13 (v13) of the DeltaV distributed control system (DCS), designed to deliver greater efficiency and performance for process control applications. New features focus on integration, advanced alarm management and security with an overarching design that improves ease of use and minimises the need for specialised expertise.

DeltaV v13 provides technologies to more easily bring multiple disparate data sources together for easy operator access and use. These technologies include an Ethernet I/O card (EIOC) for added flexibility and capacity for integrating Ethernet-based subsystems and devices, including a direct interface with smart motor control centres and substations.

The factory acceptance testing (FAT) experience has also been improved by providing enhanced safety instrumented system simulation capabilities and an easy-to-use virtualisation environment.

With v13 the native support for discrete outputs over wireless provides opportunities to reduce project wiring and associated costs through wireless devices. Additionally, template-based Foundation Fieldbus device configuration improves commissioning by eliminating steps and decreasing errors.

Emerson Process Management

www.emersonprocess.com.au

HIGH-SPEED THERMAL INKJET PRINTER

Markem-Imaje has announced the 1050 integrated thermal inkjet printer.

The printer produces high-resolution serialised data and complex 1D and 2D barcodes on fast-moving production lines in the food, beverage, pharmaceutical and other industries.

The printer can produce text, logos and high-density graphics up to 600 x 600 dpi, at rapid line speeds. It has 600 separate ink nozzles, allowing variable dpi from 1 to 600. The flexible printhead can print codes from 12.7 up to 50.8 mm high.

The snap-in and -out ink cartridges combine the printhead and ink and allow operators to maintain the printer with minimal line interruption.

Markem-Imaje Pty Ltd

www.markem-ijaje.com

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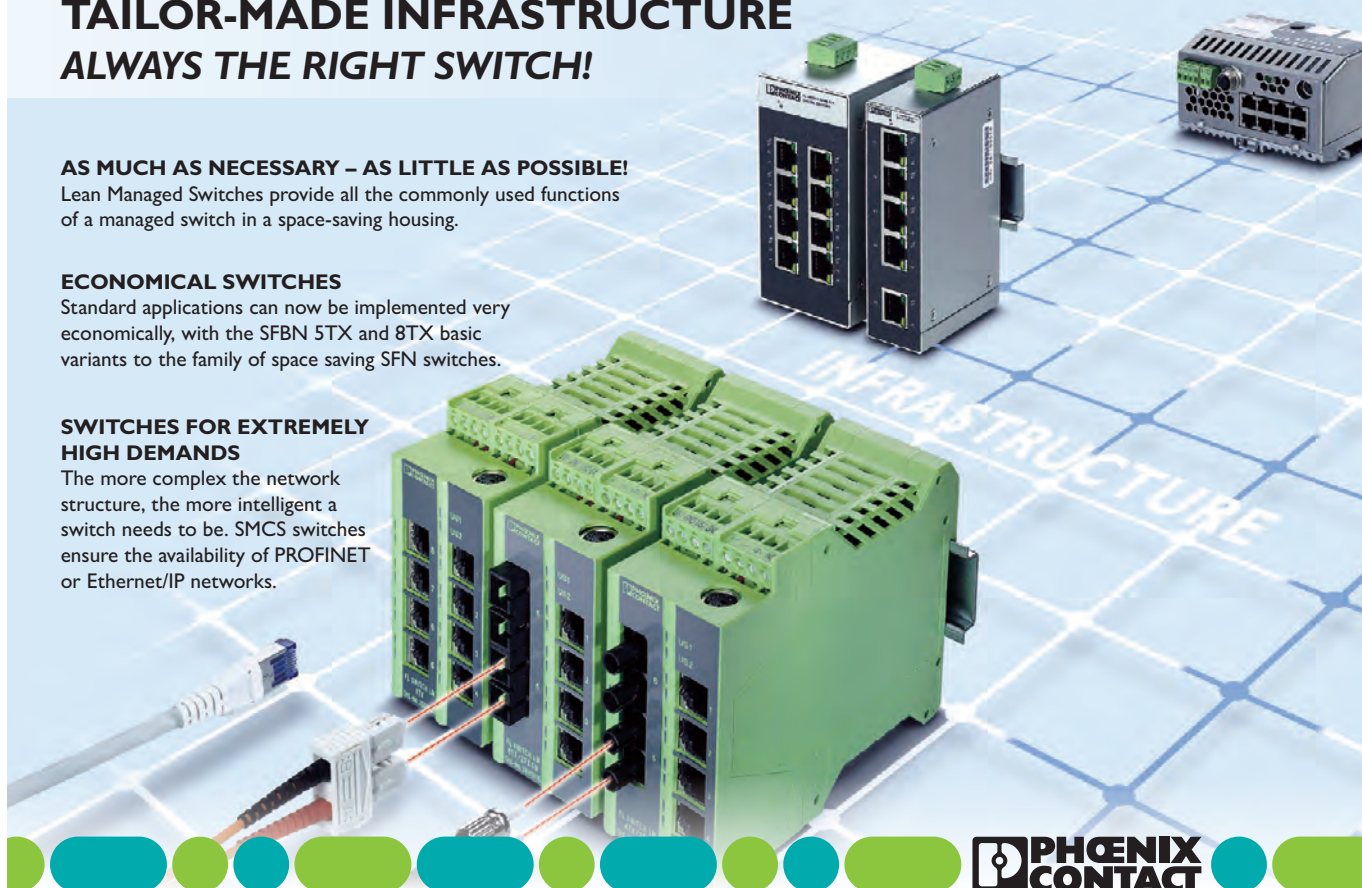
Lean Managed Switches provide all the commonly used functions of a managed switch in a space-saving housing.

