02/2022

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The easiest way towards Industry 4.0

FEATURES:

- Industry 4.0 + IIoT
- Energy management + the industrial environment
- Sensors + switches
- Plant maintenance, test + measurement

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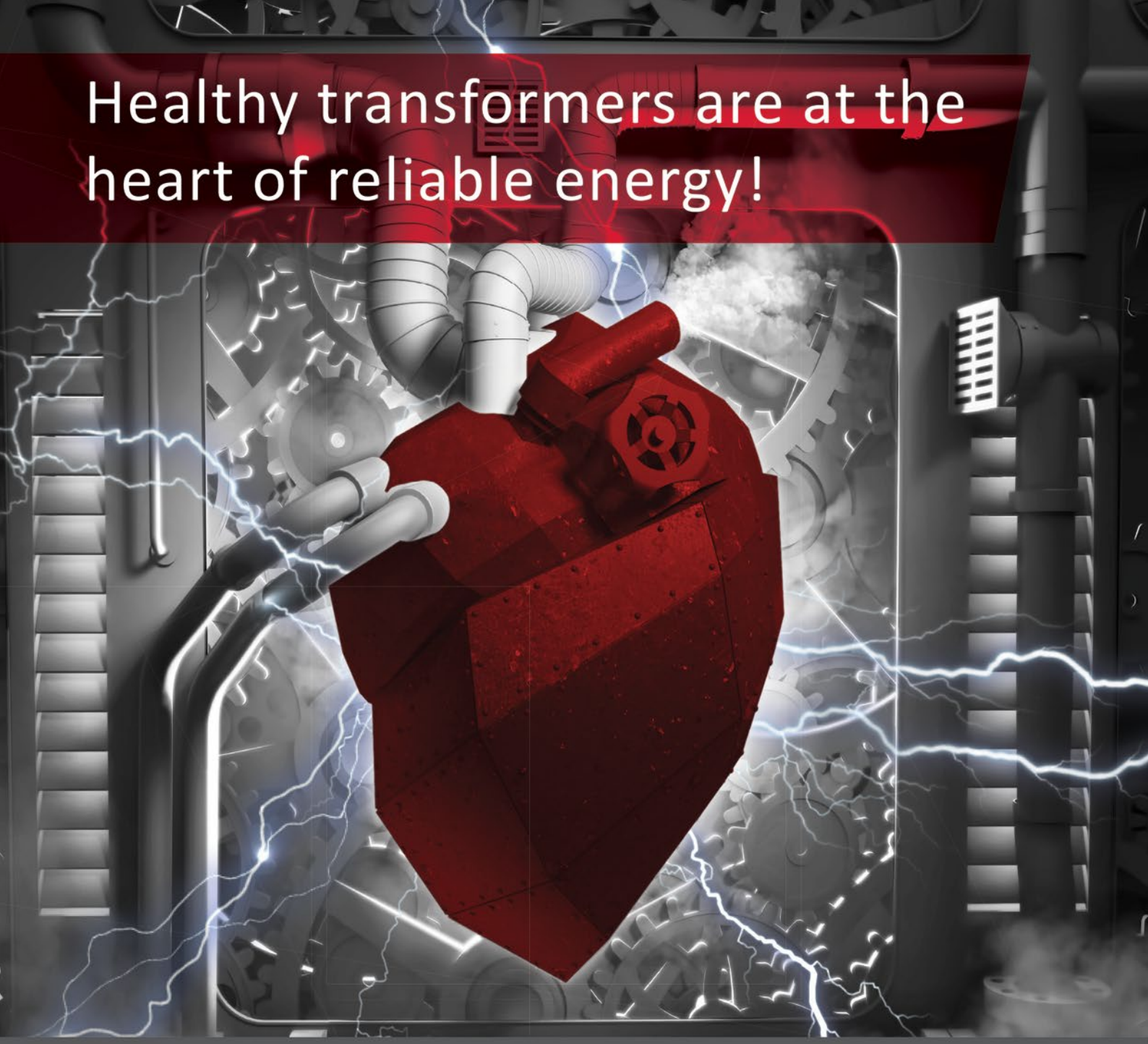

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Brochure

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With the io-key from ifm, monitoring of decentralised processes and installations can be implemented simply and efficiently.
(Read more on page 3.)

Editor: *Leigh Darroll*
Design & Layout: *Darryl James*
Advertising Manager:
Heidi Jandrell
Circulation: *Karen Smith*
Editorial Technical Director: *Ian Jandrell*
Publisher: *Karen Grant*
Deputy Publisher: *Wilhelm du Plessis*

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Let's focus on what we can change

As we move into what we hope will be a slightly more 'normal' year, it is time to step back and review how our plant is running.

Can we do better?

Can we optimise efficiency?

Can we put more on the bottom line?

Yes – the manufacturing industry has been hammered by a policy environment that is really not helpful; then there was Covid; then that looting spree; and we cannot miss the general malaise in the economy.

But sadly, I suspect a lot of the loss of confidence is due to the absence of signs of decisive action to begin to turn the boat around – even to close the loop on lawlessness.

Previously I have said that education is far too important to be left in the hands of the state alone; equally so with healthcare and security – and now, clearly, the economy.

The wise view is that there are things we can change; and others we cannot.

So let's step back and review those things on our plant that we can change – and seek out other things within our purview that we can change for the greater good.

One of these touch points will relate to how we optimise the operation of our plant, how we minimise wastage, how we use the data we have in order to inform the way we do things.

This applies in the manufacturing cycle as much as it does within the business management environment.

In this issue we focus on aspects of technology that need to be looked at carefully in this regard. In particular, we have a focus on Industrial IoT and on Test and Measurement – among others.

What gets measured gets done; and data must not only be collected – but turned into useful information.

As the age of digital transformation evolves at an accelerating pace, we need to be looking at our engagement with the IIoT very thoughtfully. This allows the interconnection of control, automation and data collection in ways that can be profoundly helpful in these difficult times. It also crosses the boundary between the plant and the office.

Please enjoy what the editor and a range of authors have packed into this edition – and let this be the year where we change the things we can and change them in a way that makes our own businesses more sustainable.

And may I suggest we remind ourselves that in spite of the help we get from our cities, our utilities, our policy environment – and so on – we proceed. We live on a continent and in a country with the most astounding potential.

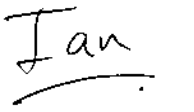
No one but us can realise that potential.

Let us lead. Let us fill the vacuums that exist at so many levels and let us do that by optimising how we use technology, how we use data, and how we manage and deal with our staff, the most important asset we have.

And let us not be swayed by the muddling about we see where decisive action would have been expected.

The call to action resides with us. Let's review our plant, our processes – and optimise now.

When the sun begins to shine again we must be ready to fly.



Ian Jandrell
PrEng IntPE(SA), BSc(Eng) GDE PhD,
FSAAE FSAIEE SMIEEE

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Unlock a new dimension of business – io-key open for success

Until now, it has typically been very time-consuming and cost-intensive to install central monitoring, analysis, and further processing of sensor data. With the io-key, things look very different, though. Now, monitoring of decentralised processes and installations can be implemented without much ado. So why not benefit from this!

io-key technology

Compatible with your requirements: The new io-key allows users to send data from more than 10 000 IO-Link enabled sensors for various applications to the IIoT.

io-key experience

At present, about 5% of your data is transferred to the controller. 95% is lost, although it could effectively and easily be used to relieve the staff and optimise your installation.

Greater efficiency – more benefit

- Plug and play: Sensor-supported plant monitoring without network planning or cabling
- Easy set-up: Connect io-key to a power supply, connect it to the sensor(s), register it on ifm cloud. Ready.
- High flexibility: The installation location can be freely selected – even outdoors with IP65
- Almost infinite possibilities: Compatible with more than 10 000 IO-Link sensors
- Efficient: Low cost compared to other industrial cloud solutions

Greater value – greater profit

The io-key helps users optimise operational process flows.

- Avoid machine failure through predictive monitoring
- Reduce operating costs due to in-time maintenance measures
- Increase productivity by trouble-free operation
- Gain efficiency benefits via data evaluation during operation to achieve an economical competitive advantage

Clear visualisation of all data

In the ifm cloud, a protected and individually adjustable dashboard is automatically provided, allowing users to monitor, manage and analyse, with added value, all sensor data online at all times.

A true all-rounder for all applications

Whether in buildings or outdoors, the io-key allows for implementation of numerous monitoring scenarios. A few examples:

- Pressure monitoring at pumping stations
- Level measurement on tanks
- Temperature monitoring on cooling and heating circuits
- Predictive maintenance on remote machines

The easiest way towards Industry 4.0

The io-key solution follows the 'keep it simple' principle. For rapid, risk-free and cost-effective implementation of your IIoT solution. For easy, intuitive handling requiring no special IT skills. For maximum efficiency with minimal effort. Everything from a single source. And extensible at any time. □

The io-key makes monitoring, dashboarding and trending of decentralised processes and installations simple and efficient.

With the capacity to monitor data from multiple sensors, the io-key helps users optimise operational process flows and increase productivity.

For more information contact ifm South Africa.
Tel: +27 (0)12 450 0400
E-mail: info.za@ifm.com
Visit: www.ifm.com

Tech trends driving industry to v5.0

Industrial automation is changing at an exponential rate. The combination of various technology trends has propelled enterprises into Industry 4.0 so fast that Frost & Sullivan has already delivered an Industry 5.0 blueprint to guide the journey forward. Speaking at Rockwell Automation's Automation Fair held in November 2021 in Houston, Texas, USA, Cyril Perducat, Senior Vice President and Chief Technology Officer shared the automation supplier's plans for the immediate future and indicated some of the key possibilities of Industry 5.0.

Rockwell Automation's Cyril Perducat explained how technology is boosting the power of the human workforce.

Perducat said, "This is a unique time in our industry. The future is a trajectory, a path we are already on. When I think of Industry 4.0 – the term was first coined in 2011 – there has certainly been a lot of learning over the past 10 years on what Industry 4.0 can deliver. And the Covid pandemic has accelerated many of those dimensions."

Industry 4.0 is already seeing the implementation of edge-and-cloud integration, converged development environments, artificial intelligence (AI) and autonomous production, among other technological innovations.

Remote connectivity, advanced engineering with multiple digital twins, mixing physical and digital assets, and the change of human-machine interaction are driving industry along the path towards Industry 5.0.

Perducat questioned whether it's too soon to look at Industry 5.0 when all the promise of Industry 4.0 has not yet been delivered, but with reference to Frost & Sullivan's comparison of Industry 4.0 to Industry 5.0 he identified five changes that are attainable and impactful. These are in the areas of:

- delivery of customer experience
- hyper customisation
- responsive and distributed supply chain
- experience-activated (interactive) products, and
- return of manpower to factories.

"We are able to bring more capabilities to people," said Perducat. "Human resources are scarce and by delivering systems that make human-machine interaction more efficient, we make it more impactful while remaining safe."

Rockwell Automation has identified four areas where technology can move companies forward on the journey:

- evolution of cloud, edge and software
- universal control and converged integrated development environments (IDEs)
- AI native operations management, including software as a service (SaaS) and digital services, and
- autonomous systems and augmented workforce.

"We believe in control at the enterprise level," said Perducat. "We believe in systems with software-defined architecture and the underlying hardware. It doesn't mean hardware is becoming obsolete. And it's not that every piece of the system needs to be smart. The entire system, from the device to the edge and to the cloud, is smart. Edge + cloud architecture is fundamental."

In the converged environment, control, safety and motion all come together and must work in an integrated way. This is especially true with the growth of robotics. "The boundaries between control and robotics are becoming more blurred," said Perducat. "Safety is fundamental in this more complex architecture. It does not work if it is not safe."

Operations management becomes more efficient when AI is native to the architecture and is at the level of the enterprise. "A holistic view requires a lot of data and the ability to process that data," Perducat explained. "Part of this has to be autonomous, using the power of applied AI; it's not just one more tool but is everywhere in the architecture. We can use AI on the machine to translate vibrations into data. We can think of AI in terms of process modelling. And model predictive control is evolving with AI. When you can orchestrate all the elements of the architecture, that is a system."

FactoryTalk Analytics LogixAI is a modelling engine that enables closed-loop optimisation through four steps: observe (sensor), infer (model), decide (controller) and act (actuator). By transforming from automated systems to autonomous systems, it enables better decisions to expand human possibility.

AI can also help to simplify a new generation of design. "You can use AI to help generate blocks of code, like individuals working together peer-to-peer, but one of them is AI, augmenting human possibility," said Perducat.

"We see the next step to autonomous manufacturing as an opportunity to deliver value to our customers. The autonomous system is reimagining the fundamental principles of autonomous control systems. You don't need to rip and replace. We can augment existing systems with new technology."

Perducat emphasised that it cannot be just about technological innovation. "Technology only creates possibilities or potential values," he said. "It has to be accessible by users, so we have to innovate from the perspective of the user experience. We want to bring that to all the products, experiences and models. In a digital native world, innovation extends beyond technology and features." □

For more information visit: www.rockwellautomation.com

Managing hybrid cloud environments

Jonathan Duncan, Vice-President Anglophone Africa, Secure Power Solutions at Schneider Electric

Jonathan Duncan, Schneider Electric.

According to research and analysis group, Mordor Intelligence, based in Hyderabad, India, the global hybrid cloud market is expected to reach US$ 145 billion by 2026, with an estimated compound annual growth rate of 18.73% over the forecast period (2021 to 2026).

This again confirms the global growth trajectory of hybrid cloud, which is seeing a healthy uptake also in the South African market with more businesses moving some of their data to cloud environments.

The reasons for businesses in South Africa adopting hybrid cloud solutions are many: for one, the cost of replacing IT assets such as high-end servers versus moving data to the cloud are driving decision makers to make the more cost-effective choice. In addition, in South Africa, there is a shortage of competent data centre managers to run these environments, so it makes sense for companies to shift some data to expert outsourced providers.

However, with the ongoing move towards hybrid cloud environments there comes an extra layer of complexity. Hybrid cloud environments are by their nature a mix-and-match of various technology options, including centralised cloud, regional edge data centres which provide significant compute and storage options, and local edge facilities that consist of smaller IT assets used by branches and satellite offices or sites.

The different technologies accommodate different needs: increasingly mature systems such as CRM, for example, can be hosted in the cloud, but others such as those managing counting machines in manufacturing environments must be at the coalface and provide consistent performance and immediate data delivery.

The challenge is to manage these somewhat diverse environments in a way that provides consistent performance and data access.

Edge data centres, which are located close to where the data is generated, provide organisations with a metadata view of their information, but must also be managed accordingly.

It is important that organisations recognise these smaller data centres as being of equal priority to off-site data centres. A node site is still a vital cog in an overall machine and if an edge data centre goes awry, it can derail an organisation's entire hybrid cloud position.

Additionally, edge data centres are vulnerable to cyber-attacks. Located at smaller branches or operational sites, edge data centres are often surrounded by aging technology that simply cannot run the required security software to keep the environment safe. This affects their security – and potentially the security of the hybrid data storage system.

