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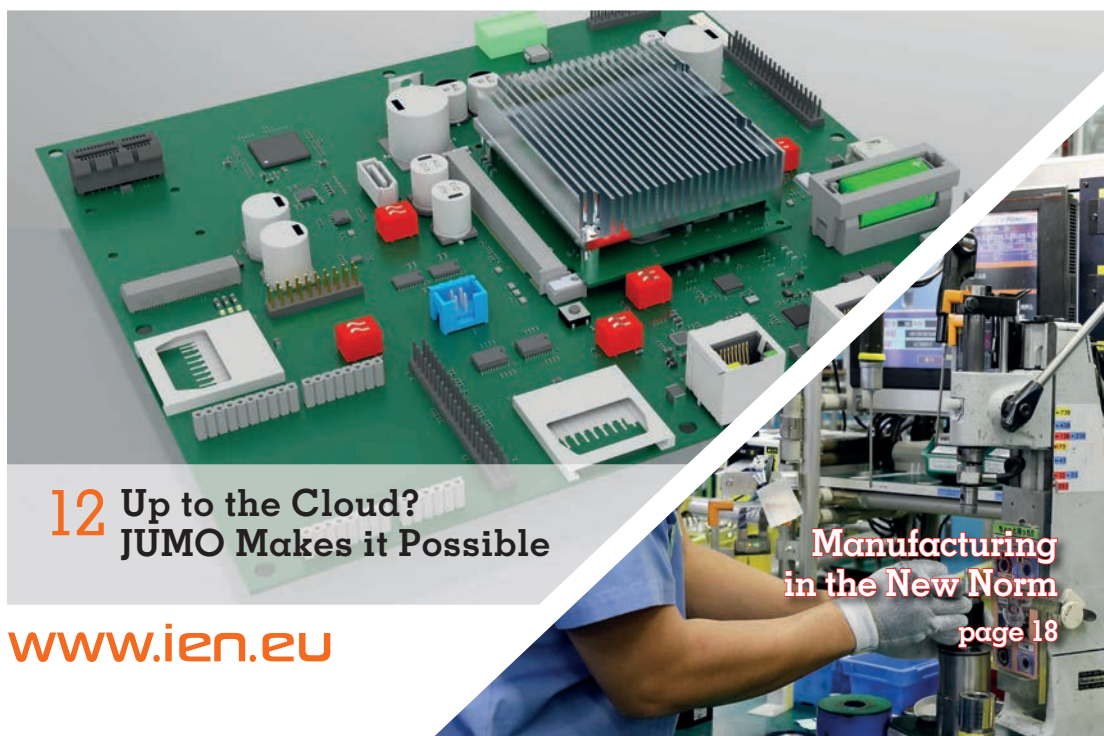
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Dear Readers,

More and more people are being vaccinated, terraces are reopening and the last days have been warmer. Now is time for important questions and habits to reconsider.

Teleworking has taken a place as a standard way of working. Yet it has shown some valuable characteristics such as reducing time to workplace, this cannot be a full-time option since it has shown its limits for companies which need to bring its human resources on site. Human relations, the collective decision-making power and the rhythm life imposed by the presence in the company are strong elements of cohesion.

Another material aspect this time concerns the vulnerability of companies. They will have to invest heavily in sophisticated security means. VPNs, firewalls, secure access zones are no longer sufficient, we must rethink security by integrating the total mobility and soon, 5G.

The major theme of relocation has also resurfaced. It is necessary to put in place the means of its ambitions. No need to repatriate old productions, we will have to look towards the future and create ecosystems where the middle-sized companies will be the spearhead of development. We must put the industry back at the heart of each European country.

Anis Zenadji

Editor for IEN Europe

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Seamless Connectivity Fuels Industrial Innovation

Analog Devices. There is a pressing and largely unmet need for reliable network connectivity in harsh, complex, and sometimes remote manufacturing environments. Network reliability is key to turning industrial data into insights that lead to smart decision-making and ultimately, to better business outcomes. For many manufacturers, operational processes have historically been designed with the assumption that staff will be on-site all the time. The disruptions of the COVID-19 pandemic, along with the evolution of advanced network connectivity and connected assets and technologies, have accelerated long overdue modernization and digitization efforts across the manufacturing industry. Today's and tomorrow's manufacturing leaders are tossing aside processes designed to ossify cost control, efficiency, and predictability, and replacing them with those that emphasize flexibility, innovation, and resilience.



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Thin Air: How Power Entry Modules can Withstand Heights

A Schurter. 2000 metres. This altitude above sea level represents the upper limit for applications of many passive components certified according to IEC. Why this limit? A little excursus into physics, more precisely into the Paschen effect. We all know that. With increasing altitude above sea level, the air pressure decreases. Less oxygen, breathing becomes increasingly difficult. But this thinner air also has an influence on dielectric strength in electrical applications. Standards are always set under clearly defined environmental conditions. These include temperature and pressure. The IEC standards for appliance connectors (IEC 60320) or filter elements (IEC 60939) are no exception. Clearly defined rules also apply to them. One such rule is that the component to be tested must comply with the specifications from sea level up to 2000 m in order to be allowed to bear the necessary seal of approval. In return, however, this also means that the devices in which these components are installed may only be used up to this 2000 m altitude. For applications at higher altitudes (>2000 m.a.s.l.), additional proof of suitability is required for all components used.



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CABLE NETWORK TESTER

Simplifies network troubleshooting



The LinkIQ™ Cable+Network Tester (LinkIQ) from **Fluke Networks** simplifies network troubleshooting when building or maintaining networks. Rugged, reliable and accurate, the LinkIQ™ features a

gesture-based touchscreen. The product provides simple pass/fail test reports using the company's innovative LinkWare™ PC Cable Test Management Software. Besides, it can verify the performance of switches, including those that provide Power over Ethernet (PoE). The LinkIQ is based on a single-test approach that automatically delivers the appropriate measurements based on what is at the other end of the cable. For an open cable, it shows the length and pairing. If this is terminated with the supplied remote, the test result shows the maximum data rate the cable can support - up to 10 Gb/s. However, if the cable is connected to a switch port, LinkIQ will show the name of the switch plus the port name, VLAN, speed, and duplex. If PoE is advertised, it will display the power and class (up to 90 W or Class 8) and then load the switch to verify the power can be delivered. The LinkIQ uses LinkWare™ PC, which is Fluke Networks' reporting software. LinkWare™ supports a variety of testers going back 20 years and is the industry's de facto standard reporting solution. The simplest way to manage report data is with a free copy of LinkWare™. The results from a wide variety of Fluke products can be stored and accessed, or PDF reports may be generated using the software.

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1-PHASE HIGH CURRENT CHOKE

Requires a significantly smaller footprint



Schurter is expanding the range of current-compensated chokes with a series for 1-phase high-current applications on printed circuit boards. Coming with a vertical design, the new DKIV-1 series requires a significantly smaller footprint. Compact and lightweight, the chokes are available with ferrite or nanocrystalline cores. The new

DKIV-1 series is manufactured for 1-phase applications at rated currents from 10 A to 50 A. Despite the high currents, the vertical choke requires only a small footprint on the PCB. This allows a compact design with high performance. The contacting is made by means of through-hole contacts (THT). The combination of a vertical choke (DKIV) with a horizontal choke (DKIH) in multistage filters reduces mutual interference of the magnetic fields of the individual chokes. The DKIV-1 current compensated chokes comply with IEC 60938 and with a rated voltage of 300 VAC or 450 VDC, they are suitable for many applications. The DKIV-1 series is certified for current ratings from 10 to 50 A, 300 VAC according to IEC and UL and 10 to 50 A, 250 VAC according to CSA. The chokes have ENEC and cURus approvals. The DKIV-1 have been designed for a wide temperature range from -40 °C to +100 °C.

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Optimized Lenses for Material Sorting & Inspection

Resolve Optics has received several major orders for instrument optimized versions of its Model 363-000 - a 16mm diameter Short Wavelength Infrared (SWIR) lens for inspection and material sorting applications. Mark Pontin, Managing Director of Resolve Optics commented "Using an off-the-shelf SWIR lens typically forces you to accept a compromise such as a reduction in optical performance or achievable resolution, a bulkier less attractive product, shorter product life and loss of competitive advantage - all of which ultimately lead to lower profitability. As a result, demand for custom versions of our Model 363-000 lens that exactly meet the needs of individual customer applications are rising dramatically. InGaAs sensors (Indium Gallium Arsenide) are a favoured detector for the SWIR region. Like all sensors, there is a move for higher and higher resolution InGaAs detectors. This trend is the major driving force behind the growth in demand for SWIR lenses that meet the demands of these new generation sensors. Many off-the-shelf SWIR lenses are in fact standard visible designs with AR coating designed for the SWIR band. These lenses do not account for the way the glass transmits in the SWIR region and as such the final image quality can often be compromised. This problem is particularly apparent with the higher resolution SWIR sensors".



Brady Acquires Nordic ID

On May, **Brady** acquired Nordic ID, adding strong, software-integrated RFID scanning capabilities and technology to Brady's industrial-grade and RFID-enabled identification labels and printers. The acquisition strengthens Brady's position as a worldwide full-service provider for RFID and Industry 4.0 solutions. The ability to include compliant, passive RFID chips and sensors in flexible, self-adhesive industrial grade label materials is a development spearheaded by Brady's RFID competence centre in the EMEA-region. "In the future, all products will need a unique digital identity to enhance their visibility throughout the supply chain, all the way to the end-customer", said Brett Wilms, Managing Director Identification Solutions for EMEA at Brady Corporation. "This enhanced visibility will help improve efficiency, increase sustainability, and enhance the customer experience. Our reliable, RFID-enabled label portfolio, know-how and print on-site capabilities are perfectly placed to enable these advantages for many companies, even in conditions considered challenging for most labels. Adding Nordic ID's technology and solutions further develops and strengthens this offer."



Long-Term Flexible Adhesion Program for Process Cooling and Heating

ICS Cool Energy has announced the release of FLEX Membership - its long-term flexible exchange program for its complete temperature control solutions for process and manufacturing facility applications. Customers can thus transform their process temperature control system from a fixed asset to a dynamic solution that can be adapted as their business and process needs change. This membership program includes equipment, 24/7 preventive and emergency maintenance, replacements and upgrades. The elements of the all-inclusive monthly contract are tailored to the needs of the process and based on a detailed assessment by ICS Cool Energy engineers. Cooling and heating systems can then be considered an operating expense rather than a capital investment. The subscription offers variable rates for in-service, standby and off-site equipment as well as the option of remote monitoring. The term of the subscription can be up to 9 years and includes a full replacement of the old equipment with a new one at renewal.



Sony Participates in The Pilot Project to Reduce Transport-Related Pollution and Pedestrian Accidents

The project, which is expected to start in June, aims to provide an intelligent parking system to reduce pollution and traffic congestion, with drivers alerted via a smartphone app before being directed to the nearest free parking space. The trial also includes a study of smart city systems to optimize the use of its public transportation network by implementing smart bus shelters and counting bus riders to identify overcrowding to ensure better bus supply and optimize costs. The IMX500 configuration used for this trial allows for real-time metadata retrieval with no images stored or leaving the sensor in compliance with privacy requirements. This reduces the bandwidth required, allows for expansion using the existing network, and reduces energy and communication costs while respecting the privacy concerns of citizens. **Sony Europe's** commitment to support the development of smart city projects is based on the "Sensing as a Service" (SeaaS) business model. Leveraging Sony's imaging and sensing technology to serve social causes in cities shows how IMX500 sensors can alleviate some of the problems faced by busy cities.



