

Motion Control Trending Topics 2021

Matthew Jaster, Senior Editor

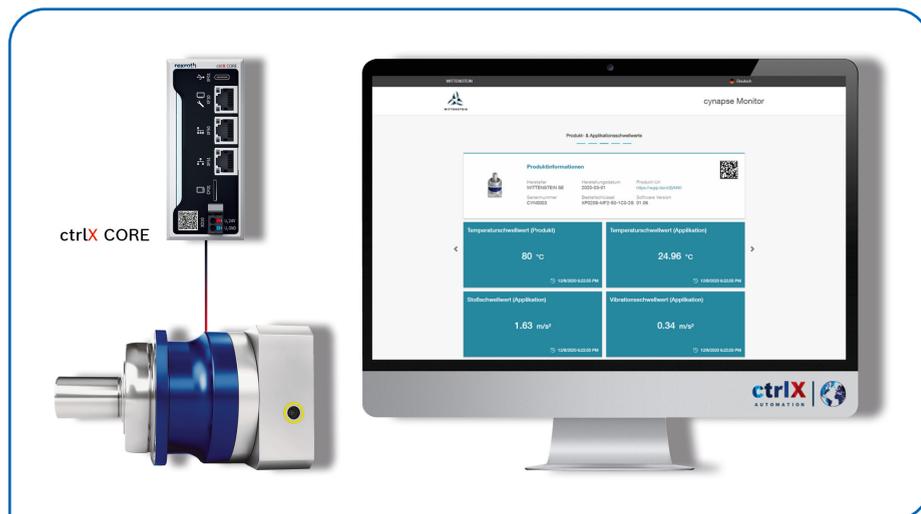
Digital transformation is taking place across industrial manufacturing and is most prominent in areas such as motion control, automation and robotics. How will today's technologies transform the factory of the future? More importantly, what areas does your organization need to focus on in 2022 as we start a new chapter of productivity post-COVID in a world with less skilled workers, more automation and an ever-growing list of new and challenging obstacles? We asked what the future has in store for automation and motion control and you answered.

Digital Ecosystem Gains Traction

Bosch Rexroth has been highlighting its ctrlX AUTOMATION platform for months and we're starting to see real-world case studies in the power transmission and motion control markets.

More than 300 companies are currently implementing the solution in their applications and the step from an open platform to an industrial ecosystem has now been taken with the launch of ctrlX World in 2021. Significant enhancements to the solution were also made this year — and further enhancements are planned.

"Industrial automation is increasingly dominated by software. We therefore need automation solutions which are geared to increasingly digitalized industry. Among other things, they should support various programming languages, offer data communication systems and allow IT and OT to be connected in a straightforward but secure manner. Today, we know that ctrlX AUTOMATION meets the automation challenges not only in mechanical engineering but also in numerous other areas such as energy, mobility and building automation," said Steffen



Wittenstein is the first component manufacturer to offer smart gearboxes as standard and has partnered with Bosch Rexroth to help customers integrate their products into an accessible system solution.

Winkler, CSO of the Automation & Electrification Solutions Business Unit at Bosch Rexroth.

Bosch Rexroth makes it easy to create, provide and use functions with ctrlX WORKS where users enjoy maximum flexibility thanks to a full range of software and programming tools. Known as the software and engineering toolbox, ctrlX WORKS includes an extensive portfolio of high-performance libraries and building blocks for typical automation tasks. In addition, users can develop their own applications in any programming language.

In 2021, a wide range of new functions for even more efficient engineering processes were added. For example, ctrlX CORE can now handle Docker images too. With the Software Development Kit (SDK), which is available to all developers on GitHub, users can now develop their own apps even more easily. A development environment for Python and Google Blockly which is integrated into ctrlX CORE is another highlight. As a result, users can now carry out development directly on the ctrlX CORE hardware. When it comes to automating

engineering processes, ctrlX WORKS now offers a simple, clearly structured script interface, the Automation Interface. Recurrent engineering processes can be automated using simple scripts. This reduces the work involved by 80-90%.

