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THE TRENDS ISSUE

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NED

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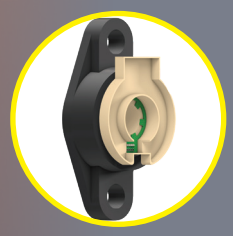

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Laura Davis | *Editor-in-Chief*
LDavis@endeavorB2B.com

Alexis Gajewski | *Senior Content Strategist*
AGajewski@endeavorB2B.com

Thomas Wilk | *Group Editor*
(614) 302-9601 • TWilk@endeavorB2B.com

Michael Annino | *Art Director*
MAnnino@endeavorB2B.com

ENDEAVOR BUSINESS MEDIA

CEO | **Chris Ferrell**
Preisdent | **June Griffin**
COO | **Patrick Rains**
CRO | **Reggie Lawrence**
Chief Administrative and Legal Officer | **Tracy Kane**
Chief Digital Officer | **Jacquie Niemiec**
VP & Group Publisher, Manufacturing | **John DiPaola**

New Equipment Digest
2 Summit Park Drive, Suite 300
Independence, OH 44131
(234) 466-0200
www.newequipment.com

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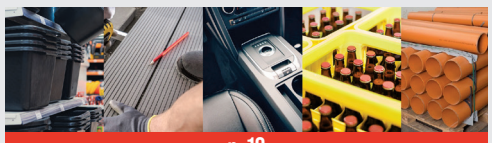

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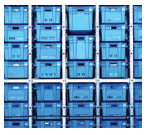

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Antares Vision Group

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Threaded Inserts for Metal Repair

E-Z Lok (Solid Wall) Threaded Inserts are for metal repair or to reinforce threaded holes in soft metals such as aluminum, magnesium, and cast iron. External threads are standard size and pitch and can be installed with standard drills and taps. Solid wall inserts are installed with a screwdriver, bolt/jam nut, or power tool. The pre-applied adhesive begins to set immediately upon installation with the insert fastener-ready in 3 to 5 min.

E-Z Lok

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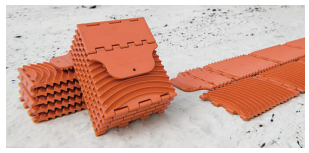
Heavy-Duty Vehicle Traction



GoTreads XXL provide heavy-duty traction for large vehicles that need quick and easy tire traction in challenging terrain and weather conditions such as mud, snow, and sand. Measuring 6 ft (2 m) long and 9 in. (230 mm) wide, they can withstand the weight and demands of even the biggest fleet vehicles, such as trucks, buses, semis, and emergency vehicles.

Pinto, Inc.

More online: newequipment.com/21281257

Economical Heavy-Duty Hoists

EM Model HF Engineered Hoists for heavy service Class D applications provide traditional capabilities of custom hoists at a reduced cost. The hoists include double reeving (8/2 and 12/2), providing true vertical lift. Half-depth drum grooves eliminate rope guides. They offer standard closed loop flux vector VF hoist control, designed with Class F motor insulation. Users can count on 40,000 hours of B-10 life for hoist gearboxes and motors.

Engineered Material Handling (EMH)

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Suite of Cordless Power Tools

Over **30 cordless products** will debut in 2024 ranging from impact wrenches to inspection cameras to Bulldog Tough SDS-plus Drill Bits. Many of Bosch's latest products aim to help users conquer concrete and other materials on the job site with greater versatility, extended battery runtimes, and more. Get the full tool list by visiting the link below.

Bosch Power Tools

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Smart Water Sensor

The **Scout** point-of-leak sensor alerts managers in real time via Wi-Fi to the StreamLabs mobile app about the presence of water and also sends alerts for fluctuating temperature and humidity levels that may indicate a leak or the risk of frozen pipes. It can be installed in minutes, with no pipe-cutting required. A network of Scouts can be placed wherever needed for early leak detection, as well as anywhere pooling or dripping water might occur.

StreamLabs, Inc.

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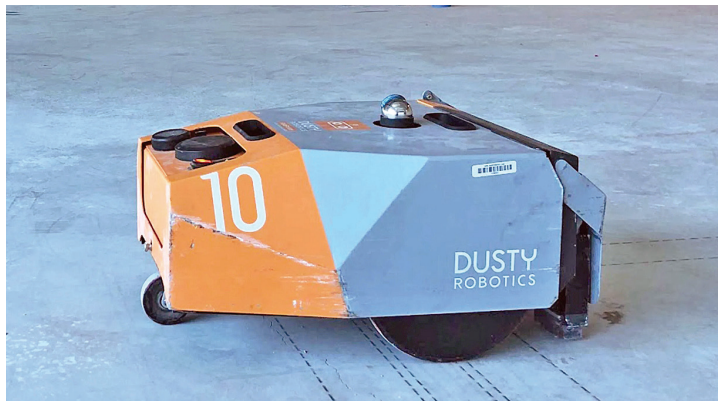
BIM-to-Field Automated Workflow

A complete BIM-to-field solution designed to reduce construction risk, the **FieldPrint Platform** provides a suite of tools that enable contractors to streamline workflow from design to installation. The suite of software and hardware includes a 2nd-generation layout robot and the FieldPrinter 2, which work together to accurately and comprehensively lay out BIM models on the deck.



Dusty Robotics

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Switch Streamlines Isolation for BESS

SourcePacT Interconnect Source Isolation Switch streamlines grid isolation for BESS projects with a single device design to the new UL 3008 standard. It's the industry's first purpose-built grid-isolation solution enabling BESS to supply emergency power to the facility's most important loads. Additionally, it's able to communicate with any inverter equipped with Form-C contacts.