ECONOMICAL SWITCHES

Standard applications can now be implemented very economically, with the SFBN 5TX and 8TX basic variants to the family of space saving SFN switches.

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Transformer manufacturer improves efficiency with new compressed air systems

Wilson Transformer Company (WTC) is an Australian manufacturer of power and distribution transformers. At the four-hectare head office in Glen Waverley, Victoria, the Power Business Unit designs, engineers, manufactures and tests a range of quality power transformers including generator, substation and autotransformers up to 550 MVA, 400 kV.

Manufacturing in Victoria since 1933, WTC has grown steadily to become the largest Australian manufacturer of power and distribution transformers by investing in people, technology and assets. As such, over the past five years, the company has committed major resources into the development of its power and distribution transformer capability. This has involved a major expansion of its Glen Waverley facility, which included upgrading the compressed air system. As Alan Veitch, improvement manager for the Power Business Unit at WTC, explained: "In

planning the expansion of our production facility, it became apparent that our existing compressor station was not going to be able to meet the new compressed air demand. The ageing compressed air system was also becoming increasingly inefficient and so costly to operate. The expansion therefore presented us with the ideal opportunity to address this issue at the same time."

The plant at Glen Waverley incorporates two main workshop areas: one for the electrical operations of core cutting, insulation preparation, coil winding, control wiring, transformer assembly, processing and testing; and the other to handle the mechanical operations which include fabrication, welding, grit blasting and painting.

Compressed air is used to power a number of operations across the two workshop areas - from breathing air used in the blasting facility to general-purpose pneumatic control systems on, for example, the drying ovens and oiling systems.

The biggest requirement for compressed air in planning the upgrade, however, was the introduction of air skates. Powered by compressed air, air skates can lift and move heavy loads on a cushion of air.

As Veitch explained: "We wanted to introduce air skates into the facility in order to lift and manoeuvre the largest transformers into restricted access areas such as the testing bays where the cranes cannot go."

To meet the increased compressed air demand and ensure optimum energy efficiency, WTC chose to invest in six Kaeser rotary screw compressors, four CSD T models with integrated refrigeration



dryers and two CSD(X) T SFC variable speed drive models.

The CSD(X) T series from Kaeser deliver premium quality compressed air and high efficiency. At the heart of every CSD(X) T rotary screw compressor lies a low-speed Sigma Profile airend equipped with flow-optimised rotors. Developed by Kaeser, the Sigma profile achieves power savings of up to 15% compared with conventional screw airend rotor profiles for a highly energy-efficient solution. In addition, all Kaeser rotary screw airends are powered by premium efficiency IE3 drive motors for maximum performance and reliability.

Combining a rotary screw compressor with a compact integrated refrigeration dryer makes the CSD(X) T units suitable where the user requires an all-in-one solution. The integrated refrigeration dryers in these units also provide further energy savings, with a sophisticated control on

these dryers ensuring that they are only active when compressed air actually needs to be dried. This achieves the required compressed air quality with maximum efficiency.

And, where compressed air demand fluctuates the CSD(X) T SFC series really comes into its own. Utilising a variable speed drive, these units have been designed to vary the speed of the airend to directly match the FAD (flow) required by the end user. This saves energy, maximises service life and enhances reliability.