Wittenstein Offers Apps for Smart Gearbox

Wittenstein is part of the ctrlX World — the partner world around the ctrlX AUTOMATION system from Bosch Rexroth. This allows users to benefit from the advantages of Wittenstein's smart cynapse gearbox via the ecosystem. ctrlX AUTOMATION supports the openness of cynapse and enables easy integration of corresponding applications. Customers can thus integrate smart services from Wittenstein into their system solution quickly and in a user-friendly manner.

"The development of smart machine concepts by machine builders, but also the increasing digitalization of existing machines by operators, should bring cost advantages and increase competitiveness. Companies want to continue to increase their process stability,

minimize waste and make the entire manufacturing process efficient and sustainable. This is precisely the kind of application for which we developed the smart cynapse gearbox,” explains Patrick Hantschel, director of the digitalization center at Wittenstein.

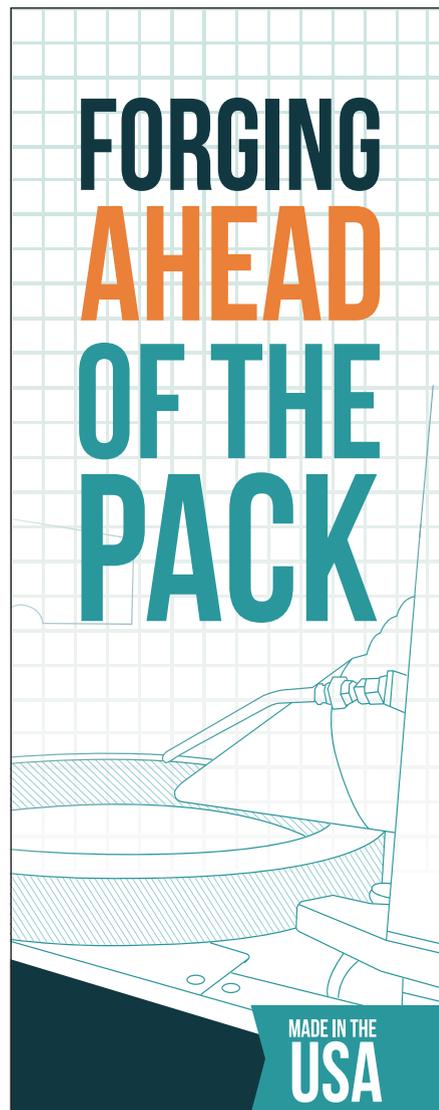
Wittenstein is the first component manufacturer to offer smart gearboxes as standard — gearboxes with cynapse. They have an integrated sensor module that enables Industry 4.0 connectivity. This solution can also be combined with smart services. Among other things, these software applications enable the combined analysis of machine and sensor data, which detects possible failures much earlier than is the case with conventional condition monitoring solutions.

“The ctrlX AUTOMATION platform leverages the openness of cynapse and supports the easy integration of overarching applications. This means users can easily integrate smart services from Wittenstein into their system solution. This enables the quick and easy implementation of condition monitoring, process monitoring and drive train control,” says Hans Michael Krause, head of product management ctrlX

This synergy between Bosch Rexroth and Wittenstein is realized through the ecosystem around the ctrlX AUTOMATION platform. Via the open automation platform and its ctrlX World for partners, desired functions can be easily downloaded in the form of apps. Here, users can employ apps from Bosch Rexroth, third-party apps or apps they have created themselves. ctrlX AUTOMATION provides all the components for complete automation solutions. The platform offers an open software architecture, a complete hardware portfolio as well as IoT, security and safety functions. This means that the system can be expanded at any time to include applications as well as hardware and software from third-party suppliers.