"Technidrive Ltd and WEG Collaborated to Provide a Vertical Elevator for Moffett's First International Project in Dubai"

The project required the construction of a system for a three-storey 30-meter high building with a throughput of 85 pallets per hour. Moffett needed an automated storage system to lift and lower pallets which weigh over 1500kg that would function in temperatures ranging from -25°C to +40°C. They approached Technidrive, who contacted **WEG** to provide them with an 11 kW electric motor, a variable speed drive (VSD) and corresponding programming software. The VSD, also known as an inverter, allows the system to accelerate and decelerate faster and to automatically correct the cart's stability according to its weight, and thus keeps it passing along smoothly at the correct level. Technidrive also took into account the regenerative energy, i.e. the energy that returns to the inverter. When the inverter controls the speed of the lowering elevator, energy is generated back in the motor and then returns to the inverter in the form of DC bus voltage and needs to be dissipated in a break resistor or burned off as heat. Technidrive therefore increased the size of its shutdown resistors and added thermal protection to ensure that no overheating problems would occur from the regenerative energy.



Aston Martin Cognizant Formula One Team Is Back in The Race Thanks to Altair's HPC Optimization

With 10 terabytes of data produced on a daily basis, Aston Martin Cognizant Formula One™ Team needed high-performance computing to manage intensive workloads. **Altair** Grid Engine allows them to efficiently sequence and coordinate the tens of thousands of simulations and other HPC tasks generated. Altair thus enables 97 percent utilization of HPC infrastructure and permits to gain strategic and performance advantages within Formula One's 25 teraflop limits by achieving higher throughput. Simulations can be performed on wind tunnels, vehicle aerodynamics or tire performance and to refine critical design elements. HPC also allows full vehicle simulations to be run so that drivers can understand how design changes will affect the performance of their car on race day.



"Prima & TTP Ensure Fast Replacement of Pitney Bowes' High-speed Printers"



Pitney Bowes required a fast replacement solution for its high-speed printers in some of its mail inserting technologies across its large install base. TTP were assigned to fulfil this mission and asked Prima to support the project. Prima succeeded to deliver prototype assemblies in short timescales for test and evaluation which permitted to promptly transition to full-scale production. The design features two ink cartridges enabling one to be replaced while the other is still functioning - thus ensuring continuous throughput. The complex design developed includes a large bill-of-materials (BoM) that comprises close to 400 different component parts. Prima is now producing the initial printer demand required by Pitney Bowes. After that, ongoing residual levels will be needed - for repair and replacement purposes.

Upcoming Dismantling of the TAT-14 Submarine Cable System

Subsea Environmental Services advised by **Red Penguin Associates** will extract and recycle shore-ends located in the US, UK and Europe, and remove deep-water segments across the North Atlantic. The planning phase took over a year beginning with a Decommissioning Study to address the interests of stakeholders regarding permitting, environmental impacts and GIS/database analysis among others. With many aging systems currently operational and approaching their end of life, the dismantling of subsea installations is of particular importance for both industry and the environment. The operations phase started last week with the planned recovery of shore-ends in Denmark and The Netherlands. It should be completed by the end of 2021. As the work progresses real-time oversight will be crucial to guarantee swift risk identification, analysis and implementation of any necessary mitigation.



"We Can Provide New or Alternate Perspectives to Solving Known or Unrecognized Challenges"

We interviewed Craig M. Carroll, Vice President – Global Marketing & Commercial Strategy at Magnetrol - AMETEK about level measurement technology, the challenges faced by the chemical industry, and safety in chemical processes.

IEN Europe: Which kind of contribution does Magnetrol bring to level measurement?

Craig M. Carroll: Magnetrol has been a leader in level measurement and innovation for almost 90 years with industry leading technology in radar, buoyancy, ultrasonic and thermal dispersion devices.

Recognized for industry leading quality and performance, Magnetrol employs a broad portfolio of technologies along with deep application and process knowledge to help customers find the optimum intersection of technology and application for their unique challenges. Trusted globally and engaged locally, Magnetrol's mission is to provide a world-class customer experience by collaborating with customers to provide unique technology insights that drive organizational success.

A Magnetrol service engineer commissioning a Model E3 Modulelevel® displacer level transmitter on site at a petrochemical plant.



Eclipse® Model 706 guided wave radar transmitter



IEN Europe: What are the main challenges faced in the chemical industry? How can your solutions help confront these issues?

The Chemical industry is facing both unique and common challenges in a dynamic and evolving marketplace. Some of these challenges are like many other industries (cost pressures, environmental, governmental, etc.), but the Chemical industry, in particular, is confronting business conditions which are a little more unique. Circular economy pressures, expanded digitalization needs, bespoke manufacturing, feedstock & power price volatility are all driving chemical companies to explore options to optimize their operations. Magnetrol, through best of breed products and technology, can elevate the ability for plants and operators to enhance the management of their processes and applications, particularly in those most challenging such as interface/emulsions. Magnetrol instruments are exceptional in difficult environmental and process conditions, provide great accuracy and measurement in diverse medias and enable better insights through advanced diagnostics and superior user interfaces. Magnetrol's rich history and experience in the Chemical industry can provide resourceful collaboration with customers by providing new or alternate perspectives to solving known or unrecognized challenges by applying Magnetrol technologies in new and inventive ways.

IEN Europe: What are the main characteristics to take into account when selecting a level measurement technology?

The reality is that there is not one perfect technology for all level applications. Each and every application, media and process will have individual characteristics which must be considered. Knowing what the end user is trying to accomplish with the measurement can help provide clarity. Certainly, the big three elements should always be considered: Temperature, Pressure and Media. These alone, in some





Latest guided wave radar (GWR) level transmitter, the Eclipse® Model 700, gives the performance and durability needed to address the biggest challenges in a streamlined, versatile configuration.

cases, are enough to allow an informed decision on the right technology. However, the higher the complexity of the application, the more questions which must be considered and answered in order to arrive at the right instrument. Among many other considerations are the hazardous conditions at the measurement (agency approvals), the vessel (internal, external, shape, etc.), material compatibility, media reactions (foam, emulsion, turbulence, steam, etc.), measurement range and accuracy. While this is by no means an exhaustive list, Magnetrol, with almost 90 years of experience in providing level instrumentation, has deep application knowledge which we can bring to bare in selecting the best level technology for any given situation.



Eclipse® Model 700 guided wave radar transmitter

IEN Europe: What role does level measurement plays in the safety and efficiency of chemical processes?

Level is a critical control function for many batch or automated process operations. Often used in conjunction with other measurements, level instrumentation can reduce the costs of liquid and foam overfills which can either disrupt downstream processes (carry-over) or cause safety and environmental concerns potentially leading to fines. Conversely, monitoring low product level in the vessel can prevent unnecessary expenses to surrounding capital equipment. By obtaining reliable and repeatable level measurement, operators mitigate these risks while boosting productivity by maximizing tank capacity. By obtaining accurate and repeatable level measurements, operators can have processes run more efficiently thereby potentially saving power and fuel, which can have significant impact on a plant's profitability. Yield is another area where accurate level control can play a part by ensuring that the process is kept at the optimum level for settling, reaction or batching. In addition, level can be used to control the amount of product that is being introduced into a reaction or application and the accurate control of the amount of media being moved can also impact a plant's financials.



IEN Europe: How can your solutions help comply with the security demands of the end users?

Magnetrol products offer various forms of password protection to ensure that unauthorized access, control and use of the instrument is not possible. Furthermore, by providing precise and reliable level control, the chance of a spill or other unintended adverse events can be mitigated.

Anis Zenadji



Application image of the Eclipse® Model 706. Magnetrol pioneered the first guided wave radar (GWR) level measurement transmitter back in 1998.



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Edge computing holds the key to IT/OT integration

Christian Nomine, Strategic Product Manager Visualisation, Mitsubishi Electric Europe B.V. explains how Edge computing provides an essential middle layer between the two, giving manufacturers the tools, they need for the smart connection of their business processes.

The digital transformation of industry has given new momentum to the connection of the operational technology of the plant floor to the information technology of the higher-level enterprise. However, making the most of the potential of digitalisation requires more than just a network connection between these two levels of the business.

The goal of the digital transformation is to provide a foundation to boost productivity, increase product quality, optimise asset availability and maximise plant utilisation, to better meet the real-time demand requirements of customers. That foundation is built on a rapidly growing network of increasingly sophisticated plant floor devices – the so-called

Industrial Internet of Things (IIoT) – all generating data related to different aspects of a plant's operations.

But surely data is data. Why should a direct vertical link between the shop floor and the higher-level business systems not be a sufficient enabler to realise the goal of the digital transformation described above? The answer lies in the way in which information technology (IT) and operational technology (OT) platforms have evolved to deal with different types of data with different processing requirements. The OT world now operates in real-time with process speeds of seconds or below; the IT world in contrast operates at much greater sampling times, from minutes



Christian Nomine, Strategic Product Manager Visualisation, Mitsubishi Electric Europe B.V.



The digital transformation of a business is dependent on forming an intermediate layer between the shop floor and the higher-level business systems, by using Edge computing solutions.

to hours or longer.

Behind the model of Industry 4.0 is the need for the OT and IT spaces to each capitalise on the data the other can provide. But neither is set up to translate and interpret the data received from the other in a fashion or timescale that can have a direct impact on the plant floor operations in real time. As the digital transformation progresses, the result of direct IT/OT integration is often simply one delivering high volumes of unfiltered data instead of just the relevant information that is needed to drive genuine improvements in operations.

Some have argued perhaps the Cloud could provide an environment for managing these



high volumes of data, providing a platform for efficient data aggregation, filtering and analysis. And certainly, protocols like OPC UA can provide a direct link from the shop floor, through the higher-level systems and on to the Cloud. But while the Cloud provides an ideal platform to develop knowledge about the plant operations, it is not the right platform to turn knowledge into action for the production operations. Yes, it can provide useful and essential data analytics functions, but not the real-time aggregation and analytics that are needed at the OT/IT bridge.

Bridging the divide

A more appropriate solution for OT/IT integration is provided by the new smart technology that is appearing at the 'Edge'. Forming an intermediate layer between the shop floor and the higher-level business systems, these Edge computing technologies provide a simple interface between the IT and OT worlds, as well as new options for where data analysis takes place.

Mitsubishi Electric's MELIPC Edge-Computing solution offers this functionality combined with OPC UA compatibility. Data can be pre-processed locally and aggregated to create valuable information for the systems that need it. And it can seamlessly connect the shop floor with higher level IT systems such as MES and ERP platforms.

By performing sophisticated data analysis in real-time, increasingly making use of AI algorithms as well as machine learning to deal more intelligently with data, the MELIPC is able to make improved production efficiencies a reality. The cost of data processing can also be considerably reduced, as only the informa-



The MELIPC Edge Computing solution from Mitsubishi Electric is able to make improved production efficiencies a reality.

tion that is necessary and relevant is passed from one level of the enterprise to the other.

The MELIPC provides a real time data logging and processing environment in a ruggedized industrial form factor. From a data processing perspective, it incorporates a suite of analytical tools including multiple regression analysis, the Mahalanobis-Taguchi system and Statistical Process Control (SPC) as well as AI functionality such as Similar Waveform recognition – giving feedback to the plant floor in real time.