When considering the above, we are finding that organisations with hybrid cloud environments are increasingly investing in:

Hybrid cloud environments encompass various data storage technologies and introduce an extra layer of complexity.

- Software that offers visibility into all data centres
- Software management tools
- Standard operation procedures (SOPs) to manage these diverse environments.

Software management tools today provide increasingly sophisticated functionality that allows organisations to gain valuable insights into their operational and data environments. For example, coupled with artificial intelligence (AI), these tools can provide the analytics to solve an issue remotely without requiring human intervention and this can save on costs and man hours.

In addition, software management tools provide predictive analytics, which can extend the service cycle of equipment, for example. The tools can be used to assess the lifespan of equipment and provide a real-world service scenario, again saving on service costs.

Software management tools thus offer a number of valuable benefits in hybrid cloud environments. These include:

- Hosted, vendor-neutral, monitoring, management, and planning
- Smart-alarming and data-driven recommendations powered by AI
- Risk planning, capacity management, and automated workflows.

Software management forms an important part of managing any hybrid cloud environment, ensuring information is collected and analysed from all data points, in the cloud or at the edge. □

For more information visit: www.se.com

Is moving to the cloud right for your business?

The pandemic has shown us that remote work is a viable alternative to large, expensive offices and IT infrastructure and hardware. Andrew Cruise, Managing Director of vendor-neutral cloud infrastructure provider, Routed, says many South African businesses slashed their office space after realising they could save money while still being fully operational remotely.

Andrew Cruise, Managing Director of vendor-neutral cloud infrastructure provider, Routed.

Although only around 5% of the South African enterprise market is fully on the cloud, according to Cruise, many more businesses are considering this option. "Work from home, mandated as a result of the pandemic, proved to many organisations that the need for physical hardware and infrastructure is fading as fast as the idea that everyone has to work from an office," says Cruise.

He outlines some key considerations for businesses looking to decide on the best option for their operations.

The benefits

Globally there has been a return to office environments, whether full-time or in a hybrid approach, but in South Africa many employees continue working from home, at least for the foreseeable future, says Cruise. "Companies are realising there is no longer a need to have on-premises hardware, because cloud provides a much more flexible solution. Even companies that have successfully moved back to the office are seeing a need for cloud services in order to have remote access when required."

Furthermore, the cloud is more cost-effective in the long run – with less risk.

"Moving to the cloud means businesses are in effect renting hardware, which removes the hidden costs of mitigating against failures, disaster recovery and maintenance when they run their own hardware. Though it may seem expensive to move initially, it can save companies a bundle in on-premises hardware as well as remove the risk of broken or stolen hardware – which could, of course, result in considerable operational losses on top of the physical loss. The good cloud providers are constantly refreshing their equipment, so businesses benefit from constantly improving performance, and will not face hardware upgrade costs every five years."

The hurdles

However, it does not necessarily make sense to move everything to the cloud. "There is still good reason to keep certain things on-premises, including for compliance purposes. But overall, the cloud offers a lower total cost of ownership," says Cruise.

Importantly, good internet connectivity is essential to access the cloud. "Fast, reliable, affordable internet is a necessity for enterprise cloud to prosper."

Timing is also important, he adds. "We're expecting a significant shift to cloud over the next five years as companies reach the end of their hardware cycles. For a business that has just upgraded all its hardware and has everything under warranty, it doesn't make sense to move to cloud, but when the next replacement cycle rolls around, that's the time to make a move."

Choosing the right provider

There are several new entrants joining the colocation stalwarts like Teraco in the local market, including Vantage's new data centre, as well as Oracle building a cloud presence in SA, IBM's SAP-based cloud offering, and Huawei recruiting new resellers, all good news for the growing cloud market, says Cruise.

Moving to the cloud should not be done on a whim. Cruise advises businesses to do a proper analysis of the contract and of the provider, and, critically, "assess whether they're right for your business needs. Be wary of services available at heavily discounted rates – could they be based on ageing out-of-warranty hardware? Some organisations have been drawn into discounted contracts, only to find two years later that they're locked in and suddenly having to pay large fees, remaining contractually bound for a few more years."

Routed has recently taken a vendor-like approach to its own business, enabling it to provide partners with the best cloud solutions for their customers. Cruise explains: "We are engaged with distributors here in SA that are already distributing Amazon Web Services and Microsoft Azure to reseller partners, who are selling that on to the end-users, and we've led the market by recently launching the VMware Cloud equivalent here. We use ISP, MSP, IT support companies and developers as our partners because they provide specialist services and manage their client relationships, while we focus on presenting our VMware Cloud service interface and making sure it is available. That's really what people want from the cloud."

Whether working from home, the office or anywhere in between, organisations and their staff are calling for solutions that are flexible and scalable as the world adapts. "Cloud is that solution, but it comes down to the partner that supports the transition that will make or break the decision forever, so organisations need to choose wisely," Cruise says. □

For more information visit: www.routed.co.za

Machine learning support for frontline plant employees

The Seeq Azure Add-on feature enables rapid deployment of Azure Machine Learning algorithms.

At the Microsoft Ignite 2021 conference, Seeq Corporation, a leader in advanced analytics software in manufacturing and Industrial Internet of Things, introduced a new add-on providing additional integration support for Microsoft Azure Machine Learning. The new Seeq Azure Add-on enables process manufacturing organisations to deploy machine learning models from Azure Machine Learning as add-ons in Seeq Workbench. As a result, machine learning algorithms and innovations developed by IT departments can be operationalised so frontline OT employees can enhance their decision making and improve production, sustainability indicators, and business outcomes.

Seeq customers include companies in the oil & gas, pharmaceutical, chemical, energy, mining, food and beverage, and other process industries.

Seeq's strategy for enabling machine learning innovations provides end users with access to algorithms from various sources, including open source, third party and internal data science teams. With the new Azure Machine Learning integration, data science teams can develop models using Azure Machine Learning Studio and publish them using the Seeq Azure Add-ons feature. Using Seeq Workbench, frontline employees with domain expertise can easily access these models, validate them by overlaying near real-time operational data with the model results, and provide feedback to the data science team. This enables an iterative set of interactions between IT and OT employees, accelerating time to insight for both groups and creating the continuous improvement loop necessary to sustain the full lifecycle of machine learning operations.

"Seeq and Azure Machine Learning are critical and complementary solutions for a successful machine learning model lifecycle," says Megan Buntain, Director of Cloud Partnerships at Seeq. "By capitalising on IT and OT users' strengths, the Seeq Azure Add-on expands the Seeq experience and creates new opportunities for organisations to scale up model deployment and development."

Along with increased access to machine learning models through this integration, Seeq's self-service applications enable frontline employees to perform ad hoc analyses and use the models themselves, rather than rely on an IT team member for support. As the models yield results, Seeq empowers users to scale them across the organisation to improve asset reliability, production monitoring, optimisation, and sustainability.

In addition to launching the Azure integration, Seeq has expanded its list of published open source algorithms with the addition of a new Seeq Add-on to GitHub for multivariate pattern search. Seeq's open source gallery also includes algorithms and workflows for correlation and clustering analytics, which users can modify and improve based on their own needs.

Seeq is available worldwide through a global partner network of system integrators that provide training and resale support for Seeq in over 40 countries, in addition to its direct sales organisation in North America and Europe.

For more information visit: www.seeq.com

Server engine meets increased ML requirements

TwinCAT Machine Learning Server is a high-performance execution module (inference engine) for trained machine learning models.

TwinCAT Machine Learning Server offers an additional inference engine to meet the growing requirements of machine learning (ML) or deep learning for industrial applications. As ML models are becoming increasingly complex and execution speed is expected to increase, greater flexibility is demanded of inference engines with respect to ML models.

TwinCAT Machine Learning Server is a standard TwinCAT PLC library and a so-called near-real-time inference engine. This means that, in contrast to the two previous engines, it is not executed in hard real time, but in a separate process on the IPC. Basically, all AI models can be executed in the server engine and with full support of the standardised exchange format Open Neural Network Exchange (ONNX). Furthermore, there are AI-optimised hardware options for this TwinCAT product which enable scalable performance.

The TwinCAT Machine Learning Server can operate in classic parallelisation on CPU kernels, either using the integrated GPU of the Beckhoff Industrial PCs or accessing dedicated GPUs, from NVIDIA, for example. This provides an inference engine with maximum flexibility in terms of models and high performance in terms of hardware. Applications can be found in predictive and prescriptive models as well as in machine vision and robotics. Examples include image-based methods for sorting or evaluating products, for defect classification as well as defect or product localisation, and for calculating gripping positions.

For more information contact Beckhoff Automation.
Tel: +27 (0)11 795 2898; Mobile: +27 (0)79 493 2288
Email: danep@beckhoff.co.za
Visit: www.beckhoff.com

Facilitating cloud-based digital transformation for industry

Siemens Digital Industries Software and Amazon Web Services, Inc. (AWS) are expanding their collaboration which combines Siemens' deep industry expertise with cloud services from AWS to help industrial companies accelerate digital transformation in the cloud. Together, AWS and Siemens plan to drive adoption of Siemens' Xcelerator as a Service and make Siemens' Xcelerator portfolio of integrated software, services and application development platform more accessible, scalable and flexible. Xcelerator as a Service acts as a catalyst for fast and predictable digital transformation – including by gaining new manufacturing insights, automating processes and deploying connected services – and offers customisable solutions for any starting point on the digital journey.

The agreement between AWS and Siemens will see the companies collaborating to support customers moving to digitalisation.

"Siemens and AWS are coming together to help companies speed up their engineering efforts, optimise factory operations and enhance customer experiences from chip to edge to cloud," said Tony Hemmelgarn, President and Chief Executive Officer at Siemens Digital Industries Software. "We are combining our proven cloud and industrial experience in this partnership and simplifying the journey for our mutual customers to become digital enterprises."

The strategic collaboration agreement between AWS and Siemens will see the companies cooperate to support customers; expand cloud capabilities in Siemens' Xcelerator as a Service portfolio; explore opportunities for innovation; and develop and take to market new solutions. One area of collaboration is in digital twin technology, where Siemens and AWS will accelerate adoption and democratise new digital twin solutions using AWS IoT TwinMaker, a newly launched AWS service that makes it faster and easier to create digital twins that incorporate multiple data sources.

Siemens' Xcelerator portfolio is already integrated with over 60 AWS services and, with the addition of AWS IoT TwinMaker, customers can apply this to develop increasingly powerful digital twin solutions that are compatible with Siemens' design, simulation and manufacturing software.

"Working together, Siemens and AWS will make it easier for industrial customers to use Siemens' comprehensive digital twin technology and AWS's cloud services to deliver new manufacturing insights, automation and connected services," said Bill Vass, Vice President of Engineering at AWS. "Together, we'll bring new cloud-based digital transformation solutions to market that will help companies of any size address industrial complexity and turn it into a competitive advantage."

For more information visit: www.siemens.com

Finding the right energy supply system for robots

Igus has introduced a new version of its robot equipment configurator to make finding the right energy supply system for cobots, SCARA and industrial robots easier.

Highly flexible cables and hoses ensure that robotic applications are supplied with energy, data and media. Energy supply systems are required to protect them safely even with high dynamics and torsion. With the extended QuickRobot, igus offers a free online tool for the quick configuration of the individual energy chain system for a range of 418 robots. New features such as product videos support the selection process.

The robots weld, rivet, palletise and assist. In order to work fail-safe in 24/7 operation of small and large scale production, they need the right energy supply system to route the cables and hoses safely from axis 1 to axis 6. To simplify design of the individual energy chain for cobots, SCARA, 4-axis robots and 6-axis robots, igus has expanded the capabilities of its robot equipment configurator. In the online tool, users can select the relevant robot from 418 different models from 10 manufacturers and find the optimum energy supply for axes 1 to 6.

With the QuickRobot configurator, more than 400 robot models can be designed with the appropriate energy supply. [Source: igus GmbH]

Multiple configuration options

The path to the customer-specific energy chain is simple. After selecting the robot model, the user is shown all compatible energy supply systems, such as the three-dimensional triflex R energy chains and retraction systems or the new SCARA cable solution. The configurator features videos of the individual products, illustrating real applications and movements of the energy chain. A visualisation of the robot and an exploded view of the components support the configuration. More detailed information on the components can be found by clicking on the help buttons for the individual fields. The customer can choose the best system for the robot. The price is calculated in real time. The parts list is created automatically and can be downloaded or transferred directly to the shopping cart. The CAD data of the individual components, a PDF report and assembly videos of the components are offered as a supplementary service. In addition, the configuration can be easily saved for coordination within the team or for subsequent projects.

For more information contact igus SA.
Tel: +27 (0)11 312 1848
Email: ihewat@igus.net, visit: www.igus.co.za

Shared technologies boost energy efficiency

Towards the end of 2021, the Southern African-German Chamber of Commerce and Industry and Energy Solutions 'Made in Germany' showcased a number of award-winning projects recognised for their energy efficiency achievements using innovative German technologies.

Speaking at the awards event, Matthias Boddenberg, Chief Executive of the Southern African-German Chamber of Commerce and Industry said, "With energy prices on the rise and the global drive to reduce the carbon footprint of industry, business and households, economic prosperity and competitiveness increasingly depend on our ability to use sustainable energy sources and energy efficient solutions in industrial processes."

Boddenberg referred to Germany's high energy efficiency standards and the German Energy Solutions Initiative which has resulted in the development of innovative energy efficiency technologies, businesses and institutions that can support energy conservation in all fields.

The transfer of this energy expertise, the sharing of technologies and technical know-how, the promotion of foreign trade and the facilitation of international development cooperation are part of the German Energy Solutions Initiative. Coordinated and financed by the German Federal Ministry for Economic Affairs and Energy (BMWi), the initiative is implemented with partners such as the Southern African-German Chamber of Commerce and Industry, as well as the German Energy Agency (dena) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

The showcase event in Johannesburg provided a platform to raise the profile of the very relevant issue of energy efficiency in South Africa and to demonstrate innovative and proven technologies in important areas for efficiency interventions. It highlighted successful South African-German private sector partnerships, which have led to increased levels of energy efficiency in industry and buildings, reduced energy costs and contributed to lower CO_2 emissions.

Energy efficiency is a key instrument that can be used to curtail the energy crisis, as the reduction of consumption and load would effectively reduce energy demand and alleviate the pressure on Eskom's infrastructure. Industrial companies benefit directly from implementing energy efficiency measures which enable them to lower their costs, increase their competitiveness and maintain growth. In the wider perspective, the population at large benefits through prevented job losses, reduced load shedding requirements – at the same time reducing its severe social impacts, and reduced negative environmental impacts.

As the industrial sector remains the largest energy-consuming sector, accounting for 45% of all electricity consumed, the role of energy efficiency in industry to reduce national power demand cannot be overstated. Energy efficiency and energy management interventions have proven to deliver significant energy savings in the South African industrial environment. This is demonstrated by the five award-winning South African-German Showcase Projects, among others.

Furthermore, the projects demonstrate the benefits for industry of considering energy optimisation as an integrated aspect of productivity optimisation and growth.

