

PROCESS

TECHNOLOGY

AUTOMATION + CONTROL + INSTRUMENTATION

March 2020 vol.33 no.9

PP100007403



Remote I/O solutions for Smart Cities

CREVIS

GLOBAL
M2M

RADAR IS THE BETTER ULTRASONIC



\$741

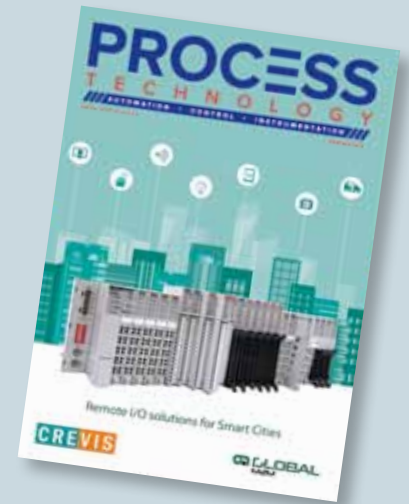
VEGAPULS C 11

80 GHz level sensor with
fixed cable connection (IP68)

All advantages of the radar technology:
www.vega.com/vegapuls

CONTENTS

- 4 Automation opportunities in the new space era
- 8 Hot Products online
- 12 The importance of being easily replaceable
- 16 Successful OT/IT network convergence is possible
- 28 Achieving a safe mobile robot installation
- 38 OT-IT convergence challenges that increase cyber risk



CREVIS specialises in the design and manufacture of industrial fieldbus network I/O, called FnIO for factory and building automation applications. In 2020 Global M2M is launching the G-Series I/O product in the Australian and New Zealand markets.

The G series distributed I/Os provide users with a broad range of field and bus connectivity for smart integrated solutions through a wide range of digital, analog and special modules for almost any signal type. Communicate effectively with overlying systems or other equipment via widely used communication protocols by combining slice I/Os with network adapter modules to match application requirements. The G-series network adapters include DeviceNet, Profibus, CANopen, CC-Link, CC-Link IE Field, CC-Link IE Field BASIC, Modbus RTU, Modbus TCP, EtherNet/IP, Profinet, EtherCAT, BACnet and Powerlink.

Clever details make installation, service and modification less complicated. G series I/O nodes are easily mounted on a standard 35 mm DIN rail with removable cage clamp connection terminals.

The G series offers a high level of performance with a higher I/O and network scan frequency, and a wide range of industrial certifications lets users operate safely in tough industrial and building automation applications (with CE, UL, FCC and RCM compliance).

Whatever configuration is chosen users can easily advance to a powerful distributed CODESYS control solution making the Crevis I/O smarter. The G series CODESYS PIO (Programmable I/O) controller modules support Modbus TCP/RTU and EtherCAT protocols. With the powerful CODESYS software platform users can utilise program speed every bit as fast as the classic PLC.

Global M2M
www.crevis.com.au

READ ONLINE! *This issue is available to read and download at*
www.processonline.com.au/magazine



AUTOMATION OPPORTUNITIES IN THE NEW SPACE ERA

The increasing interest in Australia for commercial involvement in space opens up new avenues of opportunity for automation engineers.

Since the announcement of the establishment of the Australian Space Agency (ASA) on 14 May 2018, the agency has been taking a commercial approach to space ventures. Its stated aims are to leverage Australia's industrial skills in mining remote locations and developing automation, as well as its fast-growing start-up culture, to bring the space industry sector to \$12 billion by 2030.

Of course, the agency's focus needs to be commercially based: its government-funded budget is only \$41 million for four years, which is a drop in the ocean compared with NASA's budget at US\$20 billion and the European Space Agency's 5.7 billion euros. Australia's space projects will therefore need to be commercial enough to interest businesses.

While ASA is only a new venture, Australia's space experience goes back to the earliest days of space activity. Australia was one of the first countries to launch a



© Stockbyte.com.au/Trifonov

satellite from its own territory — sending a satellite into orbit from the Woomera military site in South Australia as early as 1967 — and when Neil Armstrong made the first moonwalk in 1969, it was the Parkes Radio Telescope that picked up the TV signals for most of the transmission that was broadcast to the world.

So how is all this of interest to readers of *Process Technology*? The answer lies in the wealth of knowledge we possess in the fields of remote control and automation. If you are an automation engineer looking for new and interesting challenges, there may be some amazing new career opportunities on the horizon!

The challenges of near future space travel

Unless you have been not paying attention to the technology and science news of the last few years, you would have noticed that there is a lot of discussion about sending

people to Mars and otherwise exploiting space, not only from space agencies, but more vocally by entrepreneurs like Elon Musk (Tesla, SpaceX) and Jeff Bezos (Amazon, Blue Origin).

The biggest achievement of these organisations, particularly SpaceX, has been the development of re-usable, remote-controlled space vehicles. But of all the problems that must be solved to achieve travel to Mars, one problem is fundamental: how do you fuel it? Just escaping Earth's gravitational field requires an extensive burn of fuel, so how do you have enough left to send a vehicle on a return trip? Or even just to land on Mars safely (assuming no return journey is expected)?

Of course this problem of fuel was (sort of) solved for the Apollo program, but only enough to move three men to the Moon, land two of them, and bring them back with literally an unpowered fall and crash-landing in the ocean.

Numerous US, European and Asian agencies as well as corporations have been developing proposals for human missions to Mars. We already know the shortest time humans would have to endure such a trip: around 2 years and 11 months.

The lowest energy transfer to Mars is known as a Hohmann transfer orbit¹, which would involve an approximately 9-month travel time from Earth to Mars, about 500 days at Mars to wait for the transfer window to Earth, and a travel time of about 9 months to return to Earth — so any astronauts sent to Mars would be up for a trip of almost 2 years and 11 months, and the life support systems on Mars would need to support them for at least 500 days.

There are also plans for a permanent colony, in which those who go would not return — some argue that such a mission could be achieved with less difficulty and expense than a mission that includes a return to Earth. The time frame for human

Future automation

missions to Mars is currently predicted by most organisations involved to be within the next 10 years.

Of course all this may seem far-fetched for many, but so did the idea of landing men on the Moon when John F Kennedy announced the plan in 1961. In any case, before a successful mission to Mars can be accomplished — despite the highly optimistic predictions of Elon Musk — the Moon will play an important role in testing human activity in a hostile planetary environment, and for providing the necessary resources for any mission to Mars.

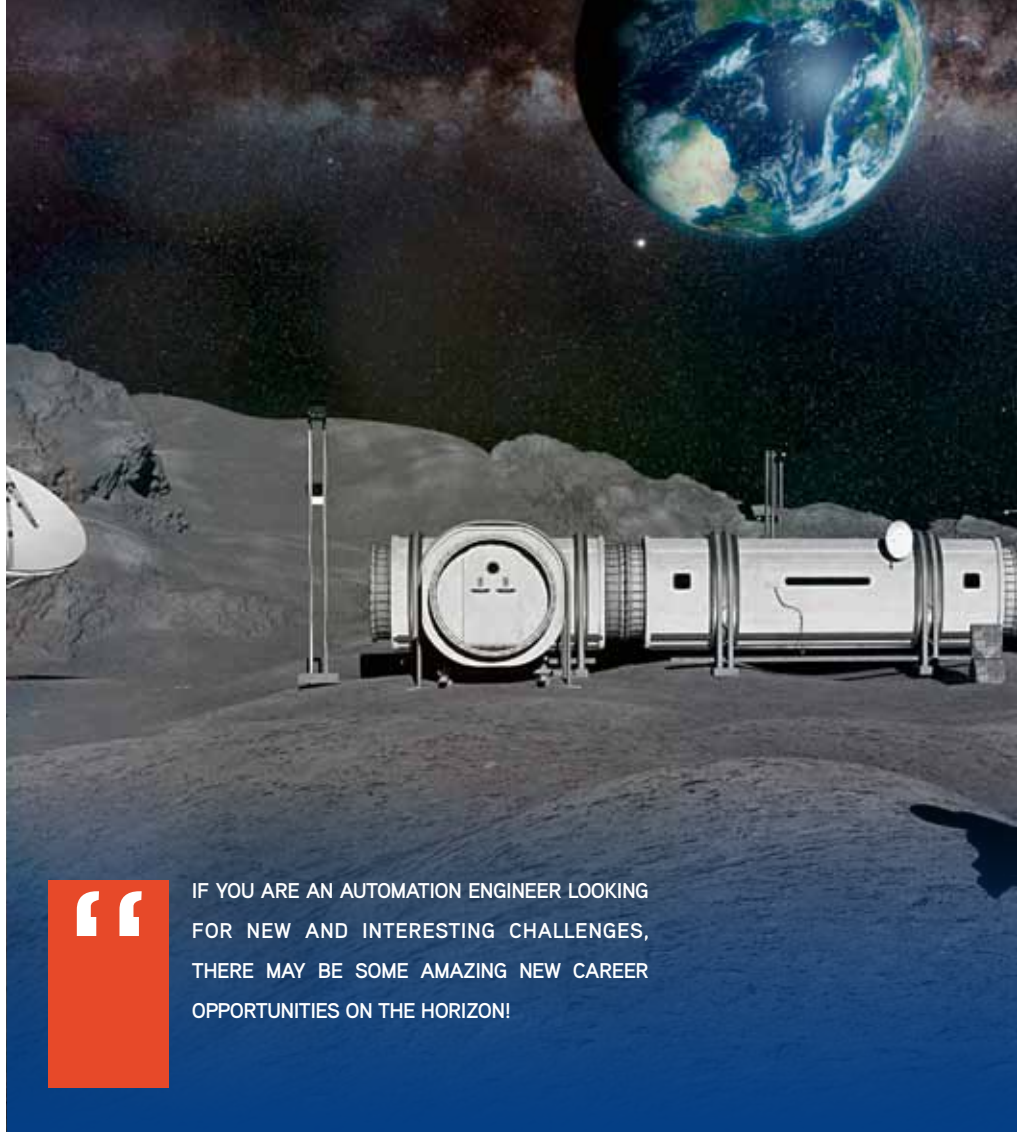
Mining the Moon

In September 2019, it was announced that the ASA and NASA have launched a new partnership on future space cooperation. This includes the opportunity for Australia to join the United States' Moon to Mars exploration approach, including NASA's Artemis lunar program.

The Australian Government is investing \$150 million over five years for Australian businesses and researchers to join NASA's endeavour, and deliver key capabilities for the mission. Dr Megan Clark AC, Head of the ASA, said the partnership "will allow our businesses and researchers to contribute Australia's best ideas and technology to support NASA's plan to return to the Moon and on to Mars". Dr Clark is also a non-executive director of Rio Tinto Limited, widely regarded as a world leader in automated mining technologies. Currently Rio Tinto is capable of tracking 4000 vehicles across 60 global operations, and its autonomous remote mining and transport capabilities are highly regarded.

So what would be mined on the Moon?

In 2018, scientists found 'definitive evidence'² that water ice exists on the Moon. In the context of a plan for people to potentially live and work on the Moon, such local water would be a valuable resource. However, more important is the potential to use the water to make rocket fuel through the generation of liquid hydrogen and oxygen.



IF YOU ARE AN AUTOMATION ENGINEER LOOKING FOR NEW AND INTERESTING CHALLENGES, THERE MAY BE SOME AMAZING NEW CAREER OPPORTUNITIES ON THE HORIZON!

This would mean that spacecraft would only need enough fuel to leave Earth and make it to the Moon, where they could then refuel. This lowers the weight (and cost) of the spacecraft, and the journey.

There is also the bulk regolith (lunar soil), which can be used in the construction of structures needed on the Moon itself and to make shielding to protect habitats thermally and from radiation. Regolith would not be transported to Earth, but for missions that include building a lunar base, it could be very beneficial.

Metals can also be extracted from the oxides in the soil by chemical reduction — iron, titanium and aluminium — although it would not be practical to return them to Earth. They would be used for local lunar purposes.

And then, of course, there are the rare earth metals (REMs). Currently, China produces more than 90% of the REMs we need for electronics. But reserves are running out fast with some elements, including dysprosium, neodymium and lanthanum, expected to be depleted within the next 20 years. In order to feed the world's appetite for technology, new sources of REMs must be found.

It is known that not only REMs can be found on the Moon, but also thorium and

helium-3, an isotope unavailable on Earth, but which would be useful on Earth for future nuclear fusion power generation. The Earth doesn't have any helium-3, because although it is blasted at the Earth from the Sun, the Earth's magnetic field acts as a shield for the charged particles carrying it. The Moon on the other hand has no appreciable magnetic field, making the Moon's surface layer of rock and dust a good candidate for obtaining helium-3.

It may happen sooner than you think

The Moon is now busier with exploration than ever before. China landed its first vehicle on the far side of the moon in January 2019³, Israel has sent a privately funded probe called Beresheet⁴ and India is having a go as well. The European Space Agency has said it plans to start mining water on the moon by the middle of the next decade.

Andrew Dempster, Director of the Australian Centre for Space Engineering Research at the University of New South Wales, is working with companies like Rio Tinto on proposals to mine water on the moon. Dempster's goal is to send a mission there within five years, citing the proliferation of private companies like SpaceX that are making space more easily accessible.