As a result, it can combine functions from data collection, filtering, processing and analysis utilising shop floor knowhow with diagnosis and predictive maintenance feedback. This occurs within a real-time information flow that can drive the production systems' decisions. It delivers a foundation for the digital transformation of the business, providing a platform for connecting machines and devices so that manufacturing processes can

react more quickly and more intelligently to production changes, whether they be asset-centric, demand-led or supply-driven.

The rising volumes of data from the plant floor, and the requirement to use that data more intelligently is both an enabler for the digital transformation of industry and a challenge. Edge computing as an intermediate layer between IT and OT is the answer to that challenge, paving the way for the event-driven architecture that defines Industry 4.0. It is the key enabler for any manufacturing plant to realise the potential of transforming into a smart operation. This technology provides the natural bridge between the worlds of OT and IT in a format that both sides of the divide can embrace.

*Christian Nomine, Strategic Product Manager
Visualisation, Mitsubishi Electric Europe B.V.*

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Up to the Cloud? JUMO Makes it Possible

The JUMO Cloud is an IoT platform for process visualization as well as data acquisition, evaluation, and archiving. Additionally, it enables worldwide access to measurement data and supports all common browsers. It is characterized by a level of high security as well as highly useful visualization and alarm functions.

Global data volumes are exploding, pushing traditional storage media to the limits of their capacity. The solution is the cloud. For the first time worldwide, more data is expected to be stored in clouds than locally. That is why global turnover from cloud computing has increased more than fivefold over the last 10 years and is currently estimated at over 200 billion euro. According to the study "Cloud Monitor 2020" conducted by the association "Bitkom", three quarters of companies in Germany with 20+ employees are already using cloud-based solutions. But what is driving this huge growth in data? One of the main factors is digitization. A self-driving car, for example, produces around 3 terabytes of data per hour. So it is no wonder that experts estimate that the volume of data generated globally will more than triple in the next 5 years alone – to 175 zettabytes (that is 175 with 21 zeros). If this quantity of data were saved on DVDs, the resulting pile would reach from the Earth

all the way to the Moon.

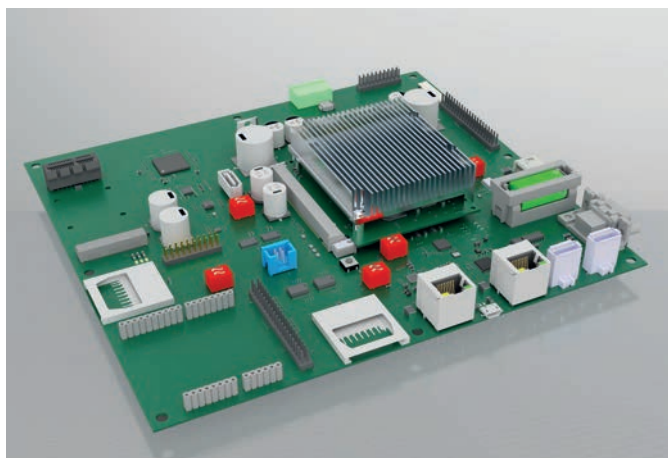
Another factor driving the cloud development is the digitization of industry. More and more processes are being monitored and controlled through automatic means. Measurement data is collected and analyzed. This is where JUMO comes into play. For a number of years, JUMO has been evolving as a supplier of industry-specific end-to-end solutions, for which JUMO also produces the necessary hardware. The JUMO portfolio stretches from sensors for various physical measurands to controllers, paperless recorders, and powerful automation systems.

JUMO is driving digitization forwards

The cloud is the next logical step in this development. Although JUMO is not one of the pioneers of this technology, it has consciously taken the necessary time to develop a sophisticated, customer-friendly product. There are 3 fundamental types of cloud-based solu-

tions. Firstly, providers of "Infrastructure as a Service" (IaaS) make data storage and processing power available on their own servers. Secondly, with "Platform as a Service" (PaaS), companies can rent predefined platforms for software development. The JUMO Cloud belongs to the third category and offers "Software as a Service" (SaaS). SaaS is a cloud-based application software with a predefined user interface.

The JUMO Cloud is an IoT platform for process visualization as well as data acquisition, evaluation, and archiving. Additionally, it enables worldwide access to measurement data. It supports all common browsers and is characterized by a level of high security as well as highly useful visualization and alarm functions (e.g. via text message, email, or voice call). Customers can use the JUMO Cloud to monitor several distributed plants, processes, or sites in one dashboard, which, in turn, increases process reliability. JUMO uses

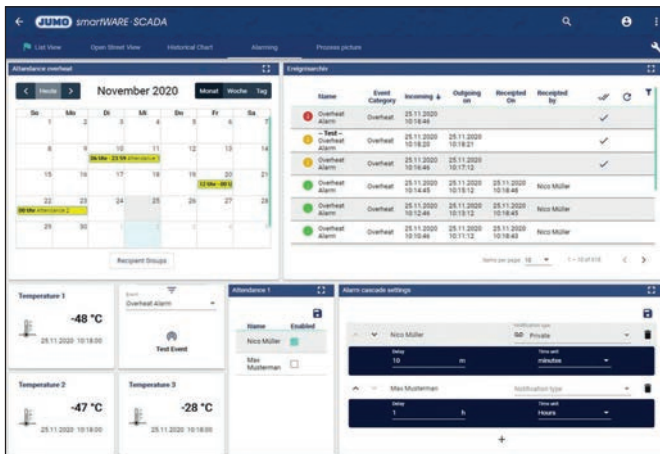


The JUMO Jupiter modular hardware and software platform

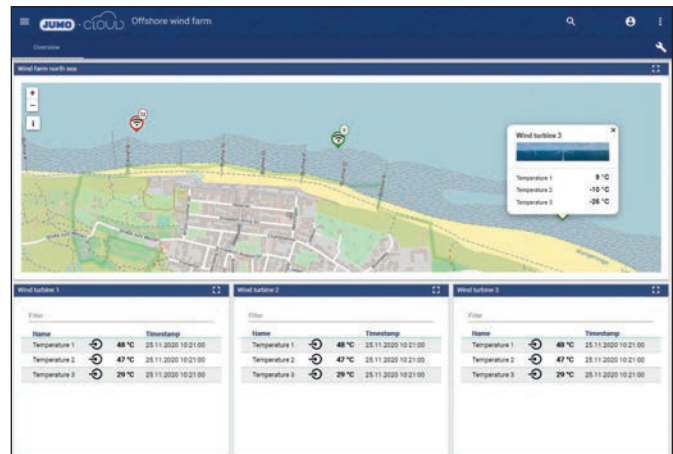


The JUMO variTRON 500 automation system

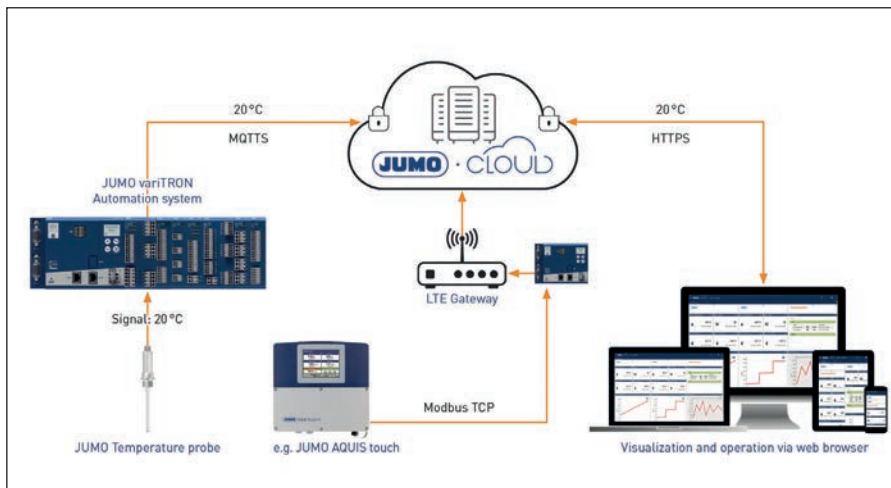




Alarm dashboard example



Exemplary representation of a wind farm



Graphical representation of the JUMO Cloud solution

a redundant infrastructure for data storage, as a result of which users save a significant amount of time.

The computer center where the data is stored is certified according to current security standards (ISO/IEC 27001), is compliant with the General Data Protection Regulation, and is located in Germany. Professional reporting and export functions considerably reduce the effort required for data acquisition requiring proof. JUMO is even going one step further by simultaneously presenting the new JUMO smartWARE SCADA. This software solution is located in the automation pyramid at the control level. Although a SCADA solution has been part of the JUMO portfolio for several years, the development of the cloud has seen it be replaced with a brand new state-of-the-art system that is based on the technology of the JUMO Cloud.

The new SCADA software provides easy access to measurement data using conventional web browsers. It offers functions for process visualization as well as for evaluation and archiving the acquired data. Visualization occurs through an editor that has an integrated animation and test tool as well as vector-based, self-scaling process screens. Consequently, JUMO smartWARE SCADA is a highly scalable and powerful digitization platform that supports manufacturing as well as work processes with efficient visualization, alarm, and planning functions. Thanks to its modern web-based interface, customers can access it without having to install any software. As a system that supports multiple clients, the software also has user rights that can be configured on an individual basis. Security is guaranteed by end-to-end encryption with possible two-factor authentication.

Flexible pricing

When paying for a JUMO Cloud the customer can choose between a flat rate and a pay-per-use model. The cloud memory can be flexibly expanded and adapted to the respective customer requirements. A key factor is that raw data is stored in an extremely compact manner. JUMO smartWARE SCADA allows variable and customer specific pricing.

What functional range does the JUMO Cloud have to offer? The possibilities are just as diverse as the JUMO portfolio itself. They span from simple alarm messages through to condition monitoring and complete plant control. The Cloud has been configured to integrate seamlessly with the new hardware and software platform JUMO JUPITER, which is also the key component in the automation system JUMO variTRON. The JUMO Engineering team with its many years of expertise is available to assist in the implementation of industry and project specific cloud and SCADA applications.

The team's extensive capabilities range from running basic feasibility studies and workshops to drawing up product requirements specifications and specification sheets as well as the configuration, programming, and validation of automation solutions. In addition to startup and project documentation, individual training courses are also offered. Currently, first projects for customers in the power plant sector or thermal process technology are being examined. Manufacturers of aquaculture facilities and cooling technology have also been signaling an interest.

► 60875 at www.ien.eu



Unified IT/OT Data Visualization with FDT and OPC UA Universal Device Information Model

FDT 3.0's data-centric IIoT platform provides a uniform approach to distribute device-data to any OPC UA Client in the enterprise

Automation professionals have always kept a close eye on developments in the Information Technology (IT) and Operational Technology (OT) worlds. With the ongoing convergence of these computing domains, there is a corresponding need for actionable production data. Plant and factory operators require proven solutions unifying the availability, transport and visualization of data for both IT and OT stakeholders.

Since 2011, FDT Group and OPC Foundation have collaborated on a uniform approach to device- and network-level data access for higher-level enterprise applications. The two organizations are in the process of finalizing an update to the existing FDT OPC Unified Architecture (UA) companion specification. This specification, which employs a Universal Device Information (DI) Model at the server-level, supports the cloud-based FDT 3.0 data-centric platform for the process, hybrid and discrete markets. It is a key technology development enabling the transmission of uniform business and operational information for any OPC UA Client.