Awards were presented to five projects recognised for their energy efficiency achievements.

The five award-winning projects demonstrate the benefits of energy efficiency in diverse interventions and point to cases that are widely replicable in industry across the country.

- **CS Instruments** - Compressed air system optimisation at a foundry. This project led to an annual energy saving of 4 816 MWh and achieved a payback period of less than three months.
- **Wilo Pumps SA** - Hoopstad wastewater pump stations. The retrofitting of a pump station with Wilo's Emu-Port solid separation systems resulted in savings in power consumption of up to 25% and reduced maintenance costs by more than 60%.
- **SustainPower** - Distell Springs – 440 kW biogas combined heat and power plant. The CHP plant converts biogas from organic wastewater into electricity for use on site. Distell sees an average daily reduction of 6 000 kWh drawn from the grid. The project payback period is calculated to be less than three years.
- **Professional Light Control** installation at Steinel Distributors Southern Africa – DSV Park Gauteng. The installation of advanced KNX German motion and presence detectors provides for occupancy- and lux level-based lighting control – adapting according to the natural light coming into the warehouse. An electricity saving of 60% is achieved, compared to energy consumption of the replaced conventional system.
- **Siemens campus microgrid.** The innovative system combines distributed power generation and energy management, including smart metering and control of use. Overall an 80% reduction in electricity costs has been achieved and energy demand from the national grid has been reduced by about 40%.

For more information visit: https://suedafrika.ahk.de/en/

Three of the award-winning projects are presented below, selected for their particular relevance to South African industry.

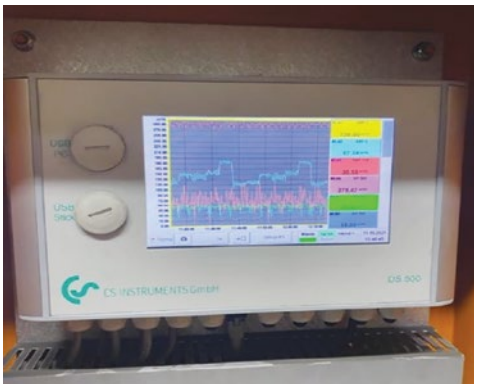
CS INSTRUMENTS - Compressed air system optimisation at a foundry

Location	Atlantis, Western Cape
Year of implementation	2019
Key characteristics	- Flow meters installed to constantly measure whether the compressed air flow system has any leakages - With the permanent flow meters installed it is possible to maintain the system and keep the leakage rate at a minimum
Achieved efficiency gains	- 560 kW compressor taken offline, leading to an annual energy saving of 4 816 MWh
German contribution	- Compressed air system optimisation audit - Installation of permanent flow meters and data loggers

In this project the client is a foundry that originally commissioned CS INSTRUMENTS to do a compressed air system optimisation audit (CASO) on its compressed air system. The compressors ran constantly and the combined compressor capacity was more than 1 MW.

The audit revealed a leakage rate of 43 to 45 % with most of the leaks allocated to faulty pulsating valves in the company's bag houses. By monitoring the compressed air flow into each of the 12 bag houses it was possible to pick up the faults and repair the leaking valves.

As a permanent solution, twelve CS INSTRUMENTS inline flow meters and two data loggers were installed to monitor the system on a continuous base. With the permanent flow meters installed, it is now possible to maintain the system and keep the leakage rate at a minimum. This system improvement enabled the company to take a 560 kW turbine compressor offline and put it on standby for redundancy. Before that, the air delivery of one turbine compressor was feeding the leakages in the bag houses on a continuous base.



© CS INSTRUMENTS

Flow meter at the foundry.

Innovation and achieved energy efficiency

Compressed air systems in South Africa in general have high leakage rates, because most companies do not monitor important parameters on these systems. Hence, using measuring equipment to begin with was already an innovative step.

The installed measuring technology (flow meters) allows the company to quantify how much air is going towards each bag house in the factory. Through online monitoring of the airflow to the bag houses it is possible to identify leakages in the bag houses and the measuring technology provides the client with a tool to calculate its energy consumption. Going forward, the company can monitor the flow and hence manage costs more efficiently. In effect, it now also has a preventive maintenance tool that is running continuously.

Monitoring the compressed air system with the flow meters and reducing the leakage rate substantially, allowed for the 560 kW compressor to be taken offline and this led to an annual energy saving of 4 816 MWh.

Market relevance and replicability

Leakages always occur in compressed air systems and they usually get bigger and higher in number over time. This is because just by changing ambient conditions, the pipework expands and contracts. Hence, leakages can occur at any joint, fitting or flange. A pressurised system will only accelerate this process.

Normally this issue is dealt with by doing regular leak audits, up to three to four times a year. In South Africa, monitoring air flows is not common practice, which leads to leakage rates of up to 50% in larger operations. At the same time, there are a lot of companies in South Africa which have medium to large compressed air systems. From a certain compressed air system size, about 150 to 180 kW and upwards, it makes financial sense to monitor a compressed air system on an ongoing basis. This helps to reduce leakages to a minimum and to run as energy efficiently as possible. The replicability for these monitoring systems is hence very high.

CS INSTRUMENTS is a German company that specialises in compressed air and gas monitoring equipment. All sensors are developed and manufactured in Germany. It also offers its clients energy audits and air quality audits, to identify the best solution. The technology used to identify and maintain energy saving opportunities is 100% German.

As well as flow meters, the company offers dewpoint sensors, pressure sensors, leak detection, monitoring software, air quality measurements and other services. This enables it to monitor all important parameters on compressed air systems.

CS INSTRUMENTS manufactures all the relevant sensors completely, from start to finish. Its meters provide high accuracy, are long lasting and offer a price advantage compared to most competitors.

South African subsidiary, CS INSTRUMENTS (Pty) Ltd, has offices in Cape Town and Johannesburg.

For more information contact: patrick.dolz@cs-instruments.co.za / Tel: +27 (0)21 557 5618

Wilo Pumps SA - Hoopstad wastewater pump stations

This project is situated in Hoopstad in the Free State and was endorsed by the provincial government. The contractor on the project was HT Palatone. The Free State Provincial Government funded and managed the project.

The project scope was to repair and restore six water pump stations that were malfunctioning. This had resulted in numerous sewage spills and increased maintenance costs. Wilo retrofitted the six existing water pump stations with Wilo Emu-Port solid separation systems, complete with control panels. Wilo commissioned the installation and will be responsible for the maintenance.

Innovation and achieved energy efficiency

The solid separation system has resulted in a 15% to 25% saving in power consumption and reduced maintenance costs by more than 60%.

This innovative technology is produced in the Wilo Minden factory in Germany and is designed to solve common problems of blockages associated with traditional wastewater pumping stations. The solid separation system reduces the solids going through the pump. Consequently, pumps with lower solid handling capabilities can be installed, resulting in higher efficiency levels. Wilo's Emu-Port solid separation system is supplied ready for installation and connection with minimal effort on site. Due to the system being a plug-and-play pump station, the project implementation period was reduced by six months.

Market relevance and replicability

The solid separation system is highly relevant to management of wastewater currently in South Africa. Many wastewater pumps stations in the country require urgent attention. If this problem is not addressed urgently, South Africa faces an environmental disaster and further reduced levels of service delivery.

Wilo's solid separation technology system can be retrofitted into current systems quickly and effectively to ensure a working pump station with improved efficiency levels and lower maintenance costs. Wilo can also provide innovative funding solutions, allowing for the pump station to be paid for with the savings achieved from reduced power consumption and savings on maintenance costs.

Location	Hoopstad, Free State
Year of implementation	2021
Key characteristics	- Retrofitting of an existing pump station with Wilo's Emu-Port solid separation systems - Solves blockage issues associated with traditional pump stations - Dramatically reduces maintenance costs - Easy installation reduces time on site
Achieved efficiency gains	- Up to 25% reduction in power consumption
German contribution	- Wilo Emu-Port solid separation systems - Commissioning of installation - Maintenance of equipment

© Wilo

Wilo's Emu-Port solid separation systems.

The Wilo Group is one of the world's leading providers of pumps and pump systems for the building services, water management and industrial sectors. Over the past decade, Wilo has developed from a hidden champion to become a visible and connected advocate for sustainability and efficiency. Wilo's innovative solutions, smart products and individual services move water in an intelligent, efficient and climate-friendly way. The company is also contributing to climate protection with its sustainability strategy and in conjunction with its partners. It is already the digital pioneer in the industry with its products and solutions, processes and business models.

Wilo South Africa is based in Midrand, Gauteng.

For more information contact: csc@wilo.com /Tel: +27 (0)11 608 2780

SustainPower - Distell Springs – 440 kW biogas combined heat and power plant

Location	Distell, Springs, Gauteng
Year of implementation	2019
Key characteristics	- 440 kWh biogas combined heat and power plant - Converts biogas from organic wastewater into on-site electricity - Distell sees an average daily reduction of 6 000 kWh drawn from the grid - CHP currently offsets up to 13% of total site load - At R1.00 per kWh, savings of R186 000 per month - Total project payback less than three years - Offsets about 110 tonnes CO_2e per month
Achieved efficiency gains	- Offset of 1 500 MWh grid electricity in a 12-month operating period
German contribution	- MAN gas engine - Motortech gas controller system

Distell, a global beverage company with a wide range of award-winning brands such as Amarula, Savanna, Hunter's Dry and others, continues to ramp up its sustainability efforts. In 2019 a CHP unit from SustainPower was installed at its Springs cider manufacturing operation to convert the effluent treatment plant's biogas into power. This is the first step to making the effluent treatment plant energy-neutral in the short term and energy-positive in the future.

Distell's effluent treatment plant, which processes wastewater from the beverage making process, is designed to produce up to 100 m^3 per hour of high-grade biogas with methane levels consistently hovering around 90%. The SustainPower SP-550-BG-CHP, which harvests the mechanical energy from the generator and the thermal energy from the combustion process, provides up to 450 kW of electrical power and has 500 kW of thermal energy available for use in the plant process.

© SustainPower

Containerised CHP unit at Distell Springs.

SustainPower installed and commissioned the CHP plant and started producing electricity within three days, with a MAN E3263 LE212 biogas engine. SustainPower designed and implemented an algorithm to match electricity production to gas production, thereby ensuring 24/7 operation, even in times of reduced gas production. The Motortech Detcon system was installed to manage the high grade, high quality biogas produced by the Tecroveer effluent treatment plant. SustainPower continues to support the project with ongoing operations and maintenance services.

Innovation and achieved energy efficiency

The installation was the first MAN 550 kW biogas CHP in South Africa, producing a consistent 420 kW output at Johannesburg altitude. As a result of the SustainPower CHP installation, Distell now sees an average daily reduction in grid electricity demand of up to 6 000 kWh. At R1.00/kWh, this produces monthly savings of about R186 000 for the client. These will lead to a project payback period of under three years. The CHP offsets up to 13% of the plant's total load and reduces Distell's carbon footprint by about 110 tonnes of CO_2 per month.

Market relevance and replicability

The prospect for biogas projects in South Africa is substantial – with a potential generation capacity of 2.5 GW. The use of biogas for energy generation can also be considered as an effective contribution to sustainable waste management and the corresponding reduction of CO_2 emissions. SustainPower's installation at Distell demonstrates the positive outcomes of using biogas for energy generation for the client – in terms of sustainability and monetary savings on its energy bills.

Furthermore, the project highlights the effects of committed partnerships: German efficiency technology put to work by a highly skilled South African workforce. Roughly 60% of the components were imported, with the balance of 40% sourced in South Africa. South African engineers, technicians and labourers produced a 100% South African design. This balance demonstrates the successful relationship between German and South African counterparts. Together, we can help power Africa in a more sustainable way.

SustainPower provides modular gas-to-power solutions for biogas, natural gas and landfill gas that are housed and transported in custom-fitted shipping containers. Based in Cape Town and with clients throughout Africa, it provides sustainable, clean power in emerging and developing countries.

SustainPower designs and supplies clean energy solutions for domestic and industrial markets. For industry, it offers biogas, natural gas and other gas-to-power solutions for continuous, prime or emergency standby power supply. With a special focus on energy efficiency, SustainPower's systems save clients money through power-outage protection, peak shaving and waste heat recovery, displacing environmentally harmful sources of energy such as coal and diesel. In the domestic and light commercial space, it offers solutions in the form of gas generator sets and battery technology, providing a clean and quiet backup alternative to the traditional petrol and diesel options.

For more information contact: info@sustainpower.co.za /Tel: +27 (0)21 204 1881

Reducing NOx emissions in industrial boilers

Since implementing one of the first nitrogen oxide (NOx) abatement projects in South Africa in 2019, Babcock International has completed a further three boiler installations at a large industrial petrochemical plant, achieving emission levels almost 40% lower than the legal requirements.

Nitrogen oxides are harmful gases that are emitted through the combustion of fossil fuels – which remain the primary source of South Africa's power – and form when the fuel is burned at high temperatures. Seeking to improve air quality, nations around the world have committed to lower NOx emissions through legislation that determines acceptable levels of nitrous oxides in the atmosphere. In South Africa, the National Environmental Management: Air Quality Act (No. 39 of 2004) calls for maximum NOx levels of 750 mg/Nm^3 for solid fuel combustion installations with a thermal rating of more than 50 MW.

The first NOx abatement installation completed by Babcock, which achieved levels of 651 mg/Nm^3, received the South African National Energy Association (SANEA) Energy Project Award in 2019. Three further iterations have been completed since that first installation, with the most recent recording the greatest success where performance tests delivered post-abatement NOx emissions of 469 mg/Nm^3 – making this among the lowest levels of NOx emissions for a pulverised coal (PC)-fired boiler installation in South Africa.

Juan Gerber, Process Engineering Manager at Babcock, explains that PC-fired boilers are generally larger utility-type boilers that generate steam, which in turn generates power. To regulate NOx emissions, new power plants are fitted with low NOx burners. Older PC-fired boilers would require retrofitting of NOx abatement solutions in order to comply with legislation, by 2025, and continue operating.

"In these most recent installations that we have completed, the boilers generate power for the client's own use and for resale, so if the boilers had to be switched off, the consequences are immense," says Gerber. "We worked with Babcock & Wilcox (B&W) to provide a solution to ensure the client's petrochemical plant, which uses 12 boilers in total, is compliant with the legal requirements. B&W, a US-based technology firm founded in 1867, has more than 50 years of experience in installing low NOx combustion systems for new and retrofit boiler applications around the world."

Gerber says that B&W's DRB-XCL® low NOx burners were selected to help meet the new emissions limits. One of the main advantages of the DRB-XCL burner is that the internals of the burner are customisable and burner performance can be optimised in situ by adjusting components. This enabled priority to be given initially to ensuring stable operation, and upon site testing, boiler system settings and burner internals could be adjusted incrementally until the optimum balance between stability and minimum NOx was achieved.

The low NOx burners fitted to pulverised coal-fired boilers have reduced NOx emissions significantly.