© Stock/Adobe.com/au/dottedyet

“What’s preventing them (the mining companies) from participating at the moment is that the risks that are there are not risks they have dealt with before,” Dempster said⁵. So as well as tackling the engineering challenge, his team needs to make a compelling business case.

Australia’s role

Australia’s stated commercial space strategy means that our country’s expertise⁶ in mining robotics and automation will make it a valuable partner for the US on the moon. Current US ambitions on the moon are not small: after the planned landing of Artemis 3 in 2024, the objective for NASA is to establish a permanent human presence on the lunar surface by 2028 over 12 Artemis missions.

Establishing and sustaining lunar base facilities will require robotic systems that can be remotely operated either from a space station in lunar orbit, known as the lunar ‘Gateway’, or potentially from Earth. Under some circumstances, those operations could be managed directly from Australia: humans and robots will be working side by side on the lunar surface, and Australian companies can contribute directly to those operations.

Our potential to play a central role in this area doesn’t just end on the moon. Imagine companies such as BHP and Rio Tinto mining

an asteroid — Australia’s expertise in the utilisation of robots and autonomous systems in terrestrial mining can be equally applied in space. The Moon would be the launch base for robotic asteroid mining.

There are, of course, risks

The opportunities are enormous, but the risks are also high. Mining companies are well versed in the risks associated with exploration (prospecting), mining methods, processing and transportation, but with regard to doing those things in a vacuum, low gravity, and far from Earth are not.

There are also legal risks: there are two existing space treaties that were written long ago — the Outer Space Treaty of 1967 and the Moon Agreement of 1979 — both of which are open to interpretation (or misinterpretation) of ownership and resource rights. At the moment the Moon and Mars are still politically a bit of a ‘wild west pioneer’ scenario.

“Commercial exploitation of resources is never explicitly mentioned,” Andrew Dempster wrote⁷. “This creates a situation in which the interpretation of the treaties can lead to strong support to both sides of the argument. For instance, the Outer Space Treaty makes statements that in relation to resource exploitation could be seen as contradictory or open to interpretation both for and against.”

Gone are the days when space exploration was dominated by NASA and US Government funding. Tomorrow’s space exploration will exploit technological innovations coming from the commercial sector — including small commercial space start-ups, including those in Australia. NASA may be taking the lead with the Artemis project, but private companies like SpaceX and Blue Origin will be close on their heels. Australia’s space industry companies need to move quickly to benefit from Artemis, because the return to the Moon will be just the beginning of a long period of growth in human space activity. The opportunities for profit for smart Australian organisations is there, now — and our automation engineers will play a key role.

References

1. Wikipedia, Hohman transfer orbit, <<https://en.wikipedia.org/wiki/Hohmann_transfer_orbit>>
2. Jet Propulsion Laboratory 2018, Ice Confirmed at the Moon’s Poles, <<<https://www.jpl.nasa.gov/news/news.php?feature=7218>>>
3. Bloomberg News 2019, ‘China Lands Probe on Far Side of the Moon in a World First’, *Bloomberg.com*, <<<https://www.bloomberg.com/news/articles/2019-01-03/china-lands-probe-on-far-side-of-the-moon-in-a-world-first>>>
4. Arnold M 2019, ‘Israel Poised to Make Space History with Private Moon Probe’, *Bloomberg.com*, <<<https://www.bloomberg.com/news/articles/2019-02-21/one-giant-step-for-israel-as-probe-set-to-lift-off-for-the-moon>>>
5. Thornhill J 2019, ‘Plan to Mine the Moon Gives Australia Opening in New Space Era’, *Bloomberg.com*, <<<https://www.bloomberg.com/news/articles/2019-04-01/plan-to-mine-the-moon-gives-australia-opening-in-new-space-era>>>
6. Hodgson D 2018, ‘How asteroid prospecting could advance Space 2.0’, *PWC Digital Pulse*, <<<https://www.digitalpulse.pwc.com.au/asteroid-prospecting-new-space-frontier/>>>
7. Dempster A 2019, ‘Australia is well placed to join the Moon mining race... or is it?’, *UNSW Newsroom*, <<<https://newsroom.unsw.edu.au/news/science-tech/australia-well-placed-join-moon-mining-race-or-it>>>

HOT PRODUCTS

ON WWW.PROCESSONLINE.COM.AU THIS MONTH

CONVEYOR ROLLER MODULES

G20 ZPA roller modules have integrated logic that allows the modules to independently control 24 VDC motor rollers without a higher-level control system.

Pepperl+Fuchs (Aust) Pty Ltd

<https://bit.ly/3ahdyQ5>



VALVE ISLAND

The Type 8653 AirLINE Field valve island is a compact, pre-assembled modular unit that can be used outside the control cabinet.

Burkert Fluid Control Systems

<https://bit.ly/38cmchE>



MULTIFUNCTION CALIBRATOR

The MC6-T from Beamex offers broad functionality in one device, making it possible to carry and maintain less equipment.

AMS Instrumentation & Calibration Pty Ltd

<https://bit.ly/2VA95UF>



DATA GATEWAY

The WISE-710 Data Gateway is a solution for connecting legacy equipment to mesh networks.

Advantech Australia Pty Ltd

<https://bit.ly/2TbMBaU>

ARBS 2020

AIR CONDITIONING, REFRIGERATION BUILDING SERVICES EXHIBITION



SOURCE PRODUCTS SHARE SOLUTIONS CONNECT @ARBS

Visit Australia's only international HVAC+R & building services trade exhibition, with the largest range of suppliers, products and solutions, all under one roof. Featuring the highly regarded Speaker Series, the new IBTech Insight Series and the celebrated ARBS Industry Awards, ARBS 2020 should not be missed.

[REGISTER ONLINE NOW AT ARBS.COM.AU](https://www.arbs.com.au)

19-21 MAY 2020 | MCEC | MELBOURNE



Waste-to-energy plant upgrades 20-year-old emission monitoring



- Increased operational efficiency.
- Long maintenance interval to minimise maintenance cost.

Having assessed all the aspects of the supplier evaluation, FUG decided to select ABB. By investing in the stable ACF5000 CEM System, FUG's pollutant emission monitoring is state of the art, while operating costs have decreased at the same time.

ABB had introduced the first FTIR spectrometer for emission measurement 25 years ago, and the ACF5000 is the fourth generation of the system. The system can measure up to 15 gas components simultaneously while providing clearly improved measurement characteristics, such as the measurement of HCl, CO₂, NH₃, NO_x, SO₂, CO and O₂.

"The ACF5000 CEM System was installed in 2018," said Vogel. "The measurements are very stable and run flawlessly. For the legally required QAL3 monitoring, in accordance with EN 14181, internal validation cells are used, so no maintenance times or downtimes occur as a result. I even think that the ACF5000 is working much better than expected."

The ACF5000 uses the FTIR technology developed at the ABB Québec plant and Frankfurt plant in continuous gas analysis, which also includes in-house system construction.

The ACF5000 provides a complete turnkey system, from sampling to measured value, and has approvals in accordance with DIN EN 15267 and DIN EN 14181. With a certified maintenance interval of six months by TÜV-Rheinland, and 12 months (MCERTS) by CSA/SIRA in England, the ACF5000 is claimed to be the first multicomponent emission device which has obtained a certified 12-month maintenance interval.

"Since the waste incineration plant in Ulm has been demonstrating the lowest emission limit values in all of Germany, special procedures were required when implementing this project," Vogel continued. "It was a risky move for FUG GmbH to place our bets on the newly developed ACF5000, yet ABB was absolutely confident from the very start that it would meet the requirements.

"As in any project, there were issues, but there was never an issue that we could not solve with ABB. Therefore, we see no other alternative than the ACF5000 to monitor emissions in a stable and reliable manner.

"In that regard, cooperation with ABB is very good and that is one of the most important success factors," he added.

Fernwärme Ulm GmbH (FUG), operator of the Zweckverband Thermische Abfallverwertung Donautal (TAD), is the district heating supplier for the city of Ulm. The core competencies of FUG include the operation, maintenance and optimisation of production and distribution systems. About half of the population of the city of Ulm is supplied with heat from FUG's broad district heating network.

Two years ago, the company invested in the renewal of its emission measuring equipment at its waste incineration plant.

The project tender placed strict requirements on all participating bidders. The goal was to replace the outdated equipment with new high-performance and futureproof technology, which would fulfil the requirements for approved emission measurement devices in all aspects.

"We convert 160,000 tons of household waste per year into energy," said Hubert Vogel, Deputy Manager MHKW Müllheizkraftwerk. "All the waste comes from Ulm and the bordering municipalities along the Danube valley with a population of around one million. From that we can guarantee the supply of heating for around 50% of the residents of the city of Ulm. For the emission measurement associated with that, we need reliable low-maintenance emission measurement equipment."

Key criteria in the assessment process for the renewal of a measurement system that was over 20 years old included:

- Fast delivery of spare parts if needed: the current system of spare parts delivery did not fulfil the listed requirements.
- Minimisation of operating and maintenance costs: the old devices were generating exceedingly high costs.
- Availability of more than 97% during annual operation to meet the legal requirements for quality assurance.
- Improved measured value stability with reduced pollutant limit values.

ABB Australia Pty Ltd
www.abbaustralia.com.au

scalable
progressive

MOVI-C®

performance
automation

MOVI-C® is the complete solution for your automation tasks. With its four fundamental modules – engineering software, control technology, inverter technology and drive technology – SEW-EURODRIVE offers a complete modular automation system from a single source.



- Premium efficiency • Higher operational safety • Robust performance
- Extended service life and longer maintenance intervals
- Adaptable to specific applications

Choose success - start a conversation for your future, today:

MELBOURNE | SYDNEY | BRISBANE | MACKAY | TOWNSVILLE | PERTH | ADELAIDE

1300 SEW AUS (1300 739 287)

www.sew-eurodrive.com.au



© StockAdobe.com.au/rippapatt

THE IMPORTANCE OF BEING EASILY REPLACEABLE

The way software vendors are being questioned during tenders is changing; and rightfully so. Vendors used to spend a lot of time defending the “ease of implementation” of their solutions, and not even bothering explaining the amount of pain involved in a hypothetical replacement. Not because they didn’t want to, but because not many buyers were asking. Until now.

“So, how quickly and easily can I rip your software solution out?”

That can sound odd. You, the end user, haven’t even bought a solution and you are already thinking of replacing it? Do you really want to know the answer or are you just ticking a box to keep your sourcing department happy? And what about the vendor’s sales rep in front of you... she might wonder if an honest answer may hurt her chances of closing the deal.

The awkwardness in this scenario may come from a fundamental, and perhaps philosophical, question: is being replaceable a good thing?

Back in the day, a software vendor would portray a ‘strong’ solution as one having deep foundations, concrete around their pillars and barbed wire at their top. An isolated and protected system like that was there to stay and was never going to be outperformed (maybe it would, but decades down the line... and it wouldn’t be your problem then). You could envision such an idea as the steel chain around a long-lasting vendor-user relationship. You would place often well-publicised confidence on the vendor in return for a ticket to an exclusive club full of infallible support and never-ending innovation.

Those were the days where quick disruption was not a trend topic, corporate moats were bigger and small competitors were easily acquired, choked or simply dismissed if they didn’t have a strong portfolio backed by half a century worth of success stories. No user would feel the need to replace one of those strong solutions. Why would you? When you bought in, you were throwing a mountain of cash onto a train full of Fortune-500 users. Asking “is your solution easily replaceable?” would seem to be a stupid question to ask (frankly, you knew the answer), and perhaps a rude one too.

“If you don’t trust my solution, why bother buying it? I’ve got dozens of your competitors waiting to buy this stuff from me. You need me because there’s no-one else out there doing the things we can.”

Not anymore.

With the arrival and boom of the Industrial Internet of Things, the benefits of cloud-based open-source solutions are enabling

the proliferation of a new breed of competitors promising better, cheaper and more flexible systems. Some of these new entrants have deep pockets filled by either venture capitalist or parent companies that make them hard kill or swallow. They also speak many computer languages and have learnt how to communicate with multiple systems from different vendors in almost seamless ways. In other words, they have mastered the art of being agnostic.

Being agnostic is becoming a common property these days, and too much of it in the industrial air is good for users but bad for rigid and unimaginative vendors. Besides banal flexibility, being agnostic conveys lower switching costs to the user two times over. First, an agnostic system can theoretically replace an old solution with limited pain to the user. Second, the system itself can also be replaced easily with another agnostic solution. So once a user jumps onto the agnostic train, the cost of switching partners becomes constrained. No more concrete around the foundations of an enterprise system. No more barbed wire preventing future vendors from adding value on top of your existing technology stack. Open-sourced solutions are producing data that can be easily consumed by an ecosystem of agnostic systems. And that can open the door to many benefits for you.

With an ever-growing offer of agnostic industrial solutions out there, there is a good chance that a user will want to switch vendors a few times over the life of an operational facility. A vendor who proudly highlights the fact that they are easily replaceable is signalling not only their high flexibility and interoperability, but also their corporate bet on the value that they can generate. They are telling that they can be replaced but that they think the user will not want to do it.