ASCO Power Technologies

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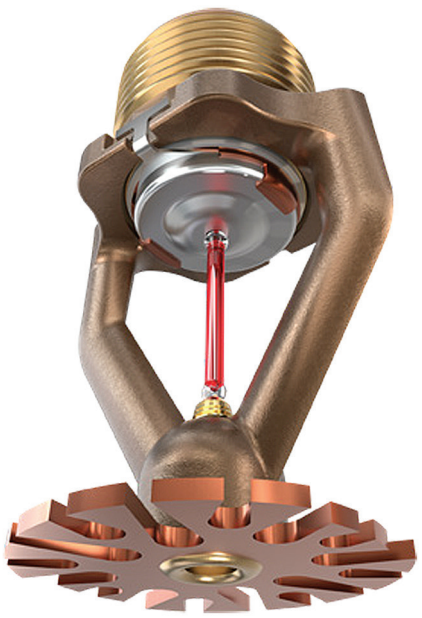

Narrow Aisle Fire Sprinkler

The **VK5141**, a K28 specific application ESFR glass bulb pendent sprinkler, has a UL Listing for ceilings up to 48 ft (15 m) for high-challenge fires in storage areas. Working with aisle widths as narrow as 5 ft (1.5 m), it allows facilities to increase storage space. It has a working pressure of 175 psi (12 bar), a threaded 1-in. NPT (25-mm BSPT), and is rated for 155°F (68°C) and 200°F (93°C).

Viking Group, Inc.

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Next-Generation Critical Power Monitor

The **M70 CPM energy meter** helps customers achieve greater energy efficiency at their mission-critical and energy-hungry sites by monitoring energy consumption easily, reliably, and in real time. Whether monitoring at the power feed, branch-circuit level, or stand-alone enclosure, it offers unmatched granularity with temperature monitoring, audible alarms, and a pivoting display for easy visual access from the floor.

Starline Holdings, LLC

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Temperature Variations are Telling

by Sheila Kennedy, CMRP

FLIR E8 Pro
© Teledyne FLIR

Titan HD camera
© Infrared Cameras, Inc. (ICI)

R40 Series All-In-One Fixed Infrared Sensor
© Palmer Wahl Instruments, Inc.

TS3700 Thermal Imaging Sensor
© Systems With Intelligence

Detecting anomalous heat in industrial environments requires purpose-built technology. Infrared and thermography solutions help to identify and quantify issues such as hot spots, leaks, asset degradation, and process concerns. Tools offering greater temperature ranges, resolution, durability, and analytics facilitate condition monitoring, inspections, and predictive maintenance.

Targeted Solutions

Recent innovations address common challenges. The **Titan HD from Infrared Cameras, Inc. (ICI)** is a high-resolution thermal imaging camera designed for surveying large and distant critical assets and infrastructure. The lightweight device measures temperatures up to 2,732°F (1,500°C) to an accuracy of 1°C, even from a significant distance.

The handheld Titan HD and its fixed-mount sibling unit, Titan 1280P, provide notable granularity. "The 1280×1024 pixel count of the infrared detector itself equates to more than 0.05 in. (1.3 mm) individual temperature points within the image," observes Carl Schultz, director of product knowledge at ICI. "The top-tier sensor and its ability to interface with ICI's SmartIR platform provides end users with a myriad of control, integration, monitoring, reporting, and process control options and opportunities."

The new utility-grade **TS3700 thermal imaging sensor from Systems With Intelligence** is a continuous thermal monitoring solution for substations with built-in temperature analytics and alarms. The sensor can be set up to automatically scan remote sites, provide temperature readings on hundreds of points, and send alarms through email or to the SCADA system. Its protective housing is built to withstand extreme conditions to support a high level of uninterrupted operation.

Richard Harada, a vice president at Systems With Intelligence, says the company's thermal monitoring solutions are "specifically designed to endure the harsh environments in electrical substations and industrial sites, while seamlessly interfacing with SCADA and asset management platforms."

Continuous detection of slag, an unwanted steel production byproduct, helps to improve steel quality and reduce energy consumption and emissions such as CO^2. AMETEK Land's Slag Detection System (SDS v2) and integrated MWIR-640 SDS mid-wavelength thermal imager enables reliable and continuous slag detection, monitoring, and process control. The system's image processing workstation with IMAGEPro v2-SDS software triggers an alarm when threshold levels are exceeded.

"The new MWIR-640 SDS thermal imager unit, with an advanced 3.9 µm (0.00015 in.) spectral response, provides the clearest view through smoke, particles, and hot process gases," notes Manfred Hayk, global product manager of IR at AMETEK Land. "The system is designed to provide accurate, real-time detection of steel/slag, independent of charge weight and without operator intervention."

New lines of fixed and handheld infrared temperature systems from Palmer Wahl Instruments are available in 10 different spectral ranges "to measure everything from loaves of bread to 5,432°F (3,000°C) steel," says President Stephen Santangelo.

Wahl's Heat Spy Monitor R40 Series Fixed Infrared Sensors are all-in-one systems available with a full complement of accessories to optimize installation. The sensors come equipped with signal processing tools that can be adjusted using a built-in keypad. Wahl's DHS40 Series Heat Spy Handheld Infrared Pyrometers uniquely have an all-metal housing for increased durability and are available in models for measuring cold metal, through flame, burning gas, glass, and thin-film plastics.