"During the final performance test of the installation in the fourth iteration, NOx emissions were reduced by more than 40% of the targeted emissions level," says Gerber. He explains that the system operators are a key link in managing the performance of the boilers, as they are able to monitor and adjust the settings to optimise each boiler's performance. Babcock provided training for the operators sharing how the technology works and explaining what is required from operators for the system to be optimised.

Reflecting on the performance record and lessons learnt since the first installation, Matimba Mangotlo, Project Engineer for Babcock, says the hardware has proven to be extremely reliable, which is critical for this type of plant.

"Furthermore, we have made continuous improvements in the way we have designed and project managed each installation and in managing stakeholders. We have also introduced industrial relations to involve the local community so that each outage is managed without incident."

Mangotlo explains that the installations have to take place within planned outages so time is of the essence. "We have refined our project delivery for every boiler that is completed, and have demonstrated that the project can be implemented successfully over 15 months in parallel with other boilers. This is an improvement of 17 months compared to the initial installation," he says.

"While B&W remains a key partner and continues to provide support to the local Babcock team throughout the engineering, installation and commissioning phases for

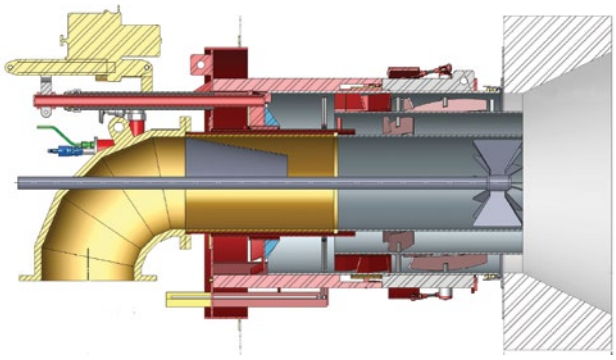
At a glance

- Low NOx burners which allow for a degree of customisation and in-situ adjustment were selected to help meet the new emissions limits.
- System operators are a key link in monitoring and managing the installations to optimise each boiler's performance.
- Babcock has refined its project delivery with each boiler completed, reducing the timeline to less than half that of the first installation.

each unit, we are proud to have local expertise to address local challenges," says Gerber.

"As South Africa's leading steam generation service provider, Babcock has all the engineering disciplines in-house to deliver a project of this scope successfully – from process, thermal and control instrumentation, to mechanical and piping engineering capabilities – ensuring support throughout the project life cycle.

"We are proud to be involved in a project of this nature that makes a significant improvement to air quality in South Africa," says Gerber. □



Engineering schematic of the burner as installed to pc-fired boilers at a South African petrochemical plant.

For more information visit: www.babcock.co.za

Tracking critical parameters in power quality

Power quality measurements can be complex to set up and frustrating when critical events are missed. Comtest, Fluke's Local Channel Partner, has introduced the new Fluke 1770 Series which captures more than 500 power quality parameters by default – so critical power quality events are never missed – from fast transients up to 8 kV, harmonics up to 30 kHz, dips and swells, as well as the voltage, current and power measurements that enable technicians to characterise electrical systems.

"The Fluke 1770 Series walks technicians through the setup to eliminate any measurement errors and ensure all the correct parameters are selected," said Frank Healy, Product Manager. "It ensures the right data is always collected and helps technicians identify issues faster and more clearly."

The 1770 Series features:

- Automatic measurement of power and power quality parameters – critical power quality data is captured as soon as a session is started, without extensive setup or selections
- Intuitive user interface – the streamlined user interface makes it easy to navigate between measurement parameters like V/A/Hz, power, dips and swells, harmonics, unbalance, or PQ health, at the push of a button.
- Capture of high-speed voltage transients – damaging high-speed high-magnitude transients are captured so effects can be mitigated before equipment fails.

The Fluke 1770 Series power quality analysers capture more than 500 power quality parameters by default, tracking critical power quality events.

Voltage transients negatively impact otherwise healthy systems every day, and their potential to damage equipment should not be underestimated. Fluke 1775 and 1777 capture high-speed transients faster than previous models by leveraging the power of the latest Intel Cyclone FPGA. With a sample rate of 20 MS/s users can effectively capture, troubleshoot and mitigate the most damaging power quality issues.

Fluke 1770 Series Power Quality Analysers are supplied standard with the powerful Fluke Energy Analyse Plus software, enabling users to analyse power quality data immediately, without extensive training required. It enables technicians to compare results to historical values, benchmark against industry norms, compare measured data to local conditions, and create a more complete picture of what is occurring across the facility – even as the data is still being collected.

With Fluke Energy Analyse Plus, technicians can create customised reports or leverage built-in one-click reporting to industry standards like EN 50160, IEEE 519, and GOST 33073.

For more information contact Comtest.
Tel: + 27 (0)10 595 1821
Email: sales@comtest.co.za, visit: www.comtest.co.za

Replacing SF_6 in high voltage existing equipment

EconiQ™ retrofill uses an eco-efficient gas mixture to replace SF_6 in HV gas-insulated lines, supporting National Grid in achieving its sustainability targets.

Hitachi Energy and National Grid in the UK have successfully energised a pilot project replacing SF_6 in installed high voltage gas-insulated lines with an eco-efficient fluoronitrile-based gas mixture. This retrofill solution is part of Hitachi Energy's EconiQ™ portfolio which is designed to deliver better environmental performance compared to conventional solutions.

As one of the world's largest investor-owned transmission and distribution utilities, National Grid aims to remove all SF_6 from its fleet by 2050. In this pioneering pilot project implemented in Richborough, National Grid has replaced SF_6 from 420 kV gas-insulated lines installed in 2016, eliminating 755 kg of SF_6.

For decades SF_6 has been used in the electrical industry due to its excellent insulation and current interruption properties. However, it has a high Global Warming Potential (GWP) and requires careful handling. Hitachi Energy is reducing the use of SF_6 on a continuing basis, improving its lifecycle management and accelerating the development of eco-efficient products.

"We have a responsibility to help our customers like National Grid to accelerate the energy transition," said Markus Heimbach, Managing Director of High Voltage Products business at Hitachi Energy. "Innovative EconiQ retrofill technology for installed gas-insulated lines, together with the new EconiQ switchgear and breakers portfolio will enable our customers and the industry as a whole to reduce the carbon footprint and rapidly transition to eco-efficient solutions."

Chris Bennett, Acting President of National Grid said, "Climate change is the greatest challenge of our time and this new, transformational, green technology will help achieve wide-scale decarbonisation on our electricity transmission network. The retrofill solution replaces SF_6, cutting emissions and network outages, and saving costs at the same time by avoiding the need to spend on costly replacement equipment. We are proud to be working with Hitachi Energy and to demonstrate a practical solution to a significant issue in the energy industry's transition to net zero."

EconiQ is Hitachi Energy's eco-efficient portfolio for sustainability, where products, services and solutions are proven to deliver exceptional environmental performance. Recently, the company announced the acceleration of its development of eco-efficient solutions, outlining its extensive EconIQ roadmap for switchgear and breakers in various voltage levels. Hitachi Energy has placed sustainability at the heart of its purpose and strives to advance a sustainable energy future for all.

For more information visit: www.hitachienergy.com

Support for Botswana's energy transition

The project will contribute to the implementation of Botswana's first IRP, facilitating investment in solar PV and wind generation capacity.

The Sustainable Energy Fund (SEFA), managed by the African Development Bank, has approved a US$1 million grant to facilitate Botswana's transition to clean energy. The technical assistance project supports the Government of Botswana in closing critical gaps in policy, regulatory and legal frameworks, which were identified at the Africa Energy Market Place (AEMP 2019). These include the introduction of least-cost planning, reduction of adverse environmental impacts and support for increased private sector participation in renewable energy generation investments.

Some of the notable outputs intended from the project include a national Grid Code, Electricity Cost of Service Study (CoSS), and a licensing framework to regulate power sector activities. The outputs from the project will contribute towards the implementation of Botswana's first Integrated Resource Plan (IRP), facilitating investments in new solar PV and wind generation capacity, amounting to at least 100 MW and 50 MW respectively, by 2030. Through its support for the further development of the renewable energy generation sector in Botswana, the project also contributes to the Mega Solar initiative, launched in 2021 in collaboration with Namibia and development partners, with the aim of building renewable energy capacity in the two countries, to enable electricity exports to the rest of the region.

Conceptualised under SEFA's Green Baseload component, the project "will contribute to the development of essential building blocks to support Botswana's energy transition," said Dr Daniel Schroth, Acting Director for Renewable Energy and Energy Efficiency at the African Development Bank.

Duncan Morotsi, Chief Operating Officer at the Botswana Energy Regulatory Authority (BERA), commented: "It has been a long journey to access this AfDB grant facility. The approval is a great step forward in the regulator's quest to facilitate independent power producers, renewable energy sources and cost reflective tariffs in Botswana. It was worthwhile pursuing this technical assistance from the AfDB."

The SEFA is a multi-donor special fund that aims to unlock private sector investments to contribute to providing universal access to affordable, reliable, sustainable and modern energy services for all in Africa, in line with the Bank's New Deal on Energy for Africa strategy and the UN's Sustainable Development Goal 7.

For more information visit: www.afdb.org

Cummins offers one-stop solutions for multiple backup power requirements providing gensets as well as all ancillary components.

Backup power and load shedding solutions

Cummins' power generation technology is well suited to dealing with load shedding due to features such as full load acceptance for critical equipment. A range of alternative power solutions is available to meet the needs of mines and factories as well as the small business sector.

"We can supply a small 17 kVA genset for residential or commercial use, up to a 3 750 kVA unit for mining, data centre and hospital applications, for example," says Warrick Gibbens, Power Generation Leader, Cummins Southern Africa.

Cummins' energy-efficient engines comply with international emission standards and have a high fuel tolerance level, which makes them suitable for tough African operating conditions. In terms of automatic start-up, they offer one of the best response times on the market.

Cummins can supply one-stop solutions for multiple backup power requirements for large-scale clients such as mining operations or factories. It provides the gensets themselves, as well as all ancillary components, from air and oil filters to coolant.

"We offer high quality products and ensure they are serviced and maintained properly," says Gibbens. Cummins has a fully-fledged training facility where its own technicians and clients can receive customised training on any engine platform. The training is fully accredited and certificates are presented to all successful candidates.

For clients using its gensets Cummins offers maintenance contracts of varying duration, depending on the application and specific requirements. This may range from simple inspection and cleaning to a recommended yearly service of any standby units. "Clients have the further peace of mind in knowing that we use only certified installers and we offer a warranty that sets an industry benchmark," says Gibbens.

Cummins can also play a role in the design phase of alternative power solutions, as well as in installation and commissioning. Fully trained technicians are located throughout South Africa, and the company has an extensive dealer network which can accommodate remote locations.

Gibbens makes the point that with backup power solutions the main aim is to limit the impact of load shedding for its customers and to ensure they have minimal downtime. An innovative development in this regard is the PowerCommandCloud 550 remote monitoring system, which is ideal for large-scale customers that operate multiple gensets. Here, monitoring each genset individually is not practical or cost-effective. Instead, PowerCommandCloud 550 provides a convenient means of remotely monitoring gensets, transfer switches and output controls. Users can access the system from any computer using a Microsoft Silverlight-enabled web browser, with no additional software required.

Customers also benefit from Cummins South Africa now being a Level 4 B-BBEE contributor, having progressed from its previous Level 8 status. "This contributes positively to our customers' own scorecards as they are now dealing with a Level 4-compliant supplier. It is a win-win for all stakeholders," says Racheal Njoroge, Managing Director, Cummins Southern Africa.

For more information contact Cummins.
Tel: +27 (0)11 451 3400
Email: sbu.gule@cummins.com
Visit: www.cummins.com

Smart Gas as an alternative fuel

100% black-owned energy infrastructure company, DNG Energy, began delivery of liquefied natural gas (LNG) to commercial customers in the industrial, transport, marine and power sectors in December 2021. LNG offers an affordable energy alternative to traditional fuels such as diesel and petrol. Its availability through DNG Energy is the result of seven years of planning, permitting and licensing efforts and heralds further investment of some $5 billion over the next several years to ensure bulk affordable and reliable LNG supply in South Africa.

DNG Energy began delivery of LNG to commercial customers in SA in December last year.

DNG Energy sees this development as a catalyst for the growth of a new gas economy in SA, in turn supporting the shift to more sustainable energy sources, facilitating industrialisation, creating new jobs, and offering commercial customers more sustainable energy options. As a cleaner fuel, LNG can play a key role in the transition from fossil fuels.

Speaking at the launch, Aldworth Mbalati, founder and CEO of DNG Energy said: "The launch of DNG Smart Gas, our commercial LNG operation, brings us

CSIR gains electricity savings with solar PV

The CSIR reports that the electricity generated by the solar photovoltaic (PV) plants installed at its Pretoria campus has reduced the organisation's electricity bill by over R14 million since 2015.

The CSIR Energy Research Centre began investing in renewable energy with the installation of solar PV systems at the start of 2015. It commissioned the solar PV system to provide a demonstration facility, leading the way towards a sustainable energy future; to provide a cost saving in the form of reduced monthly electricity bills; and to provide a research platform to test and validate locally manufactured and assembled products in a real-world environment. The PV plants are commercially designed and built to meet a 25-year lifespan, providing a steady stream of electricity during daylight hours at costs below the prevailing tariffs, which leads to a positive net present value on the investments made in the facility.

In addition to the reduction in electricity cost, the PV plants have aided industry collaboration. The plants have attracted the attention of numerous companies wanting to understand how the system works and what the comparative benefits are. These visits have resulted in collaborations between companies in the PV industry and the CSIR.

The solar PV plants installed consist of a 558 kWp ground-mounted single axis tracker, a 202 kWp ground-mounted dual axis tracker, a 250 kWp east-west fixed rooftop system on one of its buildings, a 911 kWp east-west fixed rooftop system across five additional buildings, and an additional 30 kWp ground-mounted dual axis tracker on the south side of the campus.

The solar PV installation at the CSIR's Pretoria campus has brought the organisation substantial savings on electricity costs.

Specifications

- The 558 kWp ground-mounted single axis tracker plant was commissioned in 2015. Its modules tilt from east to west over the course of each day to increase electricity production, compared to a fixed tilt system, and this reduces the CSIR electricity demand by 4 to 5%.
- The 202 kWp ground-mounted dual axis tracker plant was commissioned in 2016. The dual axis tracker system allows modules to track the sun in elevation (up/down) and azimuth (east/west), so the modules are always facing the sun directly during the day. Four additional dual axis trackers were installed in 2019, bringing the total capacity of the dual axis tracking systems to 232 kWp. The PV plants reduce the overall CSIR electricity demand by 2 to 3%.
- A 250 kWp east-west fixed rooftop system was commissioned in 2017. The rooftop system was designed with an east-west-facing rack and reduces the electricity demand by 2%.
- The 911 kWp east-west fixed rooftop system (Phase 1) plant was commissioned in 2019. The Phase 1 plant system was designed with east-west-facing racks at a 10 degree tilt and reduces the overall CSIR electricity demand by 7%.