So, don’t be afraid of the question “how easy could I rip this solution out?” Their reaction will probably give you more information than the answer itself.



**Antonio Thewissen is an industrial technology enthusiast. He currently leads Channel Marketing in APAC for AVEVA and holds a Mechatronics Engineering degree and an MBA from AGSM-UNSW. Antonio lives in Sydney, Australia, with his wife and two children.*



Customise power supplies

QUINT POWER for superior system availability

The new QUINT POWER power supplies with integrated NFC interface ensure superior system availability. You can now customize notification thresholds and characteristic curves.



For additional information call 1300 786 411 or visit phoenixcontact.com.au

COBOT PALLETISER

simPAL Mini is a cobot palletiser combining software and hardware to create a flexible palletising solution. The cobot palletiser features the TM12 collaborative robot from Techman Robots with a payload capacity of 12 kg and 1300 mm reach, allowing simPAL Mini to palletise onto a standard 1165 mm Australian pallet and operate at up to eight cycles/min.

simPAL Mini requires minimal floor space, 270 mm wider than a pallet, making it suitable for small spaces. It also has the option of single or double pallet positions.

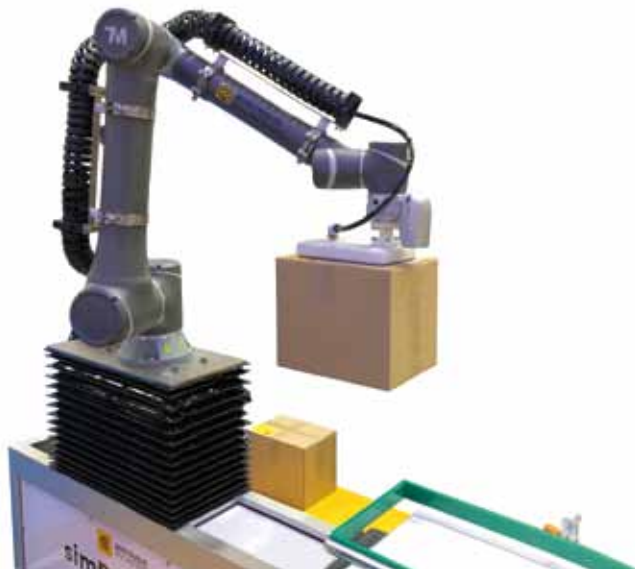
The TM12 includes a fully integrated vision system utilising a 5 MP camera. Combined with TM-Flow software, the cobot's vision system can read text, barcodes or QR codes and distinguish shapes and colours, all of which offer flexibility and futureproofing of the palletising system.

simPAL Mini can read the text or barcode on a carton and correctly palletise that product accordingly. This innovation allows easier, more flexible product integration or the addition of new product or packaging types.

simPAL Software is said to allow new products to be introduced without requiring costly reprogramming and helps owners easily generate new pallet patterns and save new recipes. It features an automatic pallet generator that creates an optimised pattern. Custom patterns can also be created directly on the touch screen. Coupled with the lead-to-teach capabilities of a Techman Robot, programming a simple pick and place can be achieved in around 5 min.

Australis Engineering Pty Ltd

www.australiseng.com.au



AI EDGE CONTROLLER

Interworld Electronics has released the BOXER-8120AI compact multi-core AI@Edge controller from Aaeon. The BOXER-8120AI is a high-performance, ultra-compact PC designed for AI at the Edge applications. Utilising the power of the NVIDIA Jetson TX2 supercomputer, the BOXER-8120AI integrates hardware and software AI solutions into a single device.

The NVIDIA Jetson TX2 is based on the HMP Dual Denver 2 + Quad ARM A57 complex neural network processor to provide an AI@Edge Linux platform. The BOXER-8120AI is equipped with 8 GB of LPDDR4 system memory, four Gigabit RJ-45 Ethernet connectors, two USB 3.0 ports, two RS-232 ports and one OTG connector. An internal 32 GB eMMC 5.1 solid state storage device and an externally accessible MicroSD card provide operating system and data storage. A HDMI 2.0 output is provided for high-resolution displays.

The fanless design of the BOXER-8120AI coupled with an operating temperature range of -20 to 50°C makes the device suitable for long-term operation in industrial and embedded environments. The BOXER-8120AI can be powered from a 9–24 VDC source or an optional 100–240 VAC power pack.

The BOXER-8120AI is compact and measures 135 x 30 x 101 mm. A wall-mounting bracket allows the computer to be installed in equipment enclosures. With its built-in neural network processor, support for Linux Ubuntu 16.04 and the ability to connect multiple IP cameras, the Boxer-8120AI is suitable for intelligent machine vision systems.

**Interworld Electronics and
Computer Industries**

www.ieci.com.au



WET GAS SENSOR



Fluid Components International (FCI) has announced an optional wet gas MASster sensor for the ST80 Series flowmeters. The sensor is said to deliver accurate, repeatable gas flow measurement in the presence of moisture and condensation droplets. Available with the FCI Model ST80, the WG sensor can be applied for use in entrained moisture and rain-shielding applications.

The sensor configuration features a mechanical design that shunts moisture, condensation and water droplets away from the thermal flow sensor, thus maintaining an accurate gas flow measurement while minimising errors that could occur from a cooling effect on the sensor that might cause a spike or false high reading. The MASster sensor option can be used in applications that have either moisture entrained in the gas (annular mist) or for protection against down the pipe rain in larger, vertical stacks.

The measuring principle of thermal mass flow meters involves heat transfer caused by gas flow. Any moisture or condensate in the gas stream that contacts the heated sensor can cause a sudden, momentary change in the heat transfer that can result in a spiked or fluctuating reading, which creates inaccurate or unstable flow measurement.

This solution to wet gas measurement featuring the MASster sensor option for the ST80 Series flowmeter means that safety approvals remain in place because this is a mechanical solution, and there is no increase in energy consumption to power the instrument, and no impact on sensor service life.

AMS Instrumentation & Calibration Pty Ltd

www.ams-ic.com.au

ONE DEVICE. endless capabilities.



As the official distributors of Red Lion in Australia, Control Logic proudly presents Red Lion's range of FlexEdge™ intelligent edge automation platforms with the DA50D and DA70D.

Designed to accommodate the future, the FlexEdge™ platform allows custom configuration, and field-installable sleds for adding cellular, serial, USB, communications and future additions. Featuring a IIoT gateway, protocol converter, scalable edge controller, and web-based HMI, FlexEdge™ is your all-in-one platform for improving productivity at the edge.

It's incredibly flexible too, with drag-and-drop functions, an LED diagnostic light ring, independent 10/100 Fast Ethernet ports and the ability to add up to 10 I/O and PID modules via plug-and-play. Edge computing puts processing horsepower closer to data sources, reducing latency, increasing speed and in turn, helping organisations run more efficiently.

Driven by highly intuitive Crimson software, simplify complex tasks and power the most intense Industry 4.0 applications from predictive maintenance to machine learning and beyond.

**FLEXIBLE, FUTUREPROOF,
FEATURE-PACKED.**

FLEXEDGE™



SUCCESSFUL OT/IT NETWORK CONVERGENCE IS POSSIBLE

EXPERIENCE-BASED BEST PRACTICES

Mike Smith, IT/OT Industry Expert, Belden Inc.

The idea of network convergence sets the stage for interactions between IT and OT network personnel with very different training, experiences and cultures.

For years, office information technology (IT) networks and plant floor operational technology (OT) networks were wholly separate. On top of that, IT and OT personnel often had little to do with one another. With the advent of Industrial Ethernet replacing fieldbus protocols on the plant floor, they now share a common network, creating valuable opportunities to combine resources and collaborate on goals for overall organisational success.

However, this network convergence also sets the stage for interactions — some might say showdowns — between IT and OT network personnel with very different training, experiences and cultures. The extent to which these necessary collaborations become adversarial or collaborative is dependent on the approach taken by the organisations and individuals involved.

There is a great deal of misunderstanding about what convergence is and what it entails. The chances of success in this environment

are low due to the steep learning curve and the opportunity for costly missteps when combining different perspectives.

Fortunately, these challenges have become less necessary to endure. As more and more organisations converge their networks, there is a growing body of resources and best practices being published.

What 'one network' means

With Ethernet now commonly running on both the IT side and the OT plant floor, isolated networks are no longer advisable. Converged networks give us the ability to selectively share data. Thus, we are seeing the emergence of what has become known as the convergence of IT and OT — or the creation of a single network.

The properly converged OT/IT network is not one big flat network, but one network strategically protected, so only appropriate data flows.



© Stock, Adobe.com/au/vegefox.com

Selective sharing controls device connectivity and data access to ensure only authorised information and resources are accessed. Specific data might flow one way, from plant to office or office to plant; back and forth both ways; or not at all. This selective sharing is a key to an effective and secure network.

The benefits of a converged network

Economies of scale

Moving to Ethernet in the OT environment is both practical and cost-effective. Since Ethernet is prevalent and standards-based, it can be found in consumer appliances, IIoT devices and ruggedised industrial devices. By leveraging the availability of Ethernet products and associated standards, you can now choose the best solutions from different manufacturers and they should communicate with each other with little effort.

Interoperability

The flexibility of implementing Ethernet on a converged network provides exponential benefits to the individuals in both OT and IT. Historically, industrial devices communicated through fieldbus protocols. However, implementing a fieldbus protocol, such as Profibus, limits device options to only those which speak Profibus. Alternatively, Ethernet supports multiple protocols.

Information

All machines are gathering data. However, data without context is useless. With the speed and immediacy of Ethernet communications, operators can, for the first time, collect highly detailed, real-time production data that can be strategically deployed to make smarter, cheaper, more efficient business decisions. By converging your network, IT and OT can leverage the skillsets of both teams to interpret and analyse the information.

The value of data

The primary interest of many manufacturers is often data capture and analysis due to its powerful and quick rewards. They can raise the bar on production goals, then gather the appropriate data and determine how to get there.

Value is locked in OT production data nearly everywhere. For example, a company that produces consumer goods lacked insight on the speed or functionality of their machines. When machine issues occurred, operators had difficulty communicating with maintenance staff. To combat this, an OT network was built that allowed their existing HMI to connect to a communication server and contact the appropriate maintenance personnel.

Through that data, they are able to monitor machines more effectively, measure response times and use real-time production data to proactively contact the appropriate person when a machine reached certain milestones.

Many companies like these are also finding that having production and sourcing information down to each individual component is extremely valuable. They can use this information to track and trace issues with specific units and ensure that such issues are minimised. Further, many industrial companies are finding that collecting data and storing it is valuable, even if you don't have the right questions to ask yet. Manufacturers might want to investigate something later, and having production data to analyse from previous months and years is very valuable in the pursuit of such knowledge.

In the pre-Ethernet days, if this type of information was collected at all, it might be hand captured on clipboards and all but lost. Even if it was later looked at, it was subject to illegibility and many other types of human error. Using Ethernet to capture and analyse information makes it potentially useful intelligence as opposed to pen scribbles.

How to design a converged network

It is important to avoid quick fixes and short-sighted solutions, such as connecting existing OT and IT networks. A converged network should not be formed from two existing networks. The methodology "just plug them in" seldom works.

Network audit

The first step in designing a new network is identifying what is on the network currently. This process gives insight into what devices are where, and what each is currently talking to. This is also a good time to develop accurate documentation as to the network structure.

Odds are you may be in for some surprises. Things tend to be added over the years without concern for the holistic nature of the network. This is your opportunity to start with a clean, streamlined, efficient slate.

Assessment

Once you've inventoried everything, your next step is to assess the status of your current network. At this snapshot in time, what is the quality of your network? You will identify the purpose of each device and decide what should be talking to what. Then you can create the optimal data flows for each case. It's a very individual and technical discussion for the organisation, and strategic planning should be done.

As a few general examples, production data might flow up to analysis software that may reside in the enterprise where it may be selectively reported to salespeople and non-technical managers. Other OT-generated data, such as real-time status reports or maintenance schedules, would likely stay in OT. By the same manner, IT data, such as personnel records and salary data, should not be accessible by the plant floor.

Structuring OT and IT

The inventory/audit will help you keep all OT machine functions out of the IT world and vice versa, ensuring that nothing is inappropriately tied to the wrong network, so the proper security protections, resources and connections can be applied. The often cited Purdue Architecture Model is a good, simplified illustration of a basic network architecture.

There are certainly some grey areas. Remember, it's not where the device is located, it's what it does. For example, there might be a device used to access email on the plant floor and these would be connected to the IT network, not the OT network. Purposes should NOT be mixed; mixing capacity opens up serious vulnerabilities.

Consider a DMZ

In between the OT and IT domains is what is known as the DMZ. This shared territory is where both worlds come together and what is shared with whom is determined. Physically, this area is a collection of servers and PCs, with information flowing up from OT and down from IT, directionally protected by firewalls. Here it is appropriately processed and then directed back to the predetermined location. The information flowing in and out is carefully controlled — selectively shared one way or both ways as appropriate.

One important function of the DMZ is to keep a wide buffer zone between the outside world accessed by IT and the bread-and-butter world of OT. Threats from the business side need to be isolated from the OT world and can be accomplished through compartmentalisation such as ISA99/IEC62443. This protects the manufacturing side from being impacted by IT threats and allows production to continue. Further, the DMZ helps ensure that production equipment would not be subject to IT necessities, such as virus scans or firmware updates.

