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THE FUTURE OF FIRE SUPPRESSION TECHNOLOGY IS HERE. www.astafreira.com
With over 11 million frequency inverter drives already sold, Mitsubishi Electric has now introduced its latest generation of compact inverters – the FREQROL-CS80 series. In addition to better features and performance, the models are also more compact and easier to install. See this month's cover story on page 30 for more on this versatile range of solutions.
Open process automation and digital twins

The Ideas of The Open Process Automation Initiative first challenged traditional process control thinking at the ARC Industry Forum in 2016. The drive began within the ExxonMobil Corporation where a large number of older DCS installations (measured in hundreds not tens) were coming due for replacement as they approached obsolescence. Faced with this critical investment dilemma, the company’s engineering and managerial decision-makers resolved to think outside the box. All ideas associated with existing control platforms were thrown out of the window. Instead, they dreamed of a new class of automation solutions that would improve and simplify production processes in the future.

What ExxonMobil’s executives hope to crack is the problem of typical DCS retrofits. They generally agree that the newer control platforms do offer value, but the primary obstacle is the cost of transferring thirty years’ worth of hard-won process intelligence from one proprietary control system to another. As other end-users identified with this conundrum, the initiative gained momentum.

The result today is the definition work for a new class of automation solutions being conducted by The Open Process Automation Forum (OPAF) and by NAMUR. The scope of their programme is broad and covers all the process control operations traditionally performed by the DCS, PLC, APC and HMI, as well as the tools that support the design and engineering of these functions.

At ARC’s 2018 industry event, this coordinated effort finally paid dividends as ExxonMobil unveiled the first public presentation of its proof of concept project.

Designed to demonstrate an architecture that can deliver the required level of vendor interoperability through standards, the proof of concept showed how components may be freely interchanged between vendors without having to modify the underlying logic, or resort to the use of gateways and translators.

The next step is to move to an on-process pilot project later this year. ExxonMobil has already identified an internal site for this with the final goal to initiate field trials of pioneer applications in 2020 and achieve full technical readiness in 2021. See page 74 for more on this groundbreaking initiative which threatens to disrupt the established market for process control solutions.

Digital twins

Speaking of disruption, one of the more abstract ideas introduced by Industrie 4.0 is that of the digital twin. Actually, the idea of the twin has been around since NASA introduced the first virtual environment as a way to optimise the performance of assets too far away to manage by conventional methods.

For instance, when disaster struck Apollo 13, it was the innovation of mirrored systems here on earth that allowed engineers and astronauts to determine how they could rescue the mission.

However, it is through the IIoT that the technology became cost-effective to industry. A digital twin is a virtual representation of a physical object. In the case of manufacturing, this would usually be a process, or even an entire plant. The digital twin then acts as a bridge between the physical and virtual worlds.

The physical plant (or process) is linked to its digital counterpart through smart sensors, which means that the virtual model contains all the information that could be gained through inspection of its real counterpart. A common use of the twin technology is digital prototyping, which allows equipment to be designed and tested in the virtual environment before anything physical is ever built.

Another powerful application is the use of equipment monitoring to implement a predictive maintenance strategy. The snag is that a digital twin is not a product that one can go out and buy. Constructing a digital twin is a journey that requires the continuous implementation of platforms, capabilities, processes and human interfaces.

Understanding the organisation’s business strategy and how this new IIoT technology can support it is fundamental to why a digital twin is needed in the first place. If the prospect of implementing a twin seems overwhelming at this point, contributing editor Gavin Halse’s article on page 60 may just help to get you started.

Steven

Editor: SA Instrumentation & Control
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Rockwell Automation and McRae Integration collaborate to deliver more to brewers

Brewers of all sizes want to compete in today’s dynamic market and need simple, standardised operations that can deliver quality brews and keep up with complex consumer demand. Rockwell Automation and McRae Integration, a Rockwell Automation Solution Partner and member of the Rockwell Automation PartnerNetwork program, are leveraging their combined strengths to help serve this growing automation market for brewers.

The collaborative solution combines McRae’s carefully developed scalable and repeatable software solutions with the PlantPAx distributed control system from Rockwell Automation. Together, the solution helps breweries enhance quality and consistency, scale up production, reduce production complexities and better manage recipes. In addition, product and solution support, service and training capabilities are available globally.

OSIsoft collaborates with Amazon to accelerate industrial analytics

OSIsoft has announced a collaboration with Amazon Web Services (AWS) to develop services and capabilities to make it easier for customers to run sophisticated analyses on the massive volumes of industrial data from OSIsoft’s PI System.

The collaboration will span major areas that include enabling data science in real-time, streamlining the deployment of the PI System on AWS, and enhancing operational data insights with Internet of Things (IoT) devices and sensor data. OSIsoft will enhance its PI Integrator for Business Analytics and provide tight integration with major AWS services to help customers develop visual analytics, machine learning and artificial intelligence applications using operations data from the PI System along with data from critical enterprise applications.

The companies will work together to provide quick-start deployment guides that will allow customers to deploy the PI System on AWS at scale.

TENET leverages XKL’s optical technology to enhance subsea network

XKL, a leading provider of fibre optic networking systems, has announced that TENET, a research and education network based in South Africa, purchased XKL DarkStar transponder and mux/demux systems, providing a protected connection between two of its strategic data centre locations in London. The interconnection is a critical component of a subsea cable network linking London to Cape Town. The transponder systems establish the connection between multi-tenant data centres, which connect to subsea fibre managed by the West African Cable System (WACS).

TENET operates multiple peering and transit links across Europe and Africa, as well as UbuntuNet gateways under contract to the UbuntuNet Alliance. The provider also offers direct connections to GÉANT, the European research and education network. With several initiatives driving network utilisation, the company intends to increase its capacity over time and sought a network solution that intelligently accommodates growth.

Michael Brown’s Practical Process Control Training Courses and Loop Optimisation Services

Courses:
These well known courses are unique and invaluable to new comers as well as experienced practitioners and process engineers in the field of industrial regulatory control optimisation. The courses offer a new and very practical approach to this subject, which very few people really understand properly.

Courses are available on demand for six or more delegates and are suitable for instrumentation and control technicians and engineers, and for plant process engineers. Many chemical and mechanical engineers have attended the courses as well as metallurgists.

Even people with many years of experience in this field have found the courses a real eye opener.

Optimisation Services and Consulting:
Michael Brown has had 35 years of experience in control loop optimisation, and in that time has successfully optimised controls in many different types of plants, including pulp and paper, power stations, chemical and petrochemical, oil, steel, mining and metallurgical recovery, cement, brewing, glass, dairy, food, and sugar, both in South Africa and many overseas countries.

His work has proved invaluable to plants and has resulted in greatly improved performance and ROI.
LTF Series Time of Flight Laser Distance Sensors are designed to accurately measure targets at distances up to 12 meters. They provide reliable detection regardless of colour or material, even at an angle, providing a reliable solution for challenging targets. They solve a broad range of industrial measurement applications, including part-in-place, part profiling and positioning, and roll diameter and web tension control.

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A game plan for digital transformation

By Kim Roberts, associate editor, SA Instrumentation and Control

X-Change 2018, Wonderware Southern Africa’s 26th annual User Conference was recently held at the picturesque Champagne Sports Resort in the Drakensberg. The theme was GameON! Define your game plan for digital transformation – how digitalisation transforms business processes. The 420 industry professionals, a record-breaking number, were treated to in-depth information sharing, education and networking opportunities in a power-packed event. The outcome was that delegates learnt how to cut through the IIoT hype and to have a game plan to improve productivity and return on capital, enabling insights across enterprise value chains, enhance competitiveness and improve customer experience. It was also an opportunity to learn about the significant benefits that AVEVA and Schneider Electric’s industrial software business have combined to create a leading engineering and industrial software company.

The event was a huge success – bigger and better than ever. Here are some of the statistics:

- 420 delegates.
- 5 keynote addresses.
- 36 international and local presenters.
- 67 breakout sessions including 12 end-user presentations featuring major South African projects.
- 20 partner exhibitors and 20 Wonderware stands featuring the latest product releases, capabilities and hands-on training.

Top drawer presentations by the five keynote speakers set the scene

1. Vision and strategy

Ravi Gopinath, COO of AVEVA, gave an overview of the company’s vision and strategy and Schneider Electric’s new look industrial software business. The aim is to drive digital transformation across the asset and operational lifecycle of capital intensive industries. He said that the industrial landscape is changing profoundly. Today we are overwhelmed with information and there is a wealth of technology available.

Companies need to ensure reliability of their assets through an open phase of over 50 years. His advice was to be led by your business process, not technology – you do not need to implement all the buzzwords. Rather step back and look through the lens of your business processes and value chains. Critical factors when embarking on the digital transformation journey are to look for the value leaks or unrealised opportunities across value chains. Identify the business processes and activities associated with these areas, determine the technology that will best realise the value, and then work with partners through a roadmap.

He related international success stories, with examples of how functionality across the platform delivers value. These included ADNOC, Shell Pernis Refinery, EDF Nuclear Power Plant, Duke Energy, BP, Roy Hill Australia and New Belgium Brewery. All have realised significant return on investment in areas such as visualisation control, predictive asset analytics, planning and scheduling, and utilisation of renewable energy.

2. Customer innovation

Grant Wolff, demand manager for AB InBev, painted a picture of ABI’s journey of innovation, starting with iBayi Brewery in Port Elizabeth, where, in partnership with Wonderware, they are creating the brewery of the future. He said that only 12% of the Fortune 500 companies of 1995 are still in business today. The average age has come down to 20 years. Disruptive technology is blamed for killing corporate America, but in fact it is the lack of embracing new technology. Most companies do not know how to implement innovation, they throw buzzwords at the problem and innovate for its own sake. He added that innovation must be infused in the business and gave some examples of how ABI achieves this.

3. Fact or fiction

Stephan Kotze, client director of manufacturing for Aurecon, said that we have access to all the technology and money we can hope to spend. The question is how to make choices about what investment to make and what to change in your business in order to work more effectively. Bigger is no longer better, the biggest obstacle to achieving your potential is mindset. According to the World Economic Forum, digitalisation will bring another €298 billion in additional value to MMM companies from 2018 to 1025 through productivity gains, cost reductions and fuel and energy savings. He warned that if your organisation is not thinking about disruption and revolution, then expect a short lifecycle. Standard ERP solutions offer no competitive advantage. You have to make a difference in the core value chain.

He described how the merger of AVEVA’s 3D design tools with the software assets of Schneider Electric has resulted in the development of a platform to create a digital twin at the early stages of a project. This has brought new immersive technologies for training in order to deliver a safer environment.

4. Trends, technology and software roadmap

Didier Collas, technical sales director for AVEVA, spelt out the benefits of cloud technology and what AVEVA can offer with its unique value proposition, Hybrid. The cloud can bring agility, scalability and nearly unlimited capacity. Typical applications are in process design, handling of process data and training.

5. What is life?

For anyone not already in orbit after this feast of new ideas, theoretical physicist, Dr Adriana Marais, provided the booster. She is on the shortlist of 100 to go to Mars – one way. She had the audience spellbound with her vision of life on Mars.

Sessions – delving into today’s verticals

Introduced for the first time at X-Change 2018, delegates had the opportunity to delve deep into vertical-specific content and solutions for each of Wonderware’s key markets. They could access every possible bit of information in an easily digestible colour-coded form using the Hello Crowd app. There are far too many to mention but here are a few highlights.

Experts covered how to start your digital transformation in oil and gas with predictive analytics; how the BASF catalyst plant in Port Elizabeth optimised a complex chemical production process; new developments in Wonderware Historian Server for
comprehensive industrial data management; and AVEVA’s fascinating SimCentral 2.0 platform simulation, which can create a digital twin for the entire process lifecycle.

The mining industry is in the very early stages of transformation. The contributions in this vertical focused on how to make a start; make continuous improvements in efficiency; implement an end-to-end optimised plan; move from reactive to proactive maintenance; and centralise the monitoring and control functions of all processes.

In the food and beverage and CPG line, emphasis was placed on the challenges food and beverage manufacturers face. Solutions were explored to make the most out of existing investments and improve operational efficiency through digital transformation.

If day one was about strategy, day two was about the products, diving deeper into four new ground-breaking AVEVA products focusing on asset management, maintenance and monitoring, predictive asset analytics, and an industry-leading mobile workforce decision-making system.

A highlight at the Expo was the video wall, collaboratively designed by Iritron, Oculus, Datacentrix, First Technology, APC by Schneider, and Wonderware as part of a project at Assmang Black Rock Mining Operations. They demonstrated a catastrophic failure of a data centre and how the servers could be brought back into full operation within nine minutes.

The grand finale
The conference was topped off with a gala dinner, while wacky comedian, Alan Committie entertained the crowd. The following awards were made in recognition of excellence:

- **Best Presenter:** Grant Wolff, AB InBev.
- **Best Flow Software Innovation:** Oranjevis Joint Venture.
- **Best HMI/Scada Application:** Oranjevis Joint Venture.
- **Best Industrial Information Management Application:** Assmang Manganese, Black Rock Mining Operations.
- **Best Manufacturing Operations Management Application:** Namibia Breweries.
- **Best Innovation:** BASF.
- **Best Digital Transformation Strategy:** Assmang Manganese, Black Rock Mining Operations.
- **Best Business Value:** RCL Foods.
- **Best Workforce Empowerment:** Aspen.
- **Most Current Certifications:** Control Systems Integration.
- **Top System Integrator, 4th Runner-up:** Systems Anywhere.

**What to take away**
Chatting to some of the exhibitors their enthusiasm bubbled over. The three days were a celebration of the union between AVEVA and Schneider Electric and an opportunity for end-users to see for themselves the benefits, an introduction to digital transformation for some, and a helping hand in embarking on this journey. Among all the words of wisdom, some nuggets to take away were:

- **• Be led by your business process not your technology.**
- **• You do not have to implement all the buzzwords.**
- **• Consider the cloud as a value proposition.**
- **• You need to disrupt to innovate.**
- **• If you can visualise your process you can follow it for fifty years.**

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Endress+Hauser wins Hermes Award

Endress+Hauser has been recognised by Hannover Messe with the prestigious Hermes technology award for iTHERM TrustSens, the world’s first self-calibrating temperature probe for industrial applications.

This compact thermometer has been designed especially for hygienic and aseptic applications in the food and beverage, and life sciences industries. With automated and fully traceable self-calibration during production, the sensor eliminates the risk of undetected non-conformities, resulting in maximum product safety and process efficiency. In addition, the integrated Heartbeat Technology allows for continuous device diagnostics and verification without interruption of the process.

Developers used physics phenomenon

iTHERM TrustSens relies on an integrated reference sensor. Developers used the Curie point physics principle, in which the magnetic properties of a material abruptly change at a specific temperature point, which is determined for the reference sensor. As soon as the temperature falls below this value, such as following a steam sterilisation, both sensors are adjusted. Since the Curie point remains constant, the reference sensor as a master provides a stable comparison value.

The probe thus calibrates itself each time the system is cleaned or sterilised as is usual in processes in the food and beverage, and life science industries. The added value for customers is huge. Large systems often include hundreds of temperature sensors that have to be calibrated several times a year. To date, this has required stopping the process and removing the instruments. iTHERM TrustSens solves that problem.

Sensor technology for the IIoT

“The award-winning product makes a major contribution to the deployment of the Industrial Internet of Things throughout the process industry,” said Jochen Köckler, CEO of Deutsche Messe. The award was presented at the opening of Hannover Messe 2018 in front of many guests, among them Germany’s Chancellor Angela Merkel. The Hermes Award is one of the most respected technology contests worldwide and recognises products and processes characterised by innovation, efficiency and application benefits.

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SEW-Eurodrive South Africa expands Field Service Department

SEW-Eurodrive South Africa has expanded its Field Service Department, and is growing its service offering with the addition of value-added services such as vibration and oil analysis.

“This will broaden the scope of our aftermarket support significantly,” comments Eben Pretorius, head of the Field Service Department. “Normally we carry out a visual inspection to determine the condition of a gearbox or power pack. Now we can pinpoint a specific bearing or gear component within the unit that is starting to fail and, in addition, identify whether or not the oil is in a usable condition.”

The advantage for customers is that they are made aware of potential problems or imminent failures, and can plan corrective actions around normal shutdown periods. This approach is less disruptive to business and more cost-effective than unscheduled or unplanned downtime. “We are now able to work with customers to carry out preventative maintenance or supply replacement units on short notice to maximise plant uptime,” stresses Pretorius. “The value-added services are applicable to SEW-Eurodrive’s extensive geared motor and industrial gear product ranges.”

While the company has already been offering such value-added services to some of its larger customers, the plan now is to roll it out to all customers. In addition, it is in the process of incorporating these value-added services into formal service contracts to ensure customer maintenance and condition monitoring is performed by skilled technicians with specialist knowledge in the transmission industry.

The Field Service Department has grown significantly in the past year. “On the electronics side, we have just completed a major project for an automotive manufacturer that has extended its plant for the assembly of its latest model,” highlights Pretorius. “We are currently busy at another automotive manufacturer, upgrading its entire plant with innovative, safe, and energy-efficient concepts and products from our comprehensive modular system of drive elements. We focus on energy efficiency and safety technology in particular, with products designed specifically for this purpose, making us an ideal partner.”

The success of the Field Service Department indicates a clear need for skilled technicians who are able to service and repair products in the field. “Technicians are available 24/7 and provide support in 23 African countries,” concludes Pretorius, “and our large local stockholding gives us the ability to respond quickly to breakdowns and critical situations.”

For more information contact Jana Klut, SEW-Eurodrive, +27 (0)11 248 7000, jklut@sew.co.za, www.sew-eurodrive.co.za
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Beckhoff Automation and EPLAN present Process 4.0 the first ‘Fourth Industrial Revolution’ seminar in South Africa for process industries.

The 2018 Breakfast Seminar Series is aimed at industry segments such as: oil & gas production, petrochemicals, chemicals, water & wastewater management, food & beverage, metals, mining, plastics, woodworking, pharmaceuticals and biotech, print and pulp & paper.

Beneficiaries include process plant operators, system integrators, planners of plants and all-round enthusiasts in process automation, especially with the US’s HazLoc Certification requirements.

Process 4.0 is the next generation of process automation. During the seminar the following topics will be covered: Integration of HART devices through FDT/DTM into PC-based control systems; ultra-thin integration of intrinsically-safe field devices; multi-touch control panels and panel PCs for hazardous locations; big data analytics and remote data access in the cloud.

This 2018 Process Breakfast Seminar Series will take place on the following dates:
- 23 July – Durban Country Club, Durban
- 25 July – D’Aria, Cape Town
- 31 July – The Fairway Hotel, Johannesburg

Attendance is free of charge and will earn 0.5 CPD points. Register via www.instrumentation.co.za/Process4.0Seminar

For more information contact
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ABB invests in Africa’s youth

For decades ABB has been driving growth through technology and innovation on the African continent and worldwide. Business with a passion is at the core of what drives the company’s innovation, for the benefit of modern society. Its CSI initiatives are an extension of this passion. ABB’s 110-year African heritage is proof that giving back should be the very fabric of any entity, large or small.

The University of the Witwatersrand Technology Centre, known as the Tshimologong Precinct, is a digital technology centre inspired by the Kendall Square Initiative in Boston, USA and the East London Tech City in London’s East End. It is powering digital innovation and catalysing black-owned tech startups for participation in the fourth industrial revolution. Centrally located in Braamfontein, it also serves as the platform for IoT and Industry 4.0. ABB provides seed funding for technology transfer projects and application of its own technologies in the African economic context. The university has partnerships in the SADEC region, and this fosters growth amongst African colleagues and initiates conversation and transfer of learning.

MD, Leon Viljoen says: “We are excited that our social investment will offer young people access to the digital economy and provide the opportunity for ABB to contribute towards industrial automation and digital technology in the region. It also provides us the opportunity to interact with future business and entrepreneurial leaders, who are brimming with bright ideas. As businesses we are responsible for shaping the future by mentoring those that follow us.”

As an example, ABB Ability would help to show young digital technology graduates, researchers, developers and entrepreneurs the applications that ABB has for the digital future in manufacturing, agriculture, marine utilities, food and beverage, and mining. ABB’s involvement could help to extend the centre’s reach into southern Africa, enabling these countries to benefit from Industry 4.0. This could potentially divert attention away from global research centres to Africa, helping to elevate Africa’s research and development capabilities.

Another proud initiative is the ABB Jürgen Dormann Foundation for Engineering Education. The foundation provides scholarships to talented engineering students in different parts or the world for their first academic degree. Students on the African continent have also been recipients of the programme.

For more information contact Shivani Chetram, ABB, +27 (0)10 202 5090, shivani.chetram@za.abb.com, www.abb.com/africa
Endress+Hauser receives double honour

For the fifth consecutive year, Endress+Hauser Conducta has received the European Business Award. The Endress+Hauser Group’s centre of competence for liquid analysis took the National Winner award in the Business of the Year category for 2018. The company also received the Top Job seal of quality once again.

“Enthusiastic employees and a focus on customer-oriented innovation is the foundation of our sustainable success,” says Dr Manfred Jagiella, CEO of Endress+Hauser Conducta and member of the Executive Board at the Endress+Hauser Group.

Since 2007, the European Business Award has recognised companies in 11 different categories. When evaluating the nominees, the jury, composed of prominent representatives from government and industry, evaluates the nominees based on innovation strength, ethical commitment, economic success and long-term strategic alignment balanced by the flexibility to respond to dynamic market conditions.

Attractive employer

At nearly the same time, Endress+Hauser Conducta was awarded the Top Job seal of quality, capturing second place among German companies with more than 500 employees. Organised by Zeag, a centre of competence in the area of employer attractiveness, the awards are bestowed on companies that exhibit a strong commitment to creating a healthy and simultaneously high-performance work culture.

Leader in liquid analysis

Endress+Hauser Conducta is one of the world’s leading providers of measurement instruments and complete systems for liquid analysis. The company’s intelligent solutions help customers in the environmental and process industries operate their systems in a safe, reliable, economic and environmentally friendly manner.

For more information contact Natlee Chetty, Endress+Hauser, +27 (0)11 262 8007, natlee.chetty@za.endress.com, www.za.endress.com
RS Components showcased a range of industrial products and new technologies at the Mining and Technical Exhibitions (MTE) in Botswana from 16 to 20 April. The company also recently launched its Africa website, www.rs-online.africa, geared to meet the requirements of a growing continent with demand from various industries such as manufacturing, mining, automotive, utilities, electronics and industrial IoT.

“Customers in Africa had access to our products prior to the website, however there were long lead times and higher freight costs depending on the customer’s location,” said Brian Andrew, MD of RS South Africa. “With the new website, customers receive their products much faster and can pay online via credit card. This opens the door for more markets in sub-Saharan Africa to easily access products through our e-commerce platform. So much is happening in Africa and we want to make sure that our engineers, makers and maintenance professionals have access to the widest range of quality products and the latest technologies in order to achieve their goals and to develop the products and solutions of the future. The rest of the world has easy access to these goods, now so do we.”


BMG’s strategy to expand its fluid technology services to meet growing market demand incorporates the introduction of new products, with the latest developments in design technologies, materials and coatings. The addition of Dual Valves’ products to BMG’s portfolio, enhances the company’s solution services and broadens BMG’s customer base, providing new market and application opportunities. Dual Products International, a local manufacturer of slurry valves for over 30 years, has become one of the world’s leading producers of abrasion-resistant valves. Market share for both companies will be significantly expanded through this distribution agreement, which improves accessibility to Dual Valves’ products throughout the African continent.

“The BMG and Dual Valves’ teams, with their invaluable experience, are able to specify the correct valves needed for every application and also assist customers in solving the problems in difficult installations and applications,” explains David Dyce, BMG business unit manager, Fluid Technology.

The Dual Valves’ manufacturing facility in Gauteng is equipped with the latest equipment, including an in-house pattern maker. An ongoing research and development programme means the range of slurry valves will be continuously improved and extended, according to stringent quality standards and market requirements.

Through BMG’s broad branch and distributor network, customers now have access to the Dual Valves range. Products include dual valves, ball check valves, non-return valves, rotary disc valves, air release valves, double ball check valves and dual pinch valves. Recently launched abrasion-resistant products include pivot gate valves.

The pivot gate valve is a new rotating gate valve, designed specifically for heavy abrasive and corrosive slurries. The patented design, which allows the valve to cycle in heavy slurries without sticking, is available in three types: wafer, flanged and high pressure valves.

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Omron delivers a practical illustration of industrial automation

Omron Electronics South Africa recently hosted an event at its head office in Johannesburg where clients and the media had the opportunity to experience Industrie 4.0 first hand.

On display was the Omron Delta pick-and-place robot as well as the new industrial PC.

Pick-and-place operations are key to assembly line functions at modern industrial manufacturing facilities. With maximum precision and efficiency required to maintain optimal productivity, automated solutions, such as the Omron Delta Robot, is essential in meeting production targets.

Backed by the seamless integration of motion, robotics, vision, and safety, single control of multiple robots, and a wide selection of mechanical options, these industrial robot solutions are designed and equipped with various features that help meet customer needs and support a facility’s operational requirements.

The Delta line of Omron robots integrates into high-speed picking systems. With the combination of the high-performance Sysmac NJ controller and GS servo motors, combined with the robot’s kinematics, users can easily achieve maximum outputs in pick-and-place applications. The controller allows for optimal precision and control of all associated motion devices through coordinated, independent, and synchronised motion. This is then made possible by easily programmable conveyors, as the system has a powerful command in place to specifically complete pick-and-place applications.

“We with our ‘integrated,’ ‘intelligent’ and ‘interactive’ concepts, we bring innovation to manufacturing sites through automation,” explained Omron field application engineer, Driaan Coetzer. “The Industrial PC platform (IPC) is a new control platform that delivers integrated and intelligent automation to production sites and equipment around the world. We are working on manufacturing innovation with manufacturers by developing our unique automation using a wide range of products including PLCs, IPCs and open industrial networks such as EtherCAT.”

The current trend is for innovative manufacturing through leveraging the IIoT, Big Data, and robotics. In order to collect data for preventive maintenance, PLCs are connected with a PC for office environments, which requires complex licence management and is supported only for a short time.

“Omron’s IPC has been designed from first principles to be powerful, reliable and scalable, making it ideally suited to visualisation, data handling, measuring and controlling,” noted Coetzer. “We have simplified the design and build to eliminate faults caused by complexity to maximise uptime and reduce costs. The future will be IT driven and Omron’s IPC platform will make users a part of it.”

So, what can customers expect from Omron in the future? “In the coming months Omron will expand its IPC range to include seventh generation Intel processors and move from a three down to a two-layer casing with a single layer option available. Advantages include faster processing speeds, smaller footprint and a reduced heat factor,” concluded Coetzer.

For more information contact Omron Electronics, +27 (0)11 579 2600, info.sa@eu.omron.com, www.industrial.omron.co.za

Comtest hosts Snell IR training and certification

Comtest is a provider of test and measurement and process control equipment solutions from world-leading manufacturers to the southern African market. The company regularly undertakes industry-related training for its customers.

Recently, Snell thermography courses (Levels I & II) were presented at the Comtest headquarters in Linbro Park, Gauteng. The Snell Group is the world’s leading expert on infrared thermography, offering infrared training and infrared inspection services, as well as certification services for infrared professionals and their programmes worldwide.

In February and March, 13 delegates successfully attended Level I and were duly certified; and impressively five delegates attained Level II.

The next such Snell thermography course is scheduled for June 2018.

For more information contact Comtest, +27 (0)10 595 1821, sales@comtest.co.za, www.comtest.co.za
AVEVA expands partnership with EOH to enhance support in the sub-Saharan Africa region

Global leader in engineering and industrial software, AVEVA, announced an expanded partnership and management role with EOH, with relation to AVEVA’s sub-Saharan Africa sales and support for its software portfolio as an in-country partner.

“Sub-Saharan Africa is home to a large number of companies in the process, mining, metals, minerals and power industries. In order to increase our presence and best serve this market, we sought an experienced partner with an established customer base,” said AVEVA chief operating officer, Ravi Gopinath. “As a long-standing distributor for our Wonderware portfolio of HMI/scada, information management and operations management solutions, we have built a strong working relationship with EOH that will now expand in scope to meet the growing demand for our asset performance and other industrial solutions.”