"We primarily chose these compressors because Kaeser is well known for manufacturing high-quality, reliable and efficient compressor solutions. And, one of the reasons we were aware of this is because Kaeser was one of our customers and we had in fact supplied them with a Wilson Transformer some years earlier," said Veitch.

The main compressor system is now effortlessly powering the new air skates, which together can lift and manoeuvre some 300 tonnes of weight.

"All of the Kaeser compressors have proven to be efficient and reliable in operation, and we are particularly impressed with their ease of maintenance. It is also evident to us that upgrading the compressed air equipment is saving us energy," he concluded.

Since the installation of the compressors, WTC has continued to rely on Seaford, Victoria-based Kaeser Partner Air Maintenance Pty Ltd for its ongoing compressor maintenance requirements with whom the company has a longstanding relationship.

Kaeser Compressors Australia

www.kaeser.com



PORTABLE HYGROMETER

The MDM50 portable hygrometer from Michell Instruments gives rapid dewpoint measurements in compressed air - T95 to -35°C from ambient typically in 5 min. It has been designed to make spot checks of dewpoint in air and gases as simple and fast as possible.

The key to the MDM50's measurement speed is the polymer sensing element, which also provides long-term stability and resistance to chemical contamination, making the MDM50 suitable for use in industrial settings where contamination could be an issue. As well as the chemically resistant sensor and integrated particulate filter, the enclosure is rated to NEMA 6 (IP68) when the lid is closed.

To ensure simple operation, the MDM50 is fully self-contained with an integrated sampling system within the compact case. Taking a measurement involves connecting to the sample gas with a Quick Connect or optional Swagelok tube fitting and turning on the instrument: the MDM50 automatically starts to measure the dewpoint of the sample gas.

As well as its simplicity, the MDM50 is a practical instrument, offering a wide measurement range of -50 to +20°C dewpoint. It is light (4 kg) and fully portable. The long battery life of 16 h operation enables users to work in locations where there is no access to charging points.

As well as dewpoint in compressed air dryers, typical applications for the MDM50 include moisture measurements in medical gases, polymer chip dryers and instrument air.

AMS Instrumentation & Calibration Pty Ltd

www.ams-ic.com.au

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LASER DISTANCE SENSOR

The Banner Engineering Q4X laser distance sensor is designed to detect distance changes as small as 1 mm and covers a 25 to 300 mm range across multiple target colours, materials and surfaces. With the ability to detect presence or absence of a target or an object's orientation, the Q4X solves a variety of sensing applications.

The Q4X is optimal for difficult distance-based sensing applications as it easily detects objects regardless of target surface reflectivity, including black foam on black plastic, black rubber in front of metal, multicolour packaging and targets of all colours. Additionally, the sensor offers high resistance to ambient light interference.

Distance readouts can be clearly read from the highly visible, angled, 4-digit display that is easily viewed from multiple vantage points. The Q4X also offers intuitive user set-up utilising three tactile buttons conveniently located below the display.

For use in high-pressure washdown environments, the Q4X is constructed with robust housing rated to IP69K. Durable FDA-grade stainless steel resists mechanical impact, overtightening and extreme vibration.

Micromax Pty Ltd

www.micromaxsa.com.au



RUGGED TABLET PC

The RuggON PM-521 meets the MIL-STD-810G rating for shock and vibration and can be dropped from 1.6 m onto plywood on a concrete surface. This slim, rugged tablet PC is fully sealed against the ingress of liquid and dust damage (IP65) and has an operating temperature rating of -20 to +50°C.

The 10.1" LED backlit screen with integrated 10-point capacitive multitouch supports glove touch, water rejection, palm rejection and a 2 mm hard tip stylus. The rugged Gorilla Glass3 screen features a display brightness of 1000 nits offering sunlight-readable functionality for outdoor applications.

The PM-521 is based on Intel's Atom E3827 1.75 GHz dual-core CPU and includes 4 GB of DDR3 SODIMM (8 GB by request) and 120 GB of upgradeable mSATA solid-state disk. The hot-swappable dual batteries offer up to 12 h of battery life in the extended version and 6 h in the standard version.

A 5 MP webcam with an LED flash and auto-focus is embedded in the rear bezel and a 2 MP camera with audio input is in the front panel. Seamless communication is available via the onboard Wi-Fi 802.11 ac/a/b/g/n, Bluetooth 4.0 and GPS plus optional 3.5G or 4G LTE modules. Additionally, GNSS (GPS/Glonass/BelDou) is a standard feature of the PM-521.