Advanced Reporting and Analysis

Using infrared thermography for condition monitoring involves more than just an effective thermal imaging camera. "Now, it is essential also to have the right image analysis and reporting software," says Rob Milner, director of business development at Teledyne FLIR. The company's new E8 Pro is an example.

The **FLIR E8 Pro** "includes the FLIR Ignite cloud service, empowering users to upload images directly to the cloud, organize and edit files, and create simple reports. For more advanced editing and reporting, there's FLIR Thermal Studio Suite, a desktop software offering batch processing, feature-rich measurement tools, and customized reports," adds Milner. The camera's one-hand operation, 3.5-in. (89 mm) touchscreen, and patented Multi-Spectral Dynamic Imaging (MSX) increase usability.

BAM, a senior scientific and technical federal institute based in Berlin, and LATODA, an AI-as-a-Service startup, co-developed a method to inspect wind turbine rotor blades from the ground for erosion damage. An infrared camera system takes thermographic images of rotor blades, and the images are analyzed using AI, enabling targeted maintenance to improve turbine efficiency and performance. The solution was successfully tested in a feasibility study.

"An automated image evaluation with artificial intelligence represents a great potential to decide even faster and more reliably after the measurement which concrete measures are to be initiated by the operators of the turbines," explains Michael Stamm, head of the project at BAM. NED

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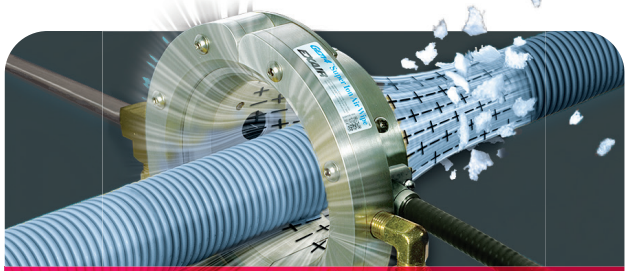

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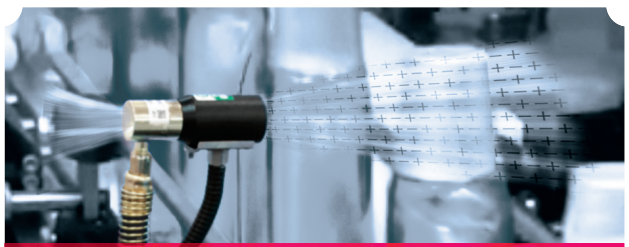

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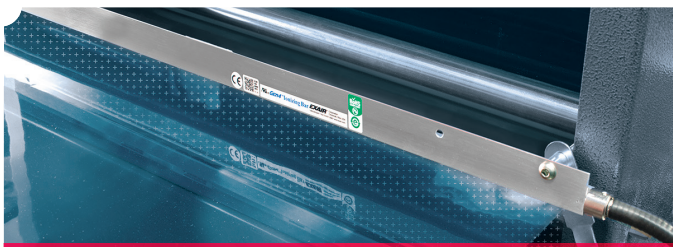

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EMBRACING THE FUTURE:

THE TECH TRENDS RESHAPING MANUFACTURING IN 2024 AND BEYOND

by **Laura Davis**

Technology is poised to play a significant role in supporting manufacturers in taking on the challenges they may face in 2024. In fact, 54% of manufacturers plan to increase technology spending in 2024, according to Gartner's 2024 Tech Trends Survey. The reason is that it will help them with staffing shortages, improve productivity, unlock new revenue streams, optimize their supply chains, and enhance their position in the market.

These technology trends reflect ongoing advancements and innovations in the manufacturing industry, which are likely to continue shaping the future of manufacturing in 2024 and beyond. However, the actual adoption and impact of these technologies will depend on various factors, including industry-specific needs, regulatory environments, and economic conditions.

So as we barrel on into 2024, is there much different that we can expect in the way of processes and technology to manufacturing operations, or will it be fairly the same? I lay out the main trends you can expect for the year and what that might look like and how you can use them.

Artificial Intelligence

Artificial intelligence (AI) has exploded and will only get stronger in 2024 as AI has become synonymous with innovation, efficiency, and competitiveness. As we delve deeper into 2024, the role of AI, particularly generative AI, is evolving rapidly, reshaping how products are designed, optimized, and produced.

AI has emerged as a transformative force in manufacturing, offering a wide range of applications across various stages of the production lifecycle. AI-powered algorithms analyze vast amounts of data, identify patterns, and make autonomous decisions, enabling manufacturers to optimize processes, improve quality, and enhance productivity whether it's predictive maintenance, quality control, or supply chain management.

The next frontier will be generative AI, leveraging advanced machine learning techniques to create novel designs, solutions, and optimizations. Unlike traditional AI, which relies on predefined rules and data inputs, generative AI can generate new ideas and solutions autonomously, based on high-level objectives and constraints provided by users. It will empower manufacturers to explore more possibilities, uncovering new solutions and optimizing designs in ways that were previously unimaginable.

Generating thousands of design iterations based on specified parameters and objectives, generative AI creates diverse design possibilities and optimizes performance, cost, and sustainability to create innovative, high-quality products that meet customer needs and market demands. Manufacturers can also optimize processes by analyzing data from sensors, equipment, and production systems to identify inefficiencies and opportunities for improvement. It also has a place in supply chain management by analyzing historical data, market trends, and external factors to generate predictive models and analyze scenarios to correctly align inventory levels, minimize lead times, and mitigate supply chain risks.