A standardized IIoT platform serving uniform IT/OT data to the enterprise

When it launches mid-year, the new FDT OPC Universal DI Model will underscore FDT's strength as a standardized IIoT platform serving uniform IT/OT data to the enterprise. With the FDT 3.0 Server Architecture natively integrated with an OPC UA Server, it is now possible to mix and match devices and device information

models from any vendor, and communicate on any network, while the FDT Server transparently unifies all the device information and moves it up to the enterprise level in real-time for any OPC UA Client.

The built-in OPC UA Server has full access to all device and network information and metadata associated with the FDT Server. Standard OPC UA browsing techniques are used to expose this information so that authorized OPC UA Clients can connect to the FDT Server to browse, collect and take action on the data as needed. Optional support for a Publish-Subscribe environment allows for efficient, real-time data monitoring and exchange.

Robust IT/OT integration and secure gateway

From a data visualization standpoint, the Universal DI Model is closely aligned with the requirements of major end user associations and their recommendations for an open architecture to

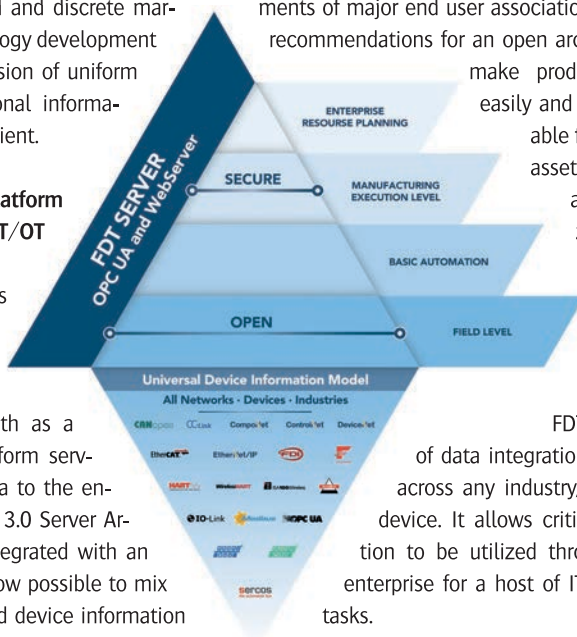
make production data easily and securely usable for plant and

asset monitoring and optimization. The

universal device information model leverages

FDT's history

of data integration and works across any industry, network or device. It allows critical information to be utilized throughout the enterprise for a host of IT/OT-related tasks.



Glenn Schulz, Managing Director of the FDT Group

In summary, the FDT 3.0 platform with its FDT Server and built-in, "pre-wired" OPC UA Server solution enables robust IT/OT integration and provides a secure gateway to make network/device data and health information available to higher level enterprise systems and applications. Developed from the ground up with best-in-class security and an operating system agnostic environment, the FDT Server is fully deployable in the cloud, on premise, at the edge, or in a desktop environment.

*Glenn Schulz,
Managing Director of the FDT Group*

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Open Standard for Sensor-to-Cloud Integration



Did you know that all networked devices can be FDT-enabled? It's true. There are millions of them in service around the world. FDT offers secure, seamless, standardized integration and information exchange for the intelligent enterprise.

Now, with FDT 3.0 all that device data is available in a universal, single FDT IIoT Server solution. Imagine an integrated web server mobilizing field device management and a natively integrated OPC UA Server for enterprise real-time device data access.

Empower Innovative Business Models: fdtgroup.org/innovation



Optimizing Compact Linear Motion Applications with Mini Motors

To achieve maximum performance from a miniature linear motion application, it is vital to make sure the motor's specification meets the requirements. Efficiency, high power, optimized dimensions and acceleration are among the criteria for selection to optimize demanding lead screw applications.

Requirements for linear motion, miniature applications range from filling syringes through to medical devices, or robotic applications used in the operating theatre. The first consideration for a design engineer is the method used to transfer the rotary motion of a miniature motor into linear motion. The most common way of achieving this is by mounting a screw and nut system on the motor shaft. It operates on rolling contact between the nut and a screw, which can provide low friction, good efficiency, and high load capability. The disadvantage however is the cost and the time to design such a solution, especially for applications which don't require high load handling.

A more cost-effective means of achieving

linear motion can be reached with a standard linear motorised solution by choosing a motor with an integrated lead screw. In particular, a digital linear actuator (or DLA) utilises a can stack stepper motor combined with a screw. Inherent with stepper technology, the motor controls its own positioning and is both an accurate and cost-effective solution, doing away with the requirement for an additional feedback system. Resolution can be managed in full, half or micro steps. With a special optimised ball bearing assembly, the axial play can even be eliminated, improving positioning accuracy as well as repeatability of motion. In addition, with stepper technology, the motor has a detent torque. As a result, it can hold its

position when the power is removed. The nut can be over-molded in the rotor assembly with special material, minimising friction and consequently increasing efficiency and lifetime.

For a high-optimised linear solution, a customised package can deliver the maximal performance and characteristics most suited to the application if the motorized solution is well designed. Taking the screw section, this could include considerations over dimensions, pitch, material, ball or lead screw. Regarding the miniature motor, the can stack stepper motor can be replaced with various choices dependent on requirement. As an example, a low inertia disc magnet stepper motor ensures the highest acceleration with the benefit of the stepper technology, providing ease of control, positioning capability and detent torque. Alternatively, a brushless DC motor maximises power density. For applications which demand energy efficiency, such as battery powered devices, a coreless brush DC motor can be advantageous. Control devices can also be added, such as an encoder for high resolution positioning feedback or a gearbox for optimised torque performance.

Designing the optimal motor assembly means understanding the application's power demand as well as the motor's power generation. The desired output force and linear speed vary depending on the application's requirements. Power is generated by the motor's torque and rotational speed and it can be calculated by using the expected output power and by taking into account motor efficiency and the lead screw parameter, including the efficiency and pitch.

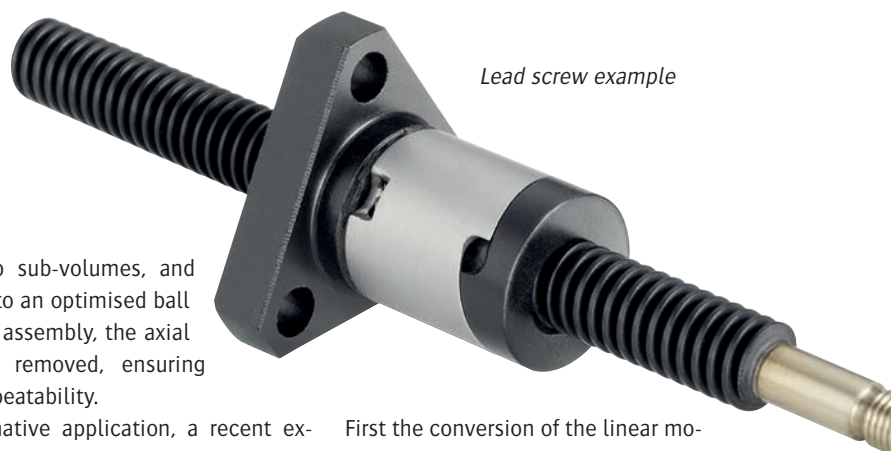


Requirements for linear motion, miniature applications range from filling syringes through to medical devices, or robotic applications used in the operating theatre





Ball screw example



Lead screw example

Now let's take an example with the development of a laboratory medical device for low volume liquid transfer, a single motor package limited to a maximum diameter of 20mm controls a multi-pipette channel. The filling stage must take less than 2.5 seconds and the pipettes then travel 50mm in 4 seconds where they are emptied in 30 sub-steps. The application requires a high-resolution system and a good repeatability to consistently provide the same amount of liquid for each sub-step. For this kind of application, a standard digital linear motor with a lead screw will usually fulfil requirements with no special development necessary, beneficial to keep costs down. A can stack stepper motor enables pipette filling control as a result of the multi-step resolution over liquid deliv-

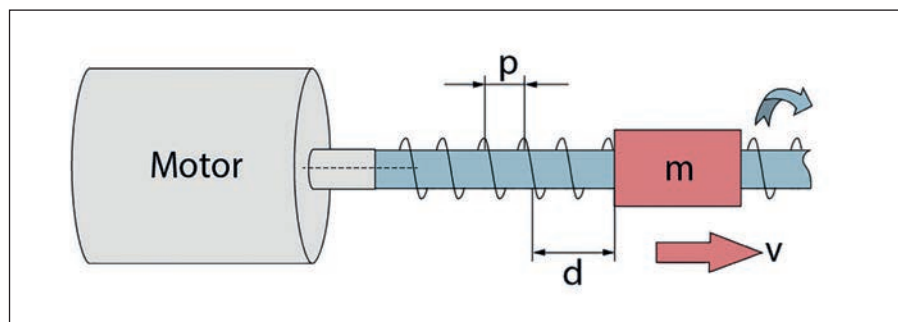
ery into sub-volumes, and thanks to an optimised ball bearing assembly, the axial play is removed, ensuring high repeatability.

In an alternative application, a recent example of a battery-powered medical device handled by a doctor during an operation demands efficient power usage. It also has to be lightweight and compact, requiring a solution with a maximum diameter of just 13mm and for this application, coreless brush DC motors ensure high efficiency. For size optimisation, the mini motor should also be paired with a gearbox. For the geared motor selection, the engineer will take in account the duty cycle and in this case the medical device will be used over several minutes in continuous duty. To determine the required input power (torque and speed) generated by the motor, some calculations are necessary.

First the conversion of the linear motion (force and linear speed) requested by the application into rotative motion (torque and rotational speed). This depends on the lead screw parameters (pitch and efficiency). To know the necessary power at the motor level, you will need to consider the ratio and efficiency of the gearbox. To ensure that the motor is powerful enough in continuous use, the required motor torque should be lower than the rated torque specified by the manufacturer. When the motor and gearbox demands have been ascertained, the power requirement and efficiency of the solution can be calculated.

Supporting linear motion application design, Portescap can support engineers with standard and customised solutions. Defining the technical requirements for the application, it's vital that the miniature motor is correctly specified and sized to ensure optimum integration and consequently, the application's maximum performance.

Clémence Muron,
Application Engineer at Portescap



Motor and lead screw example

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Manufacturing in the New Norm

Social distancing, protecting your employees, restarting operations and machines, catching up on supply chain gaps. Just like society as a whole, manufacturers are experiencing a lot of additional challenges they didn't expect, and to top it all many are facing reduced budgets. So how do you navigate the new manufacturing norm?

"Manufacturers are now trying to adapt to the changes in conditions, especially in two major aspects," said Hajime Sugiyama, Industrial IoT Evangelist of Factory Automations Systems Group, Mitsubishi Electric Corporation. "For example how do you implement social distancing in a factory?"

It's a very interesting question which has more permutations than most people initially consider. Starting with the individual we can all imagine the use of face guards and masks, and indeed many industries have traditionally used such PPE (Personal Protection Equipment), but this was driven from a hygiene or clean environment standpoint for industries producing such things as food, drugs or even

sensitive electronics and semiconductors. But such PPE is not necessarily desirable in all industries. For example, in hot or humid environments the act of wearing a mask may actually increase risks of heat exhaustion, so care must be exercised in truly understanding the worker's environment. Some plant managers are considering using screens between workers, but this is also not a panacea as there potentially can be space and restricted movement issues as well as possible problems around access to emergency devices (E-STOPS) or reporting/controlling devices..... or simply visibility challenges.