The PM-521 is available with a range of optional data capture options including NFC, 1D/2D barcode scanner, smart card reader (CAC) and magnetic stripe reader (MSR) suitable for portable inventory and asset management.

Backplane Systems Technology Pty Ltd

www.backplane.com.au



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OPERATOR TRAINING SIMULATION SYSTEM

Honeywell Process Solutions has announced its UniSim Competency Suite, designed to improve operator competency and help prepare process industry operators faster through realistic training experiences.

In the near future, many operators at industrial plants in developed countries will retire, while process industries in emerging economies will continue to face the challenge of critical skill shortages.

The UniSim Competency Suite features existing simulation models as well as new technologies, among which is UniSim Operations, an operator training simulator (OTS), providing a dynamic plant simulation that allows users to accelerate knowledge transfer by consolidating an entire lifetime of experience into a concise process training curriculum. It features realistic process, control and safety systems modelling.

UniSim Curriculum is a customisable competency model that aligns and assists in improving critical requisite skills and behaviours and tracks operator progress. It is built from Abnormal Situation Management Consortium's research into operator competency to help businesses define, deploy and manage a structured competency program.

UniSim Tutor is a knowledge capture and propagation tool that provides a repository for domain knowledge and experience, making it possible to teach and evaluate 'what if' reflexes and diagnostic abilities.

UniSim Field View is an interactive, navigable, panoramic view for realistic field operator training - using actual facility photographs - and extends UniSim Operations simulator training to include field operators.

UniSim 3D Connect provides UniSim Operations simulator integration and connectivity to a 3D virtual environment to provide credible and realistic experiences for field operator.

Honeywell Process Solutions
www.honeywell.com.au



CABLE-ACTUATED POSITION SENSOR

The ASM WS100M is a cable-actuated position sensor that has been designed to handle harsh conditions and offshore applications.

The WS100M contains a hybrid precision potentiometer sensing device and provides linearity of up to $\pm 0.05\%$ FS. The position sensor is constructed using a stainless steel housing and cable, ensuring

its durability in hostile environments with protection class IP68/IP69K.

It offers a measuring range: 0-2000 mm up to 10 m, with potentiometer, 0-10 V and 4-20 mA, 2- or 3-wire outputs.

Automated Control Pty Ltd
www.automatedcontrol.com.au

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VARIABLE AREA FLOWMETER

The Krohne H250 variable area flowmeter with M40 indicator is suitable for the flow measurement of liquids, gases and saturated vapour in the process industries and has a modular design that allows it to be adapted to the needs of any application. It is available for use in both horizontal and fall pipes as well as in the standard installation upright in rising mains.



The construction of the H250 M40 means that it can be either intrinsically safe or supplied in an explosion-proof casing, thus making it possible to comply with different regional explosion protection strategies with one device. In addition, its sturdy design ensures high resistance to pressure, temperature and media, and that it stands up to extreme application and environmental conditions.

The all-metal flowmeter has recently been approved with the North American approvals for the ignition protection types IS and non-incendive, bringing the device to more than 30 approvals worldwide for hazardous gas and dust areas, including ATEX, IECEx, usFMc, NEPSI, INMETRO, KGS, GOST-R and PESO/CCOE. Given this, the device is suitable for large international companies that need the respective local approvals, as well as OEMs looking to fulfil the requirements of different customers with one device.

The device can easily be upgraded with one or two limit switches (NAMUR, transistor or reed), a 4-20 mA signal output with HART, a graphical LCD with totaliser and pulse output or a digital, bus-powered communication interface according to FOUNDATION Fieldbus or Profibus PA - on-site without process interruptions.

Krohne Australia

www.krohne.com

HIGH-CAPACITY POWER SUPPLIES

Mean Well has released the 5 kW RST-5000 and 10 kW RST-10000 power supplies. Both have been designed to accept a three-phase AC input and are available with a 24, 36 or 48 VDC output.

For maximum system flexibility, both the output current and voltage are adjustable from 20 to 120% of the rated output. Four of the RST-5000 power supplies can be used in parallel or two of the RST-10000 giving a 20 kW capacity.

Both the RST-5000 and RST-10000 offer an efficiency rating of up to 91% and are suitable for many high-powered applications such as process automation, industrial control systems, large-scale charging systems and cloud storage systems.