The Industrial Metaverse and Smart Factories

Smart factories are nothing new, but in 2024 they will continue to be the cornerstone of modern manufacturing, driving innovation, productivity, and competitiveness to new heights. A recent Deloitte study indicated that 86% of manufacturing executives believe that smart factory solutions will be the primary drivers of competitiveness in the next five years.

The smart factory integrates advanced technologies such as AI, 5G, Internet of Things (IoT), data analytics, and cloud computing in the production environment to help provide real-time insights, end-to-end visibility, and scalable solutions. But there's also a new partner of smart factories in town gaining traction and reshaping the future of manufacturing: the Industrial Metaverse.

Inspired by the convergence of VR, augmented reality (AR), the IoT, and AI, the industrial metaverse represents a digital twin of the full physical manufacturing environment. It's a digital ecosystem designed to mirror the physical factory, creating a seamless interaction between physical assets, virtual simulations, and digital twins.

According to the 2023 *Deloitte and MLC industrial metaverse study*, over 70% of surveyed manufacturers have woven technologies such as data analytics and cloud computing into their processes, and nearly half are already harnessing the power of IoT sensors, devices, and systems.

VR and AR have been integrated into the industry for a few years now but haven't taken off in a big way. But with the emergence of the industrial metaverse, VR and AR finally have a central role to play, providing an immersive experience that bridges the gap between the physical and digital worlds of the factory. VR enables users to enter virtual environments and interact with simulated machinery, production lines, and processes by replicating real-world scenarios, letting users gain hands-on experience, develop new skills, and enhance their knowledge of operating machinery. AR overlays digital information onto the physical world, enhancing situational awareness, training, and maintenance activities such as remote monitoring and maintenance. We will see continued adoption of AR smart glasses, removing the need for on-site presence as technicians can visualize

equipment status, access maintenance instructions, and receive real-time guidance from remote experts, improving efficiency and downtime.

Of course, IoT is the backbone of this whole operation, enabling real-time monitoring and control of assets and operations. IoT sensors embedded within machinery, equipment, and infrastructure collect data on performance, condition, and energy consumption, facilitating predictive maintenance, process optimization, and quality control. AI algorithms and machine learning models power those predictive analytics through optimization algorithms and autonomous decision-making capabilities.

The industrial metaverse will foster collaboration and communication among stakeholders throughout the world. It will enable virtual meetings and shared workspaces where teams can collaborate in real time, visualize complex concepts, and troubleshoot issues more quickly and effectively, reducing the time it takes to find a solution and accelerating the decision-making process.

On-Demand Manufacturing

With the rise of supply chain challenges stemming from the 2020 pandemic, there has been a lot of talk about the customization of products and equipment in the manufacturing space. On-demand manufacturing has taken hold through its ability to let manufacturers produce goods quickly, efficiently, and in response to real-time demand. This approach minimizes inventory, reduces lead times, and enables businesses to tailor products to meet individual customer needs. By using real-time data analytics, predictive modeling, and supplier collaboration platforms, businesses can optimize inventory levels, mitigate supply chain risks, and ensure timely delivery of components, enabling seamless integration with on-demand production processes.

One of the biggest drivers behind this concept is 3D printing. After many years, 3D printing is at a place where it's enabling the quick process of prototyping and customized parts and products, allowing design freedom, complexity, and speed. It lets manufacturers move away from the more timely tasks of cutting, drilling, and molding raw materials that come with subtractive manufacturing and instead build objects layer by layer using digital design files. Businesses can tailor products to individual customers by accommodating unique specifications, variations, and configurations, enhancing customer satisfaction and loyalty.

Additionally, the advancements in automation technology such as integrated software platforms, digital design tools, and automated production systems are helping to streamline manufacturing processes, from design and prototyping to production and fulfillment, reducing manual intervention and accelerating time-to-market.

Humanoid Robots

In 2024, we are finally witnessing a robotic shift as humanoid robots take center stage. With advancements in AI, sensor technology, and robotics, humanoid robots are set to revolutionize the industry, offering unprecedented levels of flexibility, adaptability, and collaboration alongside human workers.

Designed to resemble and mimic human-like movements and capabilities, humanoid robots have the dexterity, mobility, and cognitive capabilities to perform a wide range of complex tasks in dynamic environments. From assembly and inspection to material handling and collaborative tasks, humanoid robots are redefining the boundaries of automation and human-robot interaction in manufacturing.

At the core of their capabilities lies AI and machine learning algorithms enabling them to perceive and interpret their surroundings, learn from experience, and adapt to new tasks autonomously. By leveraging AI-powered vision systems, natural language processing, and decision-making algorithms, humanoid robots can recognize objects, understand instructions, and make real-time decisions in response to changing conditions, enhancing their versatility and efficiency in manufacturing operations.

Advanced technologies such as cameras, LiDAR, and tactile sensors enable these robots to perceive and interact with their environment with human-like precision and sensitivity. By detecting and responding to tactile feedback, visual cues, and spatial awareness, humanoid robots can navigate complex environments, manipulate objects, and interact safely with human workers creating truly seamless collaboration on the factory floor.

So why the big shift to humanoid robots as opposed to mobile robots and traditional cobots? The reason is that humanoid robots really excel at the repetitive, physically demanding tasks that human workers are at risk of injuring themselves with, creating further issues with downtime and labor shortages. By using robots to handle hazardous or physically demanding tasks such as heavy lifting or exposure to hazardous materials, human workers are protected from potential harm. The robots are also capable of reprogramming and reconfiguring to accommodate changing production requirements and product variants, allowing manufacturers to have more agility and responsiveness in dynamic market environments.