“AVEVA’s reputation for innovation, coupled with the value proposition of the Industrial Software Platform to drive digital transformation, represents a unique opportunity that is unsurpassed in the industry. With our focus and technical expertise in the mining, manufacturing and infrastructure sectors, we are the perfect partner to manage and deploy AVEVA’s industrial solutions in sub-Saharan Africa, while maintaining the highest levels of customer satisfaction,” said EOH Group CEO, Zunaid Mayet. EOH operates in 31 countries in Africa and the Middle East, and is driven by its design, build and operating model, providing end-to-end solutions across all industry verticals. As a Wonderware distributor since 2003, the company has demonstrated its ongoing commitment to growth and customer success.

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IoT.nxt expands in the Netherlands

Dutch company AMIS, part of the Conclusion ecosystem, announced a strategic partnership with South African IoT innovator, IoT.nxt to act on the rising demand for IoT applications. The combination of AMIS’ knowledge of IoT and IoT.nxt’s technology agnostic solution will result in new business models and services supporting digitisation strategies.

This is a further agreement entered into in the Netherlands, following the partnership with listed Dutch company ICT Group, concluded at the end of February this year.

The IoT.nxt platform, is capable of connecting a wide range of sensors and devices irrespective of their protocols, allowing quick development of new solutions that can be retrofitted onto existing technology. The solution supports fast time to market, resulting in a very beneficial ROI, making it extremely effective and cost efficient. “This allows us to focus on generating business value for our customers. The solution is specifically suitable for industrial IoT solutions,” says Robbrecht van Amerongen, business development manager at AMIS.

Joe Bester, chief marketing officer at IoT.nxt said: “IoT.nxt and AMIS reinforce each other in the field of business solutions for IoT. With our platform we are able to support AMIS’ competencies ranging from design thinking, architecture development to technical and business operations in a way that enables them and their clients to rapidly move toward value with digitisation.”

IoT.nxt offers a hardware and software solution for edge computing that bridges the gap between the industry sensors and the data processing back-end. It connects a company’s latest digital devices, such as sensors or legacy analog devices for monitoring the quality of a production process, the condition of an engine or the frequency of usage of equipment, to a wide range of different cloud and on-premises solutions. This makes it possible to leverage the power of real time sensor data to cloud systems, machine learning, business intelligence and IoT driven business rules. Van Amerongen added that this partnership will enable AMIS to accelerate its IoT development capability and handle operations of IoT solutions more effectively. “We can focus on business value for our customers and inspire our customers with industry standard IoT solutions, thus helping them in their digital transformation process. In the last few years we have seen an expanding number of IoT platform solutions. We help our customers select a mature, usable and cost effective platform supporting their primary process. This way we provide high quality solutions with a good ROI.”

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The fifth annual Manufacturing Indaba will be hosted at Sandton Convention Centre, Johannesburg from the 19 to 20 June 2018. The event will comprise a two-day conference and exhibition and is hosted in partnership with the Department of Trade and Industry, the Department of Science and Technology, the Manufacturing Circle and the NCPC-SA. The event is designed specifically for private and public company representatives to hear from industry experts as they unpack challenges and find solutions for growth across the manufacturing sectors and explore regional trade into Africa. The 2018 event will launch the IoT/Industry 4.0 Conference aligned to the Manufacturing Indaba as an official side event.

The Manufacturing Indaba 2018 will be leading pertinent discussions regarding the various government grants, tax incentives and financing opportunities available to manufacturing-specific enterprises. The symposium will also focus on the requirements candidates must meet to be eligible for such incentives which aim to foster business growth, promote job creation and stimulate global competitiveness within South Africa’s manufacturing sector.

The Department of Trade and Industry and other government institutions are providing several government-backed financing options to incentivise manufacturing entrepreneurs and business persons. This will enable prospective industrialists to enter the field, thereby generating a positive economic and social impact, including uplifting their local communities.

 Individuals with business ideas and existing setups that comply with the requirements of funding agencies can benefit from government grant and tax incentives that promote business development. To drive the nation’s economy in the right direction, several priority or development areas that await sustainable progress have been identified. The incentives available to such manufacturing units vary from cash grants, tax breaks, and industrial financing.

Production incentives are offered to advance national priorities with focus on new assets, green technology, resource efficiency maximisation, enterprise level competitiveness enhancement, feasibility research and cluster interventions. This funding option could be up to 50% of the money spent which is available to existing manufacturers. Some of the incentive programmes that will be discussed include the Support Programme for Industrial Innovation, Black Industrialist Scheme, Agro-Processing Support Scheme, Industrial Policy Incentive, Special Economic Zones, Energy Efficiency Allowance and the Strategic Partnership Fund.

For more information visit www.manufacturingindaba.co.za

Science Week 2018 will be taking place from 29 May to 6 June 2018 at the Deutsche Internationale Schule in Pretoria and in Johannesburg, with an open workshop day on Saturday 2 June for parents and the public. This follows on the success of the inaugural event that was held in 2016, which reached over 2000 learners. The vision is to create awareness of science and technology in a fun, exciting and hands-on learning environment for learners between kindergarten and grade 12. The aim of this initiative is:

- To plant the seed of curiosity in children
- To expose them to a world of science and technology that is not available in schools
- To show them how science and technology make up the very fabric of our lives
- To bring industry and education together at a grass roots level to create experiments and projects broadening their minds

A wide range of companies and institutions were involved in Science Week 2016, including Siemens, Hytec, Festo, ABB, Sasol, CSIR and BMW. Over 33 institutions took part, with themes including coding, technology, energy, applied science, biology, chemistry and maths. The 2016 event served as an outreach programme promoting a STEAM curriculum (science, technology, engineering, art and maths) in partnership with the Deutsche Internationale Schule.

Science Week 2018 will involve around 3250 children, including 1250 from Atteridgeville, Mamelodi and Soweto. The number of companies involved on a programme content level will be increased, ensuring that there is enough programme content for all learners. Financial and programme content sponsors are currently being sought.

The next step is the development of a cutting edge centre of excellence in science and technology that will enable learners to follow a hands-on project-based curriculum which is above and beyond that offered in the school environment. This Technology Centre will have a modular-based design with a two-phase development. The concept is currently being created on paper, with design and cost possibilities.

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Appointments

BMG has appointed Gavin Kirstein as product manager for Tsubaki.

Elonics has appointed Bryce Mildenhall as regional sales manager.
Turck has acquired the cloud software of IoT specialists, Beck IPC as part of a technology buyout. The fully developed software solution provides the foundation for the development of the in-house industrial cloud solutions of the Mülheim automation specialists. "The acquisition of the well thought-out cloud software will enable Turck to take one more step along the path of becoming automation partner for Industry 4.0. Using this software as a basis, we will already in the near future be able to offer our customers a mature and future-proof industrial cloud solution, which we will further develop together," explains Turck managing director, Christian Wolf at the signing of the contract.

"In the collaboration with Turck we are seeing for the first time in automation a genuine sensor-to-cloud platform for all industrial sectors," says Thomas Schumacher, CEO of Beck IPC. Oliver Merget, head of the Turck Automation Systems business unit adds: "We don’t want to unsettle our customers with big data, but rather offer them smart data, that is only data with useful value, such as for use in predictive maintenance in order to reduce unplanned plant downtime. The new Turck cloud solutions will enable our customers to evaluate machine data effectively for their own requirements."

The software from Beck IPC stands out on account of the high security standards implemented and its specific tailoring to industrial applications, also with regard to performance and scalability. A special Beck IPC protocol increases the security of the stored data in addition to the end-to-end encryption. As the servers of the Turck cloud solutions are hosted in Germany, maximum data protection is guaranteed worldwide. Besides the simple storing of data, the solutions also enable process visualisation, the creation of data logs and data reports, right through to the display of monitoring functions that can be accessed worldwide and round the clock.

For more information contact Brandon Topham, RET Automation, +27 (0)11 453 2468, brandon.topham@retautomation.com, www.retautomation.com
Skyriders’ contract at major petchem producer

From work at tank farms to power station boiler inspection, Skyriders’ five year contract at a major petrochemical producer in South Africa has progressed in leaps and bounds. The access specialist began its association with the company by carrying out maintenance and inspection work on its fire water systems. “Over the years, our scope of work has branched out to include inspection in power station boilers,” reveals marketing manager, Mike Zinn. He adds that this is a good indication of not only the scope and size of the company in question, but the total value-add that a specialist service provider such as Skyriders can add to its operations.

While the tank farm portion of Skyriders’ scope of work has a dedicated team allocated to it, any other requirements are assigned the necessary resources as and when needed. Apart from rope-access skills, the tank farm team also has expert knowledge of deluge systems and general plumbing, especially as they are often required to join piping.

Bolting and rigging skills are also included in the mix of services that Skyriders provides. The latest development is that an Elios collision tolerant drone from Flyability of Switzerland has been deployed for confined space inspection at the petchem producer. “These areas are quite treacherous and dangerous, and pose a major health and safety risk,” Zinn continues.

The drone technology represents the latest innovation in inspection systems from Skyriders, which always strives to be at the top of its game in the industry, and thereby set itself as a benchmark for the rest of Africa. For example, during its association with the petchem producer, it has managed to achieve ISO 9001, OHSAS 18001 Occupational Health and Safety, and ISO 14001 Environmental Management.

“It is important for us to align ourselves with exactly the same standards as our client in terms of quality, health and safety, and environmental management,” Zinn adds. “We often find that our clients have specific processes and procedures that we are required to follow, and therefore it helps if we are all on the same page from the start.”

The fact that the petchem producer is so safety conscious and process-driven filters through to its entire supply chain and all of the specialist companies and service providers it deals with, which has the added benefit of raising standards in the industry as a whole.

“This is a perfect example of the kind of partnership we like to enter into with our longstanding clients, which is testament to our proven capabilities. In this particular contract, we have seen a traditional client committed to scaffolding advance to rope access and ultimately our latest drone technology,” Zinn concludes.

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Cummins’ African distribution network

With Cummins being one of the largest genset manufacturers worldwide, it is able to provide customers with a broad range of power solutions. Moreover, it differentiates itself from many of its competitors due to its robust distribution network.

The company owns its distribution channels in many key African markets, or has very strong joint venture partners. What this means for customers is a one-stop shop, not just for products, but also for service provision, explains Vivek Malapati, Cummins Africa Distribution Sales and Business Development director. “Many of our competitors mostly use independent dealers, meaning customers often have to deal with multiple companies, even for the smallest issue, which adds red tape and slows down turnaround times,” he points out.

Cummins’ distribution network is extremely well run, comprising highly skilled staff, allowing it to cater for all customer needs, from acquiring a 17 kW unit to installing a 20 MW power station. “We are not only able to provide upfront application engineering support, but project execution from start to finish, in addition to aftermarket service,” Malapati notes.

Cummins manufactures all key components of its gensets, unlike other companies that focus solely on assembly, sourcing components from various suppliers. This provides for a completely different customer experience, particularly in terms of warranty and service support, as it allows for a single point of contact, known as ‘The power of one’.

Cummins is currently investing significantly in its African distribution network. “If you look not only at power generation, but many of our other end markets, one of our key strengths has been our investment in tooling, technicians and stockholding, both for products and spare parts,” Malapati highlights.

Nigeria, Senegal, Côte d’Ivoire, Ghana, Angola and East Africa are focus countries at present for Cummins. “We invest to ensure we have sufficient capacity to meet our customers’ needs throughout the continent. In addition, we strive to provide our technicians with the latest training and equipment,” Malapati concludes.

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There was nothing out of the ordinary about the group of engineers I joined in the Slow Lounge at OR Tambo International that Saturday afternoon in April. Some were accompanied by their partners, but mostly, delegates to this year’s Hannover Messe Training Tour were just a group of experienced control and instrumentation professionals with a like-minded interest in the latest technology from a Swiss-based instrumentation company. Twelve days later things had changed. Twelve days later the Endress+Hauser experience had successfully forged that common technology interest into a bond between life-long friends.

Congratulations to the organising committee for the splendid agenda. Delegates were a mix of Endress+Hauser customers travelling alongside representatives from the regional company offices in Southern Africa. The formula is so popular because it gives end users a first-hand look into the workings of a true global leader in the field of instrumentation technology, while at the same time, giving them a chance to network with and get to know the people who will support them from its local offices. And it isn’t all work and no play. Generous helpings of after hour’s social activity set this event apart every bit as much as the quality of its technology component. Included this year were a crossbow shooting competition, an early morning visit to the castle of an eccentric Bavarian monarch, evenings of fine dining, and some late nights enjoyed by the younger (and in some cases not so younger) generation. Add the eisbein-filled celebration at the closing dinner in Hannover to the traditional ice-cold Jägermeister shots served on the bus, and maybe I’ve left you with an idea of the enjoyment factor which characterises this trip.

Alongside the fun, the educational aspect, the tour of the Endress+Hauser research and production facilities located in the 3-countries region of central Europe, is of the highest professional calibre. Endress+Hauser has accumulated an almost immeasurable amount of technical knowhow in the 65 years since founders, Georg Endress and Ludwig Hauser, first opened the doors on 1 February 1953. All I can hope to do is scratch the surface and describe a few of the things that stood out for me on this absorbing tour.

Maulburg, masters of modular production
For delegates, the training began in earnest at the production facility in Maulburg, home to the company’s level, pressure and inventory management solutions.

For level measurement applications, Endress+Hauser recently added an 80 GHz device to its already impressive range of radar-based level transmitters. This means it can now provide solutions that operate in the 1 GHz, 6 GHz, 26 GHz and 80 GHz bands. When one considers that each of these can be fitted with a variety of different antennas, the number of possible product combinations becomes mind boggling. The claim of a complete portfolio for level measurement applications is no exaggeration, but how does one deliver against this?

The problem is solved by modularity. Very few instruments are kept ex-stock at the factory with most delivered on a built-to-order basis against a customer-specific configuration. It seems obvious, until the penny drops and you stop to consider the staggering number of possible configurations that have to be accommodated. Modularity on its own works just fine if you only ever build once-offs. For continuous production though, modularity solves nothing unless it is supported by the appropriate checks and balances to ensure that at every step of the assembly process, the instrument is in fact being put together in the required configuration.

At this point, Endress+Hauser reveals a key success factor: complete control over the combination of modules during the build of an instrument. Although final assembly is still mostly done by hand, automated systems guide and support assembly line workers every step of the way. So, once an instrument has been assembled to order, the complete build history is then available for final quality inspection.

The result of a skilled workforce supported by well-designed manufacturing processes is an overall sense of order in the production area. This, and the attention to detail, made an impression on me at all the facilities we visited.

The world’s first self-calibrating temperature probe
Endress+Hauser Wetzer is the company’s competence centre for temperature measurement, temperature engineered solutions and system products. One of the latest innovations to its iTHERM product range – TrustSens – is a shining example of how investment in research and development can pay off when it is spent in the right areas.
The idea of a self-calibrating temperature probe is innovative. The fact that it can be done without taking the process offline is beneficial. The fact that it uses the process itself to perform the calibration is pure genius.

To achieve self-calibration, TrustSens uses a physical phenomenon known as the Curie point, where the magnetic properties of an integrated reference sensor abruptly change at a specific temperature. Since the Curie point remains constant, no matter what, the reference sensor always provides a stable comparison for the process element.

Here is how it uses the process to initiate a calibration. Since the Curie point (of the first, and at this stage, only model) is fixed at 118°C, a temperature reached during the steam sterilisation cycle at a food and beverage plant, every SIP operation initiates a new calibration. As an aside, the design impressed Hannover Messe to the extent that Endress+Hauser received a coveted Hermes award for this innovative new product (see page 8).

Every instrument has a Heartbeat

These days, no automation company can make a credible claim to global leadership if it has not addressed the issue of digitalisation. Endress+Hauser has this angle covered with its Heartbeat Technology.

Heartbeat Technology is not specific to any product type. Rather, it is a capability that can be built into any of the company’s measuring instruments to provide on-board diagnostics and instrument verification. The system continuously monitors the status of all components in the instrument and sends an alert whenever it detects a problem. All the relevant verification information, diagnostics alerts and instrument data can then be viewed at the control and monitoring system, or remotely accessed via a web browser.

Adding this Industrie 4.0 functionality eliminates the need for unnecessary calibrations (requiring the removal of instruments from the process), reduces the need for personnel to perform onsite instrument checks, alerts operators when an instrument requires service, and provides diagnostics information so that technicians know what type of problem they are dealing with before they go into the field.

Putting it all together

It simply isn't possible to document everything that impressed me about Endress+Hauser (and this tour) in an article of this length. I chose the three aspects described above to illustrate the level of innovation (TrustSens), the platform for digitalisation (Heartbeat Technology) and the level of manufacturing expertise (Maulburg) within the organisation.

These are all tangible achievements (you will find them documented all over the Internet), but they do not tell the full story. That, I believe, you can only get by walking around, asking questions, and seeing things first-hand for yourself. This is the real opportunity that the tour offers to delegates.

In my case, the single thing that impressed me most about the capability of the Endress+Hauser operation is how easy they make everything look. Making difficult things look easy is what separates the professionals from the also rans. Endress+Hauser makes producing one of the most extensive portfolios of high-quality process instrumentation look easy. This is a clear indication of well-designed production processes at work in an organisation that understands its business very, very well. And perhaps just as importantly, understands that even after 65 years’ experience, things are not yet perfect.

Of course my takeaway is not necessarily your takeaway. So, if you’re looking for an opportunity to learn how things work inside one of the world’s leading instrumentation companies, and you want to have some fun along the way, Endress+Hauser’s Hannover Messe Training Tour offers a fine opportunity to build new friendships through this automation technology experience of note.

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BECKHOFF

Who will benefit from this training? Automation Engineers

TwinCAT 3 Training: PLC Programming / TwinCAT 2 Training: PLC Programming –
TwinCAT 3 and TwinCAT 2 Training
Cape Town 10-12 Jul 2018
Johannesburg 10-12 Jul 2018
Port Elizabeth 17-19 Jul 2018
Durban 17-19 Jul 2018

For more information contact Andrew Reinhold,
Beckhoff Automation, +27 (0)11 795 2898,
training@beckhoff.co.za, www.beckhoff.co.za

FESTO

Who will benefit from this training? Mechatronic Engineers

ED811 – Servo and Stepper Motor Drives – Basic
Port Elizabeth 4-6 Jul 2018

HY132 – Hydraulics (3) Proportional
Johannesburg 25-27 Jul 2018

HY511 – Basic Hydraulics
Durban 25-27 Jul 2018

For more information contact
Tarren Smith, Festo,
+27 (0)78 803 5459,
tarren.smith@festo.com,
www.festo-didactic.com

SIEMENS

Who will benefit from this training? Automation Engineers

TIA-SERV1 – TIA Portal Service & Maintenance Part 1
Pinetown 11-15 Jun 2018

TIA-SERV2 – TIA Portal Service & Maintenance Part 2
Pinetown 18-22 Jun 2018

TIA-SYSUP – Upgrade from STEP7 to TIA Portal
Pinetown 25-29 Jun 2018

For more information contact
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vanessa.bonhomme@siemens.com,
www.sitrain-learning.siemens.com/za

Endress + Hauser

Who will benefit from this training? Instrument Technicians and Engineers

TC1001 – Process Measurement and Instrument Configuration 1
Sandton 23-27 Jul 2018

TC1002 – Process Measurement and Instrument Configuration 2
Sandton 30 Jul – 2 Aug 2018

TC1003 – Process Measurement and Instrument Configuration 1 and 2
Sandton 23 Jul – 8 Aug 2018

For more information contact
Nico Marneweck, Endress+Hauser,
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nico.marneweck@za.endress.com,
www.endress.za.com

Who will benefit from this training? Automation Engineers

MB-TRAIN-S – MODBUS Course
Johannesburg 23 Aug 2018

PTM – Certified PROFIBUS Installer with Troubleshooting and Maintenance
Johannesburg 29-30 Aug 2018

For more information contact
Kyle Roos, Industrial Data Xchange,
+27 (0)11 548 9960,
academy@idx.co.za,
www.idx.co.za

Who will benefit from this training? Instrument Technicians and Engineers

MB-TRAIN-S – MODBUS Course
Johannesburg 23 Aug 2018

PTM – Certified PROFIBUS Installer with Troubleshooting and Maintenance
Johannesburg 29-30 Aug 2018

For more information contact
Kyle Roos, Industrial Data Xchange,
+27 (0)11 548 9960,
academy@idx.co.za,
www.idx.co.za

Who will benefit from this training? Automation Engineers

Measurement Solution – Processing with level, Pressure and Nucleonic Devices
Poortview 17-19 Jul 2018

For more information contact
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+27 (0)73 172 1437,
claudia.olver@vega.com,
www.vega.com
Technology disruption and profiting from university R&D

It is almost a part of engineering folklore that the UK is slow to realise the potential of its inventions. The jet engine, computing and television are perhaps the best-known examples of British inventions whose financial benefits were mainly exploited by other nations. Lithium-ion technology is another that was developed in Britain, in fact in Oxford, but was commercialised mainly in the US and East Asia. However, this was not a failure of foresight but merely a misfortune of timing – the initial invention came many years before the development of mobile phones and camcorders which were the most fruitful early applications for lithium-ion batteries. The Faraday Institution was then set up as the UK’s independent centre for electrochemical energy storage science and technology, supporting research, training, and analysis. Its function is to bring together expertise from universities and industry, and they are attempting to make the UK the go-to place for the research, development, manufacture and production of new electrical storage technologies for both the automotive and the wider relevant sectors.

Accelerated technology development
Building on this general approach, the Royal Academy of Engineering has now established a scheme as part of the UK Government National Productivity Investment Fund, to accelerate the development and commercialisation of other emerging technologies within the UK. This will involve the establishment of 10 new University ‘Chairs in Emerging Technologies’ at UK universities: this scheme will identify research and innovation visionaries and provides them with long-term support to enable them to build a global centre of excellence focused on emerging technologies with high potential to deliver economic and social benefit. This type of public investment has been seen to be highly effective in stimulating co-investment from the private sector, enabling the UK to secure an early foothold in a potentially important future market and preventing UK companies from losing their competitive advantage as other countries get involved.

The CET scheme steering group reviewed the diversity of technologies and disciplines represented among the chairs selected and the breadth of societal challenges and economic opportunities that have motivated the world-leading engineers appointed, as follows:

• One chair focuses on technologies with strong medical applications. It has the objective to deliver a step change in personalised medicine by engineering cells that can combine precise disease diagnosis with therapeutic intervention in a closed loop circuit – to prevent the disease developing or provide a cure. This is sometimes called ‘theranostics’.
• Another focuses on reducing the burden of brain disorders. The goal of the chair is to accelerate the translation of therapeutic bioelectronic systems – for example a ‘brain pacemaker’ – from laboratory to industry.

Artificial intelligence, robotics and materials science
AI and robotics also had strong representation among the chairs selected. For example, one chair addresses the technologies underpinning soft robotics, which have the potential to impact upon many areas of our lives, from implantable medical devices that restore function after cancer or stroke, to wearable soft robotics that will keep us mobile in our old age – plus biodegradable robots that can combat pollution and monitor the environment. Other chairs address issues of safety and reliability associated with AI and robotic systems – a topic of great societal importance and current interest.

Two other chairs focus on driving improvements in materials that underpin important industrial and societal applications. One will develop novel interactive technologies using acoustic metamaterials; another is targeted at optimisation of next generation battery materials for improved cost, performance and durability.

Others of the chairs draw upon recent advances in the physical sciences to address novel areas. They include radical new space technologies that will underpin entirely new satellite applications; an integrated approach to two-dimensional classical and quantum photonics; and a platform for multiscale industrial design, from the level of molecules to machines.

The CET scheme steering group were deeply impressed by the quality of the applications for these chairs that they reviewed, which bodes well for the UK’s ability to continue to be at the leading edge of technology disruption. Nevertheless, it is notoriously difficult to forecast which technologies will turn out to have the most significant impacts over the long term. It would appear that the major problem will be to attract long-term technology investment from UK companies, who are notoriously short term in their views on financial payback and investment decisions.
As we reach the halfway mark this year, June is synonymous with holidays for many of us, but for a lot of students it is also a time to look for work. For the control fraternity, this includes a large number of students that require work that is relevant to their studies to help them obtain the practical experience needed to complete their degrees.

There are many initiatives in South Africa by companies who have committed to play a part through creating opportunities that help job creation. Within the SAIMC, we have a vested interest in ensuring that we assist in this initiative. For this reason, one of the strategic focus projects we have identified is for development and training.

Interactions with learning institutions are vital to ensure that the voice of industry is heard when decisions are made about curriculums. Universities have great initiatives that are aimed to prepare students for Industrie 4.0. The employees of the future need to be prepared for this ‘digital revolution’ and input is required to ensure they have the skillsets to enable them to be agile, resilient and focused on the lean principles.

The SAIMC is therefore proud to launch its first student chapter. The initiative was launched within the Durban branch under the leadership of chairman Hennie Prinsloo, with assistance from Professor Ralph Naidoo of MUT, and will include collaboration between UKZN, DUT and MUT.

The chair of the student chapter will have a seat on the branch committee to ensure that the students are adequately represented within our organisation. This initiative will assist students through guidance from within the automation and control engineering fraternity, and activities will also be implemented to promote awareness of career opportunities. We urge students and members in the Durban area to join this initiative and look forward to the establishment of other student chapters around the country.

Thank you for this initiative Durban branch!

Yours in automation,
Annemarie van Coller.
Zambia Branch

The Afritek presentation team pose for a photo after the event.

Secunda branch

On 5 April, Hannes Kruger and Hendrik Strauss from Moore Process Controls gave an informative presentation on turbine speed control applications.

A steam turbine is a device that extracts thermal energy from pressurised steam and uses it to do mechanical work on a rotating output shaft. There are two main types of turbines: impulse and reaction turbines.

Turbine control is important to prevent catastrophic failures. The inputs used for turbine are: speed; steam valve output; team valve feedback; upstream steam pressure and temperature; downstream steam pressure and temperature; steam flow; and turbine casing temperature.

Up to three speed measurements can be used for speed control and will most commonly be implemented as follows:

- When three inputs are available – use the mid-range one.
- When two inputs are available – use highest one.
- When one input is available – use that measurement.
- When 0 inputs are available – trip the turbine.

Hannes mentioned that it is important to start a turbine in auto to ensure that each start-up is similar. A Turbine has three start-up sequences: hot, warm and cold start-up. The sequence that will be used is dependent on the downtime of the turbine.

Hendrik wrapped up the presentation with a demo of turbine speed control.

The branch thanks Hannes Kruger and Hendrik Strauss for this informative presentation.

All instrumentation and control related mechanics, technicians and engineers are welcome to attend the monthly technology events. The planned dates for the rest of the year are as follows: 7 June, 5 July, 2 August, 6 September, 11 October and 1 November.

All presentations earn CPD points for ECSA registered persons. Enquiries can be directed to branch chairman Johan Maritz at johanmaritz260@gmail.com or 082 856 3865.
At the April technology evening, Dex Machida from KPMG presented on the subject: ‘Robotics in process automation’, which focused on digital labour and the rise of the machine. The market is expected to surpass $152 billion by 2020 with average ROI of between 600 to 800%. It is further envisaged that 45% of current activities performed by people in the workplace may be automated using existing technologies. It is not practical to summarize all the lessons from this very well attended event, so please feel free to request a copy of the presentation. The topic makes one think about our own future and how we need to align ourselves with trends such as Industrie 4.0, AI, etc.

Branded clothing
As part of brand building and creating awareness, and for fund raising purposes, the branch is looking at selling some branded clothing items including jackets as, in line with SAIMC Nat Com corporate identity (CI) rules. The jackets, priced in the range of R600 to R750, will be marked to identify branch and committee members. Please contact the committee for more information as samples are available for fitting purposes.

Other topics covered by Eric included:
• Achieving vector control with encoder or via sensorless
• Control loops for DC motors
• Supply-side problems
• Notching
• Harmonics
• Pulse width modulation
• Effect of inductors
• Maximum cable lengths with reactors
• Switching pulse overshoot
• Electromagnetic compatibility (EMC)
• Motor braking (dynamic and DC injection)
• Unexpected VSD trips

Understanding the cause of these problems can help mitigate the problems and move towards providing solutions. The SAIMC would like to thank Eric Carter for his informative and well received presentation.
SAIMC NEWS

The May technology evening was held as usual at the Durban Country Club where Dhiren Naidoo, product manager of the level and pressure division at Endess+Hauser, presented on the topic of Heartbeat technology.