“Due to the maximum openness of ctrlX AUTOMATION, which is also reflected in the ctrlX World, our customers and we benefit from an easy integration of overlapping applications and a constantly growing ecosystem. This also enables us to achieve a high reach for our solutions,” added Hantschel.

www.boschrexroth.com/ctrlxautomation



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The step from an open platform to an industrial ecosystem has now been taken with the launch of ctrlX World in 2021.

Cloud-Based Production Technology Maximizes Assets

Cloud-based production technology will continue to grow as companies form partnerships in areas like oil & gas, packaging and food & beverage.

Case in point: ABB and Enovate Upstream will apply their complementary digital platforms, ABB Ability Wellhead Manager and Enovate Upstream's Digital Production, to create a fully automated and scalable, digital oilfield solution. The solution maximizes the value of assets by connecting operations with reservoir engineering through a cloud-based digital platform. The artificial intelligence (AI) production technology gives customers the opportunity to understand their production rates in real time to enable better decision-making while providing financial performance assessment and capital management.

The ADA AI Digital Ecosystem created by Enovate Upstream and ABB Ability Wellhead Manager are cloud-based platforms that when integrated provide oil and gas producers insight into onshore upstream production assets. This includes reservoir analysis, using a cloud-based supervisory control and data acquisition system (SCADA) and predictive analytics platform from anywhere, at anytime, on any device.

"Our collaboration with Enovate Upstream enhances our capabilities to assist customers in their digital transformation. Working together, we bring extra value to upstream customers for a total production and operations solution. Customers using our combined

digital solution will have more insight into the reservoir data to make more informed decisions, ultimately driving operator effectiveness," said Nathan Tungseth, ABB global segment manager, onshore oil and gas.

"Initial results from our team during the co-development with operators and early field implementation demonstrated the substantial value creation for cost optimization, production enhancement, workflow automation and decision-making outcomes," said Camilo Mejia, CEO Enovate Upstream. "This collaboration demonstrates how our industry is embracing technology to improve efficiencies and support short- and long-term sustainability goals."

As demand for digital automation continues to increase, ABB and Enovate Upstream are creating an opportunity to further advance the collective goal of digital transformation. The combined expertise of the two entities aligns core beliefs that collaboration and digitalization are necessary for project value improvements across the energy sector.

www.abb.com

Safety First

Safer controls, components, and automation will be on full display as the industry starts coming back together face-to-face for trade shows in 2022. Some recent examples:

Intelligent Motion Solutions for Material Handling

Combining intelligent controls with some of the highest-quality linear actuators available on the market, Co-

lumbus McKinnon Corporation, a designer and manufacturer of intelligent motion solutions, products and technologies for material handling, today announced the introduction of its Duff-Norton brand SPA Linear Actuator with Intelli-Motion technology.

The latest and most advanced Duff-Norton linear actuator, the SPA with Intelli-Motion is designed to provide reliable operation, enable precision motion control and simplify applications, especially those that can benefit from automation technology. The latest product to join Columbus McKinnon's family of automation solutions, this intelligent actuator offers easy installation, configuration, and operation to ensure systems can get up and running quickly and perform reliably.

"Getting the most from a motion system means finding the right linear actuator, one that works efficiently, is durable, moves the load safely, and operates at the desired speed," says Mark Yerse, senior global product manager and strategic marketing manager. "The SPA with Intelli-Motion can do all of that and more. It is robust enough to handle higher-duty cycle applications while providing precise, repeatable motions and feedback capabilities."