Product-as-a-Service

In 2024, Product-as-a-Service (PaaS) has emerged as a disruptor, revolutionizing traditional manufacturing approaches and offering many benefits for both businesses and consumers. PaaS is a business model where manufacturers, instead of selling equipment, lease the equipment to customers. Alternatively, it could also mean providing a set of subscription-based services. The idea is that customers can benefit by only paying for what they need on a pay-per-use or subscription basis while also getting additional support from OEMs, helping to optimize their operations.

PaaS aligns incentives between manufacturers and consumers, creating long-term relationships and encouraging sustainable consumption. It promotes a more sustainable approach by incentivizing manufacturers to design products with longevity in mind since they retain ownership of the product through its lifecycle, reducing waste and environmental impact. It allows consumers more flexibility and scalability as they can adapt as needed by having manufacturers adjust the production capabilities of the product, upgrade its features, and introduce new offerings without requiring customers to make significant investments upfront. Additionally, it allows manufacturers to remotely monitor the equipment, anticipating and addressing potential issues before they escalate, optimizing service delivery, minimizing downtime, and enhancing overall customer satisfaction.

It's a shift from one-time transactions to recurring revenue, capturing revenue throughout the equipment lifecycle. It also lets manufacturers collect equipment usage data from customers that can be used to better understand customers' needs, optimize existing offerings, and bring new products to market.

Predictive Maintenance

Predictive maintenance has been at the forefront of manufacturing for some time now, and while it remained a key trend for 2023, it will look a little different in 2024. Instead of predictive maintenance, manufacturers are in the early stages adopting of predictive resolution.

Where predictive maintenance uses data analysis to identify anomalies in equipment performance and determine their root cause, predictive resolution takes this concept one step further, offering technicians insights on how to resolve those issues with greater certainty. In basic terms, predictive resolution increases the likelihood that an issue will be correctly addressed on the first try, enabling manufacturers to enhance equipment efficiency, reduce costs, and improve their first-time fix rate.

By using predictive resolution in conjunction with IIoT, manufacturers will be able to ensure that production assets and/or customer equipment operate as intended, proactively address issues before they have the chance to lead to unplanned downtime, and extend the life of machinery. It also can enhance workplace safety by identifying and mitigating potential hazards before they become a risk, creating a safer working environment, and ensuring compliance with regulatory requirements and industry standards.

This is yet another area in which PaaS will prove essential, as the usage data customers generate will provide manufacturers with other valuable data points that they can use to build machine learning models and engage in predictive resolution.

Conclusion

Reflecting on the advancements and industry shifts that characterized 2023, it's evident that we're in for an even bigger year in 2024.

Looking ahead, manufacturers are gearing up to embrace technology like never before. And the reason is clear: technology holds the key to addressing staffing shortages, enhancing productivity, unlocking new revenue streams, optimizing supply chains, and bolstering market position. By embracing innovation, investing in digital transformation, and fostering a culture of continuous improvement, manufacturers can position themselves for success in an increasingly digital and interconnected world. The road ahead may be challenging, but with the right vision, strategy, and commitment to innovation, the future of manufacturing is boundless. NED

3D AR Smart Glasses

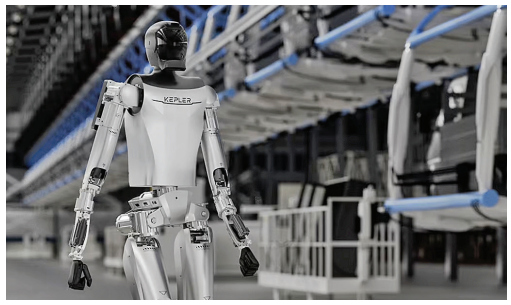
The world's first full-color 3D display smart glasses featuring the latest Snapdragon AR1 Gen 1 Platform, the **RayNeo X2 Lite AR Glasses** bring users a vivid, detailed, and portable visual experience.

The glasses harness pioneering binocular full-color Micro-LED optical waveguide display alongside interactive features. With a lightweight body for everyday wear, RayNeo has powerful all-in-one assistant features, from smart navigation and auto-translation to photography and music play.

Ideal for indoor and outdoor use, the smart GPS showcases nearby landmarks as you move, displaying on-screen messages to keep you updated wherever you go. When speaking face-to-face, the AR glasses automatically detect and translate in-person conversations with subtitles displaying on the screen. The hands-free integrated camera allows wearers to create stills, videos, and time-lapses that can then be transferred to smartphones. Lastly, "whisper mode" lets users play music through the glasses without leaking the sound for others to hear.

TCL RayNeo

More online: newequipment.com/21281373



Groundbreaking Humanoid Robot

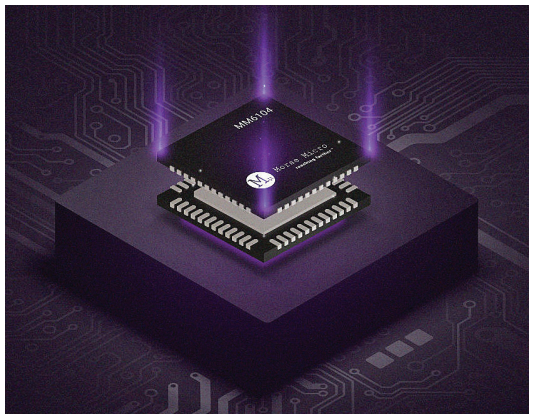
The **Kepler Forerunner Series** of general-purpose humanoid robots is designed for multifunctional use in various settings, including production lines, material handling, complex environment inspections, emergency rescue services, and more.