Dhiren took us through the different diagnostic, verification and monitoring services offered by Heartbeat, as well as how it enables cost effective and safe operation of a plant during its entire lifecycle.

Heartbeat technology complies with the requirements for traceable verification according to DIN EN ISO 9001:2008–(Section 7.6 a) Control of monitoring and measuring equipment, and is audited and attested by TÜV. Furthermore, it offers reliable self-monitoring diagnostics, compliant and traceable testing verification and supports condition-based maintenance, as compared to old technology instrumentation, where verification tests are time consuming and can lead to possible production downtime.

The benefit of Heartbeat is that it allows inline verification without process interruption. Verification is automatically generated and supports the documentation requested by internal and external procedures and standards.

Dhiren's presentation was both interesting and informative and his accompanying table-top exhibition added value for members. The branch thanks Endess+Hauser for its kind sponsorship of the evening.

Durban branch

On 22 February, the branch hosted its monthly technology evening where Gary Friend from Extech Safety Systems presented on the subject ‘Intrinsic Safety Applications’. For a resurging branch, the committee members were delighted to see the turnout for the event. The venue was full, and members mingled while they enjoyed snacks and refreshments before the presentation started.

Gary covered a wide range of topics including an update on the SABS TC165 Industrial Process Measurement, Control and Automation standard; surge protection in IS (intrinsic safety) loops; running cables through IS trucking; cable lengths for IS loops; using IS isolators in SIL (safety integrity level) loops; and mobile devices for hazardous areas.

Surge protection is compulsory for instruments in Zone 0. The general rule of thumb is that surge protection should be fitted if field wiring is greater than 100 m, or the instrument is more than 10 m above ground. A surge protection device can be used to protect the field device, a second one can be used to land field wiring to isolate and protect the control system.

Gary showed the SANS60079-11:2012 standard table for cable parameters and the impact of Zone (0, 1 or 2) and Gas Group (IIA IIB IIC) on the allowed output capacitance. He then went on to explain using IS isolators in SIL loops. The SIL is a dimension of probability for the safety instrumented function (SIF) to bring the process to a safe mode as per demand, which can be structured to achieve the required low probability of failure.

Under applications for Ex mobile devices Gary included VOIP in underground coal mines, Bluetooth barcode scanners, 1D/2D, IS cameras as well as cell phones and tablets. These certified devices are extremely robust and incorporate high-quality protection.

The branch thanks Gary for this informative presentation, which was well received. Thanks also to all members and guests who created a great atmosphere and energy at the event. We hope to see you all again soon.

Cape Town branch

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The branch thanks Gary for this informative presentation, which was well received. Thanks also to all members and guests who created a great atmosphere and energy at the event. We hope to see you all again soon.

Golf Day

Date: Friday 6 July 2018
Venue: Kloof Country Club

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  – Nearest the pin - holes 2, 4, 6, 11, 18
  – Longest/Straightest Drives – holes 9, 17

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alwyn.rautenbach@iritron.co.za
www.iritron.co.za

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SAM – Systems Automation and Management
Systems Automation and Management is a supplier of data acquisition systems and innovative automation solutions and is one of the leading integrators of PLC, scada and fieldbus systems in South Africa. The company’s comprehensive range of capabilities includes industrial networks, automation and control, scada, custom solutions, information delivery, data warehousing, hardware and software, BMS, MIS and MES.

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- Your SI listing will be published in full in the System Integrator section of the annual SA Instrumentation & Control Buyers’ Guide with a link to your url

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Laura: +27 (0)11 543 5806 | laura@technews.co.za
UCL Company, a diverse agricultural operation based in Dalton, KwaZulu-Natal, has expertise in wattle bark extract exports, sugar cane production and pine lumber. The company identified a need to upgrade the controls on its boiler number 5 in order to replace the manual nature of the control. Furthermore, a need existed to optimise the process control of the boiler in order to reduce the use of coal and maximise the use of bagasse as a primary fuel source, thereby substantially reducing operating costs.

The existing system controlled the drum level, furnace pressure and master pressure of the boiler. The fuel feed motors and draught air fans were started manually from a control desk situated in the boiler control room. The existing system required a high level of operator interaction, but was not able to provide much information in terms of plant status.

The objectives of the project were to modernise, optimise the efficiency, and to create more transparency on the boiler. UCL approached Afrilek to provide a solution to benefit the production, maintenance and management teams. According to Afrilek’s Grant Douglas, the engineering manager at UCL – Ryno van Zyl – played a crucial role in demonstrating to management the needs and merits of the upgrade.

A race against time
The time factor was a major challenge for the team, with only three months being scheduled for all work, including design, procurement, installation and commissioning. Douglas explains that this process normally takes in excess of four months to complete. “Afrilek and the end user had to work closely together to complete the design in order to ensure that the equipment was delivered and installed before the deadline. We were able to overcome the challenges for two reasons: (1) our extensive experience on similar boiler upgrade projects and (2) by using standard Siemens Advanced Process Library (APL) templates.”

Project description
The end user already had Siemens PCS 7 installed onsite for the control of the pans, which included a redundant OS pair, engineering station and process historian. The boiler control system was integrated into the existing PCS 7 infrastructure after a new fibre optic network was installed throughout the plant to allow for future upgrades of other plant areas. The fibre network consisted of Siemens Scalance switches installed in a redundant ring structure.

To allow more availability of the operator stations, one of the OS servers was moved to a different location in the power house. This allowed for the operation of the plant even if there is a loss of communication to the pan floor or power house. A Siemens Scalance switches installed throughout the plant in a redundant ring structure.

Siemens Scalance X308-2M switches were used at the balance of the locations (front-end, diffuser, 11 kV substation, power house, boilers and extract factory). The X308-2M is DIN rail mounted and also allows for expansion of ports for future upgrades. The switches are installed in a redundant ring structure and are all connected to UPS power to allow for high levels of availability. With the network infrastructure in place, a new Siemens S7400 CPU was installed in the power house to control both the boilers and the TAs in the power house. In addition, two new OS scada clients were installed, one for the operation and monitoring of Boiler 5, and one for the power house.

A new Siemens ET200M remote I/O station at the boiler integrates all the I/O from new Endress and Hauser instrumentation to the boiler MCC via Profinet. The exiting switchgear cabinets had to be retrofitted to allow for local and remote start of the starters as well as the indication and control of the starters from the PLC.

Afrilek provides UCL with 24-hour support on an ongoing basis. A VPN connection into the control system is used to provide remote support if the team is not onsite. All project objectives were successfully met within the stipulated timeframe.

For more information contact Grant Douglas, Afrilek, +27 (0)11 372 9340, grant@afrilek.com, www.afrilek.com
SENSOR SELECTION CHECKLIST

- High Performance
- Reliable Detection
- Cost-Efficient & Affordable
- Robust Build
- Diverse Options
- Flexible Installation
- Customizable

Photoelectric Sensors

- BJ Compact All-Purpose
- BR Ø18 mm Cylindrical
- BTF Ultra-Compact Thin Type
- BTS Ultra-Compact Slim Type
- BL Liquid Level Detection
- BS5 Photomicro In 5 Shapes

Proximity Sensors

- PR Standard Inductive
- PRD Long-Distance Inductive
- PRDAT Sputter-Resistant Inductive
- PSN Rectangular Inductive
- PFI Flat Design Inductive
- CR Cylindrical Capacitive

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www.autonics.com
Mitsubishi Electric has a 14.9% shareholding in Adroit Technologies, a privately held South African based company that develops world-class SCADA, alarm management, and business intelligence software. With over 11 million frequency inverter drives already sold, Mitsubishi Electric has now introduced its latest generation of compact inverters, the FREQROL-CS80 series. In addition to better features and performance than its predecessors, the models are also more compact and easier to install.

The improvements include a 57% reduction in volume, high performance, ease of use, and easy maintenance. Together, these improvements make the FREQROL-CS80 an economical and versatile solution for a wide range of applications from wood processing to controlling fans and pumps.

**Compact body**
The compact size is achieved through a low heat generation design. Side by side installation of these inverters is possible as long as the surrounding air temperature does not exceed 40°C, allowing three FR-CS84-012-60 inverters to be installed in the same space normally required for two conventional models, which ultimately means space saving in the cabinet. A DIN rail installation attachment option is available for some models, but excluded for inverters FR-CS84-120 to 295.

**High performance**
Even with a 57% reduction in volume this inverter still offers high performance. Functions available include general-purpose magnetic flux vector control and auto tuning functions. These ensure that the inverters can be used in applications that require high starting torque, such as washing machines, agitators, and transfer machines, which include conveyors, hoists, and elevators.

There is also a brake unit connection which allows a brake to be connected using the available terminals. This is useful for applications that require regenerative braking torque during deceleration, such as transfer machines and food machines. When using the inverter with the brake unit, it is recommended the FR-CS84-050-60 or a higher capacity inverter is used.

Optimum excitation control continuously adjusts the excitation current to a level that provides the highest motor efficiency. For example, at 4% motor load torque for a general-purpose motor, the motor efficiency under optimum excitation control is about 30% higher than the motor efficiency under V/F control. Optimum excitation control is an option on this inverter where the excitation current is constantly adjusted to its optimum value to drive the motor most efficiently. With a small load torque, a substantial energy saving can be achieved.

**Ease of use**
These inverters have an easy to read operation panel with an optional LCD operation panel also available. This can be connected using the separate parameter unit connection cable.
via the operation panel connection connector. Another operation panel – the enclosure surface operation panel – enables inverter operation and monitoring of frequency setting from the enclosure surface.

The parameter unit FR-PU07 features helpful settings such as direct input with a 10-key pad, operating the status display and help function. Eight languages are supported and parameter settings for up to three units can be saved. A free trial version of the software configurator can be downloaded at the Mitsubishi Electric global website. This software contains start-up functions which allow for a shorter start time with easy setup. The software features the design and operability of all MelSoft Mitsubishi Electric products.

High-speed communication is supported using a controller and RS-485 connection. The inverter can also be controlled and monitored via a network. Using the Mitsubishi inverter protocol, Modbus RTU enables communication with a speed of 115 Kbps, which is faster than the 38.4 Kbs of conventional models.

**Easy maintenance**

There is a reduction in wiring check time since wiring can be checked simply by lifting the control terminal cover, which makes maintenance work easier. The control circuit terminals are spring clamp types to allow for easy wiring to the control circuit.

The main circuit terminals are screw types with easy wiring achieved by inserting the dedicated blade terminal of each cable. Without using the blade terminal, the loose wires can also be connected using a flathead screwdriver.

The spring clamp terminals provide high reliability since the internal terminal contacts are spring-type. Therefore, these wires can be protected against loosening or contact faults due to vibrations during operation on a bogie or during transport. They are also maintenance free since no additional screw tightening is required.

A specialised coating that conforms to IEC 60721-3-3 3C2/3S2 standards covers the circuit board to protect it in hazardous environments and for improved environmental resistance.

**Supported applications**

These inverters support a variety of functions that can be used in various applications.

**Spinning:** the motor decelerates to a stop without coasting when a power failure (or under voltage) occurs, allowing slack in the thread to be easily controlled. The traverse function, used for the traverse axis of the spinning machine, prevents uneven winding or collapsing.

**Conveyors:** conveyor belts can be controlled individually by using multiple inverters and automatic operation is achieved by collectively managing these multiple devices. The deceleration time can be reduced without using a brake resistor, allowing tact time to be reduced for a transfer line or equivalent. Since a smooth pattern is maintained from the present frequency to the target frequency, it is possible to reduce shock during acceleration or deceleration, thus preventing load shifts.

**Fans and pumps:** the flow rate and air volume are controlled by an inverter, which means it is possible to regulate these to pre-set levels. Optimum excitation control enables high motor efficiency, enabling energy savings in applications with variable load torque characteristics such as fans and pumps.

**Food machinery applications:** operation continues and the overcurrent alarm is not activated even if there is a sudden change in load, for instance during the cutting of food. General-purpose magnetic flux vector control means that, depending on the type of ingredients, the right amount of low-speed torque is possible to regulate a suitable speed for almost all types of food production. Since the motor decelerates to a stop without coasting when a power failure or under voltage occurs, dangerous situations are avoided during such situations.

*For more information contact Adroit Technologies, +27 (0)11 658 8100, info@adroit.co.za, www.adroittech.co.za*
The subject projects of this year’s Scada Review are a worthy reflection of the effort put in by the respondent end-users, SIs and vendors. It is encouraging to see that even in these times of economic stagnation and uncertainty there are world-class projects being engineered by South African companies across a range of industrial sectors.

Insight in the detail
We remind readers that the value of the reviews is not always about the capabilities of the scada product – it may be about how the project has been engineered or managed, an innovative system architecture or the adoption of certain standards. This year’s reviews contain details of all of these and more.

Our subject projects
Highlights of Adroit’s submission include an upgrade to an existing Adroit 8 system at a cold storage facility in the Western Cape with a complete revamp of the mimics and animation.

In 2016, the logging of the tags was changed to SQL database for more flexible reporting and report generation for management. All the control functions, which were controlled by 50 HMIIs, were added to Adroit, with the support of 55 PLCs.

Wonderware’s subject project involved the design of a central control room at a mining operation in the Northern Cape. High availability of the services provided was an essential component of the overall design, while existing legacy infrastructure and systems had to be considered in the migration process from a highly fragmented environment to a single consolidated platform.

Driven by a 10-metre video wall in a centrally controlled environment, this innovative project provides both mine management and the operational team with an integrated and situationally aware dashboard. This enables enhanced decision making, and the ability to recognise opportunities and address challenges proactively. It is supported by core services such as power, network and data centre infrastructure to ensure business availability, continuity and effective data recoverability.

Thank you
On behalf of our readers, we thank the end-users, SIs and vendors for their efforts in comprehensively completing our 2018 scada questionnaire, for sharing their expertise and experience, and continuing to expand the knowledge base of the C&I industry in South Africa.

Notes:
1. The order of appearance of reviews is the order in which they were received by SA Instrumentation and Control.
2. Some reviewer responses have been edited due to space and comprehension considerations.
3. A ‘no’ or ‘N/A’ response to a question in the project-specific responses does not necessarily mean that the scada system lacks that feature; only that the feature was not implemented in, or not applicable to, the subject project.
4. Where a respondent has not answered a question or has answered off topic that response has been omitted.
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Welcome to the future of automation.
Review: Adroit Technologies

End-user details
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SI details
Name: Willie Cameron
Designation: MD
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Product details
Product name and version: Adroit version 8.2
Vendor: Adroit Technologies
Phone: +27 (0)11 658 8100
E-mail: info@adroit.co.za
URL: www.adroit.co.za

Application details
Location: Grabouw, Western Cape
Industry: Food & beverage
Project start date: 2016-02
Project end date: 2017-11
Application: Cold Storage management-RA/CA condition monitor/control
Server OS: Windows 7 Ver 6.1.7601, Service Pack 1
Client OS: Windows 7 Ver 6.1.7601, Service Pack 1

END-USER RESPONSES

General
Q: Briefly describe the application including information on any pre-existing control system.
Adroit was installed in 1989 to monitor temperatures of the RA/CA rooms. To monitor the CO₂ and O₂ conditions, a sampling system was installed in 1990, the first controlling function added. Since 1992 additional functionality was added for controlling scrubbers, blowers and room setpoints. As the demand for cold storage grew, more tags were added. We started with 1500 and expanded to the existing 4252 of 5000 tags.

Two years ago it was decided to upgrade to Adroit 8 with a complete revamp of the mimics and animation. The refrigeration personnel is 100% dependent on Adroit for controlling the CA/RA stores, setpoints, sampling of gas conditions, reports and remote monitoring, so we needed to put in much more detail and animation, for visual monitoring.

In 2016, the logging of the tags was changed to SQL database for more flexible reporting and report generation for management. Version 8 was installed on a new machine and Raymond Bosch redid all the mimics in detail. All the control functions, which were controlled by 50 HMIs, were added to Adroit, with the support of 55 PLCs.

Q: What was the primary motivation for the project?
Using the more user-friendly version 8, we wanted to add more detail on mimics and rely on more control functionality.

Q: What were the main goals established for the project?
The goal was to give the existing refrigeration personnel more advanced technology to monitor and control the 134 cold rooms on the primary site, as well as 2 remote sites:
• To effectively control the recipes for optimum fruit quality.
• To optimise the loading/unloading of rooms.
• Energy efficiency – load shedding according to the recipe of the CA condition

Q: In the procurement decision-making process what were the primary considerations that influenced the product selection?
Local support and the ability to maintain the system internally.

Q: What licences have been purchased for this particular application?
Adroit 8.4.

Q: How is after-sales support handled on this application?
No agreement in place – support as and when required.

Q: Do you have a documented process in place to manage, test and install OS and system software patches?
No.

Integration, reporting and archiving
Q: Is the scada system integrated onto an intranet or the Internet?
No, it is a standalone system.

Q: Does the system include or interface with an expert system?
No.

Licensing, maintenance and support
Q: Have any operational or production benchmarking tools been configured as part of the scada system?
No.

Q: Is the system integrated with an MES/ERP or other management reporting or control system?
No.

Q: Has any GIS (Geographic Information Systems) functionality been configured in the application?
No.

Q: Has any asset management functionality been configured in the application?
No.

Q: Does the application include data archiving/historian capabilities with an historical data reporting system?
Yes, standard Adroit data logging and SQL.

Q: Have any operational or production benchmarking tools been configured as part of the scada system?
No.

Maintenance, reliability and asset optimisation
Q: What maintenance, reliability, asset optimisation or continuous improvement criteria were included in the user requirements specification for this project?
None.

Mobile device support
Q: Are you currently using tablets, mobile phones or other smart mobile devices to interact with the scada system? If so, for what purposes?
Yes – standby personnel plus technical support for refrigeration personnel.
Q: Do you allow users to interface with the SCADA system via their own personal smart devices? (BYOD)
Yes – certain privileged users for daily duties and standby use.

End-user conclusion
Q: What was the predominant feature (or features) that made you decide to purchase this SCADA product over all others for this application?
Local support and ease of use.

Q: What was the most significant change that you implemented in SCADA engineering practice/technology in this project?
To go paperless through the use of technology.

Q: What single operational feature most impresses you about the product now that it is in operation?
Electrical and mechanical debugging of the refrigeration system through forensic investigation.

Q: What impresses you most about the architecture?
Marshall agent uses 1 tag that can scan 16 bits.

SI RESPONSES

Project details
Q: Approximately how many man-hours did the SCADA configuration take?
1000 hours.

Q: What tools were used to minimise the man-hours taken?
Excel importing and exporting tags.

Q: What human factors were taken into consideration as principles or development standards in the HMI design process?
Two a Day HMI Standard for skilled/unskilled operators.

Q: For the graphics development process did you use standard library images, or did you have to draw images from scratch?
Mostly standard Adroit libraries.

Q: How would you describe the library of graphic images?
Comprehensive.

Q: Did you use any ‘special’ images?
No.

Q: What alarm management standards or best practices were adopted in configuring the SCADA system alarms?
Adroit standard alarm management.

Q: What structured processes were followed to determine expected performance under full load, and during abnormal failure conditions?
UPS backup and fibre backbone with PLC safety routines.

Q: What are the key physical communication layers and communication protocols employed in the system?
Power meters to SCADA: Modbus over Ethernet.
PLC to SCADA: Ethernet over fibre and copper.
PLC to VSD: CanOpen.

Q: What is the network speed and communications medium of the slowest link in this project’s SCADA network?
1000 Mbit/s over Ethernet.

Q: What is the network speed and communications medium of the
fastest link in this project's scada network?
1 Gbit/s over fibre.

Q: What levels of redundancy are incorporated in this scada application?
No redundancy as yet, scheduled for a 2018/2019 project.

Q: Was any specific custom code or scada scripting written for this project?
No.

Maintenance, reliability and asset optimisation
Q: What steps were taken to address maintenance, reliability, asset optimisation and/or continuous improvement aspects relating to this system?
Refrigeration personnel inputs and continuous modification as needed.

Security and data protection
Q: Does the design make provision for a DMZ and firewall segregation of process (scada) network and business networks (LAN, WAN, GAN, Internet, etc.)?
No.

Q: What intrusion detection has been incorporated on the plant network(s) on which this scada system exists?
None, it is an isolated network with standard Windows security.

Q: What configuration backup and data archive backup methodologies have been adopted?
Remote use of Acronis/qnap backup system.

SI conclusion
Q: What impresses you the most about the engineering/configuration aspects of the product now that it is in operation?
Ease of debugging and satisfaction of the end user.

Q: What impresses you most about the architecture?
Open standards and the ability to upgrade.

VENDOR RESPONSES
Product
(Table 1.)

Q: Vendor comments on product/modules?
Adroit 8.4.3 offers performance enhancements and Windows 10 compatibility.

Operating systems/VMware
(Table 2.)

<table>
<thead>
<tr>
<th>Table 1.</th>
<th></th>
<th>Subject project – used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product version/Module versions</td>
<td>8.4</td>
<td>8.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2.</th>
<th></th>
<th>Subject project – used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating systems – client side run-time?</td>
<td>Windows 7, Ver 6.1.7601 Service Pack 1</td>
<td>Windows</td>
</tr>
<tr>
<td>Operating systems – client side configuration?</td>
<td>Windows 7, Ver 6.1.7601 Service Pack 1</td>
<td>Windows</td>
</tr>
<tr>
<td>Operating systems – server side?</td>
<td>Windows 7, Ver 6.1.7601 Service Pack 1</td>
<td>Windows</td>
</tr>
<tr>
<td>Browser based?</td>
<td>Internet Explorer</td>
<td>None</td>
</tr>
<tr>
<td>Front end device communications protocols</td>
<td>Schneider PLCs, Modbus over Ethernet</td>
<td>Schneider PLCs</td>
</tr>
<tr>
<td>Does the scada system rely on Java plug-ins to exploit the full functionality of its core and additional modules?</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3.</th>
<th></th>
<th>Subject project – used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product uses Web Services?</td>
<td>Yes, some modules</td>
<td>No</td>
</tr>
<tr>
<td>Cloud computing supported?</td>
<td>Yes, PerformanceAnywhere</td>
<td>No</td>
</tr>
<tr>
<td>Virtualisation models supported?</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Multi-touch gestures supported by OS + scada hardware + scada software?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Licensing, maintenance and support model
Q: What sort of licensing agreement options are offered?
Licensing is scanned I/O based – all internal logs are free, including alarms and historical log tags with databases. Base licence comprises of core modules.

Q: Are licences sold outright or subject to periodic (e.g. annual) renewal?
Outright with technology support/maintenance agreement optional – the licence is a once-off purchase per major version release.

Q: What upgrade agreements are offered?
Group-wide support and sales arrangements are available along with maintenance agreements. Adroit minor version and patch upgrades are free.

Q: What after-sales offerings iro support and maintenance are available, and which technologies are used to deliver them?
SLA (service level agreement), group-wide technology agreements, site auditing and onsite support can be offered as an annual agreement. Telephonic and remote desktop support is offered free during office hours.

Q: Do you have a documented process in place to manage and test OS patches and to release scada system software patches?
Yes, internally driven. The testing department has a procedure to test Adroit products against latest Windows releases and upgrades. Adroit has an audit procedure document.

Technology incorporated
(Table 3.)

Q: What new technology has been introduced into the product in the last 12 months?
Performance Anywhere and the Adroit health monitor. In Adroit 10 we have added Object Module and Context View, OEE (overall equipment efficiency) Reports and Advanced Auditing Reports.

Integration and reporting
Q: What generic and/or product specific interfaces does the product have iro well-known MES packages?
Feature | Benefit
--- | ---
1. Performance Anywhere | Enhanced, secure web connectivity enabling access to streamlined, customisable user interface for web browsers and mobile platforms.
2. Object Module | Creation of predefined object templates to allow rapid deployment of similar object configurations (includes agents, logging, alarming, scanning, graphics etc.).
3. Context View | A new context view is available in the Designer and Operator to contextualise various data elements (Agents, Graphic Forms etc) into a user defined hierarchy. This can be used for configuration and maintenance as well as for navigation from within the Operator through the concept of associated graphic forms (graphic forms that are associated with category nodes in the tree view).
4. IoT device connectivity | IoT device connectivity (MQTT, SigFox etc.) and integration through the IoT agent allowing customisable payload extraction for use as normal values within the Agent Server.
5. Hosted solutions | Coupled with developments in the IoT environment as well as through existing telemetry type devices, entire offsite solutions can be hosted and maintained for access via web connectivity such as Performance Anywhere or through remote Operators.

Q: What native historical data reporting options are available? Our trends support export to Excel, PDF, JPG and CSV formats. Adroit has its standard flat file data logging that is used for trending and charts and can also log to multiple different databases Microsoft SQL, Oracle, etc. Adroit Scada interface can then also be used to create simple data queries to report data in the interface. Microsoft Reporting Services can then also be hosted in the user interface via the url tool. Adroit offers free report suite with Adroit audit reports.

Maintenance, reliability and asset optimisation
Q: What maintenance, reliability, asset optimisation and/or continuous improvement related modules or capabilities does the product incorporate?
SNMP capability – possible to monitor LAN performance and IT infrastructure. All software changes and processes are logged to Microsoft Windows Events with a unique ID for Adroit. Adroit can also log this data to SQL if need be. Adroit offers Report Suite which comes with free audit reports for the system.

PLC configuration and programming
Q: What capabilities does the scada offer in terms of generation and/or management of PLC configuration files or PLC application code?
Adroit supports object-based generation of function blocks and scada objects in Mitsubishi Electric range of PLCs. I/O and PLC generated by Adroit.

Security and data protection
Q: What authentication, authorisation and role management models are available for the runtime environment?
MS security and data and standard Windows security.

Unique selling proposition (USP)
Q: List the top five feature/benefit pairs that contribute to this product’s USP.
(Table 4.)
END-USER RESPONSES

General

Q: Briefly describe the application including information on any pre-existing control system.

Driven by a 10-metre video wall in a centrally controlled environment, this innovative project provides both mine management and the operational team with an integrated and situationally aware dashboard. This enables enhanced decision making, and the ability to recognise opportunities and address challenges proactively. It is supported by core services such as power, network and data centre infrastructure to ensure business availability, continuity and effective data recoverability.

The central control room was designed and equipped with a strong emphasis on corporate branding and ownership. High availability of the services provided was an essential component of the overall design. Existing legacy infrastructure and systems had to be considered in the migration process from a highly fragmented environment to a single consolidated platform.

The road to modernisation consisted of multiple enablers in the pursuit of excellence, which included the following world-class technology components:

- Enhanced networking provides a mesh of critical connectivity between the modern datacentres. The new network design is an essential enabling factor to completing the vision as it allows for the backbone to connect the multitude of services and to act in unity.
- The processing platform provides the performance required for the business processes and servers. The existing storage layer was moved from spinning disk to SSD technology, which brought about considerable performance enhancements and optimised space utilisation.
- The complete new environment was duplicated at the second datacentre, creating a mirror image. The extended cluster established a single, logical, Metro-Cluster Datacentre. This modernised single-cluster design allows for business availability scenarios that have never before been possible. The design allows for a complete datacentre site failure to be recovered at its counterpart, and be 100% operational and functional within minutes.
- The virtualisation technology in place was upgraded, and various next-generation software components were applied.
- The video wall solution is a first for South Africa and illustrates the efficient use of the latest in visualisation technologies.

Q: What was the primary motivation for the project?

Modern-day technology has to support modern-day business requirements.

Digital solutions must be able to react to and sustain the demands and pressure from business. This can only be achieved by utilizing modern-day strategies and empowerment of people, closely aligned with the required business outcomes.

Once this vision was aligned with the business outcomes, each respective process was broken down into its elements, and so the evolution of the central control room at the Black Rock Mine Operations began. Black Rock Mine Operations, operated by Assmang Limited, is in the Northern Cape Province of South Africa, approximately 80 kilometres north-west of the town of Kuruman. Assmang Limited is jointly owned by African Rainbow Minerals Limited and Assore Limited.

The continuous pursuit of excellence, as suggested, is an ongoing effort to modernise, automate, streamline and continuously improve on all aspects of the business. This application is regarded as the start of many new opportunities in the future of digital transformation at the Black Rock Mine Operations. It provides an indispensable tool to keep costs low, profits high, and decisions strategic.

Q: What were the main goals established for the project?