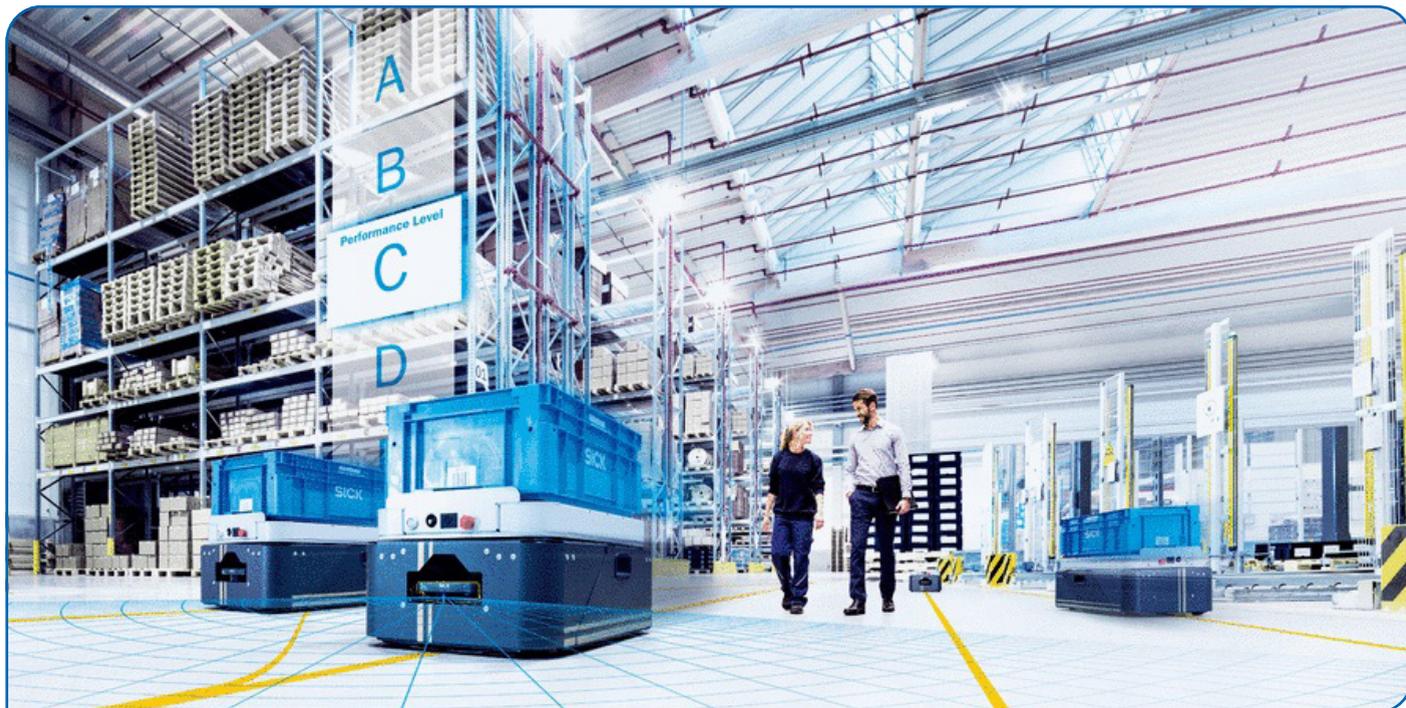
www.columbusmckinnon.com

SICK Offers Safe, Solid-State Technology

The scanGrid2 safe multibeam scanner from SICK uses a novel and in-house developed solid-state LiDAR technology to increase the productivity of small autonomous and line-guided transport vehicles. Certified as a Type 2/SIL 1



Integrated teams from Enovate Upstream and ABB are working side-by-side to rapidly advance innovation needed for growth, expansion, and customer-focused solutions across the entire oil and gas industry.



SICK employed its novel and in-house developed solid-state LiDAR technology for the first time when developing its first scanGrid2 safe multibeam scanner.

safety sensor according to IEC 61496-3, the scanGrid2 can protect hazardous areas up to performance level c and works well for collision avoidance. An app and cloning function also ensure a high level of up time and fast fleet deployment.

“With this sensor, manufacturers of autonomous and line-guided autonomous vehicles gain a cost-effective safety solution that can boost the productivity of applications. Specifically, this means increasing the speed or payload of the vehicles, or being able to eliminate mechanical barriers like fences,” said Aaron Woytcke, market product manager of industrial safety at SICK USA.