For more information visit: www.csir.co.za

significantly closer to our vision of achieving energy security and stability in South Africa. This has been a long and complex journey with numerous barriers to surmount – from securing financing to obtaining regulatory approvals.

"Our success shows that we have the capabilities in Africa to energise a brighter future. Natural gas is cheaper than currently available conventional energy sources, such as diesel and LPG, and promises significant economic benefits. We are excited to contribute to a new economic future by providing a responsible and responsive energy solution with lower greenhouse gas emissions than other fossil fuels."

Last year DNG received final authorisation from the Transnet National Ports Authority to begin bunkering operations in the Port of Coega in the Eastern Cape. The company has deployed a 125 000 cbm-capacity floating storage unit to support these operations. In addition, it has completed terminal infrastructure at Algoa Bay, where its hub is located.

This advanced infrastructure will be used to offer ship-to-ship transfers for international trading ships as well as onshore LNG transfers via road and pipelines. DNG has developed a network of gas supply, enabling reliable LNG supply to penetrate the energy market nationwide. The company has already conducted proofs of concept with partners in the private and public transport industries, including Imperial, Masana BP and Rea Vaya. The infrastructure will also serve mining and industrial customers and is a critical enabler for independent power producers.

Mbalati said: "We see the LNG value chain in a holistic way, from source to consumption, and have robust infrastructure expansion plans for South Africa, Mozambique and Nigeria. Over the next few years, LNG has the potential to drive significant growth and job creation, as well as helping South Africa meet its targets in reducing greenhouse gas emissions by as much as 30% to 40%.

For more information visit: www.dng.energy

Energy storage to support grid stability

Technology group Wärtsilä will supply a 25 MW / 48 MWh energy storage system to GIGA Storage BV in the Netherlands to help stabilise the electric grid. This will be Wärtsilä's first energy storage project in the Netherlands and will be the country's largest system to date. The order was booked in December 2021 and the system is expected to become operational in October 2022.

The Wärtsilä energy storage system, called the GIGA Buffalo battery, will be co-located with wind and solar assets at the Widnet smart grid, at the Wageningen University & Research test centre in Lelystad. Eneco, a leading energy provider in the Netherlands, will use the battery to make its energy services more sustainable and add more renewable energy to the grid. The energy storage capacity will also help to optimise the power system, regulate energy frequency and reliability on the grid and improve revenues. As the largest energy storage project in the Netherlands to date, it will store the equivalent of the annual energy consumption of more than 9 000 households each year.

"The Buffalo battery will help stabilise the Netherlands' electricity grid and save up to 23 000 tonnes of carbon dioxide emissions per year," said Maarten Quist, COO, GIGA Storage. "We're pleased to work with Wärtsilä to implement this landmark project, which will help us reach our goal of deploying 1.5 GW of energy storage in Europe by 2025."

The Dutch government has set a goal to reduce greenhouse gas emissions by 49% by 2030 and by 95% by 2050. The growth of renewable energy in the

© GIGA Storage

The 25 MW/48 MWh Buffalo battery in the Netherlands will support grid stability.

Netherlands – and likewise across Europe – has helped to decarbonise the energy system but has also created congestion on electrical networks, making energy storage a necessity for reliability. Recent reports indicate that the Netherlands will need between 29 and 54 GW of energy storage capacity by 2050.

"Wärtsilä sees a major opportunity and growing need to help its customers increase energy storage deployment throughout Europe in order to realise a 100% renewable energy future," said Pekka Tolonen, Director, Europe, Wärtsilä Energy. "This is an important milestone for Wärtsilä as our first project in the Netherlands. It adds another country to our 4 GWh portfolio of market-leading energy storage technology deployments worldwide."

The Buffalo battery will be the first large-scale energy storage project based on lithium iron phosphate (LFP) chemistry in Europe, which provides enhanced safety features and uses less vulnerable natural resources.

For more information visit: www.wartsila.com

Sun-tracking solar panels extend peak generation

Enel Green Power's (EGP's) Ngonye solar plant, which is located in the Lusaka South Multi Facility Economic Zone in Zambia, uses solar tracking systems with solar photovoltaic (PV) panels to track the movement of the sun through the day, capturing sunlight and converting the energy into electricity.

In a first for sub-Saharan Africa, this technology was selected for the Ngonye plant when the land designated for the solar farm was not large enough to accommodate the planned infrastructure. The Ngonye plant is, to date, the only site in the region to use tracking technology from Convert Italia.

The tracking of the sun is achieved via Global Positioning Satellite (GPS) connected to an Electronic Tracker Control Board (ETCB). The integrated GPS device acquires date and time. This information, together with astronomical clock algorithms, enables the system to identify and accurately track the sun's position.

Each single axis tracker automatically tracks the east to west movement of the sun through the day via the ETCB. A single control board controls a maximum of 10 structures with a photovoltaic energy capacity of about 97.5 kWp. The primary benefit of the tracking system is that it improves plant efficiency by increasing energy output, as it lengthens the plant's peak generation period above similar sized fixed axis plants.

Commissioned in 2019, the Ngonye plant is a joint venture between EGP and the Industrial Development Corporation (IDC). It has the capacity to supply 34 MW of energy to ZESCO, the Zambian national electricity utility, under an existing 25-year power purchase agreement.

EGP Zambia's Kachinga-Wankunda Phiri says the plant is one of only two large-scale grid-connected renewable energy facilities operating in the country. "As Zambia does not have a long-term procurement programme for renewables, EGP Zambia is focused on growing its commercial and industrial customer base, providing a stable, sustainable energy supply," Phiri says.

For more information visit: www.enelgreenpower.com

At the Ngonye solar PV plant in Zambia, solar tracking technology is used to optimise energy output within the size of the allocated site.

Straight talking signals

Ian Loudon, Omniflex (South Africa).

Almost 150 languages are derived from Latin, but despite similarities in form, differences in letter combination mean this is not sufficient to enable interlanguage comprehension. The same goes for processing plants; converting signals generated in the plant into an understandable form for control systems is a challenge. The answer? Signal conditioning. Ian Loudon, International Sales and Marketing Manager at signal conditioning specialist Omniflex and based in South Africa, highlights the importance of signal conditioning, describing it as industry's Google Translate.

Processing plants often produce analogue signals in their thousands per minute, directly from sensors embedded in the process – including those for temperature, pressure, flow and any other physical parameters tracked for control and monitoring. The data can be analysed to trigger actions that keep operations flowing efficiently and safely. This is done by feeding information into a control system, or by triggering an alarm annunciator in safety critical applications which alerts operators in the event of an emergency.

Mixed signals

Signal conditioning is a crucial process in plants. It involves preparing analogue signals to be converted and scaled for further processing for control and monitoring. Before a data acquisition device can measure the signal, a signal conditioning unit is required to put the data into an understandable and universally accepted form. One challenge is scaling small physical signals, such as mV or µV, to a standard plant signal that can be used for control.

Signal conditioning is also essential to avoiding interference and erroneous data. In processing plants, electromagnetic noise and ground loops and signal isolation issues are problematic to PLCs (programmable logic controllers), SCADA (supervisory control and data acquisition) systems and DCS (distributed control systems) that run the plant. If input data is incorrect, this can adversely impact the industrial processes that rely on it. For safety critical applications, in nuclear and petrochemical plants, for example, ensuring the data is as accurate as possible is not an option but a necessity.

However, noise and ground loops are common. Two devices connected within the same circuit but grounded in different locations can result in a difference in potential. This difference can lead to a flow of electrons, which generates a loop current known as a ground loop. Since the ground loop runs along the same wires as the analogue signal that the control system needs to interpret accurately, it can interfere and produce erroneous data.

Clear conditioners

Mitigating the potentially catastrophic impact that erroneous signals can have on industrial processes is a task assigned to signal conditioning units. By taking signals from sensors across the plant, the signal conditioner is responsible for converting the input signal into the desired output signal, the most common being 4-20 mA.

Signal conditioning is a crucial process in plants and essential to avoiding interference and erroneous data.

Typically, a different signal conditioning module is required for each input signal. So, plant managers could require several different units, and replacements, for each signal in a plant, which becomes complex and expensive. However, Omniflex's Omniterm TXB Universal Input unit can eliminate this complexity.

The Omniterm TXB unit has dip switches on its sides, which allow operators to set the input and output signals as required, meaning just one type of module is needed to process a range of different signals from various applications. It also means that less stock is required, as the same replacements can be used with all input signals, making for more cost-effective and streamlined inventory management.

For signals being collected from harsh or hazardous areas, IECEx and ATEX certification is provided, verifying that the unit has been fully tested and is approved for use in hazardous environments or explosive atmospheres. It also has been tested independently for IEC61508 SIL-1, which certifies that the unit can be used as part of a plant safety system when required.

As TXB is pre-certified and universal, Omniflex can speak directly with engineers and analyse system data to create a signal isolation solution for diverse applications. The high quality and broad suitability of the TXB also reduces the time required for installation and validation, allowing Omniflex to solve a plant's signal issues efficiently and quickly.

As with languages, getting just one element wrong can change the entire meaning of a signal and create a muddle of detrimental machine misunderstandings. But like Google Translate, signal conditioners are at hand, translating these signals and disregarding inaccuracies to ensure clear communication for safe, efficient operations. □

For more information visit: www.omniflex.com

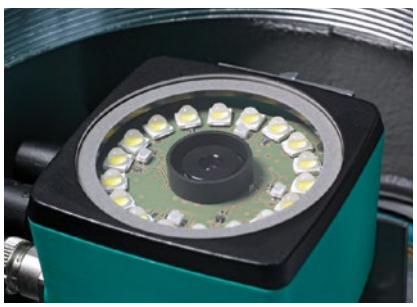
High-tech sensors for process automation in Ex areas

The dynamic world of factory automation relies on sensors with a range of technologies. If these sensors can meet the requirements for hazardous areas, a number of them could be valuable in process automation. Pepperl+Fuchs has developed a range of high-tech sensors that have proven themselves in discrete applications. With explosion protection, they are also suitable for process engineering in zones 1/21 and 2/22.

The digitalisation of process information forms the basis for modern automation and Industry 4.0 solutions. It enables remote access to data and device parameters, predictive maintenance, and data-based process optimisation. The basic data is largely supplied by sensors. The sheer variety of these devices in the world of factory automation is almost unmanageable. They are adapted to the highly differentiated technology of discrete manufacturing processes, and their development mirrors the short-term cycles and high dynamics in this field. The process industry may be focused on considerably longer cycles, but it can benefit from the technological progress in sensor technology for factory automation.

It is important to ensure mechanical integration of the sensors is as simple and standardised as possible. Reliable explosion protection for the devices is a prerequisite for their broad and flexible use in process technology. The acquisition and servicing costs for sensors usually play only a minor role in large plants in process industries compared to the outlay for permits and certifications needed in explosion protection. The sensors are often required in especially exposed areas, which creates additional challenges. The potential of devices originally developed for factory automation can best be illustrated by way of case studies.

Simple design, standardised as far as possible, makes the sensors easy to integrate into operational equipment.



High-tech sensors, proven in discrete applications, also hold potential for use in process automation.

Collision protection

When tankers are being filled with chemical fluids or oil products, personnel must be present on a moving platform above the vehicles. This workspace needs to be protected against collision risks to prevent damages to equipment or people. Working with a manufacturer of these appliances, experts from Pepperl+Fuchs helped to transfer a proven process from the non-hazardous area to the hazardous area.

The R2000 2-D laser scanner is mounted under the platform railing and its scanning field is directed toward the vehicle area. If the lifting platform is lowered too close to the tanker below it prior to the filling process, the sensor triggers a dual warning signal – a flashing light and an audible signal. At the same time, the platform is automatically stopped. This protective circuit reliably prevents damage to the platform and tanker and avoids hazardous situations for operating personnel. For use in hazardous areas, the laser scanner has been placed in a pressure-resistant aluminium enclosure with an integrated viewing window. It is approved for explosion protection zones 1/21 and 2/22. To prevent scattering and distortion of the signals by refraction, the sensor is mounted in the enclosure at a 15° angle.

Access control

Safety is a priority for oil platforms at sea. Safety measures include access restrictions and residence documentation in critical areas. Pepperl+Fuchs has developed an automated solution for this in cooperation with a supplier that specialises in tracking software. Employees wear RFID tags, which can be integrated into items like key rings or badges. Each employee's access rights to specific areas are stored on the tags, which are read by a RFID sensor at the access point to the specific areas. This read/write head is housed in an Ex-d enclosure and is approved for use in hazardous areas.

A human-machine interface (HMI) connected to the central computer is used for software visualisation. Employees are recorded every time they enter an area. The information stored in the tag enables track-and-trace evaluation of individual employees. The software determines whether the employee is authorised to access the area in question. If so, the software unlocks the relevant cabinets and doors. It simultaneously documents where exactly the employee is located, which is particularly important in emergency situations and in the event of an evacuation.

Object detection

Sensors that use the time-of-flight recording method (Pulse Ranging Technology, PRT) are ideal for quick and reliable

object detection. Pepperl+Fuchs offers object detection sensors with Ex-d enclosures. A powerful light source in the sensor emits short pulses that are reflected by the target object and captured by a precise, light-sensitive receiver element. The internal sensor electronics use the runtime of the light pulse to calculate the distance to the target object. This technology is used in the manufacturing of hoses and flexible pipes for oil production. The sensors from the VDM28 series have a detection range of up to 50 m. They monitor prescribed locations in the hazardous area and record the amount of material in stock. If a defined marker is understocked at a location, the sensor signal triggers automatic processes for refilling stock or ordering materials.

Inclination measurement and code reading

Inclination sensors are typically used in tunnel drilling systems to monitor the inclination of the drilling arms. A 360° check detects any errors in the propulsion system. Sensors from the INX360 series in pressure-resistant enclosures are used in these applications. The measurement results are not affected by the inevitable speed changes of the tunnel drill. The error-free inclination detection in this dynamic application enables precise alignment of the drill. Stationary readers, such as those from the OPC120 series, read 1-D and 2-D codes quickly and reliably in hazardous areas. The devices are reliable even on reflective surfaces.

There are many other case studies that could be presented. Pepperl+Fuchs offers application-specific solutions and ready-to-use standard products. Equipped with a pressure-tight encapsulated (flameproof) enclosure, the sensors can capture different process-related variables and provide the information basis for their automation. A wide range of standardised and certified sensors are approved for zones 1/21 and 2/22. Explosion-protected IQH and IUH read/write heads and VLM350 laser light sectional sensors are also available, in addition to those noted. □

At a glance

- Sensors originally developed for use in discrete manufacturing applications can be adapted for use in process industries.
- A laser scanner developed to provide collision protection on tanker filling platforms, for example, can be adapted for use in Ex zones.
- RFID sensors, widely used to monitor and control access to security areas can be adapted for use in process industries and hazardous areas.

For more information visit: www.pepperl-fuchs.com

Wide beam radar sensor

Turck Banner has expanded its T30R series of radar sensors with a wider-angle (45°×45°) beam pattern sensor to better detect curved or reflective surfaces and larger targets. Radar sensors are often the best choice for outdoor or dirty applications because their signals are not affected by wind, sun, rain, snow, fog, or air temperature.