1. A migration process from a highly fragmented environment to a single consolidated control environment.
2. High availability and business continuity of the services provided in the control room was an essential component of the overall design.
3. To integrate various sources of information ranging from automation, MIS, electrical, fire detection, and power and asset management systems to provide a holistic view of the entire value chain of the mine operation to the operational staff. This, in turn, provides the necessary tools to enhance real-time decision making. It gives the right information to the right people at the right time with the least amount of effort.

Q: What project management principles and/or methodologies did you employ as end-user to mitigate risk, ensuring the project came out on time and within budget?


We planned to succeed by determining
the as-is state of the brownfields environment, defining the user requirements and business objectives, developing a process control strategy and supporting specifications. Intense scheduling and planning sessions were held with the relevant parties to minimise the impact on production activities and where possible utilised technology and infrastructure as interim solutions for the migration process. Planning comprised at least 2/3 of the project duration.

Licensing, maintenance and support

**Q:** Do you have a documented process in place to manage, test and install OS and scada system software patches?

Yes, ARM Strategy for Process Control Systems.
- The version upgrades are done in a virtual environment hosting a set of virtual servers.
- The virtual servers represent all servers as found on site in the runtime environment.
- Virtual machine software installation is dedicated for the following functions: Galaxy Repository Servers; Historian Servers; Information Servers; plus a number of Redundant Application Server pairs and a Remote Desktop Server.
- All Virtual Machine Environments are equipped with snapshot or roll back capability.
- The virtual environment must be completely isolated from the runtime environment.
- Refered to Implementing Wonderware System Platform in a Virtual Environment Implementation Guide (DS08), for guidelines on how to apply an upgraded system.
- Test the full functionality of the upgraded version.
- When tests are successfully completed, servers will be moved from the test environment to the runtime environment.

**Integration, reporting and archiving**

**Q:** Is the system integrated with an MES / ERP or other management reporting or control system (e.g. Baan, SAP, SYSPRO…)?

Yes, Minesuite using .NET interfaces.

**Q:** Has any asset management functionality been configured in the application (for software assets, control system assets or for plant assets)?

Yes, underground fleet monitoring using Datatrap interfaced with the system database and presented on the video wall as KPIs.

**Q:** Do you run the scada in conjunction with any third-party application software (Other than expert system, AC, AR, MES, GIS or asset management system)?

Yes, ecWin Power Monitoring System and the Sperosense CO Monitoring System.

**Q:** Does the application include data archiving/historian capabilities with an historical data reporting system?

The application uses WW Historian for both the automation and integration layers. The integration layer historises contextualised data while the automation layer historises all raw production related data. Both WW Historians are used in conjunction with the MIS for reporting requirements.

**Maintenance, reliability and asset optimisation**

**Q:** Have any operational or production benchmarking tools been configured as part of the scada system?

Yes, a 10-metre video wall in a centrally controlled environment. This provides both mine management and the operational team with an integrated and situational aware dashboard, enabling enhanced decision making, and the ability to recognise opportunities and address challenges proactively. The end goal of this was to integrate various sources of information ranging from automation, MIS, electrical, fire detection, and power and asset management systems to provide a holistic view of the entire value chain of the mine’s operations.

**Q:** What maintenance, reliability or asset optimisation criteria relating to this system and the plant were included in the user requirements specification for this project?

High availability design on both the datacentre
End-user conclusion

Q: What was the predominant feature (or features) that made you decide to purchase this scada product over all others for this application? The product provides the ability to ensure that the automation layer is aligned with the business objectives, is an extension of the current installed base, and supports future growth requirements.

Q: What was the most significant change that you implemented in scada engineering practice/technology in this project? The video wall displaying the complete value chain with integrated KPIs and situationally-aware principles to inform operations, engineering and mining personnel.

Q: What single operational feature most impresses you about the product now that it is in operation? Provides a platform to align the automation layer with business objectives, and by integrating with the various systems provides a base for One version of the Truth, which in turn empowers the operators to make informed and in-time decisions.

Q: What impresses you most about the architecture? Hardware architecture ensures business continuity via high availability and provides opportunities for upgrades and maintenance on the system infrastructure and associated systems without disruptions to production.

Software architecture provides, by means of the integration layers, a platform to align the automation layer with business objectives.

SI RESPONSES

Project details

Q: What tools were used to minimise the man hours taken? 1DES System Platform and Modicon Export Utilities, WSP Import/Export Utilities.

Q: What human factors were taken into consideration as principles or development standards in the HMI design process? Situational awareness principles were applied according to Wonderware best practices and First-up alarming.

Q: For the graphics development process did you use standard library images, or did you have to draw images from scratch? Both standard graphics library objects, as well as newly developed Intouch OMI objects, were used.

Q: How would you describe the library of graphic images? The standard library of objects is comprehensive and only user-specific objects had to be developed.

Q: What alarm management standards or best practices were adopted in configuring the scada system alarms? WW Alarming Best Practises were implemented. ARM Process Control Strategy.

Q: What structured processes were followed to determine expected performance under full load, and during abnormal failure conditions (such as network interruptions, node failures, power outages, controller failures, etc.)? During commissioning of the systems, numerous worst-case failure tests were performed i.e. data-centre crashes, network failures, power failures, MES failures, etc.

Q: What levels of redundancy are incorporated in this scada application? WSP AOS fail-over, Data-Centre High Availability fail-over between duplicate data-centres, network redundancy on all networks. Administration, Plant, Control and Device level. Redundant Power supplies (UPS and Powers switches).

Maintenance, reliability and asset optimisation

Q: In engineering this project, what steps were taken to address maintenance, reliability, asset optimisation and/or continuous improvement aspects relating to this system and the plant monitored/controlled by this system? All control systems were implemented according to the BRMO SCADA/PLC specification and the approved project FDS. The ARM Process Control Strategy was used as guideline. Legacy standalone control systems were migrated into WSP and into the new virtual environment. All control systems were FAT tested extensively against 3rd party simulations before being commissioned on site. Environmental monitoring, HVAC monitoring, Fire monitoring, CO monitoring. Power monitoring and Network monitoring was implemented to alarm any failures in the central control room. The end-client technical staff were actively involved in all stages of the project for effective knowledge transfer, to ensure efficient future maintenance and enhancements.

Security and data protection

Q: In what ways is this project’s hardware architecture optimised for patch and antivirus management? 1. Due to the fact that the control system is running in a virtual environment all patching can be implemented and tested on a cloned test environment before being deployed on the live system. 2. Anti-virus management is fully integrated into the client’s anti-virus system.

Q: What configuration backup and data archive backup methodologies have been adopted? A comprehensive off-site VEAAM backup and disaster recovery solution was implemented.

SI conclusion

Q: How would you rate the ease of use of the historical reporting system? Very easy to use.

Q: What impresses you the most about the engineering/configuration aspects of the product now that it is in operation? The maintainability and stability of the systems.

Q: What impresses you most about the architecture? The architecture is very scalable on all levels.

VENDOR RESPONSES

Product

Q: Vendor comments on product/modules? Wonderware System Platform and Operations Management Interface (OMI) provide the tools to establish a common information and control infrastructure across many geographically dispersed assets and systems. This enables users to have a view of their entire value chain to make sure that they can run and react efficiently to changing conditions.

System Platform is a complete automation solution that can deliver 40% efficiency gains in the face of changing business and market demands by eliminating the need for scripting or customisation, and leveraging reusable visualisations.

System Platform 2017 is the only responsive, scalable platform for supervisory, scada, MES and IIoT applications, which integrates the process with the Enterprise. System Platform provides a collaborative, standards-based foundation that unifies people, processes and assets for continuous operational improvement and real-time decision support.

Licensing, maintenance and support model

Q: What sort of licensing agreement options are offered? Users can choose which modules to buy and how
many of each to implement, and in addition the number of users that need access to the system. Perpetual and/or subscription based licensing offered per module. This allows customers to decide if Capex and/or Opex is used to fund the system.

Q: Are licences sold outright or subject to periodic (e.g. annual) renewal?
Perpetual and/or subscription based licensing offered per module. This allows customers to decide if Capex and/or Opex is used to fund the system e.g. licence is a once-off purchase, or, licence is a once-off purchase for a particular version, or, licence requires annual renewal.

Technology incorporated (Table 1).
Q: What changes have been introduced into the product in the last 12 months?
1. InTouch OMI NextGen Visualisation Client.
2. Responsive HMI Framework (layouts/panes) means build once.
3. Object Wizards enable visual standards deployment.
5. Multi-Touch & Gestures – the magic touch.
6. Powering the ‘app’ revolution and digital transformation.
7. Auto-build your project and auto-generate standards.
8. Model-based smart navigation.

Integration and reporting
Q: What generic and/or product specific interfaces does the product have in response to periodic renewal?
The Wonderware suite has proven integration to all ERP and MES systems as it supports all the open integration protocols and system specific protocols unique to MES and ERP vendors. In addition, Wonderware provides toolkits that allows users to create custom interfaces if required.

Q: What native historical data reporting options are available?
Wonderware Historian comes with its own built-in reporting and dashboard tool – InSight. This can further be extended to a cloud-based solution that can provide information wherever users are. Open SQL interfaces and OData, web services are also supported that allows any third-party reporting tool to be used with the Wonderware Historian. This includes, MS Reporting Services, PowerBi, Tableau, etc. In addition, Insight provides some unique capabilities:
- Smart watches including Apple Watch, Android Wear compatible devices.
- Mobile phones such as iPhone, Android.
- Tablets and phablets (aka super-sized phones like the Samsung Galaxy Note).
- Desktop PCs and laptops via any modern HTML5 browser including Chrome, Safari, Edge, and IE11.
- Large screen displays like a projector screen or HDMI TV (driven by a smart browser, projected mobile devices (e.g., iOS AirPlay or mirroring software), and including Microsoft Xbox One).

Maintenance, reliability and asset optimisation
Q: What maintenance, reliability, asset optimisation and/or continuous improvement related modules or capabilities does the product incorporate relating to the IT and/or control system of which this product forms a part and/or the plant monitored/controlled by such system?
The system provides a complete APM (asset performance management) suite, including: 1. Preventive maintenance.
2. Condition-based maintenance.
3. Predictive maintenance.
4. Risk-based maintenance.
5. Prescriptive maintenance.
7. Monitoring and diagnostic services.
8. APM assessment.

Table 1.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable operational excellence across your organisation</td>
<td>Organisations from many different industries choose Wonderware HMI and supervisory control solutions because they satisfy the concerns of plant management, engineering, production and IT staff alike. The Scada/HMI software enables operational excellence across all industries, empowering customers with better insight into the economics of their operations, the basis for real-time performance management.</td>
</tr>
<tr>
<td>Connect to virtually any automation system or device</td>
<td>Wonderware is hardware agnostic i.e. it is not tied to specific hardware. It works with all DCS, PLCs and RTUs from Modicon, Allen-Bradley, Emerson, Foxboro, GE, Siemens and others. As the IIoT blossoms, the organisation remains committed to facilitating interaction with anything a customer might need.</td>
</tr>
<tr>
<td>Create immersive user experiences for every device, once</td>
<td>Create screen resolution independent applications. Your application will look just as nice on 600x800 as it does on high definition without having to rebuild it. Re-usability of uniform HMI content enables a configure-once-deploy-anywhere approach for the lowest development and maintenance costs.</td>
</tr>
<tr>
<td>Have graphics ready in minutes</td>
<td>HMI development should be focused on designing a user-friendly product, not advanced coding. The HMI designer should not have to worry about the target platform, deployment or system architecture. With System Platform 2017, users can think about where and how they want to interact with operators, not what has to happen behind the scenes to make the HMI work.</td>
</tr>
<tr>
<td>One of the most prevalent IIoT platforms available</td>
<td>System Platform 2017 is even more open. Third-party software partners can leverage the application development environment to build native contextualised apps. These enable the convergence of the IT and OT domains while maintaining operational integrity of the control system, and without impacting underlying HMI application design. A holistic framework provides a unified architecture designed to improve the asset performance while cutting down energy consumption and waste.</td>
</tr>
</tbody>
</table>

Table 2.

<table>
<thead>
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</tr>
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<tr>
<td>Product uses Web Services?</td>
<td>Some modules.</td>
</tr>
<tr>
<td>Cloud computing supported?</td>
<td>Yes, used in system management modules</td>
</tr>
<tr>
<td>Virtualisation models supported?</td>
<td>Hyper-V 5 and newer (version is based on the operating system utilised)</td>
</tr>
<tr>
<td></td>
<td>Both Gen 1 and Gen 2 VMs are supported</td>
</tr>
<tr>
<td></td>
<td>Windows 10 and Windows Server 2016 support</td>
</tr>
<tr>
<td></td>
<td>Versions 7 and 8</td>
</tr>
<tr>
<td></td>
<td>VMWare VSphere 6.0, including HA/OR</td>
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<td></td>
<td>VMWare Clients, including Horizon – Application Virtualisation</td>
</tr>
<tr>
<td></td>
<td>Cloud Virtualisation – Azure</td>
</tr>
<tr>
<td></td>
<td>VMWare Workstation, Version 11 and higher</td>
</tr>
<tr>
<td>Multi-touch gestures supported by OS + scada hardware + scada software?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>No</td>
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</table>

www.instrumentation.co.za  June 2018  41
Yokogawa’s open scada solution

Scada systems are typically used for supervisory monitoring and control of remote and geographically distributed assets through a more open platform for interfacing with several makes and types of equipment in a user-friendly and flexible GUI environment.

Common applications of scada systems include oil and gas offshore production as well as onshore refineries, pipelines, power, water and wastewater, mining and other industries. Yokogawa’s scada system, FAST/TOOLS, has been designed to enable the most effective transfer of data and knowledge. That is why so many global industrial companies and utilities rely on it to deliver high levels of data integration and guaranteed data integrity in a complete scada GUI software environment with the following features:

Truly open software architecture
Through its core software, FAST/TOOLS supports multiple operating systems including Linux, Unix and Windows, and interfaces with third-party applications, through numerous industry standards.

The system’s broad compatibility enables seamless integration with packages that are used for accounting, asset management, Big Data analytics, modelling, optimisation and simulation.

Future-proof lifecycle management
Yokogawa’s comprehensive lifecycle management approach eliminates the uncertainties and risks in system migration. Regardless of the application or operating system (OS), all FAST/TOOLS users are always on the update path and development roadmap.

Since the platform maintains very limited ties to the OS and is not built on any third-party software, it allows updates, such as new Microsoft Windows OS versions, to be rolled out with minimum effort. Deployment is greatly simplified and version updates incur zero down-time for users.

High performance and high capacity
Concerns over live update rates and throughput are things of the past. Even on relatively low-bandwidth satellite networks, the system can process 400 000 updates per second.

The compact and efficient architecture means that there is never a requirement for separate servers to handle alarming, real-time data, historian or any other scada and plant operation functions.

Optimised operator visualisation and advanced decision support
FAST/TOOLS puts today’s best operator practices into service. Yokogawa’s active participation in standards development incorporates the industry’s latest concepts in advanced decision support, alarm management (ISA 18.2), operator visualisation (ISA101), control room design (ISO 11064) and procedure automation (ISA106).

Enterprise automation solution (EAS)
When individual servers are interconnected, information from any server can be visualised anywhere in the system. This is not only limited to tag values, but also alarm information and historical data.

For example, a web HMI server allows users to visualise and interact with information from any other server in the enterprise. The alarm overview shows alarms combined across all the servers. Trends can combine historical data from different servers and process values from different servers are shown in the same display. This functionality does not require tags to be replicated to a central server; instead, they are truly distributed.

Success story – centralised monitoring and control of India’s gas pipelines
GAIL is India’s flagship natural gas company, integrating all parts of the natural gas value chain including exploration, production, processing, transmission, distribution, marketing and services.

The company presently has seven natural gas pipeline networks across the country, with a total length of over 10 700 km. Until recently, each pipeline network was controlled by its own independent scada system.

Considering the difficulty of managing many different systems, GAIL decided to implement a single centralised solution for all of its natural gas and LPG pipeline networks, and to integrate this system with all pipelines that are either currently under construction or on the drawing board. Yokogawa was entrusted with the conceptualisation and implementation of this state-of-the-art, centralised solution, relying on the FAST/TOOLS scada software package and a system architecture that was best suited to GAIL’s pipeline networks and its expansion requirements.

Today all pipeline networks can be monitored and controlled centrally from the National Gas Management Centre (NGMC) in Noida using the reliable data communication package. The system at the main master station (MMS) has also been integrated with a gas management system (GMS) so that all operation data can be directly utilised for gas allocation and billing. Email and SMS notification of critical alarms is supported and authorised persons have access to the scada system anywhere an Internet connection is available.

Conclusion
Yokogawa’s scada solution is scalable, flexible, high performing and platform independent. It can be implemented from local to global, field to enterprise and from control to business levels with a single platform for control, data acquisition and distribution, applications and HMI.

For more information contact Christie Cronje, Yokogawa South Africa, +27 (0)11 831 6300, christie.cronje@za.yokogawa.com, www.yokogawa.com/za
SIMATIC WinCC Professional

Efficiency and transparency for your plant – thanks to the SCADA system in the TIA Portal

Prepare yourself for the challenges of digitalization with the SCADA system SIMATIC WinCC Runtime Professional. The scalable system is perfectly integrated in the TIA Portal and increases your productivity through transparent operation: Benefit from flexible data access and targeted analyses, integrated diagnostics for higher plant availability, and energy transparency as a basis for energy savings in accordance with ISO 50001.

siemens.com/wincc-professional
Schneider gets smart with new HMI solution

In a world where quick access to data has become the key to efficiency, Schneider Electric South Africa’s latest innovation in the Magelis range of HMI solutions, Magelis GTU, allows users to create the perfect HMI for their application by simply snapping together the panel box and display of their choice.

As easy and comfortable to use as a smartphone or tablet, and ideal for applications in the food and beverage, mining, mineral and wastewater industries, Magelis GTU has been optimised for the latest HMI configuration software from Schneider Electric, Vijeo XD, and features intuitive navigation and numerous connectivity options, including remote access.

The first smartphone-like HMI with a resistive multi-touch screen, Magelis GTU is easy to integrate with system architecture thanks to an unmatched variety of embedded interfaces: dual Ethernet Gigabit port for network connectivity, dual serial and one optional fieldbus interface for easy communication with industrial devices. It also features up to four USB ports for connecting peripherals while minimising wiring, making it a cost-effective solution.

**Easy navigation and operation**
Magelis GTU offers unmatched ease and comfort of use for both the application developer and operator, and thanks to industrial multitouch, users can zoom in and out, swipe, and scroll through intuitive menus while wearing protective gloves, or through a protective screen cover. The high resolution, 16 million colour screen delivers a crystal clear view of the same key functions and tools as a PC, including Office viewer, Adobe viewer, Internet Explorer and a multimedia player.

Adding to the convenience of the system, Magelis GTU applications can also be accessed through a second display via the DVI interface and managed remotely through the Vijeo DesignAir app for mobile devices. This app also allows for remote machine commissioning, as well as real-time monitoring and diagnostics.

**Simplified maintenance**
The modular design of Magelis GTU enables full optimisation of parts inventory, and maintenance is reduced to a minimum thanks to the robust aluminium housing and wide ranging power supply of 12-24 V DC and temperature range of 0 - 60°C.

Making data easily accessible at all times, the display size and type can be changed or replaced without any special tools, while still protecting all system and user data with removable memory units. The application is automatically resized to fit the new display, and through a front USB port with IP66/67 protection, HMI data can be accessed and copied conveniently at any moment without opening the cabinet door.

Today, the fastest, easiest way to tap into real-time information is via mobile, wireless service devices. Schneider Electric South Africa is dedicated to providing the latest in technological advancements, and the highly customisable Magelis GTU promises a wealth of features for robust performance, open connectivity and secure data flow.

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As South Africa’s leader in terms of the largest deployment of proximity detection systems (PDS) in the mining sector, Booyco Electronics has celebrated another massive landmark, its 5000th PDS installation. According to managing director, Anton Lourens, getting to this point has taken years of commitment to customers and a dedication to developing leading edge products that are reliable and fit-for-purpose.

“Our stature in this market is well demonstrated by having the most deployments of any original equipment manufacturer (OEM) or supplier, and we are proud to have delivered and installed this latest unit at a coal mine in the Witbank area,” says Lourens. “Since the company was established in 2006, our focus has been on developing top quality products backed up by skilled technicians who are close to customers for rapid response times.”

Booyco Electronics now boasts a wide service infrastructure, located strategically to cover South Africa’s platinum belt, coalfields and gold mining areas as well as the mining sites in the Northern Cape and in the Richards Bay area. “This allows us to have well over 100 well trained, experienced and resourced technicians to be constantly on the move responding to customer requirements,” he says. “This fully equipped support infrastructure of seven branches, carrying extensive stocks of parts and components, is vital to service our products and customers wherever they are and now represents a distinct advantage over our competitors who have only recently entered this market.”

He highlighted the importance of Booyco Electronics’ proximity to its customer base, which allows regular and detailed interaction to ensure that the performance of its PDS offerings always meets the customers’ expectations and operational demands. “We value the in-depth engagement with customers as a key input in our product development and evolution,” he says. “Working closely with customers, we are able to ensure our PDS meets all the requirements across a broad spectrum of commodities and different types of mining operations.”

The Booyco Electronics PDS delivers specific alerts when detecting pedestrians or other vehicles – starting with a warning, then for a controlled slow-down, and finally for stopping when a certain zone around a vehicle is breeched. This makes the offering unique, as it is able to achieve zone shaping and create narrow band zones in close proximity on the side of the vehicles to meet specific operational requirements.

Full self-diagnostics is another integral element of the system, as well as visual and voice display activated in the case of a warning or a system failure. “Our PDS was developed using the latest electronic technology for effective and reliable communication, and can be used in both underground and surface mines transferring information between users via our human machine interface,” says Lourens.

The use of very low frequency (VLF) technology is another indicator of Booyco Electronics’ depth of innovative capacity and expertise; the PDS incorporates VLF technology for pedestrian detection, either on surface or underground. The system incorporates various downloading options for recorded data, including wireless when at an access point. It is supplied complete with testing equipment for both the surface and underground areas to ensure maximum functionality. The system is also IS compliant, meeting the safety requirements of fiery mines.

“To identify the optimal solution for the customer’s needs, a detailed risk assessment is first conducted on site as the deployment of PDS technology could vary between different types of vehicles on a single site. Only then can the PDS be deployed, ensuring that it is suited to the required safety integration with trackless mining machinery and other OEM underground and surface vehicles,” Lourens concludes.

For more information contact
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Infrared temperature sensing in steel processing applications

In the iron and steel industry, and in many foundry applications, temperature measurements show whether processes are operating within their proper ranges, whether a re-heater is too cold or too hot, whether a stand needs adjusting, or how much cooling should be applied. Each stage must be accurately monitored, so the steel retains the correct metallurgical properties as it travels through the process.

Every section of the steel manufacturing process can benefit from infrared thermometers and the customised applications developed by Fluke Process Instruments (formally Raytek and Ircon). These benefits include: higher quality products; increased productivity; reduced energy costs; enhanced worker safety; reduced downtime and easy data recording.

**Increased functionality and greater control**

Infrared sensors take temperature measurement one step further. Fast and accurate analog and digital output allows temperature data to be integrated into control systems and simultaneously output for remote temperature monitoring and analysis. Smart sensors, with digital electronics and 2-way communications, can be configured remotely from the safety of the control room, especially important for metals with changing emissivity. The result: increased functionality and greater control.

A wide range of optics covers an enormous variety of applications supported by integrated through-the-lens sighting, plus either laser or video sighting for correct target location. Infrared thermometers are used in many iron and steel applications including:

- **Continuous casting**: accurate real-time temperature monitoring coupled with the ability to adjust water nozzles and water flow rates allow for proper cooling, which helps maintain metallurgical properties. Fixed sensors, fibre optic sensors and line scanners are standard in this application.
- **Reheating**: reheating steel to a uniform temperature is critical so that deformation does not occur. Uneven heating strains milling equipment and increases maintenance downtime. Measuring inside a re-heater with a series of temperature measurement devices gives an operator the ability to check the overall temperature and burner efficiency, while being able to correct the process results in a more efficient use of fuel. Once the slab or billet exits the reheat furnace, ratio thermometers or line scanners (for wide slabs) transmit temperature data immediately to an operator or controller allowing mill operations to be adjusted to their correct settings.
- **Rolling mills**: the diversity in the types of hot rolling mills and the number of types of stands in a process vary according to the type of product being manufactured. Scale breakers, rolling stands, down coilers and coil boxes are a few areas for the utilisation of IR temperature measurement and scanning.
- **Cold mills**: cooling is also often done at the end of the finishing stands after cooling, and the coiled steel is transported to cold mills in another area in the plant or shipped to other facilities. Cold rolling makes a product thinner and smoother and is done while the steel is around 100°C, or at room temperature. Sensors mounted between each finishing stand allow the operator to detect temperature changes that require any adjustments.

**Rod and wire mills**

In a typical rod and/or wire mill, billets are reheated and sent to a rolling mill to be reshaped as rods. From here the rods go through a series of intermediate stands that reduce the rods to different sizes. Finishing stands reduce and smooth the rods into a product that can be further processed into hundreds of different products. Reheating a billet to a uniform temperature is critical to the entire process as uneven heating strains milling equipment and increases maintenance downtime.

Knowing the temperature of the product at each stand allows the operator to adjust the rollers accordingly. When the product heads for the cooling area, cooling is rapid but carefully monitored to make sure the metallurgical properties are correct. If cooling is improperly controlled, the product would not meet specifications and could be downgraded or scrapped.

In some processes, the high speeds and vibrations of narrow rod or wire products make temperature measurement difficult. High-performance infrared ratio thermometers solve this problem. Even when the target drifts in and out of the field of view, or is partially obscured, the Marathon sensor will still take accurate temperature measurements.

**Other processes**

Infrared provides temperature measurement solutions exist for every step in the steel treatment and manufacturing process, from coke ovens and blast furnaces to annealing mills and coating mills. In fact, wherever temperature is to be measured, from the raw material to the finished goods, there is probably an infrared, non-contact solution.

The fixed units and portables form Raytek and Ircon are well known industry standards. The scanners from both companies can come as complete applications packages with tried and tested software to fit perfectly into many industrial applications. Continual innovation and new products like the Endurance series, designed in conjunction with Raytek and Ircon, will ensure that solutions can be found for every application.

For more information contact

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Advanced pH sensor technology from Foxboro

Foxboro has been manufacturing pH probes and transmitters for over seventy years. Using this field-proven experience, the company has now developed the Dolphin series of pH sensors.

Due to the advances in manufacturing techniques and the discovery of new materials, today’s pH sensor technology looks and operates differently. In pH probes of the past, the reference junction had to be kept wet at all times. In the latest Foxboro pH sensor technology incorporated in the Dolphin series, the entirely solid-state reference junction is manufactured from Nafion and Ceramic, which eliminates the need for wetted parts.

The probes body is manufactured from PVDF (polyvinylidene fluoride, commercially known as Kynar), which incorporates the microprocessor-based smart electronics where all the sensor data and calibration curves are recorded and stored. The probe also has features built-in, temperature compensation and the digital signals from sensor to transmitter are less prone to RFI/EMI interference than conventional analog signals.

An added benefit of the Dolphin series is that users can connect the probes directly to a PC or laptop for ease of use. Via FDT and DTM certified software, the probes can be calibrated in the workshop prior to installation. In addition, information can also be extracted from the probe for maintenance and diagnostic purposes.

In summary, the advantages of the Dolphin series pH probes include:

1. Unique Nafion ion barrier prevents reference junction fouling and reduces the need for cleaning.
2. Rugged PVDF sensor body is chemical and abrasion resistant, resulting in longer service life.
3. No metallic wetted parts, results in corrosion resistance and longer life in strong chemical solutions.
4. Unique pH electrode formulations, both flat glass for abrasion resistance and domed glass for high-temperature service.
5. Enhanced diagnostics reduce the amount of time required to assess sensor health.
6. Unique sensor mounting design provides faster insertion and removal from the process.
7. Kyner sensor body and a rugged electrode result in reduced breakage during handling.

For more information contact
Johan van Jaarsveldt, EOH, +27 (0)87 803 9783, johan.vanjaarsveldt@eoh-pas.co.za, www.eoh-pas.co.za

Flowmeter for oil and gas

WIKA’s new ProPak flowmeter is a combination of proven and innovative technologies for flow profile formation. It sets new standards in terms of performance and surpasses other technologies by a long way, even in demanding and critical applications.