ADM Instrument Engineering Group

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EXPLOSION-PROOF ENCODER

The Hengstler ACURO AX70 is an explosion-proof absolute shaft encoder. Its robust construction and slim design make it suitable for absolute positioning requirements in hazardous areas.

Explosion-proof AX70 absolute encoders are constructed with an aluminium housing and are designed for use in potentially explosive Group II atmospheres. The pressure-resistant housing has been developed in compliance with the EN 60079 series of standards for use in explosive atmospheres and is permitted for use in Zones 1 and 21.

For applications within the food industry or installations within corrosive environments, the AX71 is also available with a stainless steel housing to ensure long-term durability. The AX70 is available in protection class up to IP67 and has a diameter of 70 mm.

Resolution of the AX70 is up to 34-bit (22-bit ST, 12-bit MT) and interfaces include SSI/BiSS, SSI programmable, Profibus, CANopen and DeviceNet.

Automated Control Pty Ltd

www.automatedcontrol.com.au



RFID SAFETY LOCK SENSOR

Utilising wear-free RFID technology, the RSS16 safety sensor by Schmersal is designed to overcome limitations of electromechanical devices.

The RSS16 shares its dimensions with the AZ16 electromechanical safety switch. With the addition of Schmersal's RFID technology, the RSS16 gives users the option of three levels of protection against defeat.

The basic version will accept any actuator of the RSS family. Users can teach an actuator to work with the one device, and teaching can be repeated any number of times with a delay time between teaching cycles. The third and highest level of tamper resistance will only accept the actuator presented at the very first power-up of the device.

Additional benefits include the possibility to approach the device from three sides, providing a high level of flexibility when integrating into the surrounding construction. The safety sensor can be used as a magnetic door stop and latch up to 60 N, allowing the designer to forego the use of a separate stop and latching device. Users can connect up to 31 RSS16 devices in series monitored by a single safety module all while maintaining CAT4 or PLe.

The RSS16 can be used in existing AZ16 applications with the ability to offer increased tamper protection but still keep to a 1:1 replacement.

Control Logic Pty Ltd

www.control-logic.com.au



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QUAD-CORE BOX PC

The Basicline 2000 box PCs from Phoenix Contact for use in harsh industrial environments offer powerful third-generation quad-core processors (Bay Trail) in a fanless housing.

The devices can perform simple control and communication tasks and collect data in the areas of machine building and systems manufacturing, building automation, traffic technology, and energy data transmission. The box PCs are also designed for maintenance-free, continuous 24-hour operation, even where there are high-temperature, vibration, shock, and EMC requirements.

The box PC uses the quad-core Intel Celeron N2930 processor 2.16 GHz from the Bay Trail generation with integrated Intel HD graphics processor. Its interfaces include four USB ports, two display ports and three COM ports. Two Gigabit Ethernet ports are also available, as is CFast, HDD or SSD mass storage. The RAM can be expanded by up to 8 GB DDR3.

With a thermal design power of 7.5 W, the box PC is said to be particularly energy efficient. It is also designed for an operating temperature range of 0 to +50°C and an input voltage of 24 VDC ($\pm 20\%$). Its compact design measuring 162 x 145 x 49 mm means it can be mounted directly on DIN rail.

Phoenix Contact Pty Ltd

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TERMINAL MARKING FOR VARIOUS MANUFACTURERS

The UM1 universal material marking range from Phoenix Contact provides markers for labelling terminal blocks manufactured by Weidmüller, Conta Clip, and Klemmsan.

The materials are executed in the shape of a double strip and are comparable to the original material in terms of handling and visual effect.

For precise printing, the material is fixed in magazines so the user does not need to rely upon a special output device, and instead can use different

printing systems from Phoenix Contact, such as the UV-LED Bluemark printer, the Thermomark Card thermal transfer printer or the marking plotter. The Clip Project marking software is used for data input.

The product characteristics of the UM1 materials, with regard to both material and application, are similar to the UCT materials. They exhibit high resistance to wipes and scratches as well as to oils, chemicals, and solvents.

Phoenix Contact Pty Ltd

www.phoenixcontact.com.au



4-IN-1 REMOTE I/O SYSTEM

The Moxa ioLogik 2500 series integrates I/O functionality, an Ethernet switch, serial/Modbus connectivity and 32 GB of data logging into a single remote I/O device. This integrated 4-in-1 remote I/O solution reduces the required numbers of components and connections, and eliminates the need for extensive rewiring.