With a 45°×45° beam pattern, the T30R-4545 sensor provides coverage of larger areas and more robust detection of irregular surfaces or targets presented at steeper angles. The sensor uses two independent, adjustable sensing zones and operates at 122 GHz, which enables higher-precision measurements at distances of up to 15 m. It can also detect objects as close as 150 mm and with linearity and repeatability less than ±1 cm. It offers dual discrete outputs for slow and stop positions, or analogue and IO-Link for absolute measurement values. Additionally, the Pulse Pro I/O output is available for seamless integration with Banner lights, providing direct process feedback that requires only power – no controller is needed.

While rain, snow, fog, sunlight and air temperature have the potential to interfere with accuracy in photoelectric and ultrasonic sensors, the T30R series uses FMCW radar detection to deliver dependable performance in any type of weather. Additionally, the best-in-class T30R series features rugged IP67 housings, protecting the electronic components from moisture and dust.

Left: The T30R-4545 sensor. Right: The sensor can be used outdoors, in loading docks, for example, to prevent trucks colliding with docking stations.

Applications

The wide beam radar sensor can be used for:

- Target detection of moving and stationary objects
- Collision avoidance, on board heavy equipment such as reach stackers, forklifts and mining vehicles
- Detection in harsh outdoor applications
- Fill-level applications in tanks
- Detecting object presence/absence within a defined zone
- Vehicle detection in carwash, drive-through, or loading docks.

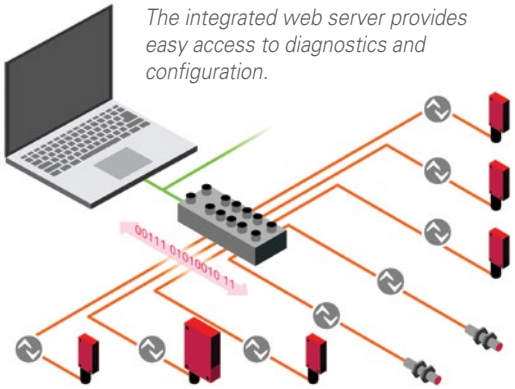
For more information contact Brandon Topham at Turck Banner.
Tel: +27 (0)11 453 2468
Email: brandon.topham@turckbanner.co.za
Visit: www.turckbanner.co.za

Quick-action integration via IO-Link

The new MD7 system from Leuze enables powerful automation and is easy to integrate. IO-Link master, hubs and sensors support high-performance systems. IO-Link hubs are a cost-effective way for users to integrate additional digital sensors into the system as required and extend the system in a flexible and economical way. Users gain the benefit of consistently transparent data and processes. With the synchronised system of IO-Link masters and Leuze sensors, the connected machines have a high level of standardisation. All the IO-Link modules as well as connected sensors and actuators can be quickly and easily commissioned, configured and centrally monitored via a web browser. With IO-Link, backward compatibility means that, even years later, sensors with older dates of manufacture can be integrated into systems with the latest specification.

Multi-protocol capability

The IO-Link masters work with a variety of protocols. In a single device they support the Ethernet-based fieldbus protocols for real-time communication. Communication via Modbus TCP is also possible and can be used to connect to simpler PLCs, operating terminals or SCADA systems, for example. This provides for flexibility in choosing the modules and a high level of standardisation with lower complexity, in turn reducing stock costs and streamlining maintenance. A Leuze device model facilitates communication via OPC UA. This variant can be integrated directly into cloud-based systems and, with its web-based configuration, it can also be operated as a standalone solution. The integrated web server with IODD interpreter allows all the connected IO-Link devices to be configured. The masters offer many ways to retrieve diagnostic and status information – either on the device or via a web server.



The integrated web server provides easy access to diagnostics and configuration.

The new MD7 system with IO-Link provides for easy integration, flexible expansion and transparent data and processes.

Flexible integration of sensors

IO-Link sensors integrated into the MD7 system transmit process data, device information, diagnostic data and event messages. Ethernet-based I/O modules combine the data and connect the machine modules to the control and superior systems. This allows modular expansion of the machine. A further time-saving and practical advantage with regard to maintenance is that if a sensor needs to be replaced, the master automatically uploads the configuration to the new device.

Wiring made easy

The IO-Link modules have an M12 power connector which enables connection irrespective of the Ethernet protocol used. The connectors deliver around 80% more power than 7/8" connectors. In daisy-chain applications – where hardware components are connected to one another in series – more modules can be wired together without requiring any additional power. This reduces installation and wiring requirements and offers a particular advantage where space in the machine is limited.

For more information visit: www.leuze.com

Reliable transmitter for thermocouples

The APAQ 130TC can be configured easily using a smartphone.

INOR has launched the APAQ 130TC, a modern transmitter for measurement with thermocouple sensors. The new transmitter is available in two variants, APAQ C130TC for mounting in the connection head and APAQ R130TC for mounting on the DIN-rail.

The APAQ 130TC is characterised by its simplicity. It does not require expensive configuration tools or fixed workstations. With a smartphone, users can easily configure the transmitter wirelessly via NFC.

The APAQ 130TC is the newest addition to the APAQ 130 transmitter family, now consisting of APAQ 130TC which works with thermocouple sensors, and APAQ 130RTD which works with Pt100 and Pt1000 sensors.

In the INOR Connect app, users can easily save and share configurations with their colleagues. They can also generate configuration protocols in PDF format for easy documentation. This makes configuring a transmitter easier than ever.

Mecosa (Pty) Ltd is the sole agent for INOR Process AB in South Africa.

For more information contact Mecosa.
Tel: +27 (0)11 257 6100
Email: measure@mecosa.co.za
Visit: www.mecosa.co.za

High performance differential pressure transmitters

Instrotech has available the Kobold PAD and PAS models of differential pressure transmitters. The microprocessor-based high-performance transmitters provide for flexible pressure calibration and output, with automatic compensation for ambient temperature, plus process variable configurations of multiple parameters and HART® protocol communication. Applications are varied and include media such as steam, gases, liquids and others. Pressure, flow and level measurement are handled by the application. Input of all data for the sensors is added, modified and stored in EEPROM (electrically erasable programmable read-only memory, as used in various electronic devices to store relatively small amounts of data).

As an option, the Kobold PAD-F is also available as a flow meter with a totalising function in the PAD transmitter, so it can check the flow rate and totalise flow. Flow rate is measured by using differential pressure without compensation for temperature and static pressure. The body of PAD-F is the same as the standard device, except for the terminal block, which has two more pulse output terminals.

Key features of the PAD and PAS models include:

- Superior performance with high reference accuracy, long-term stability and high rangeability
- Flexibility, supported by data configuration with a HART® configurator and zero point adjustment
- Reliability, supported by a continuous self-diagnostic function, automatic temperature compensation, EEPROM write protection, fail-mode process function, and compliance with CE electromagnetic compatibility standards (EN 50081-2, EN 50082-2).

The differential pressure transmitters are used in critical media applications, such as steam, gases and liquids.

Kobold's PAD and PAS transmitters provide high reference accuracy due to the high-performance processors, making them suitable for flexible application in absolute and differential pressure measurements. In addition, these two models achieve long-term stability with capacitive or piezo-resistive sensors.

For more information contact Instrotech.
Tel: +27 (0)10 595 1831
Email: sales@instrotech.co.za
Visit: www.instrotech.co.za

New level switch for granules and solid products

Val.Co has introduced a new LPM level switch designed specifically to control the storage of dusts, granules, powders and other solid products.

Particularly suited for the pharmaceutical, food, plastics and agricultural markets, the level switch is of robust construction and consists of a stainless steel rotating shaft with sealed self-lubricating bearings. The shaft is driven by a synchronous gear motor at low speed. When the material stops the rotation of the blades, the power supply to the geared motor is cut off, activating an electric changeover contact.

Managing Director of GHM Messtechnik South Africa, Jan Grobler commented, "This new LPM level switch from Val.Co is the most cost-efficient level switch on the market with the instrumentation quality, accuracy and reliability for which Val.Co is renowned. The shaft is manufactured from stainless steel and its performance is enhanced by the self-lubricating bearing system. We believe this newly developed LPM level switch will add value in control of the storage of granules, dust and other solid products."

Technical features of the Val.Co LPM level switch include:

- Power supply range 24 - 230-volt units
- A temperature range of -10°C to +120°C
- Housing of cast aluminium or stainless steel AISI 304
- Connection to FWX lengths A/B from 55 mm to one metre and connection to 40G-65G A/B 80 mm to one metre
- Electrical connection is N2 cable gland 3/8"
- Paddle can be supplied with flanged or threaded connections
- Conforms to IP65 protection standards.

The alarm system can be activated when conveyor belts unexpectedly come to a standstill.

Val.Co is part of the GHM Group of companies.

For more information contact GHM Messtechnik SA.
Tel: +27 (0)11 902 0158
Email: info@ghm-sa.co.za
Visit: www.ghm-group.de/en/

The new LPM level switch is designed to control storage of granules and similar products.

New high-pressure heaters for Eskom power stations

Steinmüller Africa, turnkey solution provider for high-temperature and -pressure static equipment, is working on two orders to supply a total of 14 new high-pressure (HP) heaters which will form part of the upgrades at Eskom's Mpumalanga-based sister plants, Tutuka and Duhva power stations.

As specified in Eskom's requirements, the header-type HP heaters will range from 12 to 14 m long, with 2 m diameters. Using Steinmüller Africa's customised designs, the heaters will achieve various pressures, ranging from 1.5 to 30 MPa, and handle very high temperatures, between 230 and 300°C.

The project required six new designs, three process and three mechanical, which were developed swiftly, despite the challenges posed by Covid-19. Having received the orders in August 2020 and February 2021 and to meet the tight design and planning deadlines while also adhering to Covid-19 protocols, the Steinmüller Africa team worked 12-hour shifts around the clock, some remotely and others in the office. This was achieved using 3D modelling software, Inventor.

Now well into material procurement phase, the company has begun initial fabrication on Tutuka's HP heaters and those for Duhva are due to follow in the next few months. Steinmüller Africa expects to complete all HP heaters by 2024, as both power stations' equipment is reaching mid-life status and requires replacement.

The company undertook extensive preparation and testing procedures to ensure Eskom's exact specifications are met. The engineering team completed various iterations, modifying procedures and production of the header to nipple welding. By re-developing the processes of drilling, re-aligning, fit-up, welding, non-destructive testing (NDT) and ultrasonic testing (UT), the company created a new process and set of protocols based on existing European methodologies.

Steinmüller Africa also extensively tested the machinery best suited to meet requirements when bending snake or serpentine tubes. Automated, semi-automated and manual machines were all tried and tested for best fit. Furthermore, the tube bending process required specific heat treatment, which is currently being tested and proven in its efficiency.

Warwick Ham, Boiler Process Engineering Group Leader at Steinmüller Africa said, "All our pre-fabrication preparation and testing methods are critically important to meet our clients' specific requirements. Through mock-up testing for the header to the nipple welding and heat treatment for tube bending, we are confident we can deliver top-quality final products."

The HP heaters are supplied with engineering and manufacturing guarantees, which are confirmed by an external reviewer on completion of the design and fabrication, respectively. Steinmüller Africa's HP heaters are expected to perform for over 30 years, which can be extended with repairs and maintenance services.

Serving the petrochemical, power generation, sugar and steel industries, Steinmüller Africa offers end-to-end solutions for utility-scale companies using turbines, boilers and HP heaters. It can meet specified design codes, including ASME, EN, British standards, API, HEI, TRD and TEMA.

Senior Process Engineer Keyur Kumar Patel says, "We engineer, design, test, fabricate and install all necessary boiler and HP heater equipment using our in-house experts and leading services."

With the help of Oerlikon Automatic Welding and Cojafex Induction Bending machines, unique to the African continent, as well as other world-class machinery, Steinmüller Africa offers a set of customised products and services. Additionally, with an internal logistics team and crane division, which offers load capacities of over 100 tonnes, materials delivery and on-site installation can be achieved across Africa.

For more information contact Steinmüller Africa.
Tel: +27 (0)11 806 3209
Email: Keyur.patel@bilfinger.com
Visit: www.steinmuller.bilfinger.com

U-Bends of a tube bundle on a HP heater.

Final fitments on a high-pressure heater tube bundle before the shell is placed over it.

Testing and inspection services in the water sector

Dekra Industrial SA, well-known for its non-destructive testing (NDT) and inspection services across a range of industries – including power generation, nuclear, oil and gas, construction, petrochemical and renewable energy – is expanding its existing services to the water sector.

With 96 years in the industry through its global parent company, Dekra Industrial has established a reputation as a leader in NDT and inspection services, including material testing, laboratory testing, 'one-stop' NDT inspection and corrosion control with rope access, lifting and drone inspections, advanced NDT, and asset integrity. It also provides industry training through the Dekra Institute of Learning (IOL).

Until 2021, the water sector represented a limited share of the Dekra Industrial portfolio of work, but it is looking to change this.

"We see the expansion of our service offering in the water sector becoming an integral part of our one-stop NDT and inspection services, generating new business for the company and adding value to the water sector," says Johan Gerber, Managing Director, Dekra Industrial SA.

Every industry needs water

With a shortage of water – or the lack of water – becoming a concerning threat to South Africa's sustained economic development, Dekra Industrial recognises that its experience in corrosion control and NDT solutions can be extended in the water sector.

"Our entire services portfolio correlates with the test and inspection needs in the water sector and it therefore makes sense – for Dekra Industrial and our clients – that we extend our services in this vital sector," says Gerber.

The company will position itself to offer a holistic, 'one-stop' service of NDT inspection, corrosion control, welding, water leakage detection, and certification services.

"We will additionally offer corrosion control, painting and blasting to the water sector," says General Manager Eddie van Hansen. "Above-ground pipelines, water purification plants, reservoirs, tanks and dam walls are all areas where corrosion takes place. Offering a multi-faceted approach, we will be able to supply our clients with a complete solution."

Pushing the boundaries of inspection

Dekra Industrial will also offer clients in the water sector advanced NDT and inspection solutions using drone technology.

"For example, when we do concrete inspections using drone technology, we can pick up problems that were previously hard to detect," says van Hansen. "In the water sector, drone inspections can be done on dam walls and other concrete structures which are affected by water and corrosion. Furthermore, by offering concrete inspections on water tanks, we can detect leakages, saving money and greater maintenance costs further down the line for private and municipal water entities."

Drones can be used in non-destructive testing and inspection in the water sector.

The company believes that automated drone inspections can be used to address water losses resulting from ageing or poorly maintained infrastructure. Drones can be programmed to follow a specific route and digitally map cracks and leakages.

Dekra Industrial's Advanced Technology Manager and Level 3 Custodian, MC Liebenberg, who is responsible for the company's drone inspection services, explains. "The camera essentially controls the drone and can detect hazards in water reservoirs or tanks, for example. The visual data obtained from the drone is recorded and, with the use of dimension data analytics and thermal imaging, water infrastructure such as tanks, dam walls or reservoirs can then be repaired, section by section."