Conventional safety laser scanners are often not a suitable solution for these very simple and exceptionally cost-effective small vehicles for economic reasons. Users often choose between limiting the speed or payload of the vehicle or avoid operating them in unfenced areas to minimize the risks associated with the vehicles. The scanGrid2 now offers users new possibilities for successfully increasing the productivity of small autonomous and line-guided carts. Thanks to the rapid return on investment, switching to a safety sensor is now a viable option with initial installations showing productivity

increases between 50 and 70%.

The scanGrid2 safely detects objects of a variety of sizes within the freely configurable protective field zones, can evaluate multiple fields, and can execute configurable monitoring cases. A warning field zone extending up to four meters beyond the safe working range can be employed for non-safety actions.

The solid-state LiDAR technology is based on the principle of time-of-flight measurement and eliminates all moving parts. Instead, the device uses only semiconductor elements in conjunction with geometrically arranged optics modules to span a protective field of 150 degrees. Within the defined protective field zone, scanGrid2 can solve Type 2 classified, performance level c safety requirements in the context of safety applications.

www.sick.com

Upgrading Cybersecurity Measures

It's incredibly important in 2021-2022 to consider implementing cybersecurity measures in conjunction with IIoT and digital factory solutions. One without the other at this point will only cause trouble down the road for technology implementation and new automation concepts. FANUC is offering

retrofit control packagers to update older equipment and Emerson provides plenty of material to consider in developing your own cybersecurity package.

Retrofitting CNC Systems

FANUC America recently introduced an upgrade solution for legacy CNC machines running on operating systems older than Windows 10. The Panel *i* Replacement Program retrofits FANUC CNCs with a powerful industrial PC available with touch or non-touch LCD display, solid-state drives and Windows 10 IoT Enterprise.

FANUC CNCs running on obsolete operating systems, such as Windows 7, XP or older, are no longer supported by Microsoft and therefore not receiving their critical updates. If machines connect to an online network, this can leave sensitive manufacturing equipment open to major cybersecurity breaches.

“To stay competitive, you need real-time operational information from your CNC machines to make data-driven decisions,” says Jon Heddleson, general manager of factory automation for FANUC America. “But we realize there is a lot of legacy CNC equipment still in use today. To fill this critical cybersecurity need, this program allows FANUC CNC users to unlock IIoT



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FANUC America recently introduced an upgrade solution for legacy CNC machines running on operating systems older than Windows 10.

advantages by connecting their machines to the business network in a safe and secure way.”

www.fanucamerica.com

Long-term security plan

Collaboration between IT and OT stakeholders is vital to implement new systems and services that help an organization digitally transform. In developing a cybersecurity strategy, IT and OT stakeholders must understand each other's strengths and how to achieve business goals whilst maintaining the highest levels of security.

Each expertise brings something different to the table, with IT having a highly standardized process and OT having a more engineered solution. The goals of both stakeholders need to be reviewed and requirements established to avoid gaps and risk to operations. Automation suppliers can make secure deployment of systems more successful by providing a layered portfolio of security controls, procedures and services that enhance system security and help end users prioritize cybersecurity assessments.

Organizations must consider cybersecurity during the front-end engineering and design of a control system project. Too often cybersecurity defenses are added later, and this is more expensive and rarely as effective as building cybersecurity into the project. This is referred to as the 'Shift Left' concept. Secure by design, coupled with an appropriate cyber risk analysis, should include a review of security features and controls to ensure their effectiveness against the growing cyber threat landscape.



The SPA with Intelli-Motion is designed to provide reliable operation, enable precision motion control and simplify applications.

To support the business justification of a cybersecurity initiative, assessments can be used as a risk reduction metric that represents the progress of cyber initiatives implemented thus far and the potential protection afforded by deploying additional cyber protections.

If an attack does happen, the best way to overcome it is to have a well-documented and practiced incident response plan. In short, overcoming an attack does not go well without cybersecurity features, controls and a well-thought-out plan. **PTE**

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