Maximised performance
It has almost no negative effects on the flow profile. The pressure loss has been reduced to a minimum, therefore achieving the highest energy efficiency of all flowmeters. Even Venturi tubes exhibit poorer values.

No need for straight upstream and downstream pipes
No straight upstream and downstream pipes are required independent of the flow profile. Even installation following two 90° elbows does not present any problem. This makes the ProPak flowmeter ideal for applications with limited mounting space.

For more information contact
WIKA Instruments, +27 (0)11 621 0000, sales.za@wika.com, www.wika.co.za
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Kobold Instrumentation has introduced its model KSV flowmeters and switches for very low flows with and without control valves, allowing even the lowest possible liquid or gas flow rates to be measured.

Specifically for liquids or air, the KSV operates on the suspended float principle. The direction of flow is from bottom to top, and the installation position is vertical. The indication point is the upper edge of the ball. The device has been designed as a simple, and economical measuring system. The optional needle valve allows control and the device has been designed for panel mounting.

Kobold’s KSV flowmeters are acid and caustic proof as they are made of polycarbonate and brass or polysulfone and stainless steel materials. They are highly suited for advanced applications in medical technology because the units are easily sterilised and operate at temperatures up to 120°C. They can also be used for a wide range of applications in the analytical instrumentation field, within production and environmental monitoring, as well as in laboratory measurement and monitoring technology.

They are shock resistant, lightweight and easy to install in a variety of available measuring ranges with an accuracy of 6% full scale.

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Autonics has released the new PRF series full-metal inductive proximity sensors with stainless steel housing and sensor heads. The robust sensors are highly resistant to deformation and corrosion and can be applied in diverse environments including food and beverage manufacturing, and the chemical and metalworking industries.

The sensors feature high resistance to impact and wear caused by contact with workpieces or wire brushes, and also provide reduced risk of malfunction caused by aluminium chips. With a specialised sensor IC, the PRF series also offers excellent noise immunity and come standard with a built-in surge protection circuit and overcurrent protection. With the 360⁰ ring type status indicators, users can easily identify operation status from various angles. The robust oil-resistant cable allows the sensors to be installed in environments with hydraulic fluids or cutting fluids, and the IP67 rated structure allows stable and error-free operation even in wet or dusty environments. The series is available in 12, 18 and 30 mm diameter sizes, and are offered in cable and cable connector types. Long sensing distance type models are also available.

The PRFA and PRFDA series are spatter-resistant models, with PTFE coating to reduce the risk of malfunction caused by welding spatter. The non-stick PTFE coating prevents welding spatter from sticking on to the sensors which minimises the risk of malfunctions during welding applications. These sensors offer high flexibility in various metalworking applications.

The full-metal type sensors offer high usage in various applications. The stainless steel body minimises the chance of bacteria spreading, and the unibody design prevents cleaning agents and germicides from entering the sensor body, making it perfect for food and beverage applications. The sensors are also ideal for chemical applications with high resistance to deformation and corrosion.

For more information contact Dean Choi, Autonics Corporation, +82 51 519 3232, sales@autonics.com, www.autonics.com
New radiometric density system

DuoSeries LB 475 is the new radiometric density system from Berthold, especially designed for the cementing and hydraulic fracturing industry.

The system stands out through excellent all-round performance with high accuracy and repeatability. Depending on customer needs, the transmitter output can be configured for units of specific gravity (SGU), ‘pounds per gallon’ (PPG), or a calculated ‘pounds proppant added’ (PPA). The DuoSeries easily connects to the FracSENS LB 6770 detector and links directly to the customer's control system. No calibration or complex mathematics is required in the data system. The density gauge is used to translate the measured count rate into the specified output values either in low or in high pressure applications.

The density transmitter is state-of-the-art with a robust 3.5” TFT touch panel, powerful Dual Core CPU, and a diverse range of interfaces. Operators benefit from the new simplified HMI where calibration is kept as simple as possible. Only two points – a low- and a high density, e.g. air and water – have to be acquired by the customer. Advanced self-diagnostics and monitoring features ensure safe functioning of the system. Operators also benefit from the new service functionalities like data logging, which can be accessed either remotely through Ethernet connection or through the USB port on the front panel of the system.

Berthold Technologies’ radiometric instruments are used in the oil production industry worldwide to control and monitor level, interface level, emulsion layers and density. The measurement systems are installed offshore and onshore on drilling rigs, production platforms, FPSO, hydraulic fracturing, in oil terminals as well as in the Canadian oil sands, providing highly accurate and reliable process information for optimised process control.

All products are internationally renowned for their high quality and reliability. The quality management system is certified according to DIN EN ISO 9001:2008, ISO 14001:2004, BS OHSAS 18001:2007 und KTA 1401.

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RS Components has launched a new RS Pro low-cost and high-performance infrared temperature sensor. The key features of the device include its extremely small size – 31 mm diameter by only 30 mm high – and side-entry cable, making it ideal for mounting in areas where space is limited. Other features include fast 125 ms response time, and built-in temperature display and controls.

The device is essentially a non-contact thermometer that is designed to measure temperature from a distance. Infrared thermometers are typically used for a wide variety of temperature monitoring functions, particularly applications where contact sensors are unsuitable, such as when the target object is moving or inaccessible, or when a fast response time is required. Use of the sensor’s analog voltage output enables the setting of alarms, or connection to a data logger for quality checking.

Although the new unit is similar in operation to handheld temperature measurement guns, the RS Pro device is intended as a permanent measurement unit for fixed mounting via a bracket, for example to install on manufacturing machinery to measure product temperature, or to monitor the condition of machine parts. Key industrial application examples include: product temperature measurement in paper and cardboard manufacturing; food manufacturing; pharmaceuticals; thermoforming; curing and drying, as well as condition monitoring on mechanical or electrical equipment.

The unit features two simultaneous and configurable outputs: selectable voltage-output ranges from 0 to 5 V, 1 to 5 V or 0 to 10 V, providing a linear voltage output with measured temperature; and an open collector alarm output for temperature threshold and hysteresis. Other features of the sensor include temperature measurement from 0 to 1000°C; accuracy of 1.5% of reading; IP65 protection and operation over the ambient temperature range from 0 to 70°C.

Electrical characteristics include: operating supply voltage from 28 V down to 6 V DC, or 12 V DC if the output is set to 0 to 10 V, and a maximum current draw of 30 mA. The unit also meets industrial EMC standards, including EN61326-1 and EN61326-2-3 for use in electrical equipment for measurement, control and laboratory applications.

For more information contact RS Components SA, +27 (0)11 691 9300, sales.za@rs-components.com, www.rsonline.com
Endress+Hauser introduces Memosens chlorine dioxide sensor

Endress+Hauser’s new Memosens CCS50D chlorine dioxide sensor supports safe and effective disinfection for clean drinking water, pathogen-free cooling water and high-quality process water.

Systematic disinfection is an essential step in water treatment and legally required in many areas to protect people and systems from illness or damage. However, high doses of disinfectants such as chlorine and chlorine dioxide can be toxic, which means compliance with limit values for those disinfectants is also very important. The Memosens CCS50D chlorine dioxide sensor helps to achieve a safe and efficient disinfection by providing stable and fast measured values.

Safety through long-term stability
The chlorine dioxide sensor features a convex membrane made of dense, dirt-repellent material that prevents soiling and makes it resistant to biofouling. Ultrasonic welding of the membrane to the sensor cap ensures integrity, preventing dilution of the electrolyte. This guarantees long-term stable measurements and gives a plant manager the security that the disinfection process is running smoothly and the required results are achieved. High stability naturally also reduces maintenance.

Minimise water loss
Drinking water is a precious resource. That is why minimum water loss is an important factor in drinking water preparation. Memosens CCS50D is able to deliver reliable disinfection measurements at low flow rates. In combination with the Flowfit CCA151 assembly, for example, the required flow rate is as low as 5 l/h, which means only a minimum amount of water is consumed in the bypass and the required disposal capacities are reduced.

Save on disinfection chemicals
Many skids in the food and beverage industry use chlorine dioxide for disinfection. These skids provide only small-volume samples for dosing control. Thanks to its special membrane design, Memosens CCS50D provides a fast response time and supports precise dosing of chlorine dioxide even in these skids, leading to safe disinfection and cost savings for chemicals.

Increase process uptime
The chlorine dioxide sensor is equipped with the proven Memosens technology by Endress+Hauser. Memosens allows for direct commissioning of new sensors without further calibration. During on-going operation, plant operators can pre-calibrate sensors in the lab, swap them into the process with plug-and-play, and thus continue measuring faster. Finally, contactless data transmission eliminates all measurement errors or even failures caused by humidity or corrosion.

Disinfection
Disinfection, based on chlorine dioxide is becoming more relevant and is becoming a disinfectant of choice because its handling has become easier. Today, chlorine dioxide is available as a ready-to-use solution that does not require manual mixing or the application of chemical generators. Memosens CCS50D is the perfect sensor to support this trend. It helps plant managers comply with strict legal requirements on disinfection, whether it is in drinking water treatment, cooling systems, wash water for packed vegetables and salads, beverage production or desalination plants.

For more information contact Jan Swart, Endress+Hauser, +27 (0)11 262 8000, jan.swart@za.endress.com, www.za.endress.com
Krohne now offers the Optisonic 7300 Biogas ultrasonic flowmeter, which has been specially designed to measure dry and wet biogas with variable composition. The flowmeter provides additional functions like calculation of standard volume, methane content measurement, and diagnostics features. It features no moving parts and no pressure loss.

The Optisonic 7300 Biogas overcomes the limitations of the ultrasonic principle in biogas applications due to high damping of the acoustic signals by carbon dioxide and high water content in the biogas. Its signal transducers provide a stronger ultrasonic signal into the gas, and specialised signal processing enables better detection of small, strongly dampened acoustic signals. These features, along with the mechanical design of transducers and transducer pockets, make the measurement insensitive to liquid water and biological scaling.

Optisonic 7300 Biogas features a maintenance-free full bore flow sensor without any moving parts. Because the hydrogen sulphide in biogas is corrosive when dissolved in water, the measuring tube is made of stainless steel 1.4404/316L and the transducers are made of NACE-approved grade 29 titanium for maximum corrosion resistance.

It is equipped with lap joint flanges to lower its overall weight. The measurement accuracy is specified at 1% of actual measured flow rate, when calibrated with air, starting from 1 m/s flow velocity. When 2% accuracy is sufficient, users can select a dry calibration alternative at a significantly lower price.

The Optisonic features a built-in temperature sensor that facilitates direct measurement of methane content using calculation of the molar mass, in combination with the measured velocity of sound. This enables end users to determine the exact methane content of the biogas, necessary when the biogas is used as fuel for gas engines in a combined heat and power (CHP) unit. It can also provide calculation of gas flow volume to standard conditions by using an additional pressure sensor. The electronics also include diagnostics to validate the flowmeter functions and the process. For output of the measured values, 4…20 mA and pulse outputs are available. HART and Modbus (optional) are included for field communication.

The Optisonic is certified for use in explosive areas (zone 1). Since no pressure drop is generally allowed in biogas pipelines, the device is available in common line sizes of 5, 7.5, 10, 15 and 20 cm.

For more information contact Clayton Duckworth, Krohne SA, +27 (0)11 314 1391, c.duckworth@krohne.com, www.za.krohne.com
Through-air radar for level measurement

Radar is one of the most common level measurement technologies in the instrumentation market. Whether measuring liquids or solids, from chemical plants to wastewater facilities to ready-mix cement manufacturers, radar provides accurate, reliable level measurement without ongoing maintenance and frequent recalibration. Radar sensors are not only a trusted means of pinpoint level control, they are easy to use as well.

Radio microwaves are transmitted by the antenna system of the sensor to the measured product, reflected by the product surface, and received by the antenna system. The microwaves travel through the air, hence the label, through-air radar. The time of flight from emission to reception of the signals is proportional to the distance to the product surface. The longer the time of flight, the greater the distance. This distance is inversely proportional to the level in the tank. The greater the distance, the lower the level.

Many parameters determine the strength of the signal returned to a radar sensor. An agitated, turbulent surface will affect signal strength, as will distance to the product surface. Even normal process conditions like build-up on the antenna system may influence a return signal. Signal strength also depends partially on chemical composition, as not every product reflects microwaves equally.

Conductive products reflect almost all microwave energy and non-conductive products reflect only a portion of the energy. Non-conductive products with low dielectric constant, oil for instance, produce weaker signals than those with high dielectric constant, like water. The range of signals a radar sensor can detect is called its dynamic range.

The focus of the microwave beam depends on a radar transmitter’s antenna size and its transmission frequency. The smaller the antenna, the wider and less focused the beam. The larger the antenna, the more focused the beam. This is why the development of liquid level sensors operating at 80 GHz transmission frequency was such enormous news in process automation.

VEGA has seen the practical benefits of 80 GHz level sensors, the VEGAPULS 64 and VEGAPULS 69, in over 70,000 installations worldwide per year. In containers and silos with many internal installations, enhanced focusing helps reduce the influence of noise created by microwave energy reflecting back to the antenna from something other than the product surface. Noise is commonplace in vessels with agitators, baffles, or heating coils, and it is sometimes created by the walls of the vessel itself. Noise is a problem because it distorts level measurement, but it can be overcome.

The most obvious advantage to using a through-air radar sensor is that it is a non-contact level measurement that requires less maintenance due to a lack of moving parts and a lack of contact with corrosive product. Through-air radar sensors are unaffected by fluctuating product properties or by changing process conditions such as temperature, pressure or intense dust generation because they use radio waves to make a measurement. Few process variables can disturb the flight of a radio wave, making through-air radar sensors a reliable option for level measurement.

Radar level transmitters are used for non-contact level measurement of liquids and bulk solids, even under high pressure and extreme temperatures. They can be used in simple as well as aggressive liquids and are suitable for applications with stringent hygiene requirements. Radar level sensors measure light as well as heavy bulk solids with absolute reliability, even in the presence of dust and noise, without being affected by build-up or condensation.

Through-air radar has tremendous capabilities and offers many benefits to users. However, through-air radar is not a level measurement panacea; it is not applicable for use with every product. In applications with rampant, heavy foam, radar is sometimes not the right solution because microwaves can be absorbed right into the foam. Another limitation is that in order to use radar for level, a user must have a connection at the top of the tank. The connection can be small, but it has to be present. Through-air radar is a great fit for the vast majority of applications, even those with foam, but not all of them. Users should discuss the specifics of their level application with their instrument providers before choosing a technology.

Through-air radar instruments are more focused than ever before, making them a reliable option in vessels with obstructions or applications that require isolation valves. Some instrumentation manufacturers are pairing this hyper-focus with incredible sensitivity and intelligent software so that users can measure non-conductive products and suppress noise from false signals. High transmission frequency sensors have made antenna sizes smaller than ever, so retrofitting and mounting are less costly and less burdensome than ever before. Any users who have shied away from radar in the past should rethink their position; any users relying on an older radar sensor should consider an upgrade. The instruments are just that good.

More information contact Chantal Groom, VEGA Controls SA, +12 (0) 11 795 3249, chantal.groom@vega.com, www.vega.com
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Digital twins, science-fiction or reality?

Industrie 4.0 introduces the somewhat abstract concept of a ‘digital twin’. But is this really new, does it actually exist anywhere in practice, and if so, what steps should be followed to build one?

A process control engineer who is already familiar with CAD, scada, process simulations, manufacturing systems and business (ERP) systems, may find the concept of a digital twin puzzling – after all integration of systems and process automation has been part of the goal of modern manufacturing for some time. So, what is new?

What is a digital twin?

A digital twin is a digital representation of a physical object, plant or process throughout its life-cycle. This digital representation can include original design information, physical attributes and context and usage information, which in turn be used to model and predict performance.

A digital twin is not a product you can buy. Implementing a digital twin is going to be a journey during which you steadily implement platforms, capabilities, processes and human/machine interfaces. Beware, all roads don’t necessarily lead to Rome, so understanding your business strategy and how these new digital technologies will support this is important as to why a digital twin is needed, and what exactly has to be done.

Design, manufacturing and maintenance data

A digital twin is easiest to understand when considering a physical object, for example a car, or an engine, or an electronic device. The digital twin is a digital representation of this device; the data is initially developed and optimised during design, tracked during manufacturing and then augmented by actual usage data to improve use/maintenance of the object by customers:

- Design data relating to the object is created and optimised virtually using computer aided design and modelling technologies.
- Manufacturing data records the detailed production parameters, for example raw materials, third-party components used in assembly, quality, process conditions and so on.
- Use/maintenance data records how the object is actually used by customers in the field, when/how it is maintained, and so on.

Modern automotive manufacturing already has several of the above elements in place and is a leader in this regard. In other industries however, the digital twin might not be as straightforward.

A digital twin is not restricted to physical objects; it might be implemented for an entire manufacturing system, including physical plant and equipment, human decisions/activities, business processes, customer data, supply chain data, events, environmental information etc. The common thread is the connection, collection, organisation, analysis, visualisation and interaction with vast amounts of data.

At the heart of the digital twin is a model that represents the attributes and operation of the system or object. But a digital twin is more than simulation software – a digital twin will usually include artificial intelligence that allows for self-learning. The output of the digital twin will be a rich interactive human machine interface, which uses for example 3D augmented/virtual reality to visualise and simulate performance.

Digital twins support the full product life-cycle in several ways:

- During design, digital twins will improve collaboration and allow product development teams to work virtually across multiple locations. Computer aided design and collaborative tools have existed for some time now. A digital twin builds on this but takes the concept further to support adaptive flexible manufacturing to quickly adapt to environmental conditions and individual customer requirements.
- During manufacturing detailed production information and small variants in the manufactured article will be measured and stored in the digital twin. For example in electronics manufacturing individual components used in assembly are often sourced from competing suppliers and will vary between batches. Tracing each component of the assembled product through design, manufacturing and ultimately during use/maintenance will allow for rich insights into how using different component suppliers affects the product performance in the hands of the customer.

Implementing a digital twin proof of concept

Implementing a digital twin can be confusing and overwhelming. I suggest that you consider starting small and do a proof of concept (POC). For example:

1. Research the opportunity in terms of your business strategy, do some planning, secure budget and build awareness and support for a POC.
2. Implement remote monitoring capabilities (this will probably need you to improve parts of your systems architecture, implement connectivity and data standards such as OPC-UA and ISO 10303-239, take on new IoT devices and build new capabilities in your IT and manufacturing systems teams).
3. Implement predictive analytics tools that will consume this remote data to self-learn and predict performance (this will likely require new capabilities in data science, modelling, artificial intelligence and visualisation).
4. Connect the result of the above to field service operations (this might require fundamental reorganisation of the established business processes in this area).
5. Close the loop by connecting the data and models back into new product development, design and engineering processes.

As you run this POC and as relevant technologies continue to mature in the market, you might also systematically introduce new human/machine interfaces and data visualisation tools, including 2D/3D visualisation, augmented reality and advanced human machine interfaces (natural language processing and natural user interfaces). Remember, the digital twin is not pure automation, it is intended to augment, not replace, human decision making.

Gavin Halse

Gavin Halse is a chemical process engineer who has been involved in the manufacturing sector since mid-1980. He founded a software business in 1999 which grew to develop specialised applications for mining, energy and process manufacturing in several countries.

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Industrial Edge adds cloud benefits at the field level

Siemens is introducing a digitalisation platform to the market in the form of Siemens Industrial Edge. This extends automation devices by providing data processing at machine level and by bringing highly developed analysis technology and the intelligence of edge computing to the manufacturing area in a secure way. Siemens Industrial Edge offers users the possibility of executing a range of descriptive, diagnostic, predictive and prescriptive analytical applications. This allows cloud connectivity (data to cloud) to be used in combination with Edge Apps from Siemens, third-party providers or end users themselves, in an integrated hardware and software ecosystem (Edge App to Device) for automation components.

With Industrial Edge, Siemens is offering users the chance to close the gap between classic, local data processing and cloud-based data processing to suit individual requirements. Edge computing allows large volumes of data to be processed locally. To this end, Siemens is releasing a broad spectrum of applications to users, including data processing, data visualisation via web servers, data transfer to the cloud or IT infrastructures, and quick innovation cycles in the development of apps. There is also an additional reduction in memory and transfer costs as large volumes of data are pre-processed and only the relevant data is finally transferred to a cloud or IT infrastructure. Industrial Edge supports cloud transfer protocols for MindSphere, Siemens’ own open, cloud-based operating system. In the future, it will also support Message Queuing Telemetry Transport (MQTT), making data transfer safe, secure and effective.

Stable processes and increased productivity for machine tools
Industrial Edge with Sinumerik provides a machine-level platform for software applications which captures, pre-processes and analyses high frequency data. In addition to this, calculations can be carried out for complex machine tools and auxiliary process times, or workplace monitoring can also be optimised. Both operating system and application in Industrial Edge for Sinumerik are installed and continuously kept up to date via backend services on MindSphere, the open, cloud-based IoT operating system from Siemens. Industrial Edge for Sinumerik thus provides users with continuously stable process and condition monitoring as well as significantly higher productivity.

High flexibility and productivity for manufacturing plants throughout the lifecycle
Siemens is offering users a platform for implementing today’s demands and those of the future in the form of Industrial Edge with Simatic. Automation components such as Simatic controller are provided with supplementary support through Edge Devices in order to process greater volumes of plant data profitably and to gain information for a continuous increase in productivity. At the same time, new applications such as condition monitoring or predictive maintenance are being introduced into classic automation technology. In addition to this, edge computing also provides access to previously unknown degrees of flexibility, allowing plants to be kept right up to date via functional, feedback-free updates, all within standard plant life cycles for automation. Siemens apps development supports users with frameworks and access to integrated connectivity to the world of automation.

Industrial Edge includes Edge Management, Edge Devices and Edge Apps
Industrial Edge includes Edge Management, Edge Devices and Edge Apps. The Edge Management System provides central control of all connected Edge Devices as well as condition monitoring. Users can use the Edge Management System to install software applications (Edge Apps) onto the required Edge Devices from the Edge App store in the backend system, for example MindSphere. Edge Devices are equipped with an Edge runtime software which guarantees the connectivity for both data capture from the connected automation element and for Edge Management. It also has a driver toolbox for access to device functions. The Edge runtime software also provides a secure app environment for executing functions on Edge Devices. Edge Apps for Siemens Industrial Edge are available from Siemens as well as third-party providers. In addition, it will also be possible for users to develop their own Edge Apps tailored to individual requirements.

Siemens Industrial Edge offers users the possibility of executing a range of descriptive, diagnostic, predictive and prescriptive analytical applications. This allows cloud connectivity (data to cloud) to be used in combination with Edge Apps from Siemens, third-party providers or end-users themselves in an integrated hardware and software ecosystem (Edge App to Device) for automation components.

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AVEVA drives digital transformation

By Kim Roberts, associate editor, SA Instrumentation and Control

The 2018 Wonderware X-Change conference created the opportunity to launch the new alliance between AVEVA and Schneider Electric. At the helm of AVEVA’s 26-strong contingent was vice president of strategic partnerships, Doug Warren. SAI&C’s associate editor, Kim Roberts, had an opportunity to catch up with him and Deryn Browning, Wonderware Southern Africa industry sales director, to find out more about the plans for their digitalisation strategy.

SAI&C: What is the logic in creating this new business?
Doug Warren: The main reason is scale, which gives us flexibility in this rapidly changing landscape of the IIoT. Digitalisation is what AVEVA can bring to the party like no other peer in the marketplace.

We also bring our 3D design tools. Most plants spend millions to update data and do modifications from scratch. With our digital representation and 3D tools we can create and track a digital fingerprint of a plant’s assets, combining this with Schneider Electric software to leverage it through its lifecycle. Schneider’s strength is focused on operations and we bring 3D visualisation design tools to the front end. We are now eight weeks into the merged company. There are exciting times ahead.

SAI&C: What is your view on digital transformation?
Doug Warren: Companies cannot afford to be left behind. There are many challenges for our end-user customer base and digitalisation helps them become more competitive. For example digital twin technology can model a design, right the way through the lifecycle, allowing more efficient use of precious capital and squeezing every ounce out of the capital invested.

A mining company for example can grow and then divide into parts of the value chain. This can lead to silos developing across the value chain and natural barriers to optimisation. Digital transformation breaks down these silos and creates a flow of information across the board. We can leverage solutions across our industrial platform to create a dashboard view and drive optimisation of the end-to-end costs of bringing data together. This is the next revolution in industrialisation and we will use it to drive our business.

SAI&C: What does this change mean to end-users?
Doug Warren: In the past an end-user building a mine would historically go to an EPC company to design the layout and link existing logistics. The EPC would hand over the keys and then tell the end-user how to run the mine. But meanwhile there would be a whole lot of other different systems running independently. The benefit now to the end-user is a seamless, natural flow of information that did not exist before.

SAI&C: What is AVEVA’s vision for Africa?
Doug Warren: Together with Wonderware we have enjoyed a special relationship with EOH. This is evident in the presence of our team at this event, and we have seen how close EOH and Wonderware are to their customer base. We now have an even greater ability to support this long-standing relationship. We see it strengthening still further and our portfolio growing. We could not have a better partner in southern Africa.

An example of where we can help is the mining industry, which already has a broad realisation that digitalisation transformation is essential for survival. The challenge comes from the non-digital culture that sometimes still exists. The difficulty is how to take bits and pieces of the IIoT to make a start in optimising across the value chain. Through digital transformation we can help them break down the silos and expose the value chain leaks.

SAI&C: How are you addressing the generation gap in the industry?
Doug Warren: There is a whole shift happening in terms of generation. Young people can handle the sheer pace of technical change, they know how to cope with the big data and they are not scared of innovation. They also make different demands on the software tools they use. Today, no young person would read a manual, they go online.

Learning in a gaming environment is natural for them and we use gamification to our benefit. A lot of 3D technologies come from the gaming industry and are then applied in an industrial context, especially augmented reality. We are looking at some of these tools and at how you can use them to manage change among workers of all ages. For example young workers today don’t stay even five years, while the older ones stay for 30 years. We must bring in a phased approach and have the workforce involved in our processes so that they own them.

SAI&C: What message should we take away from X-Change?
Deryn Browning: The purpose of X-Change was to help take away the risk for our customers as they embark on their digitalisation journey. We started by presenting our digitalisation strategy to show them what’s possible, and followed up with the technology that can make it happen. The key is to start by looking at your business process, otherwise you will go down the wrong path. Look at the value leaks and the business problem you need to solve and then get to the root of the problem. From there you can introduce digitalisation to solve the problem and reap the benefits.

Doug Warren: Our message is how we can glue our applications together onto one industrial software platform. All our innovations will be connected to this. Three things are critical:
• Firstly, we are a software company with scale and experience.
• Secondly, we have our upstream visualisation software platform for plant design.
• Thirdly, the reason why we brought our top team of more than 26 people to South Africa is that this is a fascinating market. The level of innovation in what you do with the technology we provide is world class – it is awe-inspiring. All you have to do is walk through the exhibition to see it.

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Siemens heightens industrial cyber security

Siemens presented a solution for detecting anomalies in industrial networks at Hannover Messe 2018. Industrial Anomaly Detection enables security-related incidents such as unauthorised intrusions and malware to be identified and countermeasures to be taken. The software is pre-installed on an industrial PC and easily integrated into industrial environments. Alternatively, it can run on network components from Siemens, such as the multiservice platform Ruggedcom RX1500 with Ruggedcom APE. The solution is especially suitable for companies in the automobile production, aerospace, chemical, pharmaceutical, food and beverage, and water/wastewater industries.

Industrial Anomaly Detection begins by establishing transparency regarding the devices integrated into industrial networks (such as controllers and HMI devices) and the software installed on them. Having achieved that, the second step is to identify vulnerabilities within devices on the network by matching assets with known vulnerabilities and identifying other network hygiene configuration issues that need to be closed. The third step is to monitor a device’s communication behaviour continuously. The system collects the data passively, so it does not have any effect on production. It supports the products of all the current automation manufacturers and their protocols. If the solution detects deviations that might indicate unauthorised intrusions or misconfigurations, it automatically sends an alarm to the users. Depending on the criticality, the incidents can be dealt with by onsite experts or external security specialists.

The anomaly detection system also uses artificial intelligence (AI), which configures the system by a process of self-learning. The solution automatically analyses the data traffic in the network in a learning phase so that it can then detect anomalies that might indicate intrusion or data theft by hackers. Industrial Anomaly Detection is an important complement to the range of industrial security products and services offered by Siemens. It is based on the holistic Defense-in-Depth concept.