Features include a proprietary planetary roller screw actuator, intelligent dexterous hands, and the NEBULA system for versatility. The planetary roller screw and rotary actuators are key to the dynamic movement of the robot's limbs, allowing maximum load capacity for each component and creating the simulation of human-like muscle movement control. The dexterous hand offers 12 DoF, adeptly balancing load capacity and control accuracy.

The actuator has 4 primary functions: visual recognition, visual SLAM (Simultaneous Localization and Mapping), multimodal interaction, and hand-eye coordination. The series consists of 3 models: K1, S1, and D1, each with a height of 6 ft (2 m) and weighing 187 lb. (85 kg).

Kepler Exploration Robot Co., Ltd.

More online: newequipment.com/21281364



Long-Range Wi-Fi Solution

Wi-Fi CERTIFIED HaLow technology extends the range of Wi-Fi to nearly 2 mi (3 km) by using sub-GHz Wi-Fi HaLow signals to reach long distances in challenging real-world conditions. A low-power, long-reach version of Wi-Fi based on the IEEE 802.11ah standard, Wi-Fi HaLow offers more than 10x the range, 100x the coverage area, and 1,000x the volume of traditional Wi-Fi technologies.

The 2-mi (3-km) range is enabled by Morse Micro's Wi-Fi CERTIFIED HaLow system-on-chip (SoC) solution, which offers unparalleled wireless capabilities for IoT applications. Wi-Fi HaLow overcomes the limitations of traditional Wi-Fi by operating in the sub-GHz spectrum on narrow frequency bands, enabling the penetration obstacles and providing great performance, even in noisy environments crowded with other connected devices. It also extends battery life with its power-saving features.

Morse Micro

More online: newequipment.com/21281355

Innovative MEMS Sensor IMUs for Consumer, Industrial Applications

Two high-performance motion sensors, an advanced machine learning module, and an evaluation kit for machine learning, were launched at CES 2024. **SmartMotion ICM-42370-P** is a 3-axis accelerometer for applications that require low noise and high sensitivity for IoT applications with 16-bit ADC for high sensitivity. **SmartIndustrial IIM-42653** is a high-FSR 6-axis IMU for AGVs, AMRs, and drones that achieves a digital output of ±4,000 dps and ±32 g while achieving a low gyro noise. **SmartEdgeML** is the first solution to generate and run machine learning models on a 6-axis motion sensor IMU at <30 µA, enabling new possibilities for wearables, hearables, AR glasses, and IoT. **SmartBug 2.0**, a multi-sensor wireless module, works as an evaluation system for users to get started with machine learning.

InvenSense | TDK Corp.

More online: newequipment.com/21280924

Specialized Commercial Vehicle ETA Planner

Helping improve the planning, routing, and delivery of all types of goods and packages, **HERE Advanced Traffic Patterns** leverages trillions of data points from onboard sensors, telematics systems, and mobile devices to calculate more accurate traffic speed information customized for commercial vehicles, incorporating variables such as time, day, and vehicle type. It estimates the minimum and maximum speed of each road segment, incorporating only truck movements to create better baselines for ETA windows, including the planning of future routes.

HERE Technologies

More online: newequipment.com/21280957

Intrinsically Safe Smart Glasses

The next generation of its Intrinsically Safe (IS) headset, the **RealWear Navigator Z1** is certified for ATEX Zone 1, CSA C1/D1, and IECEx where electronics are prohibited due to the risk of explosion or combustion. The hands-free wearable has an integrated battery, AI Core, and 5G IS connectivity for equipment troubleshooting via remote expert guidance and virtual training. It features an HD 720p display, a high-resolution front-facing camera (48 mp), a thermal camera, and noise cancellation for voice operation in high ambient noise areas up to 100 dBA.

Realwear, Inc.

More online: newequipment.com/21280883

Night-Time Driving Safety Detection

ADAS Safety Technology for Night-Time Pedestrian Automatic Emergency Braking (PAEB) will soon become mandated by the NHTSA. A new solution currently being tested by leading car markers uses immersive **HD LWIR thermal imaging combined with AI** to enable cars to see and identify warm creatures ahead on the road and direct the driver to slow down or stop. This system can see and identify warm objects in total darkness up to 600 ft (183 m) ahead.

Owl Autonomous Imaging

More online: newequipment.com/21280958

AMR Development Platform

Nova Carter, powered by Nova Orin reference architecture, is a complete robotics development platform that accelerates the development and deployment of next-generation AMRs. It integrates the Segway RMP Lite 220 differential drive system, the NVIDIA Jetson AGX Orin, and a comprehensive sensor suite into a fully functional robot, ready to use out of the box.

Nova Carter is packed with design features that are ideal for prototyping and also ensure reliable, large-scale deployment. Able to integrate with the NVIDIA Isaac AMR autonomy platform, it can execute surround perception, 3D mapping, and autonomous navigation. By harnessing the full range of software offerings in the NVIDIA Isaac platform, training and deploying entire fleets of AMRs becomes streamlined.

Segway Robotics

More online: newequipment.com/21281368

PRODUCT TRENDS

Multirange Wearable Scanner

Rugged, ergonomic, and lightweight, the **MARK Basic multirange** is an adaptable, wearable scanner. With configurable feedback and advanced scanning modes, this device increases productivity by up to 20%. It covers distances from 4 to 98 in. (102 mm to 2.5 m), is IP54-rated, offers 8,000 scans per battery charge, and operates in temperatures from 32 to 122°F (0 to 50°C).