Don't make security an afterthought

A plan needs to exist and be integrated as to how you will share data. Begin with determining security needs that should be built into your network. The US National Institute of Standards and Technology (NIST) has made recommendations on cybersecurity for reference.



IT HELPS TO HAVE A NEW INDIVIDUAL IN YOUR TEAM, A PROFESSIONAL WHO UNDERSTANDS FIRST-HAND THE FUNCTIONS AND PRIORITIES OF BOTH THE IT AND THE OT WORLDS AND IS CAPABLE OF COMMUNICATING WITH AND RELATING TO BOTH DEPARTMENTS.

Don't wait for the perfect solution to solve every scenario. As part of this plan, document what simple actions you can take to increase your security and implement them immediately.

A new organisational agreement

Even in an organisation where OT and IT people work well together, inevitably, it will come up: Who is in charge in situation X? Does IT or OT have the final word on equipment and operations in the DMZ? Who specifies network-wide Ethernet equipment?

When the converged organisation is built, the purpose is to share information and support both the OT mission and the IT mission. Decisions need to be thoughtfully made to ensure there is not a 'winner' and a 'loser' and subsequent disgruntlement. A better way may be to create a new dotted line organisation, frontloading universal buy-in from both IT and OT, at all levels.

In most organisations, this starts with immediate and demonstrated support from the top. It's good practice to see leaders from both the business and production teams join together and express their support



© Stock-Adobe.com.au/BillionPhotos.com

for all OT/IT convergence activities. It is vitally important that IT and OT collaborate and communicate, establishing clear responsibilities. Whether that is two individuals serving as representatives, a committee or a newly created role such as an automation and Data Exchange Engineer.

The Automation and Data Exchange Engineer

It helps to have a new individual in your team, a professional who understands first-hand the functions and priorities of both the IT and the OT worlds and is capable of communicating with and relating to both departments. Let's call this individual the Automation and Data Exchange (ADX) Engineer. It is imperative that this person is cross-trained substantially in both OT and IT practices with their background of what discipline they came from originally being less important.

Led by the ADX Engineer, there should be governance responsibilities for all things related to the converged network, and answering directly to upper management. One of their early duties might be to develop proper procedures for management and operation of the converged network. They can create a standard operating procedures (SOP) guide

for everyone to be aware of the new road ahead. The valid concerns of both IT and OT disciplines will be accounted for, with potential SOPs including directives such as "Patches will always be tested in an isolated sandbox before being applied to any OT equipment" or "Internet-connected devices shall not be placed directly on the OT network."

The committee or ADX Engineer should also lead all convergence establishment and maintenance activities. If it is a multi-location organisation, they can start with a pilot project at a smaller location and take key learnings on to additional locations. After assessing the extent of the convergence challenge at each location, they can also decide, case by case, whether internal resources possess the expertise — and the extra time — to tackle each project. They can work together to identify and select a turnkey third-party expert, identify local resources to handle the job, or some combination of both as the team sees fit.

Often, an outside third party is beneficial as they can provide insight from a different perspective, share best practices and provide instant, on-demand manpower.

Encouraging cooperation

In the drive for successful OT/IT convergence, sometimes there are situations where one group or the other, resisting change, sticks their head in the sand and refuses to cooperate, causing very difficult roadblocks. Sometimes one group or the other calls in outside help and, literally, says "don't let the (other department) know that you're here". Fortunately, this is not the norm; most organisations are made up of professionals who will work together for the common good and it is assumed that your organisation will not experience anything like this. But, theoretically, what if it does?

The visible involvement of C-Level executives will help in this regard. If it's holding up progress, they will hash it out.

Another effective strategy is to involve a third party, at least at first. It's often amazing, humbly speaking, how an idea repeatedly expressed by an insider is ignored, but that same idea expressed by an outside expert is considered genius. That's reality and it's helpful to understand. Of course, a well-chosen OT/IT consultant who has "been there, done that" provides both technological and psychological mediator-type assistance and will deliver much more than inside people ever could, drawing upon the experience of driving convergence in other organisations and helping to flatten the learning curve.

It is important that the consultant understands, has experience in and speaks the language of both IT and OT. They should be without loyalty to one side and have knowledge of both so they are not seen as "the IT consultant" or "the OT consultant" but as the "Convergence Consultant."

Conclusion

The march towards the convergence of OT and IT functions on a single Ethernet network is inevitable for companies that wish to maximise the benefits of Ethernet connectivity while also optimising the efficiency of the network. This will not come without challenges and growing pains, which vary from costly, multi-year processes, to being accomplished by a smooth, mutually beneficial effort.

Control Logic Pty Ltd
www.controllogic.com.au



EXPANDABLE EMBEDDED COMPUTER

Neusys Technology has launched its Neusys Nuvo-8034. Based on the one-for-all concept, Nuvo-8034 is designed to meet the I/O expansion demands of industrial automation and system integrators for machine vision, automation and AI applications.

The product offers seven expansion slots, including two x16 PCIe, two x8 PCIe and three PCI slots, in half the volume of a typical 4U, 19" industrial computer. It also includes an Intel 9th/8th-Gen Core desktop processor and workstation-grade Intel C246 chipset. Through effective thermal ventilation, it is able to power a single 180 W NVIDIA GPU, to fuel teraFLOP performance for deep learning-based vision inspection applications.

For external I/O, the device has eight USB 3.1 Gen2/Gen1 ports with screw lock, two Gigabit Ethernet ports, four COM ports and 8-channel isolated DI plus 8-channel isolated DO for general machine automation usage. It also has two front-accessible, hot-swappable 2.5" SATA trays with RAID 0/1 support for easy storage manipulation. Internally it supports M.2 NVMe and up to 128 GB DDR4 memory.

Neusys Technology Inc
www.neusys-tech.com

STEPPER MOTORS WITH BUILT-IN CONTROLLERS

Ametek has released a stepper motor with an in-built drive and CANopen communications. The programmable drive allows users to easily develop complex and precise motion for the motor to perform.

This unit is an economical choice compared to standard systems as the compact design already has a motor, drive and feedback all in one. It saves space, and all the user needs to do is provide power, and plug in necessary I/O connections and communications, then it's ready to go. It is available in three motor lengths with input voltage ranges from 12–60 VDC and torque ratings up to 0.15 Nm. The motor can cover a wide range of applications and be synchronised with multiple units, due to its CANopen capability.

Motion Technologies Pty Ltd
www.motiontech.com.au



DELTA ROBOT

Claimed to offer simpler automation at a lower cost, the igus delta robot uses lubrication-free components made of tribo-polymers. An updated version with a 10 times larger workspace volume is designed for easy pick-and-place tasks and is delivered as a pre-assembled kit or ready-to-install unit.

The drylin DLE-DR, by using tribo-polymers, is also low maintenance when in use. The robot consists of three maintenance-free drylin ZLW toothed belt axes with NEMA23 XL encoder stepper motors, lubrication-free igubal coupling joints and matching adapter plates for grippers and motors. This ensures the quick handling of up to 5 kg with a precision of ±0.5 mm. The delta robot offers a 10 times larger working space with 660 mm diameter at 180 mm height, which significantly increases the range. A calibrating pin allows the robot to be positioned at the zero point.

The use of the delta robot is very apt for simple assembly activities and pick-and-place tasks, as well as applications in inspection technology. As a construction kit, it can be set up in 30 minutes. The payback period is said to be less than six months for most applications. As an option, the user can choose to use their own software and control system, or the intuitive and easy-to-use dryve D1 control system from igus.



Treotham Automation Pty Ltd
www.treotham.com.au



ADVANCED COMPRESSED

- Higher energy savings
- More efficient air supply
- Expanded range
- Greater support & service

GLOBAL LEADERS IN ENERGY SAVING INNOVATION



KAISHAN AUSTRALIA PTY LTD www.kaishan.com.au

Engineering the future



LOW SMOKE HALOGEN FREE CABLE

With the increased demand for safety in public areas and buildings, contractors are now being advised to install materials that are non-hazardous to members of the public in case of fire. It is now understood that smoke and poisonous fumes can be a greater risk to lives than that of fire alone.

A cable that ensures security during a fire must have passed three tests, pertaining to halogen content, low smoke density and flame propagation. LAPP's range of low smoke halogen free cables is tested to IEC and VDE standards to maximise safety where human life or valuable property are exposed to a high risk of fire hazards.

The ÖLFLEX CLASSIC 128 H/CH series are a 0.6/1 kV flexible power and control cable, LSHF (low smoke halogen free), that have been redesigned to be space saving and cost-effective, while also rated for outdoor use as they are UV and weather resistant.

LAPP Australia Pty Ltd
lappaustralia.com.au

LAYER 3 ETHERNET SWITCH

Red Lion has released the NT328G Layer 3 Ethernet switch offering 28 high-speed ports (including four 10 Gb ports) and a wire-speed switching performance to suit bandwidth-intensive industrial applications from the network edge to the core.

The NT328G models feature a flexible mix of copper and fibre ports, allowing for a wide variety of connection options, with Layer 3 routing that provides the ability to route across VLANs or subnets.

The industrial-grade NT328G's robust feature set includes network redundancy, integrated security, policy-based traffic control and easy-to-use configuration and management — reducing operating costs while providing continuous monitoring of network activity. Its compact but rugged IP30 rackmount metal housing is constructed for long-life use in harsh industrial environments, including wide operating temperature conditions and hazardous locations for durability.

The NT328G is designed to meet the needs of the oil and gas, water and wastewater, energy, transportation, and video and security sectors, as well as other bandwidth-intensive industrial applications.

Control Logic Pty Ltd
www.controllogic.com.au



TABLET FOR HAZARDOUS AREAS

The Tab-Ex 02 tablet for ATEX Zone 1 from ecom has a wide variety of applications, such as work order management, predictive maintenance and augmented reality in hazardous areas and in harsh environments. The Tab-Ex 02 helps securely and efficiently meet the current and future communication requirements of Industry 4.0 and the Industrial Internet of Things, even in mobile applications and hazardous areas.



It leverages Samsung technology and is said to provide increased ease of use to mobile workers in the oil and gas, refining, chemical, pharmaceuticals and other hazardous industries. Offering improved processing power, increased security, optimised image quality and easier operation, the Tab-Ex 02 series features a range of functions that expand mobility in existing and future applications. Models for harsh environments and for Zone 2/Div. 2, and now also for Zone 1/Div. 1 are available.

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

AIR TECHNOLOGY



**Terms & conditions apply. See website for details*

We can supply the right machine to suit your application

1300 098 901

SMART GRID GATEWAYS

Ixxat smart grid gateways from HMS Networks enable data exchange between IEC61850 or IEC60870-5-104 based energy networks and common fieldbus and Industrial Ethernet systems. Updated functions include MediaBreaker functionality and support for IEC60870-5-101, DNP3, OPC-UA and MQTT.

Ixxat SG-gateways already support secure data transmission via VPN and the IEC60870-5-104 protocol. However, according to the TSO specifications, the transmission medium must also be changed to add a further security layer and thus prevent malicious code from being passed on to the terminal device. The integration of the IEC60870-5-101 protocol enables the user to connect 101-compatible devices to the control room in accordance with the TSO specifications. Ixxat SG-gateways enable the easy 'break' between Ethernet-based (IEC60870-5-104) and serial (IEC60870-5-101) communication. With only one Ethernet port and one serial interface, the specific MediaBreaker version is optimally adapted to this application.

Due to the media break integration, the IEC60870-5-101 protocol is now also available via the serial interface. This enables connection of old devices to modern control rooms and controllers without having to replace them with new ones.

With support for the popular OPC-UA and MQTT standards, SG-gateways can be used to feed data from various energy and industrial networks to established services from Microsoft, Google and other providers, where the data can be evaluated and reacted upon via a secure bidirectional connection.

With the SG-gateway switch version, it is possible to connect up to four devices directly to a second Ethernet port and to distribute the communication, eliminating the need for external switches.

Global M2M

www.globalm2m.com.au



TEMPERATURE MEASUREMENT MODULE

The IOLITEi-8xRTD, the latest device in the Dewesoft IOLITE range, is an 8-channel module and a suitable solution for temperature measurement with resistance temperature detectors (RTD). It can also be used for resistance measurements with ranges of up to 10 kΩ and voltage measurements with ranges up to 1 V.

The RTD module supports practically all resistance thermometers, from standard platinum resistance thermometers through to fast responsive thermistor sensors.

The RTD module also offers both channel-to-ground as well as channel-to-channel isolation up to 1000 V. With the RTD module, data is acquired simultaneously from all eight channels with sampling rates up to 100 samples/s using a 24-bit delta-sigma ADC.

The IOLITEi-8xRTD can be mounted in both IOLITEs chassis or in industry-standard IOLITEr 48.26 cm rack cabinets.

IOLITE is suitable for Industry 4.0 automation, automotive test benches, aerospace component testing, structural monitoring and alarming.