The ioLogik 2500 uses an I/O expansion design that lets users connect more than 100 different I/O channels under a single IP address to ensure efficient data acquisition at a lower cost. In addition, the new Click&Go Plus control logic supports up to 48 rules with further upgrades to eight conditions/actions, and the IOExpress configuration tool can be used for offline/online configuration, allowing users to configure every I/O parameter offline and then upload the settings to online devices, dramatically reducing the time and cost needed to manage and configure the I/O system.

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UPDATED WLAN SOFTWARE

Belden has updated its Hirschmann HiLCOS 9.0 WLAN software to further improve network availability and data security across wireless connections.

HiLCOS 9.0 is designed to help ensure the highest-available wireless connection, while also protecting industrial networks from malicious behaviour. Many markets, such as transportation (railways), power transmission and distribution, oil and gas, renewable energy, machine building and other hazardous environments, can benefit from the software's newest features.

Features available in the 9.0 version include simple deployment through an Automatic Wireless Distribution System (AutoWDS); enhanced security through a Wireless Intrusion Detection System (WIDS), Protected Management Frames (PMF), Layer 2 firewalls with stateful packet inspection and Wi-Fi Protected Access (WPA); and zero network failover due to Parallel Redundancy Protocol (PRP), even in situations with high latency and traffic congestion.

Belden Australia Pty Ltd

www.belden.com

EMBEDDED COMPUTER

ADLINK Technology has announced the Matrix MXE-5400 fanless embedded computer based on the fourth-generation Intel Core i7-4700EQ quad-core processor. The MXE-5400 is designed to maximise manageability and security for a wide range of applications, making it a solution for outdoor intelligent transportation, digital surveillance, security, and industrial automation applications.

Accompanied with ADLINK MSDK+ based on Intel Media SDK and Quick Sync Technology, media streaming capability is boosted and CPU loading reduced.

The MXE-5400 is hardware ready for Intel vPro technologies, allowing administrators and users to manage and control the system remotely via encrypted OOB TCP/IP communication by Intel iAMT 9.0. ADLINK's proprietary SEMA offers an easy-to-use library to enable real-time monitoring of system health as well as accessing management utilities.

The MXE-5400 includes support for three independent displays with DVI-I, and two dual DisplayPorts. Four serial ports with surge protection are provided, along with four Gigabit Ethernet ports, eight isolated digital I/O and six USB 3.0 ports, plus one internal USB 2.0 for dongles. To enhance data reliability, an internal dual SATA-III interface accommodates RAID support and the dual mini PCIe interfaces support rich wireless communication options, such as BT/Wi-Fi and 3G, with one configurable to mini SATA access by jumper selection.

The ADLINK MXE-5400 has a ruggedised design delivering operating shock tolerance up to 50g, and an extended operating temperature range of -20 to 60°C.

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Perfecting the chocolate sheen on confections

They are harbingers of the Christmas season: gingerbread, marzipan sweets, spiced cookies, macaroons, truffles and others begin all filling the supermarket shelves in the months before Christmas. Enrobed in chocolate coating, these baked Christmas favourites are enticingly mouth-watering for any sweet tooth.

But after the consumer unpacks them, the chocolate products seem to be covered with whitish coating. Experts refer to this phenomenon as 'fat bloom'. Even excellent products with chocolate coating could lose their gloss after a certain amount of storage time has passed, and develop a grey patina. Fat bloom is often mistaken for mould, but it really has nothing to do with this. It has no effect on the taste of the product, and the product is not ruined by it. Nonetheless, the unsightly coating has an adverse visual effect on these treats; they lose some of their quality.

"Production of Christmas baked goods already starts in July. This is where the problem lies. Fat bloom does not appear immediately after production, but instead appears days or even weeks later. It can be one of the consequences that come from storage that is too warm, or under temperatures that sharply fluctuate," explains Wolfgang Danzl, food quality expert at the Fraunhofer Institute for Process Engineering and Packaging IVV in Freising. The researcher and his team are helping food makers with their efforts to improve the resistance of their products with chocolate coatings from white flecks.

Small and medium-sized enterprises suffer the greatest impact, because they produce a majority of the confections and baked goods. Chocolate coatings represent an effective technique for refining these products, and in the process, the pastries, cakes, waffles and bars are run through a fluid, pre-crystallised chocolate stream. They then have to swiftly crystallise within the cooling channel - in other words, solidify - so that a shiny surface results. IVV researchers discovered that this stage is precisely where fat bloom can arise.