With MARK Basic multirange, workers have the flexibility to scan locations up to 8 ft (2.5 m) from the vehicle while still having a fast-scanning experience for close-range items, without workers having to adjust their arm posture to un-ergonomic positions.

ProGlove Inc.

More online: newequipment.com/21281271

24/7 Remote Maintenance Service

RemoteMD 2.0 remote support service has been added to Key Technology's optical sorting systems. RemoteMD enables Key service technicians to securely connect to a customer's sorter for real-time remote monitoring as well as technical support. With 24/7 call center support and delivery of quarterly status reports, it helps optimize equipment performance to protect food safety and ensure product quality while increasing machine uptime and reducing service costs.

Establishing a secure 2-way remote connection, RemoteMD provides a service technician with detailed information about the system's health and operating condition. The technician reviews the status of hardware and software and identifies potential improvements that can help the customer improve their system performance and uptime. When needed, RemoteMD facilitates the delivery and installation of software updates and patches.

Key Technology

More online: newequipment.com/21280849

Game-Changing 3D Materials

Two high-grade engineering materials, **Somos WeatherX 100 and Loctite 3D 3955 FST** are pushing the boundaries of 3D printing.

Somos WeatherX 100 is an environmentally durable P3/DLP photopolymer designed for functional testing and end-use parts. Tailored for demanding applications, it offers lasting mechanical and functional properties, surpassing UV-stabilized thermoplastics; a balance of temperature resistance and toughness; UV, chemical, and temperature resistance; isotropic properties throughout the printed part; good print resolution, even for challenging geometries; and fast and easy post-processing.

Loctite 3D 3955 FST caters to industries with stringent safety requirements, offering flame resistance without compromising strength. It's flame-resistant, halogen-free, has superior strength, and provides precise print accuracy for defining details with high resolution.

Stratasys Ltd.

More online: newequipment.com/21281380

AI-Powered Digital Asset Management

An AI-enabled digital asset management solution, **SOPHIA** empowers organizations to manage any data type from any source, helping automate digital assets into a single place.

- Eliminate manual efforts and errors by capturing and processing data from any source, including images, videos, documents, PDFs, audio files, and more.
- Drive operational efficiencies and improve productivity with metadata to make assets easily searchable.
- Customize filter fields, upload requirements, and workflow controls to suit unique business requirements.
- Keep sensitive data secure using advanced permission controls, maintain business continuity by preserving a global repository for mission-critical data, and ensure regulatory compliance with robust data governance features.

SOPHIA's global file-sync technology makes the most vital files available no matter your location or connection and syncs all changes back to its library. It works with any native Windows or OSX application, eliminating plug-ins or 3rd-party applications, and data can be stored in the cloud, on-premise, or as a hybrid of the two.

Rimage

More online: newequipment.com/21281385

Bio-Based Materials Portfolio

Sustainability Product Portfolio offers 3 bio-based material replacements and sustainability additives as well as 2 modifiers. Each product line features unique and complementary properties, engineered to meet specific targets including waste diversion, circularity, increased post-consumer recycled content, and emissions removal and avoidance.

- **UBQ ClimaPos:** Bio-based additive that enables greenhouse gas removal and avoidance for use in planters, pet carriers, transport boxes, and window profiles.
- **UBQ Q Series:** 1-to-1 standard material replacement that blends with most polymers. It can be used across automotive, construction, and logistics & supply chain management.
- **UBQ Industrial:** Material replacement for high-value function and reliability including shipping pallets in logistics to bitumen roofing or building infrastructure.
- **UBQ Nclozur:** Sustainability modifier for odor mitigation, ideal for indoor/interior applications, including automotive interiors, consumer products, flooring, footwear, and carpet backing.
- **UBQ Impact:** Enhancer that blends with polymer matrices to meet performance requirements, including decking, office furniture, and car-door mirrors.

UBQ Materials Ltd.

More online: newequipment.com/21281248

First-of-Its-Kind Building Management Technology

Born out of the mounting pressures around safety, operational efficiency, and energy efficiency buildings face today, **Advance Control for Buildings** uses automation and machine learning to create a streamlined operating system that features built-in cybersecurity and technology to deliver faster network speeds by using existing wiring. It's designed to break down operational barriers to give building managers more control over the efficiency of their buildings, ultimately helping improve the occupant experience while advancing energy management goals.

Honeywell

More online: newequipment.com/21281251

Drive for Extreme Environments

ACS580 UL Type 4X drive is designed for the most demanding industrial environments to withstand extreme rain, heat, cold, salt spray, dust, and humidity. UL Type 4X listed and IP66 rated, the drive provides exceptional corrosion resistance and comes with an optional integrated lockable UL98 line disconnect and fuses that allow it to maintain 100 kA SCCR and meet NEC disconnect requirements.

With a Bluetooth control panel for seamless and secure connectivity, commissioning, and monitoring through ABB apps like Drivetune and Drive Composer, it improves convenience and enhances safety by keeping staff out of the arc flash boundary. The drive also features a DC choke to mitigate harmonics, 2 slots for expanding connectivity through Fieldbus, and additional I/O.

Available in multiple power ratings from 1 to 30 hp in 1-phase 240V, 3-phase 208 to 240V, 3-phase 380 to 480V, and 3-phase 500 to 600V.

ABB

More online: newequipment.com/2128127

Sound Solutions Since the 1970s

Since 1972, Floyd Bell Inc has been providing solutions for audible alarms. We're now the industry leader in alarm technology, expanding into LED alerts, voice-capable products, combination components and CAN technology.