Stepping back from the individual challenges, Sugiyama goes on to say, "Many manufactur-

ers are focusing on social distancing through shift management. For shift management, you need to balance work shifts so that fewer people are working together at the same time to prevent a pandemic situation inside the factory. But this presents a whole new set of challenges."

While balancing shift patterns provides factory managers with a level of operational redundancy, i.e. if one shift needs to be "suspended" due to infection, the second and/or third shifts can continue business as usually after the plant has had a thorough cleaning, it is a natural consequence that less people working will naturally lower the productivity. So how do you counter that?



As an initial quick fix to social distancing in a factory, individuals could use face guards and masks.





As an initial quick fix to social distancing in a factory, individuals could use face guards and masks.

Remote is not just for homeworkers

Returning to full operations, restarting processes and lines often reveals underlying problems which were not previously visible and creates a maintenance nightmare of unquestionable proportions. Remote access is a key benefit but if the device you are accessing is not intelligent, the value is drastically reduced as the amount of information is restricted. However, if you are lucky enough to be using intelligent automation devices which have degrees of self-determination and extensive diagnostics resolving maintenance issues can be accelerated. But aren't all automation devices intelligent?

"While the essential product performance/function maybe similar, you would be mistaken if you thought that all products are equal for example, it is not really true to say 'a drive is a drive, is a drive,'" states Sugiyama.

As an example, many traditional users of Mitsubishi Electric's inverters will be familiar with simple features such as a 3-wire fan, the significance of which only becomes apparent in times like now. The benefit being the ability to diagnose the health of the cooling fan – which in turn helps extend the life of the inverter. In more recent products there are unique environmental sensors on the circuit boards to detect effects of corrosive or polluted atmospheres which is complimented by the merging of communications, intel-

Let your Co-bot take the strain

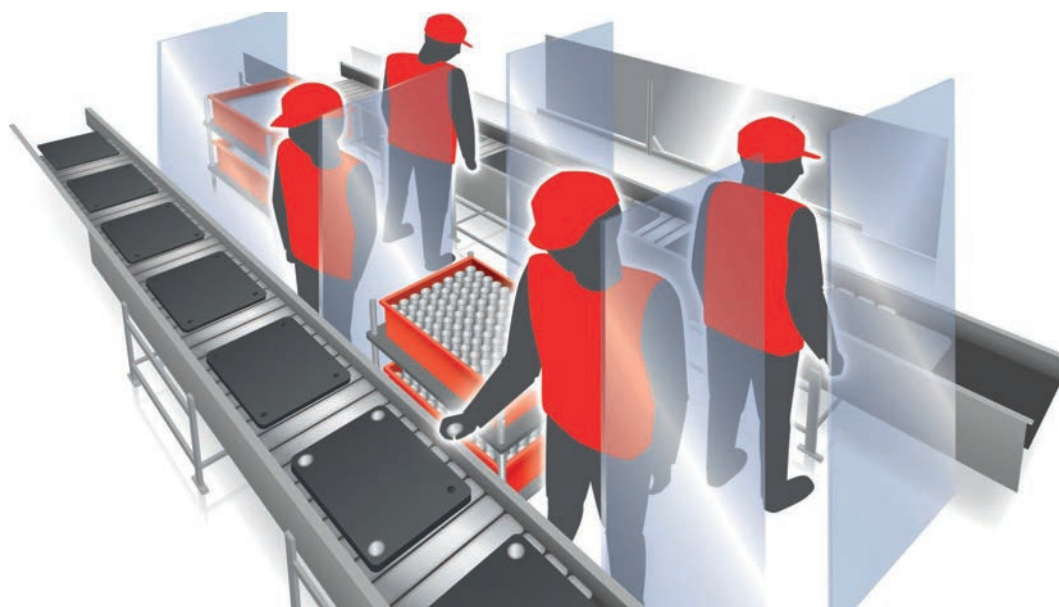
"Building extensive automation solutions takes a great deal of time, budget and planning," says Sugiyama, "and in these times when manufacturers want to get up and running quickly and flexibly all three resources are likely to be in short supply."

So what's the alternative? One possible solution is the increased use of industrial collaborative robots like "Assista". Typically these "light" devices can be quickly deployed, are human friendly and so flexible that they can be quickly trained to do a variety of tasks, i.e. you do not need to have extensive robotics expertise. And probably a key deciding factor

is that on the whole they are very cost effective. Enhancing the co-bot solution further with AI driven environmental management software as seen with solutions such as e-F@ctory Alliance partner Realtime Robotics reduce programming burdens even further and offer live travel path adaption so that the robot can dynamically navigate around obstacles such as humans, other robots and alike.

"It's clear one solution will not fit all, so flexibility to adopt the right social, 'mechanical' and collaborative solutions will be the norm. An additional area of consideration is remote access," claims Sugiyama.



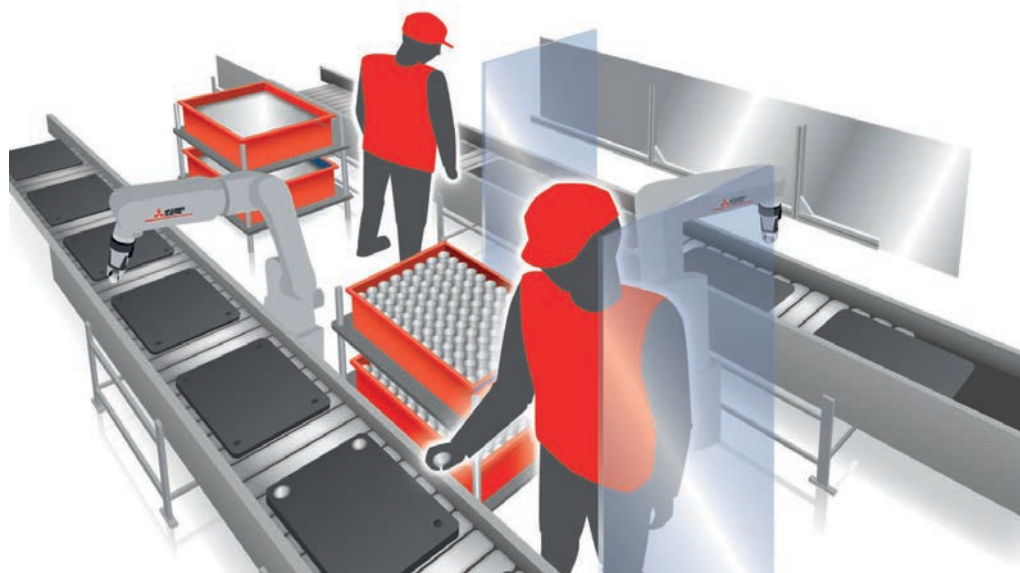


Some plant managers are considering using screens between workers, but this is not a panacea as there can be operational limitations (left). One possible solution is the increased use of industrial collaborative robots like "Assista" (right).

ligence and AI through the inverter hardware and partner software to provide advanced maintenance diagnostics.

Sugiyama explains, "Advances in product technology are not limited to the 'external function' of the device but also in how its operational life is managed and that means maintenance and performance KPIs – but such knowhow cannot remain locked up inside the product and really excels when it can be remotely accessed by the maintenance teams."

IIoT, Industrie 4.0, etc. have already been talked about for years, but at their core is the process of communication, extraction of data and subsequent analytics. However, often when plant managers consider remote access solutions they quake in their shoes as they contemplate a large, extensive SCADA system and all its associated paraphernalia. It is true these comprehensive systems are excellent for capturing vast amounts of data, providing alarming and analytics and reviewing historical data but as mentioned earlier they do take time to correctly plan and install. Other, quicker solutions can be remotely, but directly, connecting to an HMI device



on the shop floor to mimic the local screen or accessing data over a wireless interface to finally the more recent trend towards utilizing Edge controllers.

So what is the new Norm?

Actually for Sugiyama he sums it up as "A practical approach is critical. Sometimes the

answer is simply a partition screen, other times it is an investment in a co-bot, but the watch words are flexibility, scalability and results focused. So maybe the new norm is actually reminding us to identify what is important."

►► 60873 at www.ien.eu





New Technology Caps Pharma Bottling Process

A regular customer of Sensor Technology Ltd has switched to its latest range of torque sensors.

The new TorqSense SGR530/540, being introduced throughout 2020 and 2021, measures torque using a full four element strain gauge bridge. With this, four separate strain gauges are fixed to the drive shaft of the plant or machinery being monitored. The gauges are aligned so that each measures shaft deflection in a different direction as it rotates under load. Electronics within the sensor collects readings from all four gauges and uses them to calculate the torque value in real time.

Strict international rules apply to the manufacture and packaging of pharmaceutical products and require that the correct environment is maintained within the bottle or other packaging following capping. To this end, Regulation USP 671 provides a guide to the torque range to be used for screw type containers with varying closure diameters. By ensuring that bottle caps are successfully applied to the bottles within the required torque tolerances, the integrity of the product can be maintained.

Over the years Sensor Technology has worked with many OEMs to develop high precision, high speed machines for use in pharmaceutical plants and a range of other applications. One of these, an Oxfordshire neighbour of Sensor Technology, has for over 10 years incorporated TorqSense units into its capping machines. Bottle capping is nearly always performed at very high speed, so that production targets are met. A major advantage of TorqSense is that it does not need to physically contact either the bottle caps or shaft of the torque head it is monitoring, instead using a radio frequency link. This means initial set-up and change over to new product runs is fast and efficient while operational reliability is not dependent on delicate slip rings. Significantly, the new SGR530/540 sensors are designed to be drop-in replacements for the older RWT430/440 units they are replacing.

Fast and accurate torque measurement is becoming more and more important as all sectors of manufacturing automate their physical processes

The separate sensing head and electronics housing of the TorqSense SGR530/540 series allows for easy mounting on machines where space is difficult to find.



while also needing to improve the recording of production performance data. TorqSense is used in many industries from automotive to materials handling, test and measurement, FMCG (fast moving consumer goods) production, power generation etc. Sensor Technology is working with user-partners in many sectors to assess the new SGR units in a range of working environment.

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Modern LIDAR Systems: Sensing for Every Industry

Recent advances in technology have unlocked unprecedented modalities of capturing the physical world in digital form. One of those modalities is light detection and ranging, or LIDAR.

Analog Devices. Many applications and industries have adopted LIDAR technology; the applications range from geographical survey to 3D structural mapping and object recognition. Industries include manufacturing automation, safety, agriculture, and many others. All these applications and industries have leveraged LIDAR to drive down costs, create safer environments, improve efficiencies, or even do things not previously possible. To better understand the impact of LIDAR, it is important to understand what this technology is, what was used before it, and what LIDAR allows us to actually measure and, more importantly, do.

At the most fundamental level, LIDAR is a system that bounces light off objects to detect them. This boils down to a transmitting portion of the system that emits light, and a receiving portion that measures the reflected light's time of return. This happens to be exactly how traditional radar systems work, with one very important difference—the wavelength of LIDAR systems is on the order of ten thousand times shorter than the shortest radar wavelengths.

What Is Different with LIDAR?

What does a much shorter wavelength enable us to do that we could not do with radar? A shorter wavelength allows us to see a much higher resolution image, due to a physical limitation that a measurement cannot be more precise than what is used to measure it. Even with tricks in software and signal processing, you can only characterize something so well if you are using long wavelengths to do it. With LIDAR's shorter wavelength, we can scan the environment for objects

and their features, instead of being limited to only knowing location, rough size, and velocity.