Metromatics Pty Ltd

www.metromatics.com.au



IE5+ MOTORS

NORD Drivesystems recently launched a permanent magnet synchronous motor offering high energy efficiency (IE5+). The motor can be supplied with or without a fan and is suitable for washdown and intralogistics applications when incorporating a nsd tupH surface treatment.

The IE5+ series will initially be launched in a size for power ranges from 0.25 to 1.1 kW, with a continuous torque from 1.6 to 4.8 Nm and speeds from 0 to 2100 rpm. The motor can be directly mounted according to NEMA or IEC.

The nsd tupH surface treatment offered by NORD is a corrosion protection coating for gear units, smooth-surfaced motors, frequency inverters and motor starters in washdown optimised cast aluminium housings. The drives are easy to clean and largely resistant to acids and alkalis. It is even possible to use high-pressure cleaners or apply aggressive media. An integrated encoder also forms part of the standard equipment. The IE5+ motor can be combined with NORD gear units and drive electronics as a modular system.

NORD Drivesystems (Aust) Pty Ltd

www.nord.com

A NEW APPROACH TO ACCURATE WATER FLOW MEASUREMENT

A study of FPI Mag accuracy

Water measurement and management are critical to conservation and sustainability efforts. Many existing water treatment and distribution systems that need to upgrade their technology cannot shut down or stop service to the communities they serve, resulting in unmetered lines or inaccurately metered systems, leading to costly water loss.

McCrometer's solution is the FPI Mag®, a full profile insertion electromagnetic meter offering the same accuracy of traditional full-bore and flanged mag meters — but with added benefits. The FPI's hot-tap design allows for installation while systems are running at normal capacity, preventing costly construction and shutdowns. When total ownership costs are considered, the FPI can save as much as 45% compared to other full-bore mag meters. Additionally, the long-term benefits of accurate flow measurement and critical flow data are unparalleled.

The claimed accuracy for a calibrated FPI Mag meter is $\pm 0.5\%$ for velocity from 0.3 m/s to 9.8 m/s, and $\pm 1.0\%$ from 0.1 m/s to 0.3 m/s.

Accuracy testing was done at Utah State Water Research Laboratory (USWRL), a well-known water laboratory with a wide range of line sizes and achievable flow rates. A 30" FPI was tested due to the sheer volume of water a 30" line carries. Accuracy matters more in larger pipe sizes; if measurements are off by 1% in a small line, the meter would be off maybe a thousand litres. In a 30" line, the amount of water flowing is much greater, so a 1% error can mean many thousands of litres of water unaccounted for, leading to significant revenue loss.

Testing was done over a wide 22:1 turndown with 23D upstream piping and 14D downstream piping, simulating an infinite straight pipe section to establish baseline meter performance without obstructions. Flow rates reported by the FPI Mag were compared



against the flow rates reported by a 20" master Venturi flow meter owned by USWRL for the moderate and high flows. Flow rates reported by the FPI Mag were compared against a traditional 12" full-bore mag master meter owned by USWRL for the low flow rates.

One of the pipe systems was reduced from 30" to 20" to employ the Venturi, and again reduced to 12" to employ the full-bore mag. Not only did the FPI Mag measure the full range of the Venturi and full-bore mag, it did so without needing to reduce or change the pipe system. The FPI Mag allows operators to place the meter where they need it without making modifications to the piping system.

Tested accuracy of the 30" FPI Mag compared against the master flow meter is better than $\pm 1.0\%$ for velocities between 0.1 m/s to 0.3 m/s. Tested accuracy above 0.3 m/s was better than $\pm 0.5\%$ within uncertainty of the system. For the test point at 1.58 m/s, the tested FPI Mag accuracy was 0.66%. This is less than the total accuracy of measurement of 0.71% for the combined system.

Results of the 30" FPI Mag test prove the FPI Mag meets the accuracy claims. The measured error of the 30" meter was equal to or better than the specified accuracies for a wide range of flow. Not only was the meter accurate at low flow rates where accuracy is often difficult to achieve, but it was also very accurate at high flow rates where inaccuracy equals lost revenue.

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

FPI size (in)	Min flow rate (l/m)	Max flow rate (l/m)	Min velocity (m/s)	Max velocity (m/s)	Turndown	Upstream pipe diameters	Downstream pipe diameters
30"	1904	41262	0.07	1.58	22:1	23	14

Table 1: FPI Mag test protocol parameters.



Aseptic filling at Ya YA Foods in Canada



Yahya Abbas has a degree in civil engineering from Great Britain. It's thus hardly surprising that the 59-year-old President and CEO of Ya YA Foods in Toronto, Canada, still considers himself to be more of an engineer than a pen pusher. "I am a facilitator," is how he describes himself. His philosophy is therefore not to simply wait and see which challenges happen to come his way but instead to seize the initiative and actively anticipate the needs of the market. "I invest and generate capacity; our customers then come to us of their own accord."

Indeed, almost all of the big beverage brands in Canada and the US have their products bottled by Ya YA Foods.

"Our clients include the world's top 10 beverage brands," Abbas said. "Some of them have been our customers for 30 years." During this time his company has realised countless ideas for innovative products and a whole host of different packaging types and now has a wealth of experience in the filling of sensitive beverages.

Abbas was 25 when he emigrated to Canada with his parents from his native country. His family first began working in the beverage sector just two years later. "In 1987 my father met someone in the trade," he remembers. "This person wanted to sell his small bottling plant. We soon came to an agreement, bought the company and in the space of just a few years turned it into the number one contract filler for the whole of North America."

Unlike many of its competitors, Ya YA Foods doesn't sell any of its own brands. This is also part of the philosophy, explained Abbas, in which his company "feels like a partner and not a competitor". The family business sells 90% of its products in Canada and the United States, where the market is about 10 times larger than the home market. The Canadians make almost two-thirds of their entire

turnover with their big neighbour. "Our location very close to the North American border stands us in good stead," emphasises Abbas. "We can reach about 93 million people from here in a single day."

To start with, high-acid products such as juice, smoothies and tea were filled. Later, as the trend for low-acid products grew, the company increasingly concentrated on vegetable milk beverages based on peas, soya and cashews, for example, also processing animal dairy products. A maple water — as a typical Canadian product — is also being bottled in Toronto at the moment.

Accordingly, the demand for quality in the aseptic processing of these sensitive products is high. "Our maxim is not only to meet the regulatory requirements of the FDA1 or GMP2, for example, but to exceed them," Abbas said. In doing so, Ya YA Foods makes use of modern measurement systems and manufacturing technology. Due to its

highly automated lines, the bottling plant only has about 65 machine operators working in production who are responsible for a daily output of approximately 1.5 million units.

The bottler procured his very first German machine as far back as in 1992 from what was then KHS predecessor Holstein & Kappert. In 2010 Abbas again invested in high-tech equipment from the Dortmund systems supplier, acquiring his first aseptic filler, an Innosept Asbofill ABF 71 TWIN with a capacity of up to 24,000 1-litre bottles per hour, from KHS's American subsidiary. Originally equipped with two sealing machines for film/foil seals, both machine parts have since been converted to screw caps to satisfy growing market demand.

Not only has the machinery's adherence to hygienic requirements proved reliable but also its flexibility. "Format changeovers in the filler area are quick and trouble-free," Abbas said. "KHS gave us the best option back in 2010 — and nothing has changed in this respect. This is a very good system and our contact partners excel with their extensive expertise and many outstanding ideas."

In June 2018, Ya YA Foods began operating a second KHS aseptic line for up to 12,000 1-litre bottles per hour, on which smaller batches are also produced, helping to procure new customers. According to the company, approximately 13.3 million euros has been invested in KHS technology to date. And that's not all: in September of this year yet another KHS aseptic line is to be installed and commissioned with "lots of new technology and even greater efficiency than our present lines", Abbas said.

KHS Pacific Pty Ltd
www.khs.com

**NEW
PRODUCTS**



ASSET MONITORING EDGE DEVICE

Emerson has introduced the AMS Asset Monitor edge analytics device, designed to digitalise essential asset data and analytics for better operations performance and improved decision-making.

The company says that AMS Asset Monitor provides actionable insights into essential assets that were previously monitored only with infrequent assessments. The edge analytics device will connect with Emerson's Plantweb Optics asset performance platform to provide key operations personnel with instant asset health details for operations and maintenance decision-making.

Unlike typical analytics devices that send data to a historian or the cloud to be processed later, AMS Asset Monitor provides analytics at the edge, performing calculations at the device. This device-centred analytics capability is said to reduce the time, complication and expense of adding analytics to a plant's assets.

Each device collects data continuously and uses embedded logic to identify and diagnose common reliability issues. Individual issues such as imbalance, misalignment, bearing faults, lubrication issues or fouling are consolidated into an overall asset health score.

AMS Asset Monitor communicates these health scores via a web browser or — when integrated with Plantweb Optics — through real-time persona-based alerts on mobile devices. Plantweb Optics also enables enterprise-wide visibility and expands edge analytics and digital intelligence throughout the organisation, keeping personnel aware of essential asset health.

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



COMPACT RUGGED TABLET

Winmate's M900P is a compact 8" rugged tablet designed for mobile use. It helps fulfill the needs of those that want maximum portability and is a Windows 10-based device equipped with an Intel Pentium N4200 Apollo Lake processor and Intel graphics. Its 1280 x 800 display features a projected capacitive touch

screen with optical bonding and allows for outdoor viewability.

For operations in harsh industrial environments, the device is MIL-STD-810G certified, and its lightweight (900 g) yet rugged design features a wide operating temperature range (-20 to 60°C), IP65 rated water and dust proof enclosure and 1.6 m drop tolerance.

Communication options such as GPS, Wi-Fi, Bluetooth 5.0 and optional 4G LTE enable records to be updated in real time, ensuring the most up-to-date information is always available. With user-configurable data capturing options such as built-in barcode or RFID readers, and an optional Smart Card reader module, the M900P rugged tablet is designed to suit any user-specific requirements in field service, warehousing or transportation applications.

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

www.ProcessOnline.com.au

TANK PROTECTION VENTS & VALVES

- VACUUM/PRESSURE RELIEF
- INERT GAS BLANKETING



**BLANKETING
VALVES**



**PILOT OPERATED
VACUUM/PRESSURE VENTS**



**WEIGHT
& SPRING
LOADED
VENTS**



FLAME ARRESTORS - INLINE & END OF LINE

AUSTRALIAN AGENT & TECHNICAL SUPPORT



PRESSURE & SAFETY SYSTEMS

Tel: (03) 9699 7355
www.pressureandsafetysystems.com.au

9344P&SS-MN17



TOUCHSCREEN MONITORS

Purpose-built for industrial and IoT applications, the FPM-200 series are true-flat LCD monitors that feature an IP66-rated front panel for protection from water and dust ingress. This ensures the monitors can withstand rigorous cleaning using high-pressure water jets, making them suitable for industrial environments with harsh operating conditions.

Featuring a WXGA/full HD TFT LED LCD widescreen display with 10-point multi-touch control, the FPM-200 displays support two-handed operation for more intuitive input and improved efficiency. Multi-touch functionality also enables additional control features such as swipe and zoom gestures, predefined motion triggers and two-point key confirmation, which can increase operational safety and boost productivity. With a 16:9 widescreen aspect ratio, the FPM-200 series provides a 40% increased viewing area compared to traditional 4:3 aspect ratio displays, enhancing the overall visualisation of information.

The FPM-200 monitors can support various mount options, including panel, desktop and VESA mounting, to ensure easy deployment in diverse industrial environments.

Advantech Australia Pty Ltd
www.advantech.net.au



LINEAR ROBOTS

Simple, precise, fast processes: these are the requirements of Cartesian robots. They are used for such things as pick-and-place applications, sorting systems and medical technology. igus has now developed a linear and room linear robot for large workspaces. The two kinematics systems allow users to move up to 5 kg, and they can be customised to suit the application.

The two linear robots consist of preconfigured linear modules, aluminium linear axes, NEMA stepper motors and encoders. The smaller linear robot can transport loads of up to 50 N in a workspace of 800 x 500 mm at a maximum speed of up to 1 m/s. The room linear robot is a good option for more complex tasks. It can transport loads of up to 50 N in a workspace of 800 x 800 x 500 mm at a maximum speed of 0.5 m/s. Two ZLW toothed belt axes and one GRR gear rack axis help ensure precise guidance and lubrication-free operation.

The linear robot solutions are used in pick-and-place, bin picking and sorting tasks.

In addition to the stock items, users can assemble their own linear robot with strokes of up to 6 m online and request a quotation. Depending on requirements, axis length and various motors can also be configured with such items as igus energy chains and cables.

Treotham Automation Pty Ltd
www.treotham.com.au

COMPACT ELECTRIC VACUUM GRIPPER

Robot end-of-arm tooling manufacturer OnRobot has announced the VGC10 compact electric vacuum gripper.

Based on the design of the OnRobot VG10 electric vacuum gripper, the compact VGC10 is smaller and lighter than its larger counterpart, so is more suitable for constrained environments and smaller robot arms, but still offers the same payload of 15 kg. The VGC10 provides fast out-of-the-box deployment but also offers customisation, with changeable suction cup options and the ability to add or replace arms to fit specific application needs. With this configurability, the VGC10 can grip and move a wide array of small, multidimensional and heavy objects even with a lighter payload robot arm.