M-80

CAN-96-930-H
J1939 CAN-Ready
Piezo Alarm

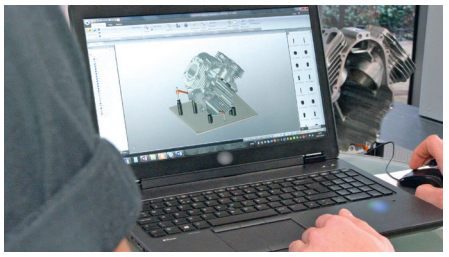
- Durable Piezoelectric Alarms
- Bright LED Panel Indicators
- Combination Light/Alarm Components
- Programmable Speaker Products

Made in the USA

View our complete line of products at FloydBell.com or call 888-Floyd-Bell

Floyd Bell Inc
SOUND SOLUTIONS

3D Fixture Modeling Software Subscription



FixtureBuilder 3D fixture-modeling software is now available as a subscription service. Customers can take advantage of a complimentary 12-month subscription to this accessible fixture-planning software when they purchase qualifying metrology fixturing products or bundles.

The user-friendly software allows quick creation and documentation of advanced CAD-based metrology fixturing set-ups for repeatable and productive part inspection. Users have access to the full catalog of Renishaw metrology fixturing components when designing and documenting their modular fixturing set-ups.

The software has an intuitive interface, complete with clear and well-organized component libraries, intelligent drag-and-drop functionality, and an easy-to-use constraint mechanism. It also offers full CAD compatibility and custom libraries, along with the software's standout feature "Build It" function which automates the generation of work instructions and bill of materials for each fixture set-up.

Renishaw Inc.

More online: newequipment.com/21280848

Program Secures AI and MLOps Lifecycle

The Channel Partner Program gives enterprises complete AI protection including rapid threat detection and security across the entire MLOps lifecycle while allowing partners to introduce security for AI to their customers. It allows partners to onboard while providing predictable, transparent pricing and flexible licensing models, and a first-of-its-kind unobtrusive, automated, scalable Artificial Intelligence Security (AISec) Platform.

There are 3 tiers for the program: Covert, Concealed, and Clandestine. Each tier includes pricing discounts, free online training for sales, and technical enablement and security for AI marketing partnerships.

Customers can safeguard against constantly evolving cybersecurity risks, helping businesses foster the acceleration of safer AI adoption.

HiddenLayer

More online: newequipment.com/21281233

IS Safety Wearable for Harsh Environments

The ATEX and IECEx-certified wearable **Bodytrak 1 IS** provides real-time data by monitoring employees' physiological responses and alerting them when risks are detected.

Through in-ear sensors—which can easily detect body temperature—data is measured and automatically analyzed by algorithms, comparing against a user's baseline to provide individualized insights and alerts. These are sent to both the user and supervisor so that intervention can be enabled.

The platform integrates with HERE Maps geo solutions to provide precise location upon alert detection, a map view of all workers with health status indicators, and geofencing to control access to hazardous areas and identify when a team member roams outside a zoned area. Bodytrak also provides vertical positioning to identify the story where the worker is located.

Bodytrak

More online: newequipment.com/21281265

Wi-Fi 6/6E Modules Easily Update Networks

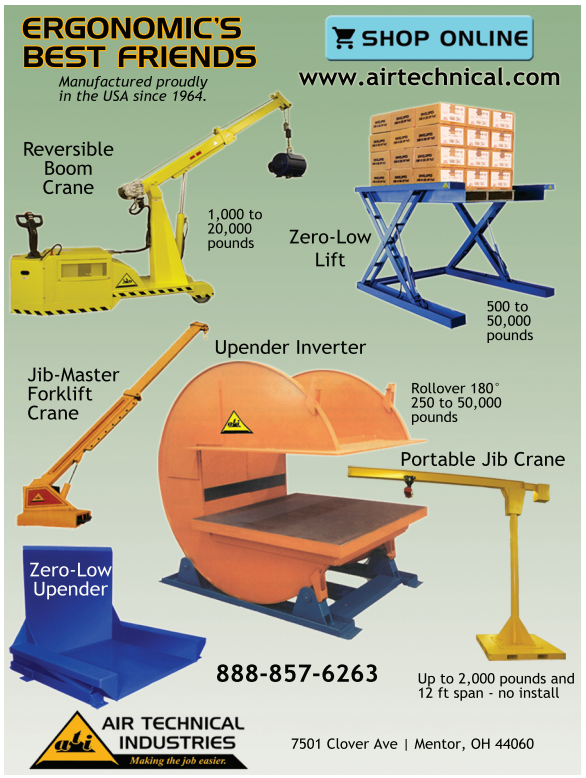
Wi-Fi 6/6E modules targeted towards Access Points/infrastructure devices, the **SX-PCEAX-AP Series modules** are embedded wireless LAN modules using Qualcomm's QCN9072 chipset, ideal for access points, gateways, and routers in industrial applications.

Designed for data-intensive applications, the modules are ideal for any OEM customer who is looking to upgrade their existing access points or network infrastructure to the latest Wi-Fi standard. Combining both the Wi-Fi 6 and 6E modules can seamlessly provide a Wi-Fi access point compatible with 2.4GHz, 5GHz, and 6GHz bandwidths.

They feature lightning-fast speeds, a 6GHz band to alleviate network congestion, a PCIe form factor, robust security protocols, and easy integration.

Silex Technology

More online: newequipment.com/21281387



MH&L Material Handling & Logistics®

How to Boost Operational Efficiency for Warehouse Automation

Learn how edge-based machine learning can improve sortation precision.
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Build a More Resilient Supply Chain
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