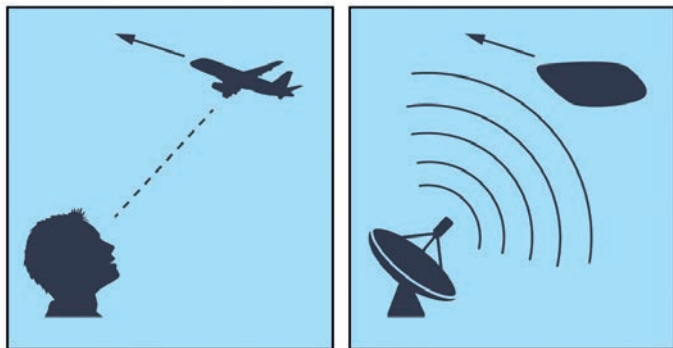
Imagine trying to navigate an unfamiliar dark room. You generally move more slowly than when it is illuminated, and you would use your hands to feel around for objects to get a sense of what is where. Take that same scenario and put on a pair of latex gloves, gardening gloves, or boxing gloves. Each of those pairs of gloves have value in their own applications, but not so much when trying to navigate in the dark.

Hasn't LIDAR Been Around for Decades? What Is New?

Radar has been used very successfully for many decades and will continue to be invaluable, but now we have an additional tool coming up on the horizon that will allow us to further extend our ability to sense things in this world. Until now, LIDAR has been restricted to applications that are large and expensive (like specialized surveying equipment) or smaller and simpler (like speed detection devices used by law enforcement). A high performance LIDAR system must meet certain criteria. The transmitting portion, for example, needs to pulse the laser for 3 ns to 5 ns at a peak of 40 A to 80 A to make it attractive for automotive—laser drivers are finally approaching these metrics of interest, making this portion of LIDAR a reality. Other factors include small and efficient power management, integration of subsystems, inexpensive high speed data processing, and sophisticated software to make sense of all this data. Our ability to push LIDAR systems' performance up and power budget down is nearing the point where they make sense to use in many applications where they simply could not meet demands previously. Due to this approaching critical mass, the collective effort in driving down the cost, size, and power needs while increasing performance is accelerating the attraction to this solution.

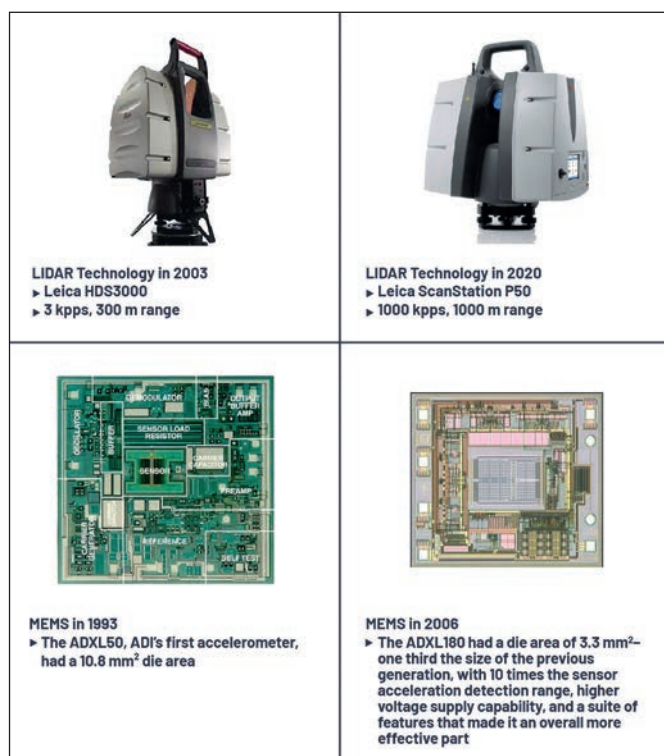
Like the microelectromechanical systems (MEMS) revolution of the 1990s, LIDAR today is becoming smaller, cheaper, and more versatile. Both LIDAR and MEMS took a long time to fully realize their potentials to other systems and subsystems. MEMS, while developed in the 1950s, was never a practical option to integrate into many systems due to its cost, size, power needs, and performance. It was not until process technology in the 1990s was mature enough to match demand to allow proliferation of MEMS into applications never dreamed of before. Similarly, LIDAR (developed in the early 1960s) is only now ready to meet similar demands.

What is currently changing is the confluence of factors that goes into



What we see vs. what a radar sees.





the design and manufacture of a high performance LIDAR system. These additional factors have helped LIDAR meet the constraints inherent in it, such as driving down cost, solving size and power issues, and increasing overall performance. Because these factors have helped LIDAR technology with enhanced performance while decreasing development costs, it makes sense to begin pursuit of other areas for LIDAR application.

What Is LIDAR Allowing Us to Do that We Have Not Done Before?

Imagine what sorts of novel technologies can be developed with a system that can scan surfaces when it is within a much more attainable price point. Here are a few recent innovations to the application of LIDAR systems:

Entertainment

A boon in the entertainment industry has been the ability to map out complex sets or objects digitally, allowing for a more seamless interaction between reality as we know it and realities generated by software. In movies or video games, for example, this allows for fluid 3D motion capture by human actors transcribed into a fictional universe that un-

3D motion capture of yesteryear using special suits, tracking movement of white spheres.



Leaps in development of LIDAR and MEMS technology over 13 years, respectively.

til now relied on expensive suits with sensors (which conveyed limited movement information) or homebrew animation (which, depending on detail desired, can be slow and expensive).

Geographical Survey

LIDAR has been used in geographical surveying for some time, but the increase in range and resolution of these systems has allowed researchers to uncover ancient ruins that would not be feasible to investigate by foot. The constantly decreasing size and cost is also making it much more attractive for civil land surveying and engineering, with advantages over traditional land surveying methods in speed, accuracy, flexibility, and safety.

Structural and Civil Engineering

As a building is being constructed, LIDAR can be used to monitor construction progress in real time, compare those measurements to current schematics, and allow for updating of those schematics. Existing structures can also be scanned to better understand the evolution of integrity over time, which would allow us to more appropriately assess needs for renovation or rebuilding.

Transportation

The panacea of autonomous driving is the addition of a low cost LIDAR

Model GY series

Magnetostrictive Displacement Transducers

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Main Specifications		Typical Applications	
Stroke	max 7500mm	• as positioning sensor for advanced industrial machinery. • as displacement transducer that can be installed inside hydraulic/pneumatic cylinders. • as a high linearity liquid level detector for a wide range of applications.	
Linearity	less than 0.025%FS		
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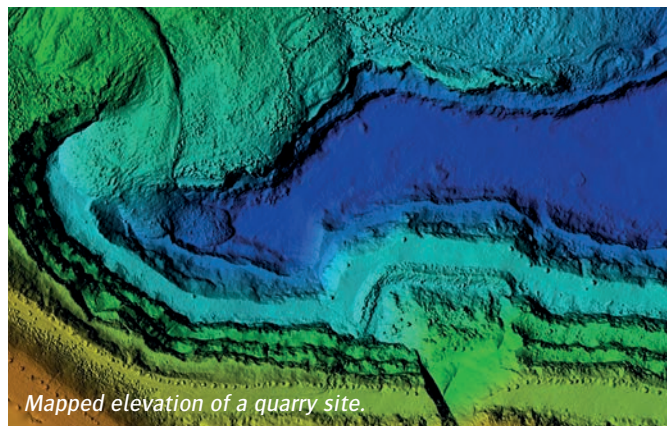
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Feature capture using LIDAR provides a much more feature-rich image.



Mapped elevation of a quarry site.

system to complement the suite of instruments that currently measures the surroundings of a vehicle. LIDAR signals allow the autonomous system to gauge the detailed surface features (thereby object identifying) that radar cannot and cut through weather obstructions much better than a traditional vision system.

Safety

Outfitting what were traditionally simple “Is there something in front of me?” sensors with LIDAR systems can have the benefit of knowing how and when to respond in safety situations. A robotic arm that handles heavy objects will be able to respond more keenly when a person-like object enters its path as opposed to an object that it was designed to handle.

Agriculture

Simple sensors have been used for years to detect things like the level of grain in a silo, the state of crops, fuel level, and so on. What these methods often do not capture is the deeper context, like how the shape

of the mound that the grain makes when poured into the silo and where it is measured (highest, lowest, mean, or arbitrary point) can affect how efficiently the storage is being utilized. Currently, the only way to capture this information using traditional methods is by using multiple sensors, which itself has resolution limits while adding significant cost to manufacturing. Being able to capture a whole crop’s growth in granular detail over time provides important data and can inform on cultivation practices, both in real time and for future crops. LIDAR can also help optimize the movement of automated machinery in harvesting crops.

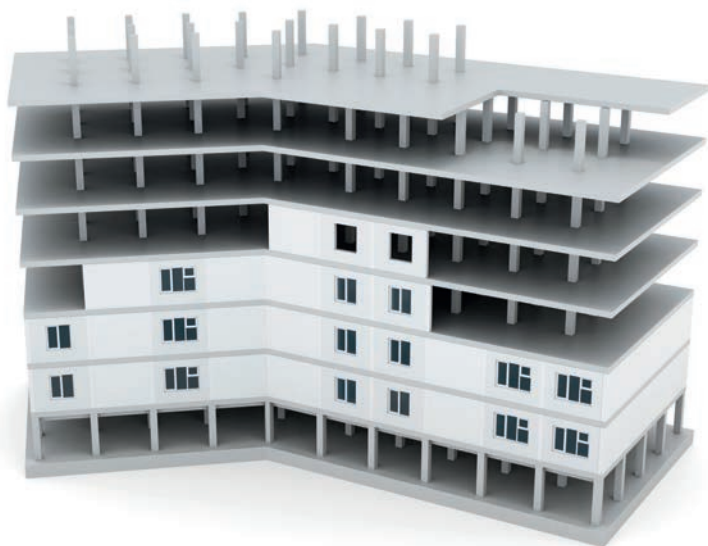
Automation

Knowing the physical structure in precise detail adds tremendous value to robotics, which can more accurately and appropriately handle objects of various sizes and geometries. This can be extrapolated to any manufacturing or warehouse context that involves repetitive handling or sorting. Having this additional information can also allow for the relaxation of otherwise unnecessarily tight tolerances in manufacturing, saving costs in production and quality control.

The previously discussed applications are ones that are currently being or have already been developed. As is always the case in human endeavors, it is impossible to know what other creative and useful ways people will come up with to use technology such as LIDAR. If you have a product or system that may be able to leverage the benefits of LIDAR, Analog Devices has the expertise to help you along the journey from conception through creation to make that idea reality.

Seeing If LIDAR Can Provide Value for Your Company

Analog.com/lidar contains a launch pad for companies looking to get into the LIDAR space or to enhance their current offerings. For a high level, applications-based approach, contact our systems experts for guidance on how to approach these problems. For a technical approach, we have evaluation platforms such as the AD-FMCLIDAR1-EBZ development platform that can help get your product to market faster by avoiding unnecessary design.



Real-time updating of a construction site, informing changes needed in design.