He highlights, for example, "Important water resources such as the Vaal Dam would benefit hugely from regular drone inspection. It has been estimated that up to 30% of its water volume is lost before it reaches storage, due to rust and corrosion leakages in underground pipes. Using drone inspection, we would be able to locate the leakages and present solutions, applying our 'one-stop' ethos."

Other NDT technologies that can be put to use in the water sector include ultrasonic testing, alternating current field measurement (ACFM), acoustic emission (AE) measurement, and Hovermaps (where an additional thermographic camera with built-in software is attached to a drone).

"Ground-penetrating radar is particularly effective where detection of water leaks under substrate such as tarmac is required," Liebenberg adds, "and infrared technology applied in drone inspections can also effectively inspect areas at risk of cracks and leakage."

Importantly, he highlights that the data gathered in drone surveillance, for example, represents only 25% of the information. "Adding the necessary levels of value to that data is a key factor that enables us to provide clients with the information required to make critical operational and maintenance decisions." he says.

Dekra Industrial SA offers its synergistic range of services across South Africa and pan Africa.

For more information contact Dekra Industrial SA.
Visit: www.dekrarsa.com

Proactive plant maintenance service

Through its Service Division, SEW-EURODRIVE provides dependable on-site support, 24 hours a day, 365 days a year. The company sees its proactive maintenance service becoming increasingly important. Taking the approach of 'prevention is better than cure' it works to improve equipment performance and reliability, reduce unscheduled breakdowns and extend equipment life.

Plant operators are often under pressure to keep production running at the expense of routine and necessary maintenance. The focus is on maintaining outputs and income in the immediate term rather than investing in a maintenance programme to ensure better long-term performance and equipment reliability. "Busy people on site don't always understand the real value of regular maintenance, so they often take unnecessary risks," says Eben Pretorius, HOD of the company's Service division.

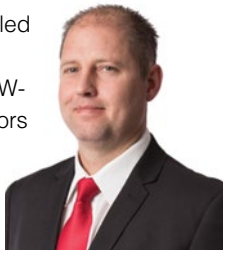
SEW-EURODRIVE offers a range of cost-effective services to help customers take better care of their industrial gearboxes, gear motors, electronic and automation controllers and variable speed drives (VSDs). As a starting point, Field services and Site assistance provides breakdown and problem-solving support for users of SEW-EURODRIVE equipment.

"For mechanical drive trains, this service includes oil sampling and analysis, vibration and thermal inspections, laser alignment, as well as internal and external inspections and on-site strip and repair work," says Pretorius.

He notes that customers often start to experience minor issues such as oil leaks with equipment a few years after installation, due to lack of maintenance. This is an ideal time to do a site survey of the drive equipment in use. During an on-site walkthrough of operating equipment, for example, SEW-EURODRIVE service specialists will typically take oil samples from the gearboxes, do vibration analysis to determine the condition of the bearings and whether the gears are meshing properly. "We may open some of the inspection covers and inspect the gears for wear, and if there are alignment issues, we can re-align the drive train, which is necessary to ensure that bearings and seals do not fail prematurely," he says.

After looking at the equipment on site, a report is produced summarising the condition of the equipment and the remedial action required to improve reliability. The problems identified are clearly explained and maintenance procedures suggested. "We highlight where urgent action is required and point out less critical issues that can be dealt with during the next scheduled shutdown," Pretorius adds.

By adopting the recommendations, customers can improve the performance and reliability of their equipment, unscheduled breakdowns can be avoided and the life of the installed equipment can be extended.



Eben Pretorius, HOD Service division at SEW-EURODRIVE.

For ongoing support, SEW-EURODRIVE offers plant operators Service Level Agreements (SLAs). The information from an on-site survey is used to identify units that most need proactive services and how often equipment condition and maintenance requirements need to be checked. "Typically, we suggest a visual inspection every three months and a more comprehensive equipment survey every six months," he says.

No one can guarantee that a machine won't fail, but SLAs and use of SEW-EURODRIVE's DriveRadar® condition monitoring system can assist in predicting when a failure is likely to happen on a unit, and confirming which of the units are in good condition and unlikely to fail. "From vibration analysis, we can pick up if a bearing is worn and about to fail, and from oil analysis, we can see if the lubricant is contaminated. By responding quickly to such issues, unexpected and more serious failures can almost always be avoided," Pretorius says.

DriveRadar® is a connected solution for data-based predictive maintenance that automatically collects data from field equipment and uses it to track tends, monitor the condition of equipment and predict potential failures. It prevents unforeseen failures in operation, detects and tracks wear rates and minimises downtime.

The DriveRadar® monitoring system is an independent system with all operating data sent to the SEW-EURODRIVE Cloud using a LTE/3G sim card or an Ethernet connection. All the information can be viewed on a secure portal, with full operating history and all operating events readily available. "While there are costs associated with our proactive maintenance services, these are far less than breakdown repair costs and, by intervening before breakdowns occur, unscheduled downtime and massive production loss costs can be avoided."

In terms of response times when an emergency arises, Pretorius says SEW-EURODRIVE reacts quickly. "On field service work, if a client needs a service technician at 8:00 at night and we have an SLA or a Field Services order, we can send someone immediately." He also cites examples of replacement gearbox units being built overnight to be delivered and commissioned on-site the following morning.

He adds that service-related training will be an important part of the company's new training Drive Academy at its new premises. "We have specific training courses to help users maintain industrial and gear motor units and our range of electronic products," Pretorius says. "All these services are offered to support plant operators and production managers."

For more information visit: www.SEW-Eurodrive.co.za

SEW-EURODRIVE's DriveRadar® is a connected condition monitoring system for data-based predictive maintenance.

Keeping customers informed

One of the latest technological innovations employed by condition monitoring specialist WearCheck, is enabling the company to use its sophisticated online system to send customers their reports via WhatsApp.

Managing Director, Neil Robinson says WearCheck is constantly exploring how technology can enhance the customer experience as well as continuously improving condition monitoring techniques.

WearCheck IT Manager, Eddie Perumal highlights the benefits of this latest step. "WhatsApp has proven its convenience as an integral part of everyone's daily life, and it adds value by allowing us to communicate in real time with maintenance teams who may be on the factory floor with their mobile phones, rather than waiting until they are sitting behind a desk checking emails. Therefore, we felt it was fitting to incorporate the option of communicating with our customers via WhatsApp," he says.

Customers can select from three message options: one-page report, two-page report, or status. Reports include fleet information, problem type and diagnosis. This feature applies to critical and urgent samples.

Another powerful reporting tool is WearCheck Online. This web-based system allows customers to view their sample reports and fleet information, and submit their sample registration details and feedback.

WearCheck Online incorporates a variety of features to assist customers to manage their oil analysis programmes. Some of these include:

- Current samples list, which shows unread reports
- Print sampling labels using A4 self-adhesive labels
- Trend-based graphs, problem-type graphs, and pivot tables
- Component analysis – view the results of one or more components in a single graph
- Basic user information for staff in the reporting hierarchy, including reports read, sample submissions, feedback entered.

Various search options and filters are available, including sample history and equipment or component searches.

Critical information can be sent to customers' mobile devices, enabling them to make instant maintenance decisions based on real-time data.

An extension to the online system – WearCheck's mobile app, which was pioneered four years ago – has been well-received in the marketplace. It offers similar features to the online system with the option to 'Ask a diagnostician,' where the customer can enquire about a specific sample. Customers can also use their mobile device to scan their sample barcode quickly.

Robinson comments: "Many industries benefit from WearCheck's services, among them are mining, earthmoving, industrial, transport, shipping, aviation and electrical operations. As optimal machine condition is critical in all these industries, and the WhatsApp service enables real-time maintenance issues to be shared, enabling instant decision making, the new service will add significant value to our condition monitoring services."

WearCheck's Customer Services division can assist customers to sign up for the WhatsApp service.

For more information contact WearCheck.
Tel: +27 (0)31 700 5460
Visit: www.weaarcheck.co.za

AI supports increased uptime across industries

ABB launched the ABB Ability™ Genix Asset Performance Management (APM) Suite in the final quarter of 2021, bringing AI-based predictive maintenance, asset reliability and integrity insights to the process and utility industries.

Genix APM is an enterprise-grade application for condition monitoring and predictive maintenance.

The Genix APM Suite makes it easy to add asset condition monitoring to existing operational technology (OT) landscapes. It enables prioritisation of maintenance activities based on AI-informed predictions and provides a comprehensive overview of asset performance.

The Genix APM Suite also empowers significant improvements in operational sustainability. It serves to improve usage of equipment and supports lifecycle analysis and capital planning. By assessing the remaining useful life of industrial assets, the software generates a plan for preventive maintenance, which can extend equipment uptime by as much as 50% and increase asset life by up to 40%.

With reliable data insights, decision makers are provided with the information they need to identify gaps and areas for improvement for energy efficiency and tighter control of operations, increasing asset availability and improving profit potential.

The Genix APM Suite brings AI-based predictive maintenance to process and utility industries.

"Poor asset availability and reliability is a serious problem that results in unplanned downtime and unexpected maintenance costs, and it impedes strategic planning and procurement," said Rajesh Ramachandran, Chief Digital Officer at ABB Process Automation. "It's not that industrial customers lack data, it's that many lack effective ways to use the data to improve operational and business performance."

Genix APM is built on the ABB Ability™ Genix Industrial Analytics and AI Suite. ABB Ability Genix is a modular, IIoT and analytics suite, which integrates IT, OT and other enterprise data in a contextualised manner, applying advanced industrial AI capabilities that support new insights to optimise operations.

For more information visit: www.abb.com

Thermal camera videoscope kits for hard-to-reach views

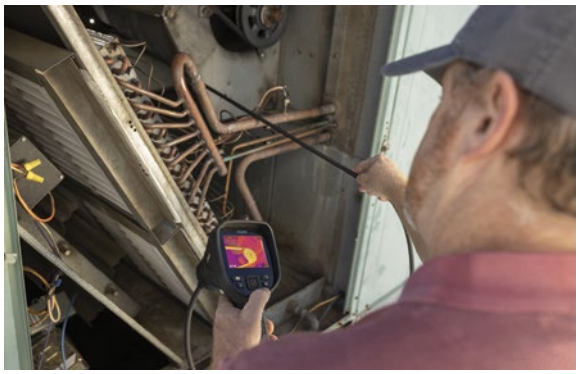
Teledyne FLIR has introduced two additions to its industry first VS290 Thermal Videoscope Kit family of devices – the VS290-33 Thermal MSX® Videoscope Kit and the VS290-21 Thermal Videoscope Kit. The VS290-33 features a rounded, dual thermal-visible probe providing greater flexibility in conducting underground utility-vault inspection and other high-voltage scenarios that require a CAT IV rating. The VS290-21 provides thermal-only building, mechanical, and electrical inspection capabilities enabling mechanical, electrical and building professionals to view hard-to-reach areas – from crawlspaces to inside motors.

The rounded VSC-IR33 dual thermal-visible probe is just 19 mm in diameter, so it can fit within tight spaces without sacrificing side-viewing capabilities. The probe houses a 160 × 120 thermal camera and a two-megapixel visible camera, together with a bright LED work light, to provide MSX imagery in both light and dark spaces. FLIR's proprietary MSX (Multispectral Dynamic Imaging) on-camera software takes key details from the visible image and embosses them on the thermal image, providing perspective and crucial contextual clues to help users assess potential issues accurately and safely.

The VSC-IR21 probe offers similar specifications in a thermal-only package that is slim enough to access hard-to-reach spaces and locate potential problems quickly. It features the same 160 × 120 resolution as the VSC-IR32/33, but in a forward-facing camera designed to help users view inside walls, within machinery, and in other tight spaces

Improved analysis and reporting

The VS290 Videoscope Kits are compatible with FLIR Thermal Studio Suite software for quick report generation, post-processing and analysis. The software enables operators to document and share issues and include before-and-after imagery to show when a problem has been resolved.



The VS290-21 Thermal Videoscope Kit provides infrared inspection capabilities in hard-to-reach areas.

On the base units, operators can view live video and captured images via the 3.5-inch colour display. The display includes the option of adding isotherm colour alarms to identify potential issues in real time across a temperature range from -10 to 400°C.

Ruggedised design

The family of VS290 Videoscope Kits feature IP67 camera tips and IP54 rated base units and probes, providing a high level of protection against dust and water. The base units are also drop-test rated for two metres.

For more information visit: www.teledyneflir.com

Rope access teams provide agile maintenance

During the past year rope access specialist, Skyriders Access Specialists, was called on to carry out a range of inspection, repair and maintenance services across diverse sites – from a 50-storey skyscraper to a shopping centre and a major food processing plant.

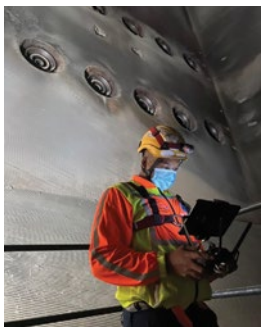
"This is a growth area for us, especially as regular maintenance schedules have to be followed to ensure continuing productivity and efficiency, despite the restrictions imposed by the Covid-19 pandemic," says Marketing Manager Mike Zinn.

Skyriders can field small, flexible and dynamic teams that offer a range of services, all while remaining fully compliant with Covid-19 regulations. "Building a high scaffold structure takes considerable labour, while rope access requires only a small team. The same applies to our drone department, where a two-person team can inspect an entire furnace area of a boiler visually without the need for scaffolding," Zinn notes.

Often called on to conduct maintenance, repair and inspection services at large-scale industrial structures such as smokestacks and petrochemical tanks, Skyriders has also carried out general routine cleaning in difficult-to-access areas at a food processing plant. A six-person team oversaw the fast-track project over a two-day period, deploying high-pressure washers using food-safe detergent in line with the strict hygiene and health and safety standards of the food and beverage industry.

Skyriders offers a variety of rope access aided services to industries such as power generation, petrochemical, mining, heavy industry and facilities management. These services include non-destructive testing (NDT) and inspection, concrete inspection, maintenance and repairs, application of coating systems, work-at-height safety systems, welding, and confined space rescue and standby.

For more information contact Skyriders.
Tel: +27 (0)11 312 1418
Email: mike@ropeaccess.co.za
Visit: www.ropeaccess.co.za



In some projects Skyriders uses advanced technology like Elios SkyEye drones.

Investing in people is essential for growth

Daniel Orelowitz, Managing Director of Training Force

Broad-Based Black Economic Empowerment (B-BBEE) was intended to address the inequalities of the past by creating equal employment opportunities. However, rather than speeding up economic transformation, it has often enriched a select few while so many previously disadvantaged individuals remain at a disadvantage. Every element of economic transformation needs to be made broad-based, and skills development lies at the heart of this. Investing in developing people's skills is essential to create ongoing and sustainable economic transformation and real employment equity.