At the Munich Security Conference 2018, Siemens also initiated the Charter of Trust for binding rules and standards to build trust in cybersecurity and further advance digitalisation. To continuously innovate and adapt cybersecurity measures to new threats it is important to combine domain know-how. For this reason Siemens cooperates with numerous different partners for Industrial Anomaly Detection technology from leading partners.

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Plant performance data on a big screen

Visualising plant performance data on a big screen for everybody to see has become a mandatory requirement in this age of management by KPIs, and encouraging performance driven objectives and motivation for personnel. Not just the plant, but in administration areas as well, a glance at key data presented in real-time can improve operational efficiency. Any size large screen HDMI display can be used, depending on budget, with the mTV 100 from Omniflex enabling full dynamic HMI visualisation of plant processes or strategic KPIs derived directly from them.

Apply as and where needed: Users can add as many as they need to the network as they operate independently extracting plant data directly from the PLC or database. A different emphasis on every screen can be made enabling appropriate information for the audience concerned with operational targets. It is DIN rail mounted, 24 VDC powered and uses a standard HDMI cable up to 5 m, making it easy to apply.

Any PLC data source: With Over 250 PLCs supported, gathering plant data is simplified allowing screens to show the information where it is needed in the plant or office, presented in clear non-technical forms, bar-charts or trends, all running in real-time from plant data.

Gigabit Ethernet connectivity
Connect units to an Ethernet network as required, even in the office environment, to display the KPI criteria for all to see.

USB Bluetooth device compatibility
If user interaction is required Bluetooth devices can be added to the user interface at will.

Other benefits include:
- Easy to use graphic icons and templates.
- Any size HDMI display TV or monitor at 1080p resolution.
- Low cost and easily replaces standard HDMI TVs.
- Full dynamic graphics trending and statistical graphics.
- Easy installation – DIN rail and 24 VDC power.

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As machines and systems are becoming more modular and control cabinets smaller, the space requirements of control components are increasingly scrutinised. At the same time, evermore complex and sophisticated machines require more computing performance. However, there are also more cost pressures in the field of automation. In order to meet all these requirements, Beckhoff has developed a new series of ultra-compact industrial PCs (IPCs) – starting with the C6015 and the high-end C6030. These devices are ideal for a broad range of applications, including environments with decentralised architectures and today’s Internet of Things (IoT) and Industry 4.0 applications.

The new series of ultra-compact Industrial PCs premiered with the C6015 at the 2016 SPS IPC Drives trade show in Nuremberg, Germany. Equipped with an Intel Atom CPU, it is well suited for all kinds of automation, visualisation and communication tasks in the medium performance range. Measuring only 82 x 82 x 40 mm, the ultra-compact and industrial strength multi-core IPC is only one third the size of the C6905, previously the smallest control cabinet IPC in the Beckhoff portfolio. With price savings of approximately 25 percent, the C6015 ranks far below the previously lowest cost x86 IPCs from Beckhoff. With exceptional installation flexibility, it also opens the door to application areas that were previously closed to IPC technology because of cost or space limitations.

The four factors of a true success story
The ultra-compact C6015 IPC was a true success from the very start. It has already been deployed in a wide range of applications in high volumes, including many large-scale projects in Germany and abroad. The concept of the new IPC generation impressed users for several reasons:

• The most important and obvious feature of the C6015 is the extremely compact size that does not compromise suitability for industrial applications. This is underscored by a design with passive cooling and long-term availability in a robust aluminum and zinc die-cast housing. It also meets all other industrial requirements, such as an expanded temperature range from 0 to 55°C and exceptional vibration and shock resistance.

• Combining high computing power with low energy consumption, the C6015 leverages Intel Atom CPUs with up to four cores, providing the ideal basis to handle all applications in the low to medium performance range.

• The exceptionally flexible installation concept permits vertical or horizontal back wall installation in control cabinets. Moreover, with its symmetrical cooling fins, the C6015 can be positioned freely within the mounting frame. Features like these and the free orientation of the connector level, with all connectors on a single side, allow a wide range of installation scenarios that accommodate all incoming cable feeds in even the smallest spaces. In the past, this was often impossible, precluding the use of an industrial PC in certain machine designs.

• The features and interfaces of the C6015 are also designed for a wide range of applications with a 30 GB M.2 SSD, 2 GB of DDR3L RAM (expandable to 4 GB), one DisplayPort, one onboard dual Ethernet adaptor with 2 x 100/1000Base-T connectors, one USB 3.0 port, and one USB 2.0 port.

Overall, the C6015 is likely the first industrial PC on the market to offer such a high performance density paired with all the interfaces needed in a machine design.

C6015: Popular for use as an IoT gateway
Beyond its typical use case as control hardware for automation and visualisation tasks, the success of the C6015 is also largely based on IoT applications. About half of the devices installed to date are being used for communications purposes in IoT applications. These may include something as simple as the collection, processing and provision of process data or more complex tasks that are typical of an IoT gateway. The Microsoft Azure certification of the C6015 underscores that it is an ideal device for Industry 4.0 applications.

The C6015 is well-matched for such communication tasks, including connectivity with legacy systems, because it makes it easy to add IoT capabilities to existing machines and get them ready for future communication requirements – either as an IoT gateway or a basic data collection device.

C6030: Building on a successful concept with high-end computing power
Beckhoff is continuously adding models to its family of ultra-compact and flexible Industrial
Rockwell software release optimises productivity and reduces design time

Engineers can design, build and commission automation systems more quickly, using the newly enhanced Rockwell Software Studio 5000 integrated development environment. This latest software release includes a new user interface that provides a common, modern look across all Studio 5000 applications, and includes updates to help engineers improve productivity from design to deployment.

The Studio 5000 Logix Designer application now includes updates to several programming languages and a modernised structured text editor to help optimise design time. The text editor has been updated with many new features, such as collapsible code segments and inline value monitoring, for more productive programming and editing. “The modified structured text editor improves ease-of-use for programmers at different skill levels,” said business manager, Christo Buys. “Power users currently using structured text programming and new engineers who are unfamiliar with it will both be comfortable using the modernised editor.”

The new Logix tag-based alarm functionality allows engineers to easily add alarms to structures and manage them in a single environment, which helps save time by avoiding the need for programming. The update also includes new drive safety instructions in accordance with IEC 61800-5-2, and motion instructions for expanded kinematic support. In addition, the modern user interface includes multi-monitor support and tabbed views to help improve usability and reduce design time. The Studio 5000 Logix Designer application also includes support for the new Allen-Bradley GuardLogix 5580 and Compact GuardLogix 5380 controllers. This provides new high performance options for users as they design safety systems and can help reduce overall machine costs. The Studio 5000 View Designer application now includes data logging and trending for easier troubleshoot. It gives engineers access to emulation capabilities for virtual commissioning and testing applications to help reduce system development time and risk.

The Studio 5000 Architect application supports systemwide capabilities that can reduce design complexity and time. For example, the updated version has adopted the open data-exchange interface, AutomationML (Automation Markup Language), for expanded connectivity and robust data sharing between the Studio 5000 software and other engineering tools, such as EPLAN Electric P8.

A new Studio 5000 Application Code Manager light edition is available for download as a single-user edition for machine and equipment builders who operate on a smaller scale. At no added cost, this version contains bulk programming and library management capabilities, with a standard version available as an annual subscription.

In addition, to help jumpstart development, Rockwell Automation now provides a Machine Builder Library and Process Object Library for Studio 5000 Application Code Manager. Both libraries can be downloaded from the Product Compatibility Download Center (PCDC) for no additional cost. The Studio 5000 Logix Emulate application now has an updated interface for connectivity to operator training systems like Cape Software VP Link and MYNAH Mimic, along with an improved user interface.

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What does the ‘rise of the machines’ mean for Africa?

By Barry Elliott, managing director, Rockwell Automation Sub-Saharan Africa.

What does digital connectivity mean for Africa’s industrial and economic development? Rockwell Automation Sub-Saharan Africa managing director Barry Elliott considers the possible impact of the Internet of Things in Africa.

Will automation, artificial intelligence and robotics – the ‘rise of the machines’ – really reduce the value of people and their roles as meaningful contributors to society? Or will it unlock new avenues for creating value and new opportunities, which may manifest in a greater industrial and economic future for societies in Africa?

The Economist Innovation Summit Africa 2018, a conference I recently attended in Nairobi, Kenya – Africa’s ‘silicone savannah’ – explored these issues directly, investigating the opportunities and challenges of digital transformation in Africa through the viewpoints of business leaders, policymakers, entrepreneurs, technologists and thinkers from a wide range of professions and industries across the world.

But for me, it’s not a conversation that should be understood as the rise of machines, but rather as the rise of connectivity, and what this means for Africans, especially in terms of how new value can be created, and aspects like skills shortages and poor infrastructure.

Africa faces a deficit of tens of billions of dollars in infrastructural spend that prevents many isolated communities from receiving even the most basic services. Yet with rapid developments in aerial drone technology, for example – as a fellow panelist pointed out – drones can be deployed to supply critical consumables such as medical supplies or animal vaccines to remote, otherwise inaccessible settlements.

This is already happening in Rwanda, where a company called Zipline has operated the world’s only national scale drone delivery system since October 2016. As the costs of this technology continue to become even more affordable, so will the capacity of governments to deliver rural healthcare and rapidly stock other consumables.

At the very centre of all these smart technologies is connectivity. The digital connectivity of pretty much everything in our world is inevitable. This isn’t a phenomenon that’s foreign to people in Africa. On the contrary, adoption of mobile telephony, for instance, was among the fastest anywhere in the world, it’s not just something Africans are familiar with; it’s something they have innovatively mobilised in their day to day activities.

Whereas smartphone payments, for example, are becoming more and more popular in the US, mobile money is old news in Kenya. M-Pesa, the country’s most popular mobile payment service with over 18 million active users, was designed to serve the micro-payment requirements of Africa’s so-called ‘base of the pyramid;’ giving anyone with a mobile phone the power to send and receive money at the touch of a button. Now used in ten countries, M-Pesa processed around six billion transactions in 2016.

This is just one example of Africans using connectivity innovatively to service the pyramid base better. It is suggested that M-Pesa’s mobile money services have lifted 2% of Kenyan households out of poverty.

If connectivity is now an intrinsic part of life across Africa, this is especially pronounced amongst the continent’s youth – digital natives that use connected technologies intuitively.

Digitisation and the digital twin

The concept of a ‘digital twin’ is one that most people experience every day on their smartphone. It is therefore not a huge stretch to understand that a ‘thing’, such as some sort of industrial device, too, could have a digital twin through which it can be controlled, monitored and analysed.

With this massive latent potential of digitally savvy people in Africa, is Africa not more likely to become a digitisation giant than a manufacturing one? Africa’s digital natives are ready for the digital era; the question is how do we skill and educate people to make them employable, and how can we enable them to develop the skillsets that will facilitate their meaningful participation in this new digital economy?

One way is by using smart technologies in innovative ways that increase the potential for learning. For example, application- and industry-specific experiential learning platforms make use of virtual and augmented reality to simulate actual plant and production processes accurately. Hypothetical production issues, such as bottlenecks or unplanned equipment downtime, which demand analytical and problem-solving skills to correct an issue, can be recreated with lifelike accuracy in a virtual environment. Such experiential learning environments are potential game-changers for training and upskilling youth in Africa.

Information-driven services

What is critical is that we understand what the fundamental purpose of connectivity is. Connectivity ensures our ability to collect data; analyse it through data science, artificial intelligence, machine learning and reinforcement learning; and finally, transform it into actionable intelligence that can create new value for humans. While the most labour-intensive and dangerous tasks will continue to be replaced by automated machines that improve the efficiency and productivity of industrial output, so will digital technologies create new opportunities amongst Africa’s digital natives for whom connectivity is such a fundamental part of life.

Our opportunity as Africans – individuals, organisations and governments – lies in our innovativeness in how we can use new technologies in disruptive ways, a need to innovate driven often by basic necessity. This is how countries in Africa should be thinking about their industrial futures.

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Yokogawa has released version R4.01 of the Plant Resource Manager (PRM) software tool for centrally managing large amounts of data from plant monitoring and control devices as well as manufacturing equipment. PRM R4.01, an upgrade to R3.31, has been significantly enhanced with a new function that provides statistical data needed to identify the overall status of the devices in a plant. Through the provision of information that is essential for efficient maintenance and optimum operations, this new PRM release will help to ensure plant safety.

Manufacturers are constantly looking for ways to improve maintenance efficiency by using software tools like PRM that can centrally manage large amounts of maintenance information and other types of data from plant monitoring and control devices as well as manufacturing equipment, and for quickly identifying device failures that could interfere with the safe operation of plants. To better meet such needs, Yokogawa has reinforced the functions of PRM. With PRM R3.31, users have been able to access information needed to identify the operating status of individual devices. To address the need for a solution that would yield insights into the overall condition of the devices installed in a plant, Yokogawa has added a new status reporting function to R4.01. A new function that improves maintenance efficiency has also been added.

New enhancements feature the display of quantitative status information on all the devices in a plant and efficient setting of device parameters.

A function for the reporting of key performance indicators (KPIs) on field assets has been added to R4.01. With this function, PRM is able to create and display the following three KPIs: overall device effectiveness, the percentage of time that devices operate normally without alarms or events; time availability, the percentage of time that devices communicate normally with PRM; and performance availability, the percentage of time that devices operate and communicate normally with PRM. While the previous PRM release only provided information on individual devices, R4.01 has the added ability to display statistics on the operating status of all the devices in a plant. Thus PRM R4.01 can help operators detect potential device problems, identify and analyse failure causes and determine maintenance priorities. These KPIs can also be referred to when planning a maintenance schedule.

A template function for the setting of device parameters has been added to R4.01. Once parameters are set using this function, the template can be downloaded to multiple devices. This makes it easy to apply parameters to devices. When replacing one or more devices, their template can be used as is on the new device(s), or another template with different parameters that has been prepared in advance can be used. By making it easy to reset parameters, this function allows the immediate start up and use of the new device(s).

PRM is a software package that centrally manages large amounts of status and maintenance information from plant monitoring and control devices and manufacturing equipment. It supports major field digital communication protocols and can be used for devices and diagnosis and adjustment software tools from other manufacturers. It includes various maintenance support functions, including online functions for monitoring and diagnosing devices and equipment. It can work with the FieldMate device management software for setting, adjusting and managing field devices. Through FieldMate, the current device information stored in PRM can be checked in the field. For improved access to maintenance information, the PRM device information can also be accessed from any human interface station linked to the CENTUM VP integrated production control system.

Major target markets include industries such as oil and gas, petrochemicals, chemicals, iron and steel, pulp and paper, electric power and wastewater treatment, in applications such as field device maintenance and startup and plant operation support.

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Siemens is launching a new app for drive systems in the field of motion control called Analyze MyDrives, and has also introduced Manage MyMachines/Remote, a new plug-in to upgrade its tried and tested Manage MyMachines MindApp for machine tools with the addition of a smart remote feature. Analyze MyDrives and Manage MyMachines/Remote are special MindApps designed specifically for MindSphere, the open IoT operating system from Siemens, which allow users to utilise the benefits of cloud-based services and create added value with machine operation. Digitalising drive systems or machine tools enables extensive data generated by the drive or machine to be analysed and put to use. By connecting to MindSphere, this process can be carried out simply by the machine manufacturer or user, significantly improving the efficiency of drive systems and machines and boosting productivity across the production network. In this way, these MindApps provide the starting point for totally new applications for drives or machine tools which enable innovative digital services such as predictive maintenance, energy data management or resource optimisation.

Using the Analyze MyDrives MindApp for the Sinamics V20 and V90 converters, Sinamics G modular and compact, and Sinamics S (up to 250 kW), machine operators are now able to also monitor the drive components of their machines. The app captures and analyses all the operating data, allowing the actual maintenance requirement to be detected by continuously monitoring power consumption, torque and frequency. The machine operator is kept informed about critical machine operating statuses, and machine builders are able to suggest preventive machine servicing as and when it’s needed. This eliminates the need for machine maintenance at fixed intervals, boosting machine capacity utilisation and productivity, extending maintenance intervals and minimising downtimes. The analysis of operating data also enables predictive maintenance which reduces the probability of unscheduled costs. The MindApp also allows the measurement of energy flows as the basis for determining energy-saving potential, allowing consistent energy-saving optimisation measures to be implemented.

Manage MyMachines/Remote is a plug-in offered by Siemens for its Manage MyMachines MindApp, which enables remote access to the CNC (Computerised Numerical Control). This allows complete remote control of the CNC by means of fail-safe encrypted communication over the internet, which not only improves machine availability and simplifies maintenance but also cuts costs in the event of a fault. By graduating the supply stages for Single Access, Conferencing and Remote STEP 7, the scope of performance can be precisely adjusted to customer requirements. The ability to record the entire maintenance process in different video formats makes for enhanced transparency.

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An automation customer speaks

By Oratile Sematle.

The engineering institutions, systems integrators, suppliers and seminar groups within the automation industry in South Africa are all concerned, and rightfully so, with the lack of active participation by automation and technology customers. Within the automation professional networks, these are commonly referred to as automation ‘end users.’ In reflection, the Society of Automation, Instrumentation, Measurement and Control (SAIMC) seeks to cultivate participation of these end users in an industry-wide automation discourse. The Industrial Instrumentation Group (IIG) member companies continually find ways to enlighten end users on the untapped value that lies in the space of automation and new technologies. The African Automation Fair (AAF) and the Manufacturing Indaba, which act as automation knowledge sharing hubs, keep asking the question: ‘Where are all the end users?’ In all these instances, end user reaction remains sluggish.

As an end user myself, and carrying the voice of many others within my professional networks – physical and virtual, I was tasked to react. To this end then, an automation customer finally speaks! The voice in this editorial is dedicated to the professional network within the manufacturing sector.

Questions abound

One professional from the petrochemical sector postulated with frustration: “We have sensors and monitoring systems across the entire business value chain, the data generated seems useful but we are not too sure how to package and link it to our business value chain. What value drivers should we focus on, and who is best placed to advise us? Should our focus be supply/demand match i.e. data-driven demand prediction, or service/sales optimisation i.e. virtually guided self-service? How do we digitally implement these solutions?”

A probing voice in the beauty and cosmetic sector pondered: “It is clear that our next digital step should be time-to-market focused. We need a digital solution for rapid experimentation and simulation, concurrent engineering, and finding cheaper digital ways to enable customer creation. Is this part of Industrie 4.0? How does 3D printing fit in? Do you have contacts for us?”

A worried voice from the mining sector with a desperate need for optimisation theorised: “What is the best way to implement, human-robot collaboration? Are there any labour laws that could guide us? We are also seeking remote monitoring solutions, as well as visual monitoring with automated control capability, due to risks and safety concerns. It appears that no one supplier can offer us a complete solution. We need system integrators who can take ownership and design with third-party products. While it seems like a demanding request, it simplifies maintenance.”

A voice from a utility company running cross-border operations between Mozambique and South Africa noted: “Effective asset utilisation is paramount to us. We are currently exploring ways to implement digitised predictive maintenance and augmented reality for maintenance, repair and operations. All conferences I have been to speak of what Industrie 4.0 is, but not necessarily on how to deconstruct its concepts, and apply and implement them to solve our particular business problems.”

End users must shout louder

The act of wonder – questioning, searching and seeking clarity – seems to be endless and fortifies the need for end users to join in the automation discourse. What is evident is that they are concerned not with the technology itself, but with the practical implementation of Industrie 4.0 concepts, and connecting these with the appropriate value creation engines.

What is also evident is that some end users, who have heard of this digital revolution called Industrie 4.0, are confused by what it is. Those who are abreast of the concepts are looking for ways to connect them to their value chains in an integrated way, but they are struggling in silence with this. End users in South Africa must stop being the ‘shrinking violets’ of Industrie 4.0.

Deconstructing some of the concerns leads me to believe that an approach that could move local industry forward would be to provide clarity on the application of Industrie 4.0 concepts through real-world case studies, which show how measurable value can be realised. The current perception is that the focus on data gathering related to production and sales leads to isolated solutions that only address part of the problem – mainly production/factory related. In reality, this is not the case. Industrie 4.0, when applied correctly, breaks down the traditional isolated silos of operation by providing transparency of information across the entire organisation.

The question end users need answered is: “What do we do with all the data generated by these new-fangled automation networks in order to generate a positive influence on our key performance indicators?” End users must focus on their processes and demand solutions that enhance their value drivers. Automation suppliers and system integrators must address their needs through a collaborative approach to business optimisation that takes the limitations of existing legacy systems into account. Deploying technology just because we can is not the digital revolution. Industrie 4.0 stands for applying the latest digital methods to make manufacturing more efficient and profitable than was possible using the technologies we had before. This is what end users must be concerned about, and the time has come for them to shout louder – it is imperative that their voices be heard if local manufacturing is to remain competitive.

The discourse should not be about the technology itself, but rather the application of the technology to unlock new value streams. But, before the real Industrie 4.0 discourse can begin, the end user community needs to speak up, and be heard.

Oratile Sematle

Oratile is the Electrical and Instrumentation manager at Sasol Group Technology. He holds a bachelor of science degree in electrical and electronic engineering as well as an MBA from the University of Cape Town. As the former president of the Society of Automation, Instrumentation, Measurement and Control (SAIMC), he helps to drive the vision shared by council to address issues specific to the automation industry, and is partly accountable for the development of the automation engineering profession in South Africa. Oratile is a conference speaker and has spoken at engineering events such as Industry 4.0 and African Automation Fair. His ambition is to form cross-industry coalitions to tackle the social and educational problems experienced by disadvantaged communities.
Sensor solution for high-end vehicle market

SICK Automation Southern Africa (SICK) was contracted by Mahle, a manufacturer of vehicle heat exchangers, to install an imaged based sensor solution in its KwaZulu-Natal manufacturing facility. Mahle needed the scanning equipment selected to increase its quality checking method to 100% to provide a 100% flawless product guarantee to its customers.

The components to be checked were the tubes used in a specific motor vehicle. The scanning requirement was to ensure that all clips fitted into the tubes were present and that the scanning system would, via PLC, stop the process should it detect a clip missing from the component. SICK Automation installed its Inspector Camera image based sensor.

The Inspector Camera, part of the InspectorP65x product family, was side-mounted on both sides of the assembly machine and positioned above a jig. The camera is manually operated using a two-button system on the assembly machine which, once pushed, captures an image which it compares to a reference image. If all tube clips are present the PLC receives a ‘pass’ signal and the process continues. If any clips, even only one, are missing, a ‘fail’ signal is sent preventing the operation from continuing. Both of these processes are complemented with visual elements for the operators’ benefit.

“The system implemented is 100% fail-safe,” says Prishan Chain, national sales manager – Factory and Logistics Automation, SICK Southern Africa. “This quality inspection is integral in terms of the quality of the product delivered to the end user. If only one of the inspected components has a clip missing and continues into production, it will lead to end product quality challenges which may result in component failure. So we certify full control by ensuring the inspection process is totally reliable before releasing the component for the next manufacturing phase.”

SICK’s scope of work included the supply, installation and commissioning of all hardware, the setting up and programming of the Inspector Camera, the construction and supply of electrical panels, provision of electrical wiring diagram for the panel, testing and commissioning of the system to output a ‘fail’ signal for missing clips in any of the tubes, as well as the programming and commissioning of the PLC software.

“The Inspector Camera range of imaged based sensors provides an intelligent vision solution in an easy-to-use sensor package,” Chain explains. “Regardless of the task at hand, be it to verify completeness and quality, find a part’s position or measure its dimensions, the Inspector Camera is up to the challenge.” He adds that the rugged design and IP67 metal housing makes these sensors ideal for tough environments, while the intelligent processing technology used makes them ideal for use with high-speed applications. “The housing is designed to easily optimise the optical needs of most applications,” Chain adds, “which ensures excellent inspection even with tough targets like highly reflective metal parts and multi-coloured labels.”

The image based sensor is not necessarily application specific, which means that MAHLE can use it for both new and aftermarket vehicles, as well as change the application for which it is used. More benefits of this solution include:

• A multi-functional vision toolbox that offers smart camera-level performance with sensor ease of use
• Its unique, interchangeable housing design that provides the easiest way to improve image quality
• The simple configuration in SOPAS, including emulator for offline configuration and testing, that reduces production downtime
• The optimised easy to use operator interface that simplifies daily work
• Ethernet communication and web API for excellent connectivity and freedom to customise a user’s HMI

“As one of the oldest and largest sensor manufacturers globally, we provide entire solutions in addition to our comprehensive product range,” concludes Chain. “In Germany we are known as an innovative organisation offering entire sensor solutions, and our German parent has begun following developments in the southern African industry. What this means for sub-Saharan Africa is that if there is a sensor or scanning application or solution that does not yet exist, SICK will tailor manufacture a solution to suit the exact requirements.”

SICK was awarded the contract based on Mahle’s previous experience with the company and its products. Testing of the product to application requirements began in January 2017 with final onsite concept and testing done in June. The official order was placed with SICK in July 2017 and installation completed in a fortnight.

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The PushPull V4 Industrial

Harting's solution for power, signals and data.

The PushPull V4 was developed for Ethernet cabling in industrial buildings and consequently become the IEC standard. Since Ethernet has now penetrated into the field, it was time to set a standard for industrial device cabling with the new version of this proven interface. Among other things, it now features a new housing material designed to withstand very aggressive chemicals, a lock, and a more flexible cable entry.

Which properties are particularly important for a connector in terms of modularity and Industrie 4.0? If users are asked, simple and fast handling is just as important as robustness and the resulting usage spectrum.

Industrial production processes are becoming ever more modular and flexible, and cabling and connection technology must take this into account. Downtime during conversion work costs a system operator money, and naturally must be kept as short as possible. If production must be relocated or switched over, Harting's PushPull system can be used to disconnect and reconnect the industrial lifelines in seconds. To optimise this process, Harting gave the PushPull a facelift.

The PushPull now meets the toughest requirements

The PushPull V4 Industrial has a new housing material, which additionally protects it against extremely aggressive chemicals such as cutting oils in turning and milling centres. These and other aggressive operating materials present increased challenges for connectors, but the PushPull now meets the toughest requirements.

In order to make locking the connector even more secure, the new version has an additional anti-rotation device which secures the locking element in the plugged state to ensure process reliability against pulling.

Process reliability is also guaranteed by the connector's simple and intuitive operation. Consequently, the second generation of the PushPull has only one cable clamp instead of three, with a larger cable diameter of 4.5-10 mm diameter. This relegates loose fit and poor strain relief to the past.

To increase the speed of the plug-and-play principle, the new PushPull has been fitted with two different colour markings. The first is used to provide a quick overview of whether the connector and the socket are correctly aligned so that plugging can occur without problems. The second serves to ensure the correct arrangement of plug and socket. If an application features numerous PushPull connectors installed side-by-side, the installer will have an easier time eliminating incorrect wiring.

In short, the new PushPull V4 Industrial increases process reliability in industrial device cabling, saving assembly time and ensuring simplified and safe handling even in demanding applications.

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Modern electromechanical machine design

Engineers from the older generation will remember the days when machine design had to be based around catalogued electromechanical actuators. Variations from standard were rare, in addition to being expensive. Fast forward around 40 years and the modern experience is somewhat different. Today’s machine designers not only desire highly configurable and adaptable products, they expect them.

With this in mind, many leading motion technology suppliers have developed their product portfolio specifically for machine designers. Explained below are some key factors that will aid the selection of electromechanical motion products for use in the machines of today.

Stroke capacity
Among the fundamental questions to ask is: Does the actuator offer various stroke lengths as standard? A product using a ball or lead-screw drive is commonly restricted to stroke lengths up to around two metres maximum for practicality. There are some actuators offering strokes to four metres, however at lengths such as these, speed is often limited due to screw ‘whip’, so the product that achieves a particular speed at one stroke will not usually achieve that speed at a longer stroke length.

Very long stroke lengths can, however, be achieved by belt drives, which perform to a similar level regardless of stroke length, but lack the precision of a screw-driven product.

A further option is linear motor-driven products, which provide performance levels that scale extremely well with increases in stroke. In addition, linear motors do not demonstrate speed restrictions at longer strokes and offer the same repeatability over the full stroke.

Scalability
With regard to scalability, machine builders should determine if the actuator is available in a number of different frame sizes or widths. Having a family of products to select from allows the project to be cost-optimised. Moreover, many multi-axis applications demand different loading for each axis.