Tony Pirc, Applications Engineer at Analog Devices

» 60876 at www.ien.eu



Bin Picking Application: Robot Takes Over Machine Loading

At its plant in Speyer, Germany, Mann+Hummel was looking for a solution to automate the loading of a screen-printing machine with air/oil separators. Previously a worker carried out this very monotonous and non-ergonomic task manually. Now, they decided to solve this task using a cobot from Universal Robots.

Artiminds. The automotive supplier Mann+Hummel is the world market leader in filtration and employs 20,000 people at 80 locations worldwide. The cobot they selected should pick two air/oil separators from a grid box and place them on a timed conveyor belt, on which the filters are transported to the screen printing machine for printing.

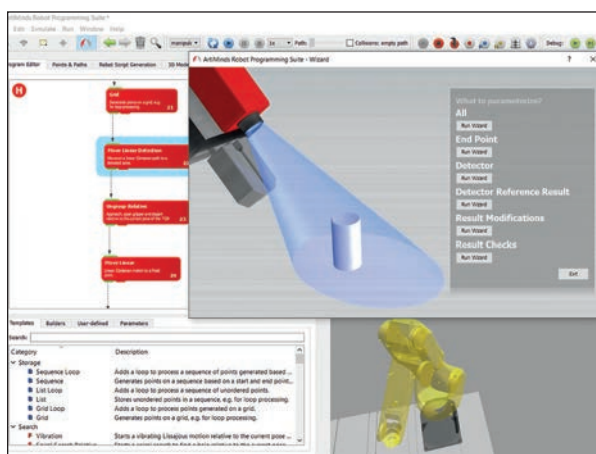
Since the filters are provided partially sorted in several levels with intermediate storage, one challenge was the correct detection of the part position. Another requirement was that the detection jobs could easily be adapted to new variants of the filters.

In order to keep the robot application flexible and to be able to switch back to manual loading if, for example, the robot has to be adapted to a new product, it was decided to use a cobot in combination with a light grid to ensure safety. A SensoPart vision sensor that is mounted above the feeding box and that is directly connected to the robot should handle the detection of the picking position.

To stay as flexible as possible and to simplify the deployment of the application, Mann+Hummel decided to use the software ArtiMinds Robot Programming Suite (RPS) for the entire programming of the cobot, including the integration of the vision sensor.

Sascha Mummert, Technology and Process Engineer at Mann+Hummel explains: "Our goal was to proof the possibilities of current robotics technology and build up appropriate internal know-how."

ArtiMinds RPS makes it possible to generate robot programs intuitive and simple by drag



The integration of hardware components such as a vision sensor is easily possible with ArtiMinds RPS. (Copyright: ArtiMinds)

execution of the program was possible completely independent from the ArtiMinds software since native UR Script code was generated automatically by ArtiMinds RPS.

Sascha Mummert summarizes: "The successful implementation of our pilot plant in Speyer has proven that with

suitable components and the right software, even complex robotic applications can be flexibly implemented by our own employees."

Take aways of the Bin Picking application:

- ArtiMinds RPS simplifies the programming of sensor-based applications. In combination with sensor technology, even the program logic for cobot applications can quickly become very complex.
- The boxes are available in different variants. It was therefore important that the detection jobs could be easily adapted.
- External influences in production could not be completely ruled out, so robust detection had to be ensured.
- The installed application was to serve as a basis for further systems and the program created should therefore easily transferable to a new hardware setup.

Silke Glasstetter, Head of Marketing
at ArtiMinds

►► 60875 at www.i-en.eu



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CERAMIC PRESSURE SENSORS

For use with liquid or aggressive media



The new pressure sensor designed by **AMSYS** allows cost-efficient large-scale production with various applications not only for pharmaceutical and medical technology, but also in the industrial sector and building

technology. Thanks to the flush ceramic diaphragm, this sensor has hygienic advantages as it is easy to clean and less susceptible to deposits. The electronics mounted on the backside of the ceramic membrane avoids disturbing noises due to short signal paths. It is highly resistant against most aggressive chemicals. Designed in the common 18 mm diameter, this pressure sensor enables an accuracy of up to 1%FS and good overpressure characteristics. The electrical connection of the ME790 can be easily achieved either via solder pads, cables, plugs or spring contacts.

►► 60772 at www.ien.eu

OPTIMIZED ENERGY-EFFICIENT REFRIGERANT

High-quality design reducing environmental impact



The 2021 version of the Tundra range features for 6 of its models the R513a refrigerant, a HFC/HFO blend, without ODP (Ozone Depletion Potential) thus reducing its carbon footprint. **Hi-line's** R513a refrigerant was designed to replace the R134a,

to comply with increasingly strict legislation in this area. Featuring direct expansion technology, it allows a constant +3°C dewpoint. The aluminum heat exchanger module enables effective heat transfer at low energy cost while the variable-speed fan only consumes the necessary energy. Fan speed control on the refrigerant circuit eliminates the need for fan pressure switches making it suitable for applications such as workshop air and machine air in general manufacturing.

►► 60810 at www.ien.eu

FLOW MONITORING OF REFRIGERANT LIQUIDS

Keeping A Cool Head With Data Storage



Using steel reinforced polymer components, the low inertia turbines of **Titan's** 900 and 1000 Series turbine flow sensors are ideal for measuring the low viscosities (0.3 to 0.4 centipoises) encountered with volatile refrigerant fluids measured in liquid form. Both turbine flowmeters are designed to give high

performance (+/- 0.1% repeatability) across 6 flow ranges from 0.05 to 15 litres per minute - and up to 30 litres per minute in the 1000 series. The chemically resistant components make these the ideal choice for flow metering a wide range of liquid temperatures (-25°C to +125°C). The polymer components of the 900 and 1000 Series flow meters are moulded in an FDA approved grade of PVDF and mounted in a 316 stainless steel body.

►► 60800 at www.ien.eu

MODULAR MULTI-ROTOR DRONE

Winner of the Red Dot Design Award in 2018



Fischer Connectors. Equipped with several interfaces, the Tundra allows the integration of accessories, sensors and other modules already available or under development and thus intends to fight against obsolescence.

The drone's arms are interchangeable and easy to remove, and allow to carry a payload of up to four kilos for a flight time of 30 minutes. The landing gear can be assembled and the arms screwed on in less than a minute, which allows for easy use in the field. Hexadrome chose Fischer Connectors' push-pull connectivity solutions to enhance the performance of the Tundra. The Tundra unmanned aerial vehicle (UAV) uses Fischer UltiMate™ and Fischer MiniMax™ connectivity solutions to cover the technical needs of integrators in terms of robustness and reliability, miniaturization, waterproofing up to IP68 and data transmission.

►► 60829 at www.ien.eu

TEMPERATURE MEASURING UNIT

Using modern standard CAN FD



PEAK-System. Eight mini-connectors for thermocouples of the types J, K, or T are available for temperature measurement, depending on the product version. A D-Sub connector enables the CAN communication. The measuring units supports the CAN FD standard and is

also downward compatible to classic CAN 2.0 A/B. The MU-Thermocouple1 CAN FD enables temperature measurement to be integrated directly into automotive test benches or industrial plants employing CAN FD communication. Its rugged aluminum casing and its thermal resistance are ranging from -40° to +85°C. The parameters for data processing, CAN communication and LED indication are generated with user-friendly Windows software and transferred via CAN to the MU-Thermocouple1 CAN FD.

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HIGH RELIABILITY OUTPUT MODULES

For industrial applications



Vox Power's OPA2 and OPA3 modules provide field configurable, manually adjustable output voltages from 4.5 to 15V at 25A and 9 to 30V at 15A, respectively. With those output modules, NEVO+600 units only use two

isolated, configurable power modules to achieve up to 600W while the larger 1200W model use up to four, thus reducing cable and link requirements and part count simplifying construction while increasing reliability (1 FPMH at 40°C at 80% load). NEVO+ modular supplies are the smallest in class. The larger unit measures just 152.4 x 152.4 x 40.8mm (6 x 6 x 1.61in) resulting in a power density figure of 21W/in³. With only 1,2kg, the NEVO+1200 includes 90% efficiency, a standby power of less than 3W, accurate current sharing and the capacity to connect modules in parallel and series. NEVO+ units can be configured in the field and current and voltage programming can be done remotely.

►► 60831 at www.ien.eu



MAGNETIC POSITION SENSOR

For automotive and industrial applications



The A31315 sensor from **Allegro** address the critical safety needs of autonomous driving systems and advanced driver assistance systems (ADAS) applications including

steering, braking, transmission and throttle systems. Superior accuracy and on-chip diagnostics help improve driver, passenger, and public safety for autonomous and driver-assisted vehicles while low power consumption and robust power management options help extend and optimize battery life. The A31315 facilitate system integration while achieving strict accuracy requirement. They support flexible low-voltage programming through sensor outputs regardless of the interface, allowing direct programming by a microcontroller in embedded designs and simplifying the interface for end-of-line system calibration.

► 60828 at www.ien.eu

3.5" EMBEDDED SINGLE BOARD COMPUTER

Capable to resist to extreme temperature environments



The new CS551 SBC from **Impulse Embedded** has been designed to start up at low temperatures permitting various applications in military, aerospace, outdoor industrial applications and railway technology. Develop

to support INTEL9th/8th Core processors, it applies dynamic performance adjustment of both CPU and GPU speeds. These new features include dual DisplayPort+ graphical interfaces supporting resolutions up to 4094 x 2304 @ 60Hz, dual Gigabit Ethernet ports and four USB3.1 ports. It internally embeds SATA3.0 storage support, an M.2 2280 M-key NVMe slot and a full-size MiniPCIe slot with SIM support for cellular connectivity. Impulse provides the complete configuration of the CS551 single board computer to the customer's exact specifications in its UK-based engineering center such as the required choice of memory, storage, peripherals and Microsoft Windows Embedded operating system.

► 60795 at www.ien.eu

GATE WITHSTAND VOLTAGE TECHNOLOGY

Improvement from 6V to 8V for 150V GaN HEMT



ROHM introduced the industry's highest (8V) gate withstand voltage (rated gate-source voltage) technology for 150V GaN HEMT devices. They successfully increased the gate source voltage rating from 6V to 8V using a

original structure. This allows for improved design margin while increasing the reliability of power supply circuits using GaN devices that require high efficiency. In addition, ROHM is designing a dedicated package for easy mounting and efficient heat dissipation. This ensures easy replacement of existing silicon devices while facilitating handling during the assembly process. Possible applications for High 8V Gate Withstand Voltage Marking Technology include 48V input buck converter circuits for data centers and base stations, boost converter circuits for base station power amplifier block, and LiDAR control circuits.

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NON-CONTACT VOLTAGE CLAMP METER

Allows accurate voltage and current measurements



The **Fluke** 377 FC and 378 FC true-rms clamp meters enables the technicians to take measurements through the clamp jaw without touching a live conductor. It permits faster and safer testing by avoiding risk of electric shock and arc flash. The 'iFlex' current probe allows measurements of extremely high current as high as 2500 A (AC) and provides access to large conductors in tight spaces. The 377 FC and 378 FC versions calculate phase rotation, display it on a smartphone and easily save it to the cloud with Fluke Connect software, allowing service technicians to document the values and easily share them with their teams. The data collected can then be used as the basis for a preventive maintenance program. It has a unique power quality (PQ) indicator that senses PQ issues, relating to current, voltage or power factor.

► 60809 at www.ien.eu

RASPBERRY PI® VOLTAGE MEASUREMENT HAT

16-bit resolution and multiple analog input ranges



Measurement Computing Corporation released the MCC 128 Voltage Measurement HAT for Raspberry Pi. Suitable for precision voltage measurements and featuring screw terminal signal connectors, it features 16-bit resolution and multiple analog input ranges.