The VGC10 features two independently controlled air channels that allow it to act as a dual gripper with pick-up and release in the same action, further increasing efficiency and reducing cycle time. The gripper can also be used with a single air channel for higher gripping performance. With no compressor or air supply needed, eliminating the cost, noise, space and maintenance of producing compressed air, the compact electrical gripper is easy to implement and move. Fully integrated software through OnRobot's One System Solution platform makes it quick to deploy and redeploy on any major collaborative or light industrial robot arm for greater production flexibility.

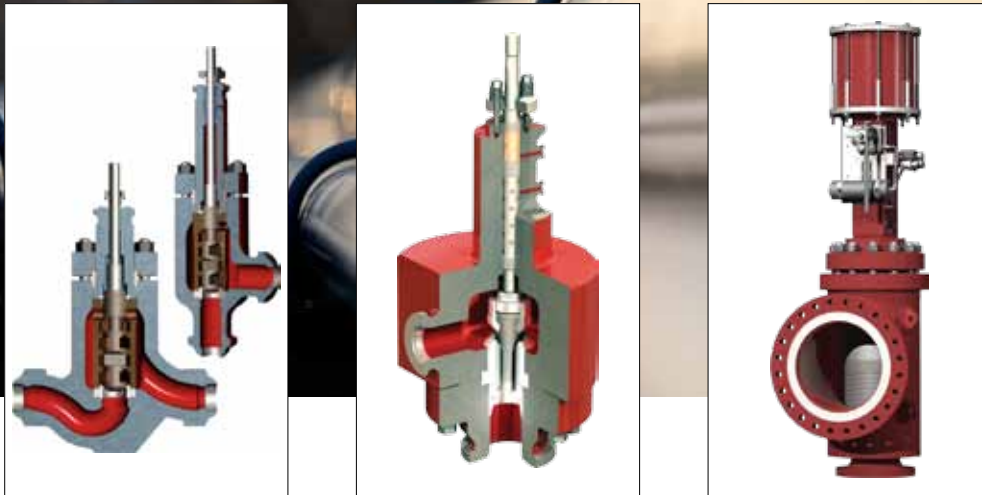
OnRobot
onrobot.com/en





POWERFLO
SOLUTIONS

Baker Hughes 



MASONEILAN ENGINEERED CONTROL VALVES ARE THE PERFECT SOLUTION FOR HIGH PRESSURE LETDOWN APPLICATIONS!

With a full range of tailor-made Control Valve designs for high and very high pressure drop applications – under either high, ambient or cryogenic temperature conditions, Masoneilan Multi-Stage Axial and 3-Dimensional Axial and Radial Labyrinth trim solutions, totally eliminate cavitation and associated noise and vibration, through controlled energy management! Even in dirty, oily and solid-laden flow streams! Especially in 2-Phase flow streams. Up to 497 Bar!

There's no need to think about it....whether it be for Amine, Catalyst Slurry, Hydrocarbon, Potassium Carbonate, Steam or Urea – we have a proven solution for you from A to Z!

With installations in Australia dating back to the 1950's, Masoneilan Control Valves provide unmatched control performance and reliability. Frankly nobody does it better!

Contact us at POWERFLO SOLUTIONS for local technical support and all aspects of After-Market service.

***Total Engineered Control,
Shut-off and Over-Pressure
Protection Devices***

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



ACHIEVING A SAFE MOBILE ROBOT INSTALLATION

Autonomous mobile robots (AMRs) are increasingly used to automate the transportation of materials through industrial buildings, leaving companies with questions on how to ensure a safe robot installation.

According to the International Federation of Robotics (IFR), the market for AMRs in logistics automation is booming, with an expected increase from 110,000 in 2018 to more than 700,000 in 2022. This represents a CAGR of 45% in the manufacturing industry and 60% in non-manufacturing environments such as e-commerce and hospitals. While these mobile robots are designed to navigate safely around people, rapid changes in the market can leave companies with questions on how to ensure a safe mobile robot installation. With an increasing number of AMRs being installed, new AMRs on the market and new customers with limited experience with this new technology, the topic of mobile robot safety is more important than ever.

Which safety requirements should AMRs live up to today?

AMRs are designed to work safely in environments with people

AMRs complete their given missions using sensors and software algorithms to manoeuvre through dynamic environments, avoiding obstacles and for some AMRs recomputing their path on the fly. Extensive built-in safety mechanisms allow the robots to navigate collaboratively around human co-workers by slowing down, changing direction or stopping to avoid collision. These safety features are key to the success of mobile robots, but companies deploying AMRs need to



go a step further to ensure workers' ongoing safety. Safety standards are made to ensure machines and robots operate in a way that does not bring humans into dangerous situations when working with them.

It is important to distinguish between the AMR, which is the mobile robot itself, and the AMR system, which is the AMR (or fleet of AMRs), charging stations, load transfer stations, top modules that are mounted on the AMR to create a complete machine and other peripheral equipment within the environment where the AMR operates.

The AMR is defined as the out-of-the box mobile robot without top modules and without the customer environment taken into account.

Understanding applicable standards, laws and directives for mobile robots

Legal requirements must also be understood and properly applied in order to ensure that mobile robot applications remain as safe and reliable as they are intended to be. In response to the rapid adoption of AMRs, global standards organisations are updating and developing guidelines for the safe design, manufacture and commissioning of mobile robots. The development of this new technology has been faster than the development of relevant standards. But in the meantime, mobile robot manufacturers, purchasers and integrators must enforce safety requirements using a variety of existing standards that focus on similar applications of industrial vehicles, even though these were not written specifically for AMRs.

The most applicable standard for AMRs is currently EN 1525:1997 – Safety of industrial trucks – Driverless trucks and their systems. This standard applies to an automated guided vehicle (AGV) as well as its systems and also applies to the commissioning and preparation of the environment in which the robot will be used. EN 1525 is

a European standard that establishes strict safety requirements for vehicles from AGVs to industrial trucks, which often are larger and heavier than AMRs and can have a completely different set-up. One key difference is that EN 1525 does not take autonomous navigation into account. However, EN 1525 fills the void for safe implementation of mobile robots until newer standards are adopted that also address potential hazards connected to AMRs. The ANSI/ITSDF standard B56.5-2012 is an American standard that was also written to address AGVs and has the same scope as EN 1525. An update of B56.5 was published in August 2019.

Like standards, laws related to worker safety and machinery can vary widely by geography. In the European Union, a user can assume that a mobile robot that has a CE mark is safe and meets relevant standards because it has been designed and manufactured according to the Machinery Directive (MD). This means that if the robot is used as promoted or described in the manual and an injury occurs, the manufacturer, rather than the customer, can be liable for the injury.

It is important to note that the CE mark only covers the robot itself, not the AMR system as a whole. When one or more mobile robots are deployed into a facility with top modules, loading stations and chargers, the full system also needs to be CE marked by the part that is responsible of commissioning the AMR system.

Upcoming standards

Standards organisations worldwide are working on new standards that address AMRs. The successor to EN 1525 as the most applicable standard for AMRs is ISO/FDIS 3691-4 – Driverless industrial trucks and their systems, which was scheduled for release in January 2020. ISO/FDIS 3691-4 addresses safety concerns for internal logistics and the hazards related to recompute paths on the fly, which are key aspects of AMRs. The new standard will provide detailed requirements for commissioning mobile robots as well as environment and work-cell design.

There are also other standards in progress that will likely have impacts on manufacturers, users and integrators of mobile robots in the future. These include ISO 10218, prRIA 15:08 and prUL 3100, each of which addresses different aspects of AMRs and their implementation.

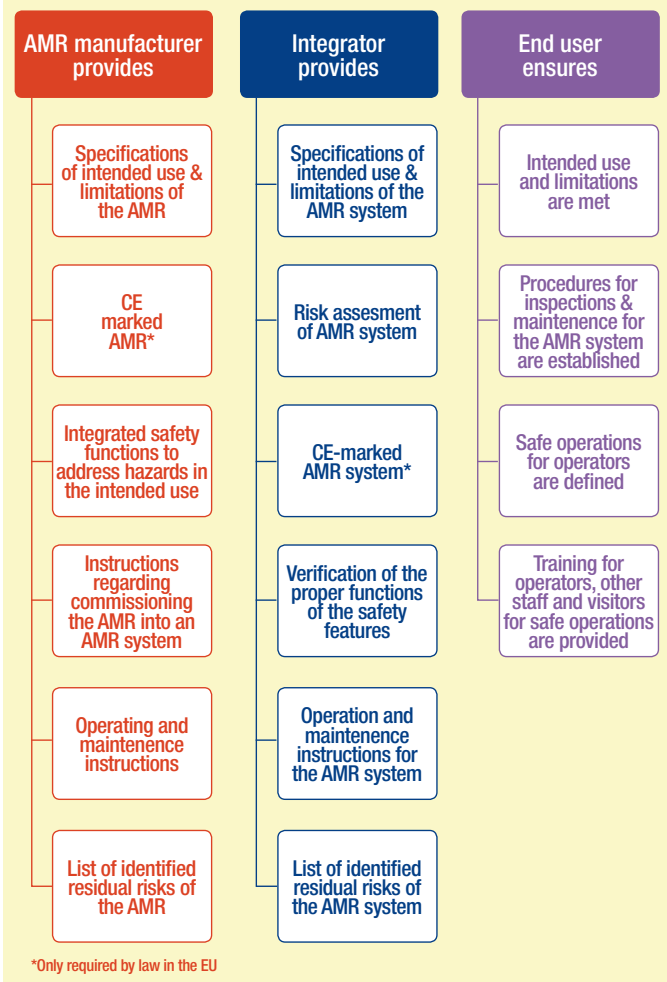
Summary

Standards and laws that are amended for AMRs are under development and planned to be introduced in 2020:

- Safety standards are developed to ensure that robots do not bring humans into dangerous situations when working with them. Therefore, it is important that your AMR manufacturer follows the current standards that are developed for logistics applications to make sure you have a safe AMR and AMR system.
- Safety standards and laws are determined locally by country/region, so deployed AMRs must meet those local standards.
- The European standard EN 1525:1997 and the CE mark provide a good framework when it comes to safety for the AMR as well as the AMR system. While it is not a requirement to comply to EU laws and standards outside the EU, it makes sense to use these principles to ensure a safe AMR system across all regions.
- For global manufacturers that are making global use of AMRs, the European standards and laws provide a good framework that can be applied to all factories with an amendment to address local aspects.



ROLES AND RESPONSIBILITIES TO ENSURE A SAFE AMR SYSTEM WORKSPACE:



Manufacturer, integrator and customer responsibilities

A safe workplace requires a joint effort from the AMR manufacturer, the integrator of the AMR system and the end user. It is essential that roles and responsibilities between the parties are clarified.

The guidelines provided by the European MD help customers and integrators ensure a safe workspace as the MD takes into account both the AMR and the full AMR system. By law, it is not required to follow the MD outside EU, but it is recommended to do so as it describes the current state of the art for safe AMR installations.

The manufacturer of the AMR must provide a vehicle that is designed to be commissioned in a safe AMR system and provide adequate information for integration and operation. This means that the manufacturer is responsible for specifying intended use and limitations of the AMR, which is typically to transport materials without a driver in industrial environments. The manufacturer must CE-mark the AMR according to intended use through compliance to safety standards for AGVs, comply with complementary standards to address all risks and provide integrated safety functions to address hazards expected in the intended use.

In addition to designing a safe robot, the manufacturer must also provide adequate documentation, including instructions regarding commissioning of the AMR into an AMR system, operating instructions for operation and maintenance of the AMR, and a list of identified residual risks for the AMR. Ultimately, the manufacturer is responsible for providing a safe AMR out of the box with all the required documentation.

At the time of installation, the responsibility moves to the integrator of the system. The integrator of the AMR system (which may be the end user if they are integrating the robot themselves) is responsible for providing an installation where all hazards are addressed or identified and providing adequate information for operation. Because AMRs can be programmed to move throughout a building, factory or warehouse, the integrator who commissions



the AMR must anticipate potential safety hazards and program the robot to act appropriately in compliance with safety standards. Commissioning also extends to the top module. If the robot is commissioned outside of those limitations, the integrator (or user) must incorporate additional protections to ensure that safety standards are met for the full robot application. The integrator must therefore specify the intended use and limits of the AMR system and make a risk assessment of the AMR system in the light of the AMR manufacturer's specifications, intended use and limitations. As the application changes from an AMR to an AMR system, the integrator must CE-mark the AMR system according to the new intended use, and provide documentation consisting of operating instructions for operation and maintenance of the AMR system and a list of identified residual risks from risk assessment for the AMR system.

Once the AMR system has been deployed, the end user is responsible for setting up and following procedures for operation and

maintenance of the AMR system. The end user must ensure that the intended use and limitations are met, and set up procedures for inspections and maintenance for the AMR system, including warning and markings. The end user should define safe operating procedures for operators and define training for operators, other staff and visitors for safe operation.