Having multiple drive train choices in the same product is often overlooked, but the availability of screw or belt options within a given product can prove extremely useful to a machine designer. In the same form factor, designers can tailor the drive train to specific requirements, be it thrust density normally obtainable from a screw-type drive, or speed from a belt drive. The ability to bounce between the two without having to rethink the machine’s layout can be highly beneficial.

Modularity and performance
It is a common requirement for electromechanical actuators to be connected to other actuators or mechanical devices. The ability to combine linear actuators into XY, XZ, or XYZ assemblies quickly and effortlessly is vital. As a result, most modern electromechanical products can be bolted together like building blocks, without the use of transition plates for XY systems (plates are often unavoidable for the Z or vertical axes to maintain stability).

A further factor here is performance-to-size ratios, which should be considered carefully. Using a product that is highly condensed leaves more space for machine designers to include end effectors and tooling. For this reason, metrics such as thrust or rated load per height-by-width become important.

Selectable resolutions and encoder types
To retain good servo control, an actuator should have 5–10 times more resolution available than the repeatability of motion required. With this in mind, having multiple options is the optimum solution as high-resolution encoders can be quite costly.

Being able to adjust the resolution is also important. Some of the latest encoder products can vary their resolution through a relatively simple hardware change. A further approach is to deploy analog feedback devices and compatible servo drives. In using analog feedback signals (typically 1 V peak-to-peak), two analog signals are passed from the encoder to the drive, 90° out of phase with one another. Equivalent resolution is established within the drive, and is dependent upon the pitch of the linear scale and resolution of the drive’s analog input.

Flexible encoders
As well as flexible resolution, the availability of flexible encoder technologies is another major benefit. Optical encoders with glass scales have been a popular choice for many years, but today there are many alternative technologies that provide competitive resolutions and costs.

For example, in applications that do not require especially high levels of precision, magnetic encoder technology is a cost-effective option, while applications that do require high precision but not long stroke lengths benefit from the very high resolutions of capacitive encoders. Inductive encoders are often popular for applications directly exposed to heavy contamination, such as coolant from a machine tool. Applications which require constant positional information regardless of an axis being home will require an absolute feedback source.

With regard to communications, until recently, most encoder protocols were based on embedded propriety signals, which meant that designers had to use a limited list of manufacturers. Today, open standard protocols
such as the single cable Hiperface DSL solution allow design engineers to use a variety of products and even reduce installation and cabling efforts.

**Digital design**

In cutting-edge design software, finite element analysis (FEA) can be used to understand not only the deflection characteristics, but also the thermal or magnetic variations within the product. Naturally, these simulations cannot give results with 100% certainty as they are only as good as the algorithms and assumptions that are used, but modern design is starting to leverage these digital design methodologies more heavily to expedite development.

**Purely analog signal conditioning**

IMTRON, part of the GHM Group, has launched the Purely Analogue Signal Conditioning TSA modules that offer well-established methods for processing, filtering, amplifying and galvanically isolating sensor data in high quality.

The modules can convert nearly any analog sensor signal into standard signals that can then be processed, for instance, in a control unit for data acquisition. In order to prevent damage to the system and guarantee high signal quality, inputs and outputs are galvanically isolated from each other and the supply voltage and signals are filtered.

Offering test stand design for machine construction and the automotive industry, status monitoring of machines and systems, monitoring of wind turbines and actuation of servo valves, the modules offer the following advantages:

- **Cost reduction** – signal condition and galvanically isolating amplifier in one device, a separate isolator is unnecessary.
- **More signals** – optional second output for integration into PLCs, displays and end devices for data acquisition.
- **High signal quality** – flexible interference suppression with replaceable filter modules.
- **Velocity** – limit frequencies of up to 30 kHz.
- **Precision** – high precision and long-term stability.
- **Special requests** – tailored solutions possible, even in small quantities.
- **No software necessary** – plug & play

A selection of TSA modules comprising standard, two channel, special modules and TSA PWR special modules for actuation of servo valves are available.

**Metrology test data**

Test data from metrology can be used to take ball-screw backlash into account, and improve overall system accuracy. For applications with very specific requirements, these tests can be performed to mirror the actual application characteristics. Cleanroom applications are a good example as there are many characteristics, such as speed, acceleration, orientation and air flow, which can greatly impact product performance. Selecting products from a design partner that understands the mission-critical aspects of the application and tests will prove particularly advantageous.

**Summary**

Today, the demand for faster turnaround time on machines has become critical. The same design engineer who might have allowed for a machine to be developed in several months, now expects it in weeks. Key to the machine-building race is selecting the right product from a manufacturer which understands the daily design hurdles and has systems in place that allow for rapid machine development.

Factors such as breadth of product, range of options, modularity and product test data should be taken into account when designing the machines of today. This strategy will enhance the machine builder’s ability to respond to customer needs, and provide faster ROI.

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Open Process Automation moves to the proof of concept stage

By Paul Miller and Harry Forbes, ARC Advisory Group.

Open Process Automation was once again a hot topic at the 2018 ARC Industry Forum in Orlando, Florida, earlier this year. Among the highlights was the session focusing on the current status of several open process automation initiatives currently in progress. The session featured the first public presentation on the ExxonMobil proof of concept demonstration project.

In the same Forum session, Abdullah Al-Khalifah presented Saudi Aramco’s experimental Data-centric Open Process Automation, and BASF’s Michael Krauss (supported by ExxonMobil’s Don Bartusiak) presented the NAMUR Open Architecture (NOA) vision. Krauss and Bartusiak both made a point of discussing the synergies and a cooperative path forward.

In his presentation, Al-Khalifah also mentioned that Saudi Aramco is committed to support and work with the Open Process Automation Forum (a forum of The Open Group) to capture experience and knowledge to support the OPAF standardisation efforts to achieve the defined objectives.

Significantly, this was the first time that parties from these three parallel initiatives presented publicly together in a joint session.

Open Process Automation: moving beyond the art of possibilities

David DeBari, prototype lead engineer for the OPAF program at Ex-on-Mobil, worked closely with a team at LockheedMartin and others to develop a prototype proof of concept system based on the OPAF architecture envisioned by ExxonMobil and the industry standards identified by the Open Process Automation Forum. In his first of a kind ARC Industry Forum presentation on the system, DeBari proudly reported: “We’ve been able to transform from the art of possibilities into a running, proof of concept system.”

As DeBari explained, the objective for the proof of concept project was to demonstrate the feasibility of the architecture to deliver the targeted multivendor interoperability through standards (without resorting to gateways or translators), interchangeability to enable components to be individually and freely replaced between vendors (without having to modify the underlying logic), configuration and application portability, and application development flexibility.

DeBari then presented a series of slides that showed how all these objectives were met in a concept system controlling a simulated natural draft fired heater. The team chose this process due to its widespread use in process industries, the many PID control loops involved, plus the need for constraint controls.

Proof of concept passes stress tests

As part of the stress testing, the team broke the control application into multiple parts and distributed these over a dozen different DCNs. According to DeBari, the control still worked flawlessly.

Due to concerns previously expressed about potential latency issues in the real-time bus, the team tested the control loops at 100 microseconds. While this appears to be well below the ultimate bus capacity, it is still far faster than required for most continuous process control applications.

Moving forward?

So, what is the next step? According to DeBari, now that the proof of concept has demonstrated the desired characteristics on a simulated process, the next step is to move to an on-process pilot project later this year. ExxonMobil has already identified an internal site for this pilot and encourages other operating companies to not only join and actively participate in the Open Process Automation Forum activities, but to initiate additional OPAF development efforts, pilots, and field trials, ideally across a variety of different industries. The goal is to initiate field trials of pioneer applications in 2020 and achieve full technical readiness in 2021.

What makes these complementary open automation initiatives so exciting and important, is that they have been initiated and driven by end user organisations and are receiving increasing support from the suppliers, which is critical for ultimate success. Based on what ARC learned at this Forum session, we are also reasonably optimistic that these initiatives will converge, which is also critical for ultimate market success.

Following the success of the OPAF proof of concept project, ARC encourages end user organisations across the process industries to learn more about the initiative and, if deemed appropriate for their applications, both join the Open Process Automation Forum as a member and, if possible, participate in the upcoming on-process field trials. This would provide both an opportunity to get a head start toward achieving a long-term resolution to the chronic system obsolescence issues faced by many process manufacturers and influence the direction of this technology as it develops.

And while the open process automation concept challenges the current business models of many process automation and technology suppliers, it also offers numerous new opportunities.

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Data to the desk without the need for expensive cabling

Permasense® provides complete non-intrusive sensor-based solutions for continuous corrosion or erosion monitoring. We develop, manufacture and deliver permanently installed monitoring systems that can operate in extreme temperatures and environments, and the remotest of locations.

Ageing plant, greater fluid corrosiveness, tightening health and safety requirements, and the environmental costs of a leakage are all challenges with which we are familiar. Direct, accurate and sufficiently frequent measurement of pipework thickness to accurately identify trends is rarely feasible with manual inspection methods.

Coupled with this are the challenges involved with manual inspection, such as accessibility and avoidance of safety risks to personnel. Continuous corrosion monitoring provides asset and integrity managers with an up-to-date picture of how infrastructure is coping with the demands placed upon it.

The reliable, accurate wall thickness data delivered by Permasense systems informs decision making about the timing of maintenance and replacement. It also informs optimisation of corrosion prevention and mitigation strategies, and furthers understanding of the impact of feedstock decisions.

We have developed sophisticated data management and viewing software as an integral part of the Permasense solution to support data interpretation, this software offers both an overview of all locations monitored at a facility, and drill-down functionality.
Parker Hannifin has introduced the GLF iprotect series, a new generation of low pressure filters. As with Parker’s proven high and medium pressure types, the innovative and environmentally friendly design is based on patented filter elements. With the introduction of the new product family, Parker has consolidated its low pressure area for clearer and more user-friendly filter selection and improved customer service.

The efficient GLF iprotect filters in sizes 2 and 3 (further sizes to follow) are designed for flow rates up to 800 l/min, with pace-saving ‘in-tank’ solutions are available for tight spaces. The elements feature the powerful and durable Parker quantumfibre filter material for particle sizes 2 μ, 5 μ, 10 μ and 20 μ. Thanks to the patented element design, users benefit from a lasting aftermarket business.

For the phased introductory and conversion process, during which the existing TTF, BGT, Tanktopper, FT and Multiflow low pressure series will be replaced by high quality and at least functionally identical GLF iprotect filters, customers will receive active support, for example through the user-friendly online part number converter.

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Ai2SA replaces HMI on legacy Mitsubishi A series PLC

Architects Integrating Industry (Ai2SA), which specialises in ‘optimally managing and scoping industrial systems projects’ was recently contracted to replace a faulty HMI on an legacy Mitsubishi A Series PLC. Initially, the engineers tried to reduce the cost by repairing the faulty HMI (dating back to 2004), however this proved impractical as spares were unavailable locally, and the cost of importing them was prohibitive.

A decision was then made by the client to decommission the line, however they were persuaded not to. Ai2SA then proceeded with some research to identify an HMI which would be able to communicate to the PLC CPU, which dated back to the 1980s. A unit was identified, and re-engineering started using a backup from another line, which required significant changes as the new unit was only available with touch panel functionality not an external key pad.

During initial commissioning it was found that the OEM documentation was incorrect as the unit did not offer RS-422 communications and therefore an additional RS-232/RS-422 convertor had to be procured. The project was then completed and signed off by the customer who was able to increase lifespan of the production line, thus generating a return on their investment. A screenshot of converted HMI is depicted here reflecting the Ai2SA colour scheme.

In conclusion, it is important to note that it is often possible to customise technology and thus extend the serviceable life of production equipment.

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Take a look at Forpheus, Omron's table tennis playing robot. It symbolises the company's 3-i philosophy for machines – integrated, interactive, intelligent. How can a machine like Forpheus play a sport? While Forpheus combines several technologies to create a robot with human-machine interaction, the fundamental element to making any machine smarter is data.

The first step is collecting data, from individual machines or preferably from an entire production line. Analysing all this data can be handled effectively and cheaply using today's processing power and cloud storage. Clean data is essential to enable more efficient processing and the best results. Displaying this collected information on a screen in an easy to understand way can help operators identify and respond to anomalies in the process.

Data analysis helps operators
Displaying process operation data in this way can already deliver 20 to 30% efficiency increases. However, as the amount of data increases, humans are less capable of interpreting it or perceiving patterns. By incorporating large data analysis software, computers offer a more accurate tool to support humans in the task of analysing the big data. These tools can identify irregularities in performance data and flag potential issues to the operator.

With more data and more advanced analysis, the insights and results become more comprehensive and accurate. For example, instead of just identifying an issue, the system can locate exactly where the problem is in the line and what needs to be done to fix it. The operator's job is made easier and line efficiency is further optimised.

As the amount of data increases, data management also becomes important. Collected data is often taken offline for advanced processing and pattern recognition. The resulting patterns are transferred back to the factory to be implemented in real-time by the machine.

Using data to increase automation
Automation can be taken a step further. Smart systems could identify an issue or potential issue, flag it, and then automatically adapt parts of the production line to compensate for any shortfall whilst the problem was being fixed. All within safe operating parameters. This results in even better production efficiency.

Let us consider this at the level of an individual machine. Smart machines, equipped with data analysis capabilities, can optimise their behaviour for any given situation because they know how they are supposed to work normally. They monitor their own performance, ensuring it matches expected behaviour. If a defect or divergence from a standard pattern occurs, the machine reports the issue to the entire system and if possible compensates for the issue by amending its operation. From a system viewpoint, any alterations must be balanced throughout the line to ensure consistent operation between machines.

Real smart factory automation
The complexity of the data is one of the items that makes moving to a smart factory a major challenge. That is why Omron is implementing these smarter systems into its own processes, allowing the company to investigate requirements and develop best practices. And there is plenty to learn. At first when they start looking at their own processes two years ago, the very first data scientist spent 80% of his time just cleaning up the data.

Today they are applying what they have learned to their systems and products to bring the benefits of smart automation to their customers. Together with several selected customers, they are now carrying out experiments in smart automation, learning where any bottlenecks occur. In the end, only by performing this research in real factories can the real value be uncovered.

Human-machine interaction
Building on data collection and analysis, smart automation can be extended into the realm of human-machine interaction. Returning to Omron's budding ping-pong champion, Forpheus has the capability to observe the motion of the opponent facing it on the other side of the table, along with cameras that watch the ball's movement. Analysing the data from the sensors, it can calculate movement very precisely and quickly, so it can anticipate how the opponent will hit the ball and its trajectory. Forpheus then moves its paddle to intercept the ball and hit it back across the table.

How difficult or easy it returns the ball gives a clue as to one way this smart machine can be used to general advantage. By being able to assess how its opponent plays, it can determine its skill level. Forpheus can modify its own playing level to get the best from its opponent. If it plays at a slightly better level, the opponent will have a challenging game without becoming frustrated. Hence, smart machines can also be used to train people.

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IO-Link master for the IIoT world

The IO-Link master modules for the control cabinet serve as a gateway between intelligent IO-Link sensors and the fieldbus, allowing important information from intelligent sensors to be sent into the IT world. With a separate IoT Ethernet socket, the IT network can be set up completely separately from the automation network with sensor information is transferred into the IT world via the established TCP/IP JSON interface.

Advantages and customer benefits

Separation between automation and IT network
Machine uptime is of highest priority. The automation network must by no means be interrupted by external factors. Therefore the unit features a separate IoT Ethernet socket separating IT and the automation network. This means that important sensor information can be safely sent to the IT and ERP systems.

Sensor configuration with LR Device
The intuitive software finds all IO-Link masters in the network and creates an overview of the whole plant. In addition, all connected sensors are displayed with the respective parameters. This makes it possible to set the parameters of all sensors in the system from one central point.

Easy sensor connection
The sensors and actuators are connected via standard M12 connection cables without screening. The connection cables are fixed via removable Combicon connectors on the IO-Link master. Up to 8 IO-Link sensors can be connected and be supplied with up to 3.6 A. The cable between the IO-Link master and sensor can be up to 20 metres long.

Reliable digital data
The sensor data is transferred digitally. Unlike analog signals, contact resistance and EMC interference cannot corrupt the signals.

For more information contact ifm electronic SA,
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Muting reinvented

Smart Process Gating, introduced by Leuze, has made muting processes more economical as well as simpler and safer. This technology is available in southern African from sensor solutions specialist, Countapulse Controls. Managing director, Gerry Bryant, explains that in intralogistics as well as in the automotive and packaging industries, material locks often need to be safeguarded against unauthorised access by means of safety sensors.

Previously, muting processes with muting sensors were required to identify clearly when transported goods were approaching a protective field. These muting sensors then bridged the passing of these goods through the protective field at the correct moment. The Smart Process Gating method has completely eliminated the need for signal-emitting sensors, making this a far simpler and more reliable solution in these applications. This solution is based on the Leuze MLC safety light curtains and this means that conveyor systems can be made more compact.

This configuration of the sensing solution has eliminated the risk of misalignment or damage to the sensors, and in addition because it is so simple to install there is a reduction in capital input costs. There is also a considerable reduction in maintenance and servicing requirements, which also reduces costs. Increased reliability and sensing accuracy is a major advantage of the Smart Process Gating solution, and this will increase not only productivity but also safety in an operation. In the case of typical intralogistics applications, the height of the protective device is entirely dependent on the safety-related requirements and this sensing methodology does not require synchronisation beams to be taken into consideration, again saving on cost and increasing reliability.

The first muting signal comes from the process controller (PLC), while the second muting signal is generated by the protective field itself. Smart Process Gating requires a detailed knowledge of the process so that the necessary control signals are made available in the expected time window. Countapulse Controls offers a full technical advisory service that can assess any application and provide the most appropriate solution using this technology.

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Signal Conditioning with TSA Modules

**TSA module areas of application**
- Signal condition and conversion of standard signals
- 3-way isolation
- Replaceable filter modules for each channel
- Power supply via T-bus or front terminal

**Application examples**
- Test stands for machine construction and the automotive industry
- Status monitoring of machines and systems
- Monitoring of status changes
- Monitoring of wind turbines
- Actuation of servo valves

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Demand more from low voltage systems

Schneider Electric has an innovative high breaking capacity for the Compact NSX range of moulded case circuit breakers (MCCBs), offering users more from their low voltage (LV) infrastructure and a cost-effective alternative to fuses over the long term.

Companies involved in the exploration, extraction and processing of natural resources look for the smartest, most cost-effective way to run their operations. Opportunities to lower capital costs and operating expenses often lie buried within a site’s LV power distribution networks.

Smart alternative to high-power fuses

The high breaking capacity of the Compact NSX MCCBs will withstand demanding fault conditions, staying reliably in service after three faults. After a fault is cleared, remote control reclosing functionality puts circuits back into operation quickly, enabling maximum operational continuity. Discrimination and coordination will isolate faults, to avoid system-wide outages. Over the long term, this reduces the cost impacts of downtime and avoids the labour and parts costs associated with fuse replacement, giving users a cost of ownership advantage.

Critical, high demand power distribution systems, operating at 440/480 V or lower, need protection against extreme short-circuit fault currents. Such faults occur in systems with multiple paralleled power sources or large numbers of motor loads. The higher breaking capacity of the Compact NSX range can be used to provide better protection and higher continuity.

Substation retrofit gives IEC 61850 MMS solution

A regional substation was tasked with improving the substation’s performance and reducing maintenance problems, but without replacing several key serial IEDs already in operation. Since the many RTUs, HMIs, switches, and IEDs installed in the substation were from different vendors and some used proprietary protocols, several different drivers had to be installed to allow the power scada system to manage the entire substation. A key part of the solution was to upgrade or replace the existing scada system, RTUs, HMIs, and switches to support the IEC 61850 MMS protocol and thereby achieve unified MMS monitoring and vendor-independent maintenance. In order to keep the existing serial IEDs connected to the system, RTUs were considered for connecting the legacy Modbus and DNP3 IEDs to the substation’s network.

• High-port density of serial connections to network the existing Modbus, DNP3 and proprietary legacy IEDs to the substation network.
• Robust reliability to withstand harsh EMI conditions.

Moxa’s solution

Instead of using RTUs, the system integrator found that Moxa’s NPort 59650I was a perfect solution for connecting the ageing, legacy IEDs to the substation’s IEC 61850 network. Since the NPort 59650I serial device servers support the IEC 61850 MMS protocol, they can be monitored by the power scada system. The NPort 59650I provides up to 16 serial ports to connect existing Modbus and DNP3 IEDs, and uses the MMS protocol to communicate with both the power scada and RTUs to report the status of legacy IEDs, such as turning a modem on or off, keeping track of TX/RX counts, etc.

The NPort 59650I supports both the IEEE 1588 protocol and IRIG-B time synchronisation, making it possible to construct a timeline of events for troubleshooting purposes. The NPort 59650I can obtain the precise time from the IEEE 1588 protocol (via an Ethernet port) or IRIG-B time server (via a BNC connector) and then send the signals over the serial connections to synchronise the serial IEDs with the rest of the network.

After the substation’s Ethernet equipment was upgraded to a total MMS solution, the power scada system could use the unified MMS interface to monitor all of the various Ethernet devices, regardless of brand. In fact, the NPort 59650I’s serial-to-Ethernet capability and support of the MMS protocol allowed the substation’s power scada system to monitor the status of all the substation’s legacy serial IEDs in addition to the Ethernet-based devices.

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Onsite oil treatment saves transformers

With what is claimed to be the largest mobile oil regeneration plant in Africa, WEG Transformers Africa (WTA) plays a vital role in extending the life of South Africa’s transformer population and preventing unplanned down-time within electricity transmission systems. According to engineering manager, Ronaldo Bertoldi, ageing transformer oil introduces a number of risks into the performance and longevity of oil cooled transformers. “Moisture and impurities reduce the intended insulating effect that oil has within the windings and produces acid, making it more likely for breakdowns to occur, with potentially severe damage to the transformer itself,” he says.

WTA is able to conduct an oil regeneration service onsite for large transformers. This is done by transporting the regeneration plant by road and setting it up at the location required by the customer. Once linked up to the transformer, the unit circulates the oil through a process which involves filtering it through Fuller’s earth to remove impurities.

Careful sampling of the oil is first conducted in accordance with ISO and SANS sampling procedures by the company’s field teams, so that oil testing can establish the severity of the contamination. Laboratory tests, also conducted by WTA, are able to pick up the extent of cellulose breakdown from the insulation around the windings, oil decomposition and any moisture ingress. “The regeneration process removes acids, as well as absorbing moisture and oil decaying products through a hot oil circulation process through Fuller’s earth and inline oil purification in a closed loop path,” Bertoldi explains.

The process of purification only is shorter and uses inline micro filters to remove water, alcohol, dissolved gases, oxides and solid impurities. This is also a hot oil circulation process conducted in a closed loop path, and can usually be conducted in less than a day, depending on the condition of the oil. The number of passes that the oil requires through the system is based on the laboratory tests that indicate the level of contamination. Most of this work is conducted for end-users of transformers in various industrial sectors, with municipalities currently doing less oil purification or regeneration than in the past.

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Governments around the world know the importance of supplementing fossil-fuelled energy with renewable energy in an effort to ensure a greener and cleaner environment for our planet. Wind is a renewable energy resource. There are no fuel costs associated with it and no harmful polluting gases are produced when using wind energy as an option to produce electricity. According to the 20 year Integrated Resource Plan (IRP2010), about 42% of the electricity generated in South Africa should be supplied from renewable resources in the near future. The Western, Eastern and Northern Cape are the leading provinces in wind energy in South Africa. All three of these provinces provide a suitable environment for wind farms thanks to the abundance of wind throughout the year.

When developing a wind farm, it is critical to optimise its layout for maximum efficiency. This process is called wind farm micrositing. The aim of such a process is to maximise the energy production of the wind farm, while minimising infrastructural and operating costs. For most projects, the economics are substantially more sensitive to changes in energy production than infrastructure costs. It is therefore appropriate to use energy production as the dominant layout design parameter.

Factors to be considered when micrositing include:
- Maximum installed capacity (due to grid connection or power purchase agreement terms)
- Site boundary
- Turbine load constraints to avoid unfavourable wind conditions such as high shear, turbulence and extreme wind gusts
- Turbine minimum spacing to reduce wake-induced turbulence and wake losses of downstream turbines
- Set-back distances from roads, dwellings, overhead lines and ownership boundaries
- Environmental constraints
- Location of noise-sensitive dwellings and assessment criteria
- Location of visually sensitive viewpoints and assessment criteria
- Location of dwellings that may be affected by flickering shadows cast by rotating blades (shadow flicker) when the sun is in a particular position
- Turbine minimum spacing, as defined by the turbine supplier
- Constraints associated with communications signals, for example microwave link corridors or radar

These constraints may change as discussions and negotiations with various parties progress, so this is inevitably an iterative process.

The number of variables makes micrositing a challenging process, and it is an ideal candidate for advanced analytics that can crunch vast amounts of data to arrive at a scientifically optimal solution.

Some wind energy firms are using these prescriptive analytics to solve energy production problems that were once thought unsolvable. In 2016, Norwegian startup company, Markedsblabben managed to solve its wind layout challenge, and by so doing improved its energy yield by 2 to 5%. The company employed the use of FICO’s Xpress Optimisation Suite in its algorithm to optimise wind farm layouts.

“While industry software previously has been capable of maximising energy yield by heuristics or genetic algorithms, no one has to date been able to incorporate load constraints into the optimisation,” said Klaus Vogstad, owner of Markedsblabben (now known as WindFarmDesigns.com). “This means that consultants and manufacturers spend a lot of time checking layout solutions for load compliance, and adjust these layouts manually. This process is time consuming, and also achieves suboptimal results.”

Using a suite of optimisation tools from analytics software firm FICO, WindFarmDesigns managed to crack the code by incorporating load constraints in the layout optimisation problem using an MIP formulation with iterative relaxation. The resulting algorithm allowed the problem to be solved in just minutes for a typical windfarm size of 20 turbines.

WindFarmDesigns now helps clients optimise wind power projects to be profitable and compliant and to help reduce CO₂ emissions. “Our Xpress Optimisation Suite can go a long way in solving complex business problems. It gives you the tools you need to understand where you are as an organisation and the potential opportunities that are within your reach,” said Derick Cluley, head of operations at FICO South Africa. “By using the world’s most advanced optimisation software, wind energy producers and other businesses can quickly and easily solve massively complex business problems faster.”

For more information contact Britespark, +27 (0)11 655 7367, info@britespark.co.za, www.britespark.co.za
Online condition monitoring with fieldbus interface

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The new VSE15x family provides different fieldbus interfaces to exchange data with a PLC.

This makes it possible to display the measuring values directly on the control system and optimally adapt the monitoring functions to the operating states and processes of the machine.

In addition to the fieldbus, 2 fast digital switching outputs (response time ≤1 ms) are provided for time-critical alarms.

Reduced network complexity saves time and money

The direct PLC connection via fieldbus allows auxiliary parameters (e.g. rotational speed and triggers for operating states) as well as non-time-critical alarms from condition monitoring to be exchanged over the bus.

This not only reduces wiring complexity but also saves the cost of providing the corresponding inputs/outputs on the PLC.

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Improved protection against under- and over-pressurisation of safety devices

Recommended good practice for subsea production systems require sensors to be installed that measure pressure safety high (PSH) to provide over-pressure protection on downstream vessels in a production train. Similarly, pressure safety low (PSL) sensors are required to provide under-pressure protection. These pressure safety devices must use live input data to determine the safety high and safety low values to help prevent over or under pressurisation of a vessel if they are to adhere to regulatory requirements.

**Background**

The Bureau of Ocean Energy Management Regulation & Enforcement (BOEMRE) require Gulf of Mexico operations to use range charts to determine the safety settings of PSH and PSL for pressure safety devices. Range charts (previously referred to as minerals management service trends) display a set of data points that require two values per data point. These values consist of a high value (PSH) and a low value (PSL) that define the range for each data point. Having access to this live pressure data will provide information on the current pressurisation of a vessel; but how do you collect and store all these data points and can you record these values accurately that satisfy regulatory requirements? Are operators confident that they really know the highest and lowest pressures over a specific time period? This requires a repeatable process that can calculate range values for a defined date/time that is easily accessible from the control room.

Organisations that operate in these environments can benefit from an effective method of collecting and storing all settings for all sensors that is maintainable and repeatable over time to help prevent over/under pressurisation of their pressure safety devices.