It comprises 8 single-ended or four differential-ended analog inputs with sample rates up to 100 kS/s. Up to 8 MCC HATs can be stacked onto one Raspberry Pi providing up to 64 channels of data and a maximum throughput of 320kS/s. With two versions available, MCC offers DAQ HATs that enable users to configure multifunction, Pi-based solutions with voltage, thermocouple, or vibration inputs, voltage outputs, and digital I/O. The open-source MCC DAQ HAT Library of commands in C/C++® and Python™ allows users to develop applications on Linux®.

► 60768 at www.ien.eu

CONNECTORS WITH PUSH-PULL TECHNOLOGY

Easy assembling processes and reliable connectivity



Thanks to an easy assembling process, **TE's** Push-Pull variant facilitate the deployment of the M12 system. This technology permits to save time during

the installation. It ensures secure locking by providing haptic and acoustic feedback and also allows blind mating of the connector. IP67 rating for resistance to intrusion of dust and water makes it suitable for harsh environments. The connector can be locked without the use of any tool thus providing a higher density of PCB socket connectors and reducing the installing time in the field. The new sockets of the push-pull range are suitable with traditional M12 screw type connectors and comply with IEC 61076-2-012 specification for circular connectors with inner push-pull locking based on M12 connector interfaces according to IEC 61076-2-101, IEC 61076-2-109, IEC 61076-211 2-111 and IEC 61076-2-113.

► 60812 at www.ien.eu

FAN-COOLED COAXPRESS FRAME GRABBERS

Protect industrial mini-computers



Bitflow has developed two new purpose-built frame grabbers featuring board-mounted micro fans to draw in cool air to replace hot air in the SFF PC. This new design increases heat transfer from the FPGA while reducing

the overall system size, resulting in higher computing performance and avoiding costly downtime. BitFlow Cyton CXP4-V and Claxon CXP4-V quad-channel frame grabbers enable the integrators to have complete confidence when selecting either of these field-proven designs for their vision systems. The Claxon CXP4 frame grabber is a quad CXP-12 PCIe Gen 3 frame grabber that supports one to four CXP-12 cameras and multi-link CXP-12 cameras, with CXP speeds from 3.25 to 12.5 Gb/S. Each connected camera has its own I/O and can draw up to 13 W of power. The Cyton CXP4 frame grabber is based on the CoaXPress 1.1 standard and has a Gen 2.0 x8 PCI Express bus interface on its back-end.

► 60814 at www.ien.eu

ELECTROHYDROSTATIC ACTUATION SYSTEM

Provides high levels of accuracy for industrial machinery



Designed for applications requiring high dynamics and power density, **Moog's** Compact EAS is suitable not only for metalworking but also for other

materials including glass, ceramic, plastics and leather. Pump output and direction of rotation enable a defined linear movement of the cylinder while force, speed and position can directly be preset. Compact EAS units comprise six elements: a servo motor, internal gear pump, compensation tank, valve block, stop valve, and cylinder. The Compact EAS can provide a movement in the cylinder of up to 640 mm/s with a force of up to 500 kN in its standard configuration while customized versions permit to reach more speed and force. Position accuracy is precise to within 0,01 mm, while position repeatability is down to 0.01 mm.

► 60797 at www.ien.eu

SMART GLOVES

Adapt to the great changes in the logistics industry



Thread In Motion's smart gloves can be used in many business processes such as goods entry and exit, picking, sorting, goods counting, e-commerce operations. Glogi gloves improve logistics processes, increase

the speed of operations by fifty percent and reduce human errors to almost zero. It innovates in the logistics sector with its hands-free ease of use and its weight of only 45 grams. Functional keypad eases and accelerates daily operational jobs and 1.5 inches screen helps virtualize tasks and lists. The glove comprises a low power WiFi solution with IEEE802.11a/b/g/n support for dual band operation (2.4GHz and 5GHz). Its low power characteristics make it last for a whole day operation and it is equipped with several indicator components to generate various feedbacks for users's attention. Each indicator can be programmed for several responses depending on the user scenario.

► 60814 at www.ien.eu

HIGH TORQUE DENSITY FRAMELESS MOTOR

High power density with smooth motion performance



INMOCO, the OMNI+™ motor series enhances thermal management with lower power dissipation and decreased temperature rise. Designed in a variety of axial lengths

and winding options, the Omni+™ Series is currently available in 60 and 70 mm diameters. The 60 mm version creates up to 5.29 Nm pulse duty and 1.61 Nm continuous duty, while the 70 mm version has a maximum torque of 6.38 Nm pulse duty and 1.96 Nm continuous duty. Decreased cogging also reduces torque ripple, resulting in high heat dissipation. Celera Motion's Everest Series and Capitan Series miniature servo drives can be associated for optimal control, while Celera Motion also provides a range of optical encoders and inductive encoders for precision feedback. Custom windings and form factors are also available, and INMOCO can provide application integration support to design engineers.

► 60775 at www.ien.eu

READY-TO-USE CMS

OT & IT convergence from sensor to data dashboard



Condition monitoring (CM) is a key component of Industry 4.0, where continuous acquisition of machine data is an essential requirement for ensuring uninterrupted operation of OT and IT. An example is the

DATAEAGLE CM solution designed by **Schildknecht AG** together with PRTG from Paessler AG. This end-to-end solution consists of three components. The compact Bluetooth sensors are designed for various applications, such as multi-sensors that acquire up to 8 metrics (e.g. temperature, acceleration, etc.). The industry-proven IoT Edge Gateway DATAEAGLE 2730 with several interfaces, including an integrated eSIM card for global connectivity or a fieldbus interface for local machine or edge connectivity. Last, the PRTG Network Monitor has dashboard and monitoring functionality to visualize sensor and machine data on an IT level.

► 60870 at www.ien.eu

UV-VISIBLE SPECTROPHOTOMETER

Particularly adapted to continuous flow applications



The standard Flow UVTM cell has a path length of 1 mm, can withstand pressures up to 35 bar at room temperature and can be placed anywhere in the flow path.

Other path lengths are available, and the instrument is suitable for use with a wide range of Z-configuration flow cells that may be more adapted to high-throughput

process applications. Dispersion and steady state may be monitored at 5 user selected wavelengths in real time to assist with product collection and quality control. The **Uniqsis** FlowControl II system control software allows to automate reaction product collection in either 'Collect All', 'Steady State' or 'Balanced' collection modes. It enables the recall of recorded methods and automatically saves a background spectrum at the beginning of each experiment.

► 60855 at www.ien.eu



NEW PORTFOLIO OF MEDICAL GRADES

Improve the quality of care for patients



DSM's new medical grades are narrowly tested to meet the highest global quality and safety standards for medical applications. This new portfolio includes Arnitel® Care polyester-based

thermoplastic elastomer (TPC), Arnite® Care polybutylene terephthalate (PBT), and ForTii® Care polyphthalamide (PPA) materials. Arnitel® Care TPC range ensure high chemical resistance with applications among others for medical and respiratory tubing. Arnite® Care PBT has been developed for durable thermoplastic medical device components and offers high-purity, mechanical strength, low moisture uptake, and excellent chemical resistance. Finally, ForTii® Care PPA provides material solution for metal replacement and minimally-invasive surgical tools thanks to stiffness, high-temperature performance and chemical resistance.

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POWER MODULES WITH COMPACT DESIGN

For high-power density applications



Infineon Technologies. Using a new aluminum nitride (AlN) ceramic, the 1200 V devices are designed in half-bridge configuration with an on-state resistance (RDS(on)) of 11 mΩ in

an EasyDUAL 1B package and 6 mΩ in an EasyDUAL 2B package. These features enable high-power density applications including solar systems, uninterruptible power supplies, auxiliary inverters, energy storage systems and electric vehicle chargers. The thermal conductivity of the DCB material improves the thermal resistance to the heat sink (R_{thJH}) permitting a reduction up to 40%. Thanks to the CoolSiC MOSFET technology, the EasyDUAL modules FF11MR12W1M1_B70 and FF6MR12W2M1_B70 offer an increase of the output power or reduces the junction temperatures.

► 60796 at www.ien.eu

BOX PC WITH AI-BASED IMAGE RECOGNITION

Coming with new features



The **Kontron's** KBox PC based on an Intel Atom® x7-E3950 processor has been designed to be integrated directly into existing X86 landscapes enabling own application possibilities around

Machine Learning and AI at the Intelligent Edge. These new capabilities include image and video data processing for visual inspection, quality assurance, predictive maintenance, sorting or object recognition, as a stand-alone device or as a gateway. The integrated Google Coral Edge TPU (Tensor Processing Acceleration Unit), increases the speed significantly, supports small and low power applications and requires only one watt for two TOPS. The gateway solution based on the KBOX A-203 system networks different end devices and guarantees seamless transmission to a higher-lever infrastructure. The KBOX also features many interfaces such as Two front USB 3.0 ports, connections for displays, two GB Ethernet and an industrial 24 VDC power input.

► 60792 at www.ien.eu

THERMAL IMAGING CAMERAS

Compact design and IP66 rating



Featuring a thermal resolution of 464 x 348 (A50) or 640 x 480 (A70), **FLIR** A50 and A70 thermal cameras offer improved accuracy of ±2 °C or ±2% temperature measurement.

This allows professionals to obtain consistent readings over time and in the presence of varying environmental factors. The small and compact packaging allows easy mounting of the cameras inside machines with limited space. The IP66 rating protects against dust, oil and water, eliminating the need to add an enclosure around the camera, allowing it to be used in harsh industrial environments. The cameras are available in 3 versions: Smart, Streaming or Research and Development options, which enable efficient inspection and data analysis for condition monitoring programs, process and quality control, or as a research and development solution.

► 60808 at www.ien.eu

INNOVATIVE CAMERA MONITOR SYSTEM

Substitute solution for conventional rear-view mirror



The mirror replacement system combines a camera, a controller and a display, and complies with the ISO 26262 (ASIL B) functional safety standard. The system has already been integrated

into hyper cars such as the KTM X-Bow GT2 Concept but is also available as a road traffic certified system without special permits. Aerodynamically optimized, it provides maximum performance and increased range. **Kappa Optronics' CMS HDR Mirror** delivers latency-free and low-flicker HDR imaging able to use more residual light than the human eye can. The customizable design enables vehicle-specific customer requests to be configured quickly and efficiently.

► 60811 at www.ien.eu

MEDICAL DESKTOP ADAPTERS

In the 90W Power Supply Range



These 19.5V/4.62A output power supplies meet the latest global energy efficiency standards by complying with the DoE & Energy Star level VI and ErP stage II requirements. Measuring 5.94" (L) x 2.52" (W) x 1.37" (H), the power supplies include 4 AC

inlets: EC 320/C6 or IEC 320/C14 AC inlet for the class I units and IEC 320/C8 or IEC 320/C18 AC inlet for the class II. The adapters are operational for ambient temperature range of 0°C to +40°C. The units allow high reliability with 300,000 hours minimum MTBF at 25°C ambient. **TRUMPower's** TDM90 series are compatible for use in patient care environments thanks to a withstand voltage of 4,000 VAC from input-output (2 x MOPP) and 1,500 VAC from input-ground. It is approved to the UL, cUL, TUV, CE, CB, PSE, and CCC agency standards.

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