Deploy a safe AMR installation in close cooperation with your AMR manufacturer

The state of the art in the design and implementation of mobile robots is changing rapidly, and standards organisations are challenged to keep up. Compliance with current standards developed for logistics systems is still relevant, however. Many factors must be taken into account when deploying not just an AMR but an AMR system, which is often working in many different locations of a facility and in different applications. Users and integrators should expect guidance from robot manufacturers in order to reap the benefits of AMRs while ensuring workers' safety. At the same time, users must ensure that chosen AMR manufacturers are up to date with current and future safety standards and laws not limited to the AMR itself.

Mobile Industrial Robots
mir-robots.com

HARTING's Connectivity & Networks Solution for Automation

Visit our new digital platform
www.HARTING.com/myHARTING

HARTING PushPull
Tool free connection



HARTING T1 Industrial
Single Pair Ethernet



Han® 1A
Compact and robust connector



Han-Modular® Flexbox
Modular connector for energy chains



HARTING ix Industrial®
New Ethernet interface standard



Han-Modular®
All-in-one connector





Pushing Performance

Flexible Solutions of the Future

HARTING offers connectivity solutions for device integration up to the flexible and modular world of automation technology. Connectors facilitate development, assembly, transport, production and maintenance processes. The product portfolio ranges from connectors for electrical signal and power transmission, interfaces for optical fibers and pneumatic lines as well as comprehensive solutions for Industrial Ethernet. HARTING products are designed to meet all required protection classes of industrial environments.

Find more information, phone +61 3 9466 7088 or write to au@HARTING.com

www.HARTING.com/AU



Scan to learn more

People | Power | Partnership

VARIABLE FREQUENCY DRIVES

The Beijer Electronics BFI E3 general-purpose industrial variable frequency drives are dedicated to low power applications, and are said to combine innovative technology, reliability, robustness and ease of use. Dust-tight and ready for washdown, the IP66-rated inverters can be mounted directly onto processing equipment, while the IP20-rated inverters can be mounted in control cabinets or in machine parts providing the required protection.

Features include sensorless vector control, built-in PI control, EMC filter (C1) and brake chopper. Precise control is provided for IE2, IE3 and IE4 induction motors, permanent magnet motors, brushless DC motors, synchronous reluctance motors. The BFI-E3 series also has built-in application macros for industrial, fan and pump operation. Industrial mode optimises the BFI-E3 for the load characteristics of typical industrial applications, including conveyors, mixers and treadmills.

Pump mode makes energy-efficient pump control easier and can be applied to applications including dosing pumps, borehole pumps, transfer pumps, swimming pools, spas and fountains. Fan mode (incl. fire operation) makes air handling easier, suitable for simple HVAC systems. Applications include air handling units, ventilation fans, circulating fans, air curtains and kitchen extraction.

Global Automation Asia-Pacific

www.globalautomation.com.au



42-POLE MODULAR INSERT

The ILME MIXO series has been expanded with a high-density, 42-pole modular insert, the CX 42 DF/DM.

The high-density ILME modular insert, featuring a 20% additional density in comparison with previous models, is a space-saving connector particularly suitable for applications on test benches and robotics.

Suitable to be used in combination with all the standard MIXO modular units and frames, the MIXO 42-pole insert can also become an HNM (high number of matings) module when used in combination with HNM frames, contacts and enclosures, reaching up to 10,000 couplings.

By combining three of these crimp double-sized 10 A, 150 V modules, users can obtain a 126-pole connection with a 6-slot MIXO frame.

Customised black lock-in tabs included in the package allow the module to be easily fixed on the frame. The 10 A gold- or silver-plated contacts (to be bought separately) complete the installation.

Treotham Automation Pty Ltd

www.treotham.com.au



UPDATE TO CLOUD-BASED ANALYTICS SOLUTION

Seeq Corporation has announced availability of its latest release, R22, and beta availability of Seeq Data Lab. Seeq applications include Workbench for easy-to-use advanced analytics, Organizer for publishing insights in reports and dashboards, and now Seeq Data Lab for accessing Python libraries. These applications are designed to enable engineers and scientists in process manufacturing organisations to rapidly analyse, predict, collaborate and share insights to improve operations and business outcomes.

R22 features support enterprise data governance initiatives and priorities to support Seeq expansion in large organisations. For example, Seeq Integrated Security honours OS/soft PI security restrictions for PI data access and enables administrators to set signal-level permissions on data in historians and other time series data stores. Each user therefore only has access to the data they need, facilitating data access compliance.

Additional R22 features requested by Seeq users include an improved Scatterplot in Workbench, with conditional filtering and more display options to help users find relationships among signals more quickly; and multi-user awareness, so that users can know when other users are viewing, editing or presenting the same Worksheet or Topic.

All of the browser-based Seeq applications — Organizer, Workbench and Data Lab — connect to a shared Seeq server to enable collaboration, access connected data sources and enable administrative control.

Seeq Corporation

www.seeq.com



SUBMERSIBLE DP TRANSDUCER

The Validyne P78 is a submersible differential pressure transducer that is specifically designed for pressure measurements applications underwater or in harsh environments. It features variable reluctance sensing technology for use in a wide variety of low-pressure measurement applications that require sensors with a fast and dynamic response, high resistance to vibration and high temperature stability.

The P78 differential pressure transducer can perform pressure measurement of both gases and liquids. The sensing diaphragm is directly in contact with the medium, which means there are no internal isolation fluids to slow down the response or cause temperature shift errors. The sensor is available in three output configurations: 4–20 mA, DC and isolated DC. The wetted parts are designed from 316 stainless steel for high corrosion resistance and the diaphragm is Teflon coated. It can also be optionally designed from Inconel or Hastelloy for measurement in highly corrosive environments.

This rugged submersible pressure sensor is suitable for level measurements in industrial plants, and can also be used for measuring pressure in hydraulic systems, vehicle testing and engine test cells.

Bestech Australia Pty Ltd
www.bestech.com.au

HEAVY-DUTY AUTONOMOUS MOBILE ROBOT

Omron has launched the LD-250 autonomous mobile robot (AMR) with a payload capacity of 250 kg. The LD-250 is the strongest mobile robot in the LD series range and features a maximum speed of 1.2 m/s and a maximum run time of 13 h before it needs recharging.

The LD-250 allows users to load larger and heavier payloads, making fewer trips with heavier batches, ultimately increasing return on investment.

Omron also offers accessories that improve performance, such as its high accuracy positioning system (HAPS) and side lasers.

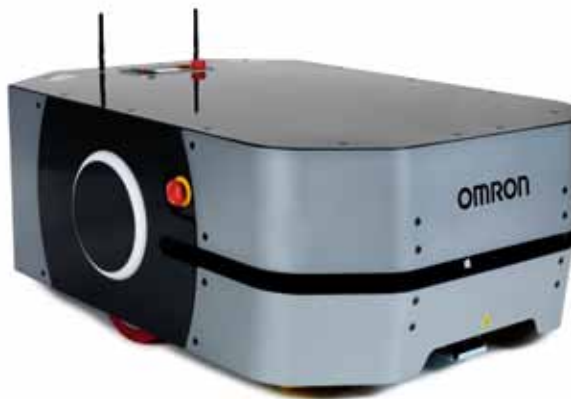
The LD-250 mobile robot can be paired with Omron collaborative robot arms for applications that require mobile manipulation.

The robot can also use accessories such as conveyor tops, courier systems and adaptive material handling mechanics to meet application needs. It can autonomously avoid people and obstacles while calculating the best routes to transport material. Additional E-stops can be easily added.

The robot complies with ISO EN1525, JIS D6802 and ANSI B56.5 safety standards and works safely around people.

Unlike AGVs, Omron AMRs can safely navigate without the use of floor magnets or wall-mounted beacons. An AMR will first create a baseline map of a facility using built-in sensors, then will constantly detect its surroundings. When processes change, AMRs can easily change as well, creating networks of new routes or being reassigned to new tasks.

Omron Electronics Pty Ltd
www.omron.com.au





Leuze

Forerunner.
Yesterday. Today. Tomorrow.

The Sensor People have been setting technological standards in industrial automation for more than 50 years. This is how we ensure the success of our customers in an industry that is ever evolving. We have been a forerunner from the start, and we are working on standardizing industrial communication. Among other things, we make sensors that are capable of transmitting data to control systems and the cloud via IO-Link and OPC-UA.

sales.au@leuze.com www.leuze.com.au

I/O MODULES

Opto 22 has released three groov EPIC I/O modules for switching, analog and temperature inputs.

The GRV-IDCSW-12 module, providing 12 discrete input channels and DC contact switch status, monitors the open/closed status of dry contact switches, and provides the necessary excitation voltage to power the circuit. This module is suitable for monitoring distributed IT equipment, benchtop analysers, motor run/stop relays or any device that offers only a dry contact for status.

The GRV-IVI-12 module provides 12 analog voltage inputs, ± 1.25 to ± 160 V. Each channel is configurable to one of eight ranges from ± 1.25 to ± 160 V and eliminates the need to segregate I/O signals over multiple modules, providing cost and space reduction for mixed voltage applications. The GRV-IVI-12 has 20-bit resolution and is accurate to 0.1% of the configured range, and includes options for scaling, filtering and averaging.

The GRV-IRTD-8 is an 8-channel analog input module for RTD or resistor temperature inputs, increasing options for accuracy and I/O density in temperature applications. It provides eight channels for 2- and 3-wire RTD inputs, with a maximum range of -200 to 850°C. Users can take advantage of multiple fixed ranges or one of two auto-ranging methods to simplify configuration. GRV-IRTD-8 can also be used for high-resolution resistance measurements, with accuracy ranging from 4.2Ω at the $8K\Omega$ input range to 0.058Ω at the 10Ω range for 3-wire RTDs.

PAC Project 10.2003 or the Opto 22 Library Package for CODESYS v1.0.2.0 are required for full support of these modules.

Systems 22 Pty Ltd

www.systems22.com.au



LINE VACUUM CONVEYORS

EXAIR's 2.5" and 3" high-temperature line vacuum conveyors convert hose, tube or pipe into an inline conveying system for high-temperature materials up to 482°C. These air-operated conveyors are available with smooth ends to fit into hose or tube and secured with a simple hose clamp, or they are available with NPT threaded ends to mount into threaded pipe. They feature large throat diameters for maximum throughput capability.

The high-temperature line vac conveyors eject a small amount of compressed air to produce a vacuum on one end, resulting in high output flows on the other. The response is instantaneous. Regulating the compressed air pressure provides infinite control of the conveying rate.

The devices are CE compliant and available in seven sizes from 19 to 76 mm. Construction is durable Type 303 or Type 316 stainless steel to resist high temperature, corrosion and contamination.

Applications include sampling hot flue gases, exhausting fumes, conveying soot, ashes, salts and other hot debris. Other models for hopper loading, scrap and trim removal, small part transfer and packaging are available.

Compressed Air Australia Pty Ltd

www.caasafety.com.au

HIGH-LIFT BIN TIPPER

An open-chute high-lift bin tipper from Flexicon hydraulically raises and dumps mobile bins into a hopper that feeds an integral flexible screw conveyor operating under loss-of-weight control. Bins weighing up to 1350 kg are rolled into a three-sided pen, where a lifting tongue centred inboard of the castors raises and seats the rim of the bin against a grate which, together with panelled side bracing, steadies the bin during the dumping cycle and directs the discharge path of material.

The system automatically lifts a mobile bin at variable heights up to 3 m above floor level, opens the gate-style lid of the 1.7 m³ capacity receiving hopper, dumps the entire contents of the bin into the hopper and returns the bin to the plant floor as the hopper lid closes, isolating the material from the plant environment.

A laser curtain prevents operation until the bin is secured and the area cleared, eliminating the need for a safety cage with interlocked doors.

The design of the receiving hopper includes a vibratory 'live' bottom to promote the uninterrupted passage of non-free-flowing material through flexible downspouting into the material charging area of a flexible screw conveyor. This conveyor stops and starts based on loss-of-weight signals from load cells to the system, delivering the desired weight of material to be transferred.

The unit is constructed of stainless steel finished to food, dairy, pharmaceutical or industrial standards, and is also available in carbon steel with material contact surfaces of stainless steel.

Flexicon Corporation (Aust) Pty Ltd

www.flexicon.com.au



END-OF-ARM TOOLING INTERFACE

Denmark-based OnRobot has introduced two new products — the Digital I/O Converter Kit and the Quick Changer — which, together with other OnRobot end-of-arm tools (EoATs), creates a one-system solution that is intended to simplify automation.

OnRobot’s Digital I/O Converter Kit allows OnRobot EoATs to work with a full range of collaborative and light industrial robot brands. All OnRobot products now have a unified mechanical and communications interface based on the OnRobot Quick Changer, which is now an integrated part of all OnRobot products. An additional Dual Quick Changer incorporates these same new capabilities while allowing the use of two tools in one cycle, mixing and matching to suit application needs and maximising robot utilisation.

With the OnRobot Quick Changer a single cable provides a universal interface for tools and communications, so there is no need to disconnect cables when changing tools, and extended communications options support a full range of robotic platforms.

All OnRobot products now have a unified communication platform using standard fieldbus protocols, making it easy to program the tools, regardless of robot used.