"It is not uncommon for residual chocolate at the end of the coating stage to flow right back to the start. During this recycling, the shortening used for filling and baking is washed off. We were able to prove that for the first time. To obtain the evidence, we developed commensurate methodology. Until now, there were hardly any investigations on coating systems," Danzl explains.

The fat components from the fillings could penetrate to the surface of the confection and accumulate in the coating. This



process is also called 'fat migration'. Fine fat crystals accumulate at the surface and thus change the crystallisation properties of the chocolate coating.

"The filling fats cause the chocolate to crystallise more slowly, making the coating softer. This allows the fat to accumulate even more efficiently. Fat migration is facilitated, which in turn can lead to fat bloom formation," the researcher explains.

The type and quantity of the filling fats influences the chocolate's crystallisation behaviour. Cocoa butter with a minimum proportion of other fats and oils is highly predisposed to fat bloom. Most of all nut oil and lauric fats tend to soften the chocolate coating, the IVV researchers determined through their lab testing. This includes coconut oil and palm kernel fat. They contain lauric acid, which does not mix well with the cocoa butter. By unravelling, the crystalline structure is destroyed; as a result, these white flecks emerge.

Producers can arrange to have the food experts at IVV investigate their chocolates at the laboratory. For this purpose, they have to remove the fluid mass from the tank during production. The researchers are capable of evaluating the quality of the chocolates, identify the proportion of filling fat and analyse precisely how great the risk is for fat bloom to occur. They advise the companies about how to optimise the production processes and which measures to implement. Depending on the application, the phenomenon can be counteracted by adjusting the temperature gauge, the refrigeration channel or the backflow. Evaluating the baking and filling fats could furthermore help improve recipes.

Fraunhofer-Gesellschaft

<http://www.fraunhofer.de>



CONNECTOR PROTECTION

German company igus has developed the 'Conprotect' solution as protection for sensitive connectors in industrial applications.

This protection against mechanical loads for standard USB connectors is assembled with only a few steps and without tools.

For even better protection for USB connectors in industrial environments, Conprotect has a protective enclosure that is easily clipped around USB connectors. Two knurled screws give the connection added reliability. This approach prevents inadvertent unplugging. This rugged and protective enclosure for connectors can also be used with a coupling for flying connections.

In order to make assembly as easy as possible, the lids of Conprotect are made from identical parts that fully enclose the connector by hand. The screws are then simply clipped in and users can retrofit Conprotect on existing connections.

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RACKMOUNT COMPUTER

The RE0814 rugged embedded computer from Crystal Group features no moving parts and is fanless. The unit has an operating temperature range of -40 to 85°C and it encloses an Intel Core i3, i5 or i7 processor into a small rugged 1U short chassis (27.9 x 35.5 cm).

The RE0814's billet construction is made from machined strain-hardened 6061T651 structural aircraft aluminium. This compact construction weighs 3.4 kg and has the ability to include four SATA 6.35 cm solid-state drives and five USB ports - four on the back and one on the front. The unit is also available with up to four Ethernet ports and a VGA or DVI-I port.

The RE0814 is tested to IEEE 1613 and IEC 61850-3 standards, and designed to MIL-STD-810 and MIL-STD-461.

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The EasiDrive is a low-cost alternative to permanent actuators. No permanent power supply is required, and it is therefore suitable for minimum facilities installations. It is capable of moving tight or partially seized valves and is adaptable to any size or type of valve.

The 'reaction kit', which prevents a torque kickback, is especially useful as valve movement is always fully controlled, preventing operator injury and fatigue. In addition, the variable torque output feature, which prevents excessive torque being applied, ensures proper and safe valve operation at all times.

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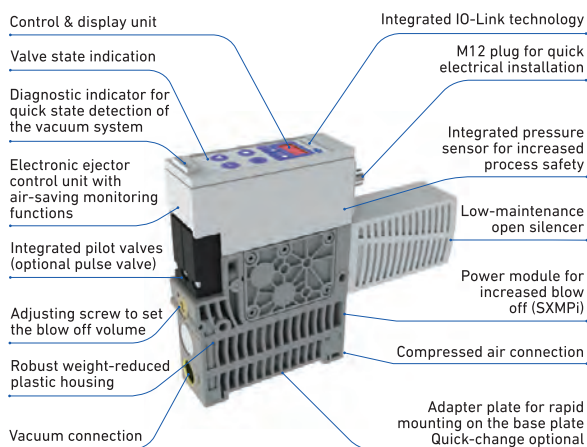
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EMBEDDED PC WITH CANBUS

The Matrix MXC-2300 is a fan-less, expandable, embedded computer equipped with the latest Intel Atom Quad-Core Processor E3845.