It's all about people

For any organisation, people are not only the biggest asset, but also the biggest expense. Without the right skills it is impossible for a business to grow and thrive, even as technology plays an increasing role. As the Fourth Industrial Revolution (4IR) evolves, skills development becomes more important as skill sets are changing, and if South Africa is to compete at a global level, the country's workforce skills need to be improved.

Hiring people without the right skills for the job and simply to tick a box on the BEE scorecard, will not enable them to add value to the business. B-BBEE needs to become more about creating equitable employment and developing the necessary skills, rather than fulfilling a set of requirements to obtain a certificate.

Understanding people's circumstances

One of the challenges around creating an equitable employment environment lies in understanding the circumstances of disadvantaged job seekers. Without the necessary skills, they are less employable, but without employment, they are unable to gain skills or experience that will give them a better chance of getting a job. The number of discouraged job seekers in South Africa is high, and this, together with high levels of unemployment, creates an unsustainable economic situation. It perpetuates the cycle of poverty and addressing this challenge is where B-BBEE should come into play.

Every individual has value and something to add to a business, but often, people are not given the opportunity to prove their worth. Learnerships are an invaluable tool that businesses need to embrace to uplift people, provide opportunities for individuals to obtain qualifications and experience, and allow organisations to develop the skills they need to enhance business growth and value.

Partners in success

B-BBEE sets the foundation for companies to spend money on skills development and can be used as an opportunity for businesses to help previously disadvantaged individuals to uplift themselves. The key is to match people who want to learn with companies that offer the opportunity for them to learn new skills that are aligned with their interests and abilities. Not every business can take on people, but they may be able to offer funding to help another business that can offer the practical workplace experience.

Skills development is essential in giving people the opportunity to develop and use their unique attributes and talents.

A skills development and training partner can play a central role in navigating this complexity and acting as a facilitator. This is important in helping people to find opportunities and businesses to offer them, and matching resources to requirements, at the same time ensuring that skills development is aligned with identified needs to help businesses grow.

The true spirit of transformation

Embracing B-BBEE as more than a tick-box exercise means examining the entire scorecard and understanding how best to make the requirements work for your business and maximise value. For example, is the ownership requirement truly adding value, or are you simply giving away part of the profits to 'tick' that box? Ownership should be about wealth creation and sharing, and about benefiting the business through new leadership, rather than being seen as a tax that will further enrich a select few. The same applies to skills development and enterprise supplier development. The right partner can assist in ensuring all these elements help the business, at the same time building skills, uplifting people, and creating a more sustainable economy in which businesses can grow and thrive.

Skills development is essential in giving people the opportunity to develop and use their unique attributes and talents. In turn this will benefit businesses and the entire economy: if all businesses work together to train people and collectively grow the pool of talent available, the whole country will benefit. When addressing the B-BBEE scorecard, businesses need to give it the time and attention it deserves. Many spend a lot of money on certification, so this could best be done in such a way that it adds value. With the right partner, this investment in time and resources can be maximised to the benefit of all.

Training Force is a company within the Workforce Training and Consulting Cluster, part of Workforce Holdings.

For more information visit: www.workforce.co.za

Mass spyware targets ICS and other computers

In 2021 security experts at Kaspersky uncovered a new piece of malware that had targeted more than 35 000 computers across 195 countries. Dubbed 'PseudoManuscrypt' for its similarities with the advanced persistent threat (APT) group Lazarus' Manuscrypt malware, the new malware contains advanced spying capabilities and has been seen targeting government organisations and industrial control systems (ICS) across numerous industries.

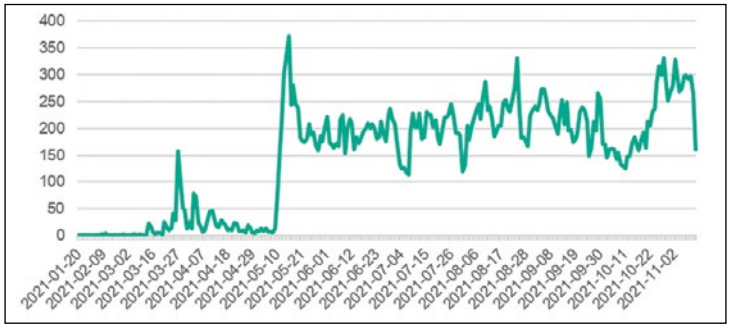
Industrial organisations are some of the most coveted targets for cybercriminals – for financial gain and intelligence gathering. 2021 saw significant interest in industrial organisations from well-known APT groups like Lazarus and APT41. While investigating another string of attacks, Kaspersky experts uncovered the new malware.

From January 20th to November 10th 2021, Kaspersky products blocked PseudoManuscrypt on those thousands of computers where it was uncovered. Many of the targets were industrial and government organisations, including military-industrial enterprises and research laboratories. 7.2% of attacked computers were part of industrial control systems (ICS), with engineering and building automation representing the most affected industries.

PseudoManuscrypt is initially downloaded on targets' systems via fake pirated software installer archives, some of which are for ICS-specific pirated software. It is likely these fake installers are offered via a Malware-as-a-Service (MaaS) platform. After initial infection, a complicated infection chain is initiated that eventually downloads the main malicious module. Kaspersky experts have identified two variants of this module. Both have advanced spyware capabilities, including logging keystrokes, copying data from the clipboard, stealing VPN (and potentially RDP) authentication credentials and connection data, copying screenshots, and suchlike.

The attacks show no preference for particular industries, but the large number of engineering computers attacked, including systems used for 3D and physical modelling and digital twins, suggest industrial espionage may be one objective.

Some of the targets share ties with the victims of the Lazarus campaign that ICS CERT reported on previously, and data is sent to the attackers' server over a rare protocol using a library that has previously only been used with APT41's malware. Nevertheless, given the large number of victims and the lack of an explicit focus, Kaspersky does not link the campaign to Lazarus or any known APT threat actor.



Tracking the number of systems on which PseudoManuscrypt was detected, by day.

Vyacheslav Kopeytsev, security expert at Kaspersky says, "This is a highly unusual campaign and we are still piecing together the information we have. However, one fact is clear: this is a threat that specialists need to pay attention to. It has been able to make its way onto thousands of ICS computers, including those in many high-profile organisations. We will continue our investigations, keeping the security community apprised of any new findings."

To stay safe from PseudoManuscrypt, Kaspersky experts recommend organisations take the following actions.

- Install endpoint protection software on all servers and workstations.
- Check all endpoint protection components are enabled on all systems and that a policy is in place which requires the administrator password be entered in the event someone attempts to disable the software.
- Check that Active Directory policies include restrictions on user attempts to log in to systems. Users should only be allowed to log in to those systems which they need to access to perform their job responsibilities.
- Restrict network connections, including VPN, between systems on the OT network; block connections on all those ports that are not required for the continuity and safety of operations.
- Use smart cards (tokens) or one-time codes as the second authentication factor when establishing a VPN connection. In cases where this is applicable, use the Access Control List (ACL) technology to restrict the list of IP addresses from which a VPN connection can be initiated.
- Train employees of the enterprise in working with the internet, email and other communication channels securely and, specifically, explain the possible consequences of downloading and executing files from unverified sources.
- Use accounts with local administrator and domain administrator privileges only when this is necessary to perform job responsibilities.
- Consider using Managed Detection and Response class services to gain quick access to high-level knowledge and the expertise of security professionals.
- Use dedicated protection for shop-floor systems. Kaspersky Industrial CyberSecurity protects industrial endpoints and enables OT network monitoring to identify and block malicious activity. □

For more information visit: ics-cert.kaspersky.com

Technology is key to unlocking a green future

Leanne Mostert and Cindy Leibowitz, Webber Wentzel

According to several reports, the interior of Southern Africa is warming at twice the global rate. Significant changes to long-term weather patterns, agriculture and food security, water availability and biodiversity are likely and their effects potentially severe. Existing and new technologies will be critical to mitigate and manage the damage of global warming.

In the words of the Prime Minister of Barbados, Mia Mottley, speaking at COP26 held in Glasgow, UK in November last year: "Commitments made by some are based on technologies yet to be developed and this is at best reckless and at worst dangerous." There is no doubt that if the world is to address the climate change crisis, new technologies are pivotal to shaping a future for our children and grandchildren, and the failure to do so would be disastrous.

The role of technology in transforming unsustainable systems, structures and practices into more sustainable ones is recognised in the United Nation's Sustainable Development Goals (SDGs). SDG 9 encompasses industry, innovation and infrastructure targets, and SDG 17 deals with the strengthening of global partnerships to achieve sustainable development, including through financing for developing countries and sharing knowledge, expertise and technology.

There is an abundance of opportunity for technology companies, entrepreneurs and innovators to create new and innovative solutions to enable and accelerate a green future. However, thinking outside of the box about potential green technology solutions is critical if governments are to achieve net zero by 2050.

For instance, blockchain technology and the Internet of Things (IoT) are not necessarily front of mind as being technology solutions that can be leveraged to transform practices in the energy sector. However, because blockchain technology is immutable and agile in supporting automated, transparent transactions, and because of the interconnectivity of devices which underpins the IoT, there are many use cases for these technologies in addressing climate change.

One such case, for example, pertains to monitoring and reporting on greenhouse gas (GHG) emissions. Existing processes for monitoring GHG are often inept at capturing accurate information and providing adequate tracking and reporting. Blockchain technology can be used to record and track data gathered by IoT sensors, drones or robots, centrally, with the key benefit being that the information gathered will be far more accurate than data which has traditionally been manually collected.

The creation of such advanced technologies often requires collaboration among multiple parties. While a software developer may have the technical skills to write the necessary code, it may be that an investor is needed to fund the development. Typically, this leads to various negotiation points, one of which is the ownership of the intellectual property in the new technology solution. This is one of the most hotly debated points of negotiation in any research and development or joint venture arrangement. Given the critical nature of a successful innovative solution to address climate change, parties will be vying for ownership rights, and agreements between parties will need to be carefully drafted to cater for this.

Technology can be harnessed to combat climate change and support a sustainable future.

In addition, because the effects of climate change transcend borders, many new technology solutions will or should be commercialised offshore. We foresee many cross-border licensing arrangements being negotiated by those that are first to market with new clean technology solutions. Parties importing or exporting intellectual property into or from the Common Monetary Area (eSwatini, Lesotho, Namibia and South Africa) will need to give due attention to adhering to the South African Reserve Bank's exchange control regulations.

We remain hopeful that the hundreds of governments and companies that have made net zero commitments will step up to the challenge. These institutions have billions of dollars at their disposal to invest in new technologies. As stated by the Prime Minister of Barbados, in the past 13 years, the central banks of the world's wealthiest nations engaged in US$25 trillion of quantitative easing. Astonishingly, of that amount, US$9 trillion was used to fight the Covid-19 pandemic. It is now time for wealthy nations and organisations to mobilise funds to create technology solutions that can be used to fight global warming.

In our view, the winners will be those organisations and businesses that can deliver rapidly scalable, affordable solutions that can be deployed internationally – but the ultimate winners will be all of us who live on this planet, particularly those individuals and communities who are in dire need of drastic action to be taken to address basic human needs such as access to clean water and reliable energy supply. It's a win-win situation for innovators and for society at large.

For more information visit: www.webberwentzel.com

Eskom unlocks land for renewable energy development

To facilitate investments in infrastructure for further electricity generation capacity, Eskom has initiated an auction process to unlock and make some of the land at its power stations available to private investors for renewable electricity generation. The availability of Eskom-owned land to near-ready projects will remove a significant barrier to investment and go a long way to resolving the widely documented power crisis in the country, which is faced with an urgent and critical need for additional generation capacity.

The land will be made available for lease in a competitive bidding process, initially in Mpumalanga. It will be offered to the private sector for purposes of generating electricity from renewable technologies for own consumption or for sale to third parties. Mpumalanga has by far the most coal-fired plants with established transmission and distribution infrastructure.

Eskom Group Chief Executive, André de Ruyter says, "The bidding criteria will favour generators for size and speed of delivery – thus quickest delivery of the most megawatts to the grid – in order to help relieve the constraints on the power system." He adds that the leasing of land would have to be made subject to production being achieved by a contracted date.

The maximum amount of electricity generation capacity per project will be capped at 100 MW, and the lease will be for a minimum period of 20 years. Eskom will provide connection up to the nearest network connection point. In terms of the scheme, the land will remain the property of Eskom for the duration of the lease.

Lending further support to the rapid and urgent addition of generating capacity is the amendment to Schedule 2 of the Electricity Regulation Act of 2006, gazetted by the Department of Mineral Resources and Energy in August 2021. The amendment allows generators to wheel electricity through the transmission grid, subject to wheeling charges and connection agreements with the relevant transmission or distribution licence holders.

The amendment also presents Eskom with opportunities to sell or lease its properties close to its existing power stations, with established grid infrastructure, to the private sector, enabling the development of renewable plants up to 100 MW, in support of President Ramaphosa's call for "an ambitious, bold and urgent response to the energy crisis".

Eskom plans to lease some of the land at its power stations to private investors to develop renewable electricity generation capacity.

This project is in line with the President's directive for South Africa to take bold steps to emerge from the electricity constraints as soon as possible. "Our ability to address the energy crisis swiftly and comprehensively will determine the pace of our economic recovery," said President Ramaphosa when introducing the amendment to Section 2 of the Electricity Regulation Act in June 2021. "Resolving the energy supply shortfall and reducing the risk of load shedding is our single most important objective in reviving economic growth," the President said.

This urgent directive to address the energy crisis also found expression in the Medium-Term Budget Statement (MTBS). Finance Minister Enoch Godongwana said in the MTBS, "Our first and immediate task, in this regard, must be to ensure stable energy supply, reduce the risk of load shedding and accelerate the transition to renewable energy sources."

Eskom's constrained financial situation, which makes access to capital expensive, makes it imperative to consider innovative ways to add new capacity to the electricity system, including leveraging Eskom 'assets' to incentivise the expedited establishment of generation capacity by independent power producers. These assets include access to land (with established environmental approvals) and proximity to grid connection points, among others.

The commercial process is based on auctioning lucrative renewable generation sites, with the evaluation process favouring quick delivery of large capacity to the system.

Renewable energy is the least cost option for new generating capacity, as demonstrated by the REIPPPP Bid window 5 prices. However, Eskom's Transmission Development Plan confirms that areas with the best solar and wind resources have limited capacity to accommodate additional generating capacity. Therefore, until the transmission backbone is strengthened in areas like the Northern, Western and Eastern Cape, opportunities for additional generating capacity in other provinces need to be explored.

"As Eskom retires its aged coal-fired generation plants, this presents an opportunity to transition towards cleaner sources of electricity generation while benefitting from the continued use of the existing transmission and distribution line infrastructure. This allows Eskom to use the significant portfolio of land it owns across Mpumalanga to facilitate the creation of additional generation capacity at minimal cost and removes a significant barrier to investment for the private sector," said De Ruyter.

Additionally, it helps to support the Just Energy Transition through the creation of new economic activity and jobs, specifically in the Mpumalanga region where several coal-fired power stations are due to be shut down.

For more information visit: www.eskom.co.za

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