For robots that connect through digital I/O, the OnRobot one-system solution includes an OnRobot WebLogic interface. Using the IP address of the OnRobot Compute Box, manufacturers can sign in via the OnRobot WebClient from a phone or any other network-connected device to monitor the robot or create simple robot programs.



OnRobot
onrobot.com/en

**THIN CLIENTS ENSURE
A SECURE FUTURE.**



THE STRONGEST LINK.



NOW WITH REMOTE V5 FIRMWARE.

Our Operating and Monitoring Systems are compact, cost-saving and, thanks to their innovative concept, they are more safe, simple and reliable than ever before. What’s more, they are already prepared for pioneering technologies such as automation in the cloud or modular automation.

Discover more at: r-stahl.com/en/hmi or sales.aurs@r-stahl.com

I/O SYSTEM WITH MULTIPOINT ANALOG ALARM

The Moore Industries NET Concentrator System (NCS) now has a Multipoint Analog Alarm (-MAA) option that allows users to quickly set up simple or dynamic alarming schemes. The -MAA option utilises a built-in ISaGRAF program providing a flexible alarm configuration that is accessed via easy-to-use web pages through the onboard web server. The -MAA option allows users to configure up to 32 alarms that can be freely assigned to any of the eight relay outputs on the Relay Output Module (ROM). This enables each relay output to be driven by one input or alarm, or multiple inputs or alarms. Each alarm can be configured as high or low with its own deadband setting and can optionally include alarming on any NCS system faults.

Designed specifically for demanding industrial applications, the modular and smart NCS remote I/O system provides a real-time signal gateway between the field or factory floor and the control strategy and handles a wide range of signal inputs and outputs including current, voltage, relay, RTD, discrete, thermocouple, resistance or potentiometer. The NCS features robust RFI/EMI protection, peer-to-host and peer-to-peer operation, full channel-to-channel isolation, data logging capabilities, 20-bit input and 18-bit output resolution, and installs in harsh ambient temperature conditions.

Moore Industries Pacific Inc
www.miinet.com




Connecting Industry

IICA TECHNOLOGY EXPOS

DOYALSON	BRISBANE	SWAN HILL
29 April	13 May	27 May

TÜV RHEINLAND
 FUNCTIONAL SAFETY PROGRAM

SYDNEY	MELBOURNE
22 - 26 June	19 - 23 October

BATHURST
 10 June

www.iica.org.au



INDUSTRIAL DISPLAYS AND PANEL PCS

Emerson has released the RXi industrial display and panel PC range for monitoring, visualising and enhancing everyday production processes in life sciences, metals and mining, power and water, and manufacturing and machinery. The industrial display platform is based on a modular design, enabling users to select the right configuration based on application needs and minimising life cycle cost through flexibility, easy serviceability and field upgradeability.

The industrial displays are designed to work with both Emerson's PLC and PAC solutions as well as third-party control systems. The displays feature standardised physical designs to minimise the variety of enclosure cut-outs required for OEM applications, making each display easily replaceable and upgradeable in the field with no need to modify existing or install new cabinets.

Three display types provide options for a variety of applications. The RXi - Panel PC includes a high-performance and rugged industrial PC for powerful computing capabilities; the RXi - Industrial Monitor works with most industrial or commercial PCs for plant floor visualisation; and the RXi - Web Panel supports web-hosted applications.

Displays are available in sizes ranging from 7" to 24", providing a single, scalable platform for a wide range of operations and applications. Key features for all models include vivid projective capacitive, multi-touch screens that can operate in temperatures from 20 to 65°C and optional sunlight-readable screens on select sizes.

The range carries multiple certifications for high performance in rugged environments and is IP66-certified for protection against dust and strong jets of water.

Emerson Automation Solutions

www.emerson.com/au/automation

SMART CAMERA FOR MACHINE TOOLS

The LCAM 408i from Leuze electronic is an industrial IP smart camera that has an IP65/67 anodised metal housing and an easy-to-clean glass pane, making it suitable for monitoring the production processes of machine tools.

The resolution of the 5 MP IP camera and the Gigabit Ethernet interface offer high image quality and provide insight into the processing centre even under harsh operating conditions. Via the M12 connections and 24 V supply, the product can be easily integrated into machine controls.

Configuration is performed using a standard web browser or directly from the control panel, and additional software is not required. The option of optics cleaning via a compressed air connection is also available.

Leuze electronic Pty Ltd

www.leuze.com.au



LED EMERGENCY BEACON

The D2xB1LD3 LED beacon from E2S Warning Signals generates an effective candela rating of 82.1 cd under UL1971 test conditions, making it a visual emergency signalling device suitable for use as part of a public mode fire alarm installation for hazardous areas. The NFPA 72 compliant 20 ms high-intensity pulse generates light output equivalent in perception to a traditional strobe, but with ultra-low current consumption (150 mA) and low in-rush. The array of high output LEDs are installed to optimise visibility in any direction.

The beacon contains a supervisory diode and duplicated pluggable terminals that not only simplify installation, but also enable a four-wire connection. Multiple units will auto-synchronise when powered from the same source, removing the need for additional synchronisation modules and reducing power supply requirements. The beacon is globally approved to UL, cUL and ULC for Class I Div 2, Class II Div 2, Class I Zone 2/22 as well as IECEx and ATEX certified for Zone 2 and 22 hazardous area applications.

The D2xB1LD3 can be combined with a D2xS1 alarm horn sounder with an audible output up to 116 dB(A), 64 embedded alarm tones and four remotely selectable stages/channels to create the D2xC2LD3 combination signal. The alarm tone will also auto-synchronise on multi-unit systems where powered from the same source.

All members of the D2x range are housed in marine-grade aluminium enclosures with an ingress protection rating of IP66, NEMA Type 4 and 4X.

Mechtrix Pty Ltd

www.mechtrix.com.au





OT-IT CONVERGENCE CHALLENGES THAT INCREASE CYBER RISK

The ever-expanding overlap between information technology (IT) and operational technology (OT) networks is forcing many organisations to assess and improve their cybersecurity. With the exposure of legacy OT devices to the internet, and new attacks specifically built for them, ICS network protection is now commanding board-level attention.

The reality is that the failure of an ICS network controlling critical infrastructure such as an electricity grid, oil rig or emergency response service could have catastrophic results. This is why it is important for OT-IT organisations to understand where risks can come from and prepare for them.

With the increase in convergence between OT and IT, new risks are emerging that can have major impacts on Australian and New Zealand companies, particularly for critical national infrastructure providers. Urgent, proactive strategies are needed to ensure OT cybersecurity develops to the same maturity as IT cybersecurity.

At Forescout we have identified unique challenges that OT-IT convergence is creating for critical infrastructure companies.

Firstly, there is an increase in cyber threats targeting OT/ICS networks. The presence of newer, IP-connected devices in OT networks makes organisations that use them vulnerable to internet-based threats. Many companies are also using third-party vendors as a cost-effective alternative to onsite staff to patch, update and repair their systems. Unfortunately, the protocols used for remote access can be vulnerable to exploits, as was seen recently with the BLUEKEEP vulnerability, and adversaries can leverage this to gain access to the corporate network and compromise OT devices. In November 2019, Shodan.io showed over 40,000 internet facing systems with the vulnerable port exposed.

Secondly, the Internet of Things (IoT) explosion is having an impact. As the scale and diversity of IoT devices grow, monitoring and controlling them should become a critical focus of an organisation's cybersecurity plans along with eliminating 'bad' security

practices like having unencrypted traffic, or leaving default or simple credentials in place.

We are also seeing an increasing workload for security operations teams. The mounting pressure to bulk up OT cybersecurity has resulted in security leaders at many critical infrastructure organisations investing sizeable amounts of money into the latest and greatest cybersecurity tools. This has led to organisations using many disparate tools that force them to manually analyse yet more data, when they should be starting with maximising the value from tools they already have. Obtaining the capability to unify visibility and control for OT and IT networks into one interface can help reduce the burden of piecing together security and operational alerts from separate tools.

Compliance requirements are also becoming more complex. To achieve compliance, many organisations implement manual compliance processes, sending staff to perform site visits and map assets as best they can, while compiling this data for their reports. Despite these costly and labour-intensive efforts, this process is tedious and error-prone, and the possibility of being fined for non-compliance remains relatively high. Organisations should consider automating their asset inventory and management, as well as the required reporting for audits, which can help reduce an organisation's compliance burden.

By taking simple steps to understand how OT and IT networks interoperate, organisations can holistically manage risks to organisational OT infrastructure. There are many challenges that have arisen in the IT and OT fields, and taking precautions can help minimise the potential for disruption for organisations.



Steve Hunter is a Senior Director of System Engineering Asia Pacific and Japan at Forescout Technologies.

©stockadobe.com/au/Brad Pict



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

www.wfmedia.com.au

Head Office
Unit 7, 6-8 Byfield Street, North Ryde
Locked Bag 2226, North Ryde BC NSW 1670

AUSTRALIA
ph: +61 2 9168 2500

Editor
Glenn Johnson
gt@wfmedia.com.au

Publishing Director/MD
Geoff Hird

Art Director/Production Manager
Julie Wright

Art/Production
Colleen Sam, Veronica King

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

Copy Control
Mitchie Mullins
copy@wfmedia.com.au

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

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

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

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



Contact the editor

Printed and bound by Bluestar Print
Print Post Approved PP100007403
ISSN No. 0819-5447

All material published in this magazine is published in good faith and every care is taken to accurately relay information provided to us. Readers are advised by the publishers to ensure that all necessary safety devices and precautions are installed and safe working procedures adopted before the use of any equipment found or purchased through the information we provide. Further, all performance criteria was provided by the representative company concerned and any dispute should be referred to them.

Information indicating that products are made in Australia or New Zealand is supplied by the source company. Westwick Farrow P/L does not quantify the amount of local content or the accuracy of the statement made by the source.

FREE

to industry and business professionals



The magazine you are reading is just one of 11 published by Westwick-Farrow Media. To receive your free subscription (magazine and eNewsletter), visit the link below.

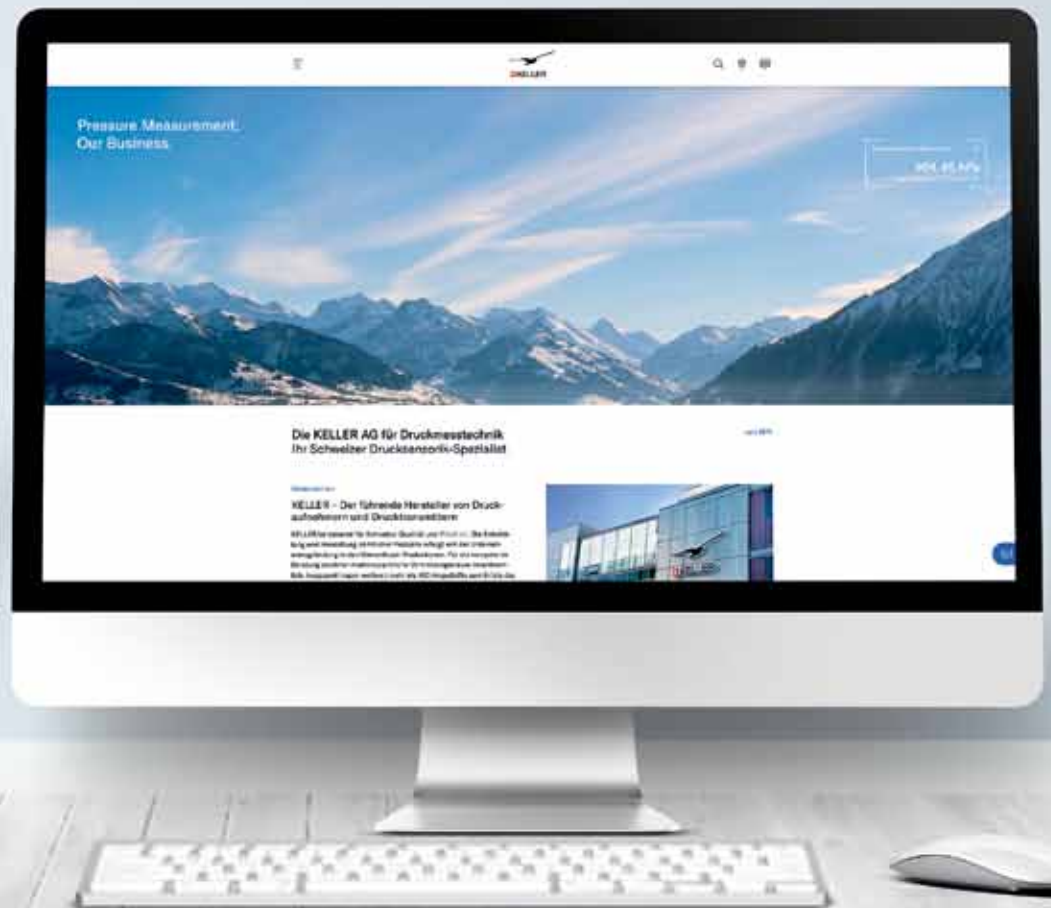


www.WFMedia.com.au/subscribe



KELLER

ENJOY THE NEW KELLER WEBSITE



keller-druck.com

**COMPETITION
UNTIL 31.03.2020**