The MXC-2300 is designed to deliver high computing performance at minimal power consumption, along with advancements in visual processing capabilities provided by Intel Gen 7 HD graphic technology (Ivy Bridge GPU). In addition, a built-in dual-port isolated CANbus with SJA1000 controller delivers bus arbitration and error detection with real-time data transmission, minimising data loss and ensuring system reliability.

Continuing the singular expansion principles of the Matrix MXC series, the MXC-2300 sustains versatile expandability from three PCI/PCIe expansion slots accommodating a variety of I/O cards. As a result, the MXC-2300 series presents an intelligent computing platform suitable for machine automation, machine vision, intelligent transportation systems, maritime automation and energy providers.

The MXC-2300 provides three PCI/PCIe expansion slots and one mini-PCIe socket, all in a compact enclosure for fast and flexible system extension. Abundant I/O capability with one USB 3.0 and four 2.0 ports, four COM ports and two Intel Gigabit Ethernet ports with teaming function offer higher reliability for increased interconnectivity and interdependency.

The MXC-2300 offers a ruggedised construction, with operating shock tolerance up to 50g and extended operating range of -20 to 70°C. In addition to employing HALT (highly accelerated life test) scientific testing methods to ensure maximum reliability and long-term availability, the MXC-2300 is claimed to achieve MTBF of 420,000 h.

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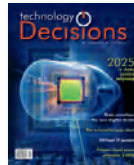


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AS I SEE IT



AN IMPORTANT STEP IN CONNECTIVITY IMPROVEMENT

Client-server network architecture has become entrenched in modern-day computer systems. This is where one or more server computers act as a repository of data and serve it up for one or more clients, over a network. Servers work behind the scenes, while clients utilise the data and often interface with the end user.

This model is implemented in many of the computing tasks we use every day, such as email, printing, files and even web serving. Similarly, the realm of industrial and process systems has almost universally embraced client-server architecture, after many successful implementations. Common examples are SCADA systems and OPC interfaces. The architecture is undoubtedly effective and seems set to stay.

However, a variation to this theme is emerging, with notable success.

Most of the data wanted by clients resides in controllers which are distributed throughout the field. Traditionally, a server (usually a desktop computer) has collected this data by polling the controllers, often via dedicated protocols, and has served it up for clients to use.

This architecture can be streamlined by discarding the dedicated server, thereby reducing hardware. Server functionality can instead be implemented within the controller, which clients are able to access directly over the network.

Taking away hardware provides immediate benefits in the reduction of occupied space and fewer cables. Costs are also reduced by less hardware, no intermediate or driver software, and none of the associated maintenance costs or annual licence fees. Even more importantly, as no intermediate server computer is required, reliability is increased and throughput improved. The improvement in response times is such that real-time data exchange between the controller and client can become a reality, something that is all but impossible with intermediate servers.

Database connectivity is also changing. In the age of the internet and the demands

for 'big data', the use of databases to handle large amounts of information is becoming increasingly commonplace in industrial applications. This is in line with the constant drive to improve efficiency and output. Once in a database, the latest tools can be used to analyse production monitoring, predictive maintenance and quality traceability throughout the entire process.

In the past, database connectivity was usually implemented by a serving gateway (again, usually a standard PC) that interpreted SQL commands and translated them into a protocol the controller could understand. This data translation occurred both ways, for each command and response.

But this is another application that can be improved by making serving computers redundant. Modern controllers support a full array of SQL client functionality, and this is in addition to their usual logic tasks, motion control and communication functions. They can even connect simultaneously to a range of SQL servers, made by different vendors!

The SECS/GEM standards, created by SEMI (Semiconductor Equipment and Materials International), is another instance of where a direct interface between client and controller (acting as a server) has proved beneficial for manufacturing - in this case, the semiconductor industry. It has improved the efficiency of communications and simplified network architecture.



Harry Mulder has been involved in the industrial control industry for over 25 years, with the last 24 years at Omron Electronics. With a degree in computer science, his experience includes sales, engineering and product management. He currently manages an engineering team across four states but still enjoys getting involved with day-to-day problem solving.



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