**Yokogawa’s solution**

Yokogawa provides an effective solution to access live data to determine the safety settings for pressure safety devices. Exaquantum collects and stores pressure data and via its AutoTrend software application, it provides a range chart with the ability to display real-time and historical trend information for PSH and PSL values. The range chart tracks and monitors pressure safety devices that can be printed or saved electronically over a selectable time period. The PSH and PSL values are calculated based on the latest data and time range applied. If the date/time range is changed, the PSH and PSL values are updated and re-calculated based on this new information, conforming to recommended best practices and BOEMRE standards relating to pressure sensors installed on subsea production systems.

To improve operator efficiency, navigation to the range chart is easily accessible from the HMIs in the control room. Users can easily see which sensors to track and select which tags they want to chart with simple drag/drop functionality. An in-built calculation engine helps to determine the safety high and safety low values for pressure sensors with a quick and efficient range chart solution. In addition, every pressure device that is charted can be quality checked with a pass/fail quality check.

**Benefits**

- Improved vessel protection against pressurisation.
- Exaquantum enables operators and end users to determine the safety settings of PSH and PSL for selected pressure safety devices for improved protection of downstream vessels against over and under pressurisation.
- Meets regulatory requirements.
- Regulatory bodies such as the BOEMRE require proof that safety settings of PSH and PSL for pressure safety devices are determined using live input data. Exaquantum’s Range Chart software provides this functionality, and provides evidence to support these requirements.
- Data recorded electronically.
- When the PSH and PSL values have been determined, operators can print a copy of the trend or save an electronic copy for recording and storage purposes.
- Email Event Service (EES) and File Data Manager.
- EES sends an email when important process data arrives into Exaquantum. In addition, the File Data Manager transfers CSV files containing process data values (tags) into Exaquantum.

**Conclusion**

Organisations that operate in the subsea production systems environment require an effective method of collecting and storing all settings for all sensors to help prevent over/under pressurisation of their pressure safety devices. As part of an ongoing requirement, it is important that pressure safety data is maintainable and repeatable over time. The BOEMRE standards and recommended practice regarding pressure sensors state that safety settings of PSH and PSL are required to use live input data. Exaquantum’s Range Chart software meets these requirements and provides the necessary evidence to support regulatory compliance.

Yokogawa’s software solution provides control room operators with an easy and intuitive tool to monitor and track pressure safety devices that uses real-time and historical trend information. The range chart provides the PSH and PSL values for selected devices via a simple drag and drop menu screen over a defined period of time that can be printed or saved electronically as needed.

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Imagine 10 000 temperature readings, monitored at one central point, using one fibre optic cable!

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APPLICATIONS INCLUDE:
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ADVANTAGES:
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UP TO 10KM OF FIBRE OPTIC CABLE CAN BE USED TO SENSE HEAT ON EACH 1M SECTION TO 1°C ACCURACY ENABLING USERS TO MONITOR 10 000 TEMPERATURE READINGS FROM ONE CENTRAL POINT USING ONE 10KM FIBRE OPTIC CABLE.

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Distributed Temperature Sensing (DTS) utilises laser light and fibre optic cables to measure temperature. An infrared LASER PULSE is sent through the fibre. The incident energy is back-scattered from the glass molecules throughout the entire length of the fibre. These minute light signals contain information about the temperature of the glass at any given point in the fibre, in accordance with the Raman Effect. The back scattered light is measured and then analysed for temperature. The POSITION of the temperature reading (along the fibre length) is determined by measuring the time delay of the returning light pulse, similar to a radar echo.

Do not hesitate to contact us for additional product information and re-seller opportunities.
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Fibre optic temperature monitoring of switchgear

AP Sensing’s passive fibre optic cable provides accurate temperature measurements along the length of equipment such as a conveyor belt, or inside switchgear. The system enables cost-effective monitoring along extended or short distances, allowing overheating to be quickly detected and localised to within one-metre accuracy.

Case study
With all the possibilities that the AP Sensing FO DTS (fibre optic distributed temperature measurement) has to offer, a simple but very important question arises: Can it be used to detect hot spots within a switchgear cabinet? Can the DTS detect the change in temperature inside the cabinet caused by a hot component with a temperature between 100°C and 150°C? And, can it detect such a hot spot within 48 hours of the component reaching the specified temperatures?

Purpose of the test
The purpose of the test was to investigate if the DTS system is able to detect a typical hot contact/conductor anywhere inside a switchgear cabinet, even without the sensing cable touching the hot component.

Setup
• A cabinet was placed inside an air-conditioned room to keep the ambient temperature between 22°C and 24°C.
• The dimensions of the cabinet were 2620 x 500 x 2320 mm, with six ‘buckets’ varying in sizes between 200 and 600 mm.
• The top two buckets were closed off on the sides of the cabinet to simulate a real installation and to prevent convection to influence the result.
• A 100 W heat source 20 x 20 x 10 mm, with a surface temperature between 120°C and 150°C was placed at the bottom bucket inside the cabinet to simulate a hot connection point.

Conclusions
The results showed that the heat source caused a very small but detectable rise in the average internal temperature of the cabinet. Since the buckets were not completely isolated from each other, hot air could rise in the cabinet due to natural convection.

Detecting a hot contact/component inside the switchgear cabinet is not only a function of the source temperature, but also of the available power from the heat source. As long as the temperature sensing happens at a higher location than the source, any location inside the cabinet will suffice to detect a difference in temperature. If the cabinets are stacked end-to-end and isolated from each other, the sensing cable only needs to be inside the top most bucket. If the cabinets are not isolated from each other, the sensing cable needs to be inside the cabinet, running vertically for the height of the cabinet.

The closer the sensing cable is to the source the faster it will respond, but it is important to note that the development of a hot contact is gradual and the entire cabinet temperature will change over an extended period of time.

Questions and answers regarding the test results
Why did the system only register 35°C when any test results show that a significant change in temperature must be considered? The system measures the temperature of the actual glass molecules of the optical fibre. Any change in temperature must be conducted from the outside of the cable to the glass cores inside. If the cable is not in direct contact with the heat source, the measured temperature will always be lower than the source temperature.

The cable is sensitive to radiated heat (infrared radiation heating up the surface) as well as ambient heat (hot air surrounding the cable).

The internal components of a typical electrical cabinet will be an optical (line-of-sight) obstruction to most of the fibre cable, thus the detection cannot rely on radiation only.

Conclusions
• The heat source will warm the air surrounding it and natural convection will transport the hot air to where the cable is located.
• The test proved that the 120°C source with a heating power of 100 W, sufficiently heats up the air to cause a temperature rise of more than 10°C at the top edges of the bucket where the source is located.
• 35°C was the air temperature leaving the bucket by natural convection.

How long will it take to detect a hot contact within a bucket?
• The test results show that a significant change in temperature is evident within 30 minutes, with the temperature stabilising after 3 hours.
• The suggestion is to have a fibre cable running vertically for the entire height of the cabinet.

Any heat source similar or more powerful than the test source will cause hot air to escape the problem bucket and come into contact with the cable.

How should the alarm parameters be configured to detect a change in temperature?
• The best alarming method to use will be rate-of-rise. The entire length of the fibre cable inside the cabinet will be allocated to one detection zone. The system allows for up to three separate rate-of-rise parameters per zone, usually implemented as short term, medium term and long term parameters. (A detailed copy of the test results is available on request.)

Fibre optic sensing technology offers multiple measurement solutions for measuring operating conditions in the mining and industrial sectors. It performs exceptionally well in harsh conditions and is virtually maintenance free, offering the user reliability and low cost of ownership.

For more information contact Marihette Hattingh, Sperosens, +27 (0)12 665 0317, marihette.hattingh@spero.co.za, www.spero.co.za
Motors drive industry and provide convenience in everyday life. However, if they are not maintained they can fail, which will interrupt production, affect revenue, energy efficiency and product quality, and could also result in safety hazards. This invariably causes an increase in the cost of production.

The IIoT Motor Diagnostic System accurately diagnoses the state of equipment in real time and automatically notifies users of problems as well as solutions. It analyses the voltage and current signals supplied to the motor. To do this, users need only connect a sensor between the motor and the distribution board. The diagnostic system analyses the current state of the motor and makes estimations about its health. The system runs a comparison analysis between the measured data from the motor and that of the line motor database. It picks up even slight differences and analyses them to diagnose abnormalities and then gives advance notice in real-time of possible impending failure.

The system has a periodic notification function that evaluates the performance of the motor at set intervals and informs of possible maintenance risks and estimated time to replace parts. It is installed in the motor control panel and results are analysed automatically. It is easy to use and can conveniently be managed remotely as well. The IIoT Motor Diagnostic System detects both electrical and mechanical faults of various types in industrial equipment, driven by three-phase electric motors.

Additionally, it is also capable of detecting abnormalities of the connecting cable and terminal blocks, as well as changes in the load and supply. Hence the system allows users to observe in real-time whether the motor is performing optimally.

Motors that consume the most power in the industrial field often run at low efficiency during long-term operations. If the efficiency of such motors is managed properly it can save a considerable amount of energy. The IIoT Motor Diagnostic System has a built-in power quality measurement function for electrical signal analysis as an integrated solution that saves energy.

Correctly timed maintenance and repair actions, initiated by the diagnostic system, allows motors to last longer at the lowest cost, without suffering from quality problems or unexpected failures.

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The next generation in fire detection

Cirrus Hybrid represents the next evolutionary step in the advancement of fire detection systems.

The fire engineering industry, which offers a crucial life and property saving service to the world, it used to be based on plain old heat and smoke detection. Then technology got a little cleverer with optical/heat point type detectors. Some smart vendors also added carbon monoxide detection for good measure. As infrastructure started to evolve that did not suit point type detection, such as data centres and high-bay warehousing, air sampling devices were introduced. Then came very early warning smoke detection systems, more commonly known as high sensitivity smoke detection systems (HSSD).

Technology evolves

This technology brought about a push forward to sense combustion early. The primary need is to reliably sense a fire at its earliest stages in order to illicit an alarm and then take immediate action to minimise injury and loss. Nevertheless, this technology is hamstrung by the fact that there is always a false alarm potential when optical only smoke sensing is used, for instance lasers and LEDs.

To elaborate, smoke particles are similar in size to dust particles. When either phenomena is sampled and analysed by the optical sensing mechanism within very early warning smoke detection systems, light is scattered in similar ways resulting in the detector possibly making an incorrect decision that there is a fire, and signalling an alarm. Manufacturers of such systems have tried various methods to mitigate this, mostly with costly dust filtering systems that require continuous and onerous maintenance.

All such air sampling devices that utilise optical sensing are in essence ‘smoke detectors’. However, right now, there is a next generation air sampling system available that can sense an impending fire threat accurately and reliably, and can do it prior to any smoke even being emitted.

Cirrus Hybrid

The Cirrus Hybrid is a ‘very early warning smoke and fire air sampling detector’. It utilises multisensor technology, which is not tied to the limitations of optical only smoke detection. The key reasons behind the development of this revolutionary new product is to answer the high demands of a world now well into the ‘Information Age’.

There are data centres all over the planet hosting consumer data ‘in the cloud’. Such infrastructure requires densely packed hard disk drives, networking infrastructure, densely packed electrical power cables, as well as data cables. All of which have varying polymers that combust differently.

Some produce little or no smoke, while other polymers emit thick black smoke. Gone are the days of having a few air conditioner units scattered around. Cooling systems have become far more sophisticated incorporating hot aisle/cold aisle containment systems. Air is being moved at high velocities. Dust is present in ceiling and sub-floor areas. Data centres by their design work against fire detection systems, but many are required to have automatic fire extinguishing systems installed, as most insurers insist on it.

Those older very early warning detection systems offered an attempt at solving the fire sensing issue by detecting the earliest signs of smoke, but many engineering standards steered away from the use of such devices to trigger the operation of automatic fire extinguishing systems because of the inherent false alarm potential. Such standards, like BS6266/SANS246, recommend that air cooling systems be turned off to allow point type smoke detectors a chance to sense smoke and therefore provide a second separate signal to operate the automatic fire extinguishing system. If the decision was left to the limitations of the optical sensing mechanism alone, dust could trick it into thinking there is smoke from a fire, creating a false alarm and possibly leading to the costly unwanted operation of an automatic fire extinguishing system.

The Cirrus Hybrid is not affected by such limitations since it combines two separate detection mechanisms in a single system. It has optical smoke sensing similar to all the other types of very early warning smoke detectors, but it also has a cloud chamber. This is a ‘combustion detector’, not a ‘smoke detector’. It looks for invisible combustion particles that occur before smoke at the ‘thermal particulate’ stage of a fire. The Cirrus Hybrid continually asks its different detectors for their status. In order for it to decide that there is a genuine fire, the cloud chamber must confirm, thereby dismissing false alarms from dust, humidity and other phenomena that plague older optical only detectors. Should smoke be emitted during a genuine fire, the smoke detectors create a smart ‘boost’ signal that further reduces response times.

The advantages of convergence

One of the major advantages of the Cirrus Hybrid is that it reliably responds to different kinds of fires. It can sense when polymers electrically overheat – but emit little or no smoke – far in advance of an optical only fire detector. Fumigation systems that produce high amounts of obscuration can also fool optical only type very early warning smoke detection systems. The cloud chamber is not so easily fooled. Many of the largest and most prestigious data centres are now employing this technology to not only detect fire, but also to provide a reliable set of signals to operate automatic fire extinguishing systems.

The convergence of technology means that this fire and smoke detection product sits at the cutting edge of possibility. It utilises a 7” full colour touchscreen for easy navigation and use. It stores around two months of historic fire, smoke, air flow data. It can also enhance itself by being integrated into a client LAN IP network. It can interact with IP security cameras and broadcast what such cameras see on the Cirrus Hybrid’s touch screen, allowing an impending fire threat to be investigated without having to walk into a potentially dangerous situation. Offsite remote viewing is also possible, which allows for remote technical support from a specialist, all via the Internet, thus minimising cost and time when technical intervention is required. Furthermore, the Cirrus Hybrid is both a fully addressable and conventional type detector making it compatible with any reputable fire control panel. It is loaded with the Protec Algotech Protocol for use on the Protec Addressable range of fire control panels. Thus, each pipe is an addressable device that can provide multi staged alarm levels per pipe.

By combining both smoke and combustion detection principles, by converging fire detection with security system technologies, by being loop enabled with addressable fire control systems, the Cirrus Hybrid represents the next technological step in the advancement of fire detection. The time for reliance on old technology solutions has passed – long live the future.

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www.instrumentation.co.za
Siemens has extended its Sinamics G120 converter series portfolio to include an option for wireless commissioning, diagnostics and servicing. The new Sinamics G120 Smart Access Module enables the wireless connection of mobile devices such as tablets, smartphones or laptops over WiFi to the Sinamics G120, Sinamics G120C and Sinamics G120P converter series, making for considerably simpler converter handling. The module is set up in a few simple steps using a conventional web browser and any standard operating system. The web server functionality eliminates the need to download any additional software. With its intuitively structured user interface and menu guidance, the module offers outstanding user convenience.

The G120 Smart Access Module is available for Sinamics G120C, Sinamics G120 with Control Units CU230P-2 and CU240-E2, as well as for Sinamics G120P with CU230P-2. Since the use of the module is not linked to a specific web browser, customers are free to choose any preferred browser and use any optional terminal such as a smartphone, tablet or laptop for converter commissioning, parameterisation and maintenance. The motor can also be tested in the JOG mode. Error messages or warning signals are quickly detected over the wireless link, which can also be used to save or reset settings. A function enabling the settings from one converter to be duplicated, sent to other mobile devices and used to set additional converters provides an enormous labour saving when handling several converters. It is also possible to swap Sinamics G120 Smart Access Modules between different converters of the specified series, allowing them to be commissioned using a single mobile terminal. In this case, the module acts as a transportable storage facility with web-based operator unit and wireless client link.

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Inor goes wireless

Inor, a leading manufacturer of industrial process instrumentation for temperature measurement, has introduced a completely new way of configuring and monitoring transmitters. By integrating the wireless technologies of NFC and Bluetooth, Inor enables communication with the transmitter via a smartphone or tablet without needing to remove the device from the process.

The transmitter can easily be configured through the intuitive interface of the ‘Inor Connect” app, which offers, among other things a feature that makes it possible to copy a configuration to multiple transmitters. There is also a monitoring feature to facilitate troubleshooting.

The new concept is launched together with the IPAQ 530, the first temperature transmitter with built-in NFC and with support for Bluetooth via the Icon-BT modem. It is also equipped with the latest HART 7 version for extended diagnostics. The IPAQ 530 is a modern, universal transmitter available both in head and rail mount versions, and with ATEX and IECEx approval. It is designed to meet the highest standards of flexibility, accuracy and reliability.

The IPAQ 530 is the latest advance in the company’s new industrial platform of previously launched products such as IPAQ 202 and IPAQ 330. “Using technologies like NFC and Bluetooth, Inor is driving the process industry towards digitalisation and a wireless future,” concludes CEO Benny Björkander.

For more information contact Mecosa, +27 (0)11 257 6100, measure@mecosa.co.za, www.mecosa.co.za
RS Components has announced availability of a new series of thermal imaging and test and measurement products from FLIR. Primarily targeting electricians, electrical engineers and technicians, and those involved in maintenance applications, the selection of products includes an advanced thermal imaging camera along with a wide selection of new handheld multi-function tools.

Integrating FLIR’s MSX (multi spectral dynamic imaging) technology, the FLIR E53 brings thermal imaging within reach of the large number of maintenance engineers and technicians that need the capability to identify hot spots or other issues before they potentially lead to expensive repairs. In one unit, it combines the ability to deliver advanced thermal imaging capability for electrical and mechanical systems, as well as building applications. For example, the easy-to-use E53 is ideal for spotting the build-up of heat in electrical/mechanical applications, as well as delivering the resolution needed to detect temperature changes that indicate a building deficiency such as inadequate insulation or moisture intrusion.

Rugged and reliable
Designed to withstand tough environments, the unit has been built with a rugged and water-resistant design and has been drop-tested to a height of 2 m. Other key features include: WiFi connectivity; a 5-megapixel camera; a vibrant 4-inch touchscreen with a 160-degree viewing angle; and a 240x180 resolution detector that offers more than 43,000 points of temperature measurement and a temperature range up to 650°C. In addition, the device’s agile user interface delivers intuitive operation and useful features such as one-touch level/span, enabling users to improve contrast on their target by touching the screen.

Also new from FLIR are three handheld units that feature the company’s IGM (infrared guided measurement) technology. The DM285 is an all-in-one industrial true-RMS digital multimeter and thermal imager that enables users to find hot spots or temperature anomalies. The device offers a built-in 160 x 120 thermal imager and is ideal for use either on the bench-top or in the field and for inspecting a range of electrical, mechanical and HVAC applications and systems.

The second is the CM275, a clamp meter that combines thermal imaging with electrical measurement, providing a fast and reliable way to identify hot spots and overloaded circuits from a safe distance. The third device is the DM166, which is a highly affordable multimeter with a built-in 80 x 60 thermal imager, ideal for locating temperature anomalies, along with a feature-packed multimeter for troubleshooting and diagnosing issues in either high- and low-voltage applications.

The final part of the launch is the availability of new exceptional-value FLIR multimeters: the DM62 and DM66 True-RMS digital multimeters target electrical and field service engineers and technicians. Combining a rich feature set with precise measurements and quality construction, the units offer measurement of voltage, current, frequency, capacitance, and temperature, as well as impedance for the DM66.

For more information contact RS Components SA, +27 (0)11 691 9300, sales.za@rs-components.com, www.rsonline.co.com
is dependent upon the volume flow. A differential pressure is generated which is used to measure various electrical parameters. They have four push button type selector switches and a rotary switch. The rotary switch provides a selection of measurement parameters: AC and DC voltage or current (including mico and nano), frequency, resistance, continuity (with buzzer), capacitance and diode check.

Four push-on terminals allow the circuits to be measured via two colour-coded leads. A 65x47 mm four-digit LCD provides accurate visual readings of the measured parameters, while two fuses protect the meter against excessive input currents. Additional features include: a dual display; data hold/diode tester; beep-jack input warning and a bar graph.

**Wedge flowmeter**

The model FLC-WG wedge flowmeter consists of a pipe inside which a V-shaped wedge is fitted. Through this constriction, a differential pressure is generated which is dependent upon the volume flow. The design of the wedge flowmeter is extremely robust against particle-laden, erosive and abrasive media.

**Low maintenance through robust design**

The constructional design of the wedge flowmeter enables bi-directional measurement, which differentiates it from other flowmeters. As standard, there are four different H/D ratios to select in order to cover a multitude of flow rates.

**For very high and very low Reynolds numbers**

Due to its design, the wedge flowmeter is suitable for nearly all types of flow, especially for media with a very low Reynolds number of 300 up to very high Reynolds numbers of several million. As a result, the wedge flowmeter is very well suited for the measurement of slurries and highly viscous media such as wastewater, sewage sludge, tar sand and cement, as well as gases and vapours.

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**A unique compressed air dryer**

The design of any air dryer is critical to its life span, with many, especially the smaller types for air compressors with capacities from 0.38 to 1.5 m³/min built to a price.

There are a number of components that make up a ‘normal’ dryer. They are a Freon compressor, a heat exchanger to cool the compressed air to 3°C and the finned condenser coil with its electric fan. It is the condenser coil and the fan that more often than not causes a dryer’s premature failure. The fan, on small capacity dryers, runs in a bush not a bearing.

Atmospheric dust and dirt can cause the bush to fail, which burns out the fan motor. When the fan stops the Freon system gets excessively hot, which burns out the Freon compressor winding as well. The result is an expensive repair requiring a new Freon compressor and fan motor, along with a gas refill and labour costs.

If the fan bush does not fail, the close fin design of the condenser is the next potential cause of failure. As dirt blocks the cooling air flow through the condenser the gas temperature rises, the fan switch overworks and the bush works harder along with the fan motor. Either elevated gas temperature causes a Freon compressor winding failure, or again, the bush fails, resulting in an expensive repair bill.

The TX Series of air dryers is unique in that it is designed to work under all site conditions. It has a static condenser, much the same as a wide spaced domestic fridge/freezer panel. It is an evaporative cooler with no fan, which means no fan motor or bush, and no close fin spacing so dirt cannot accumulate on the condenser coil. There are only three moving parts on the dryer, a finned condenser coil with its electric fan. It is the condenser coil that more often than not causes a dryer’s premature failure. The fan, on small capacity dryers, runs in a bush not a bearing.

The Freon circuit is very different to a ‘normal’ dryer. The gas leaving the compressor is passed into the static condenser coil and the fan that more often than not causes a dryer’s premature failure. The fan, on small capacity dryers, runs in a bush not a bearing.

For more information contact Ryan Burger, HellermannTyton, +27 (0)11 879 6620, jhb.sales@hellermann.co.za, www.hellermannTyton.co.za

For more information contact Wika Instruments, +27 (0)11 621 0000, sales.za@wika.com, www.wika.co.za

For more information contact Allen Cockfield, Artic Driers International, +27 (0)11 420 0274, allen@articdriers.co.za, www.articdriers.co.za

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**HellermannTyton offers intrinsically safe multimeters**

The TBM811XEX and TBM812XEX multimeters with a CATIV 1000 V rating from HellermannTyton are designed for hazardous environments such as mining and petrochemical.

The approved explosion protection rating for both instruments is suitable for use in Zone 1 hazardous area. Group I (coal mines) underground and Group II surface applications.

Both of these meters comply to IEC SANS 60079-0:2000 and IEC SANS 60079-11:1999 and include the following markings on the meter: Ex ib I Mb; Ex ib IIC Gb; SAEx MS/09-0:2000 and IEC SANS 60079-14:2007. The rotary switch provides a selection of measurement parameters: AC and DC voltage or current (including micro and nano), frequency, resistance, continuity (with buzzer), capacitance and diode check.

Four push-on terminals allow the circuits to be measured via two colour-coded leads. A 65x47 mm four-digit LCD provides accurate visual readings of the measured parameters, while two fuses protect the meter against excessive input currents. Additional features include: a dual display; data hold/diode tester; beep-jack input warning and a bar graph.

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For more information contact Allen Cockfield, Artic Driers International, +27 (0)11 420 0274, allen@articdriers.co.za, www.articdriers.co.za
**PRODUCT NEWS**

**USB configurable infrared temperature sensors**

ASSTech markets the British made Calex range of pyrometers and now offers the new USB configurable infrared temperature sensors with 4-20 mA output. Temperatures are measured accurately and consistently from -40 to 2000°C with an outstanding response time of 200 ms. The devices are compatible with almost any indicator, controller, recorder or data logger, without the need for special interfacing or signal conditioning.

A choice of measurement wavelengths is available to suit a range of applications. The general purpose PUA8 models can measure from -40 to 1000°C. They are suitable for measuring high emissivity materials such as paper, thick plastics, food, pharmaceuticals, rubber, asphalt and painted surfaces. These models are capable of measuring very low temperatures and are ideal for sub-zero measurements in the food, logistics and storage industries.

Short wavelength models (PUA2) have a choice of temperature ranges from 45 to 2000°C. They provide a more accurate reading when measuring low emissivity materials such as many reflective metals. They are also capable of measuring through glass viewports. Glass PUA5 models operate in ranges between 50 to 1650°C. They are filtered at a wavelength where glass is least reflective, making these an ideal pyrometer for glass surface measurement. A USB cable and Windows software is included. All data is transmitted via Modbus so it is also easy to configure and read temperatures from the sensor using third-party software. The USB cable has an IP65 connector and housing is stainless steel.

*For more information contact ASSTech Process Electronics + Instrumentation, +27 (0)11 708 9200, info@asstech.co.za, www.asstech.co.za*

**Non-contact IR thermometer – efficiency in thermal testing**

HellermannTyton’s T151 non-contact IR thermometer is suitable for various industries such as food and beverage, mining and refrigeration. The instrument ensures machinery is working optimally by finding any hotspots quickly through its non-contact IR functionality.

A coaxial circular laser forms a circle with scales to reduce measurement errors while providing an indication of distance from the surface being measured. The fully integrated UV LED allows for easy detection and location of leaks in heating, ventilation and air conditioning systems (HVAC) with its fluorescent coolant. Other features include:

- 4-in-1 design, (UV refrigerant leak detector, distance and spot size indicator, non-contact IR thermometer and flashlight).
- Drop proof, up to 1.2 metres.
- Distance and spot (field of vision) 15:1.
- Emissivity adjustable.
- High and low alarms for measurements outside the limit.
- Joystick-like scroll button to navigate through the features.

The battery-powered portable device weighs 300 g and comes with an integrated lens cap to ensure that the optics are well protected from potential contamination and damage due to hazardous environments.

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**Lever-action grease coupler**

SKF recently released the lever-action coupler. Developed to optimise grease gun lubricant delivery, this coupler is available in two versions – one for battery powered grease guns and one for manual grease guns.

The lever-action coupler tool improves safety and simplifies the manual lubrication process. Featuring one-handed operation, the easy to use coupler remains attached to the fitting without being held in place. In addition, its reverse-jaw design holds the fitting securely to the seat for less grease spillage.

Offering a comfortable, ergonomic design, the lever-action coupler has a flexible rubber sleeve that offsets pressure applied to the lever and protects the hose from unnecessary wear. Also, its durable, all-steel construction delivers long service life.

It enables one-handed operation for improved safety and is easy to use. The lever is activated for quick attachment and release from the fitting. It is a comfortable, ergonomic design with a protective grip and optimises lubricant delivery. It reduces grease spillage and is made of a robust, all-steel construction.

The lever-action coupler is suitable for use with all manual greasing tools and solves common problems encountered when using a flexible hose. Typical applications include agriculture, construction and general industry, as well as vehicle service environments.

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<td><a href="mailto:sales@instrotech.co.za">sales@instrotech.co.za</a></td>
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<td><a href="mailto:c.duckworth@krohne.com">c.duckworth@krohne.com</a></td>
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<td><a href="mailto:glen@loadtech.co.za">glen@loadtech.co.za</a></td>
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<td><a href="mailto:kamil.maharaj@macfluid.co.za">kamil.maharaj@macfluid.co.za</a></td>
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<td>Michael Brown Control Eng</td>
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<td><a href="mailto:michael.brown@mweb.co.za">michael.brown@mweb.co.za</a></td>
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<td><a href="mailto:info@randci.co.za">info@randci.co.za</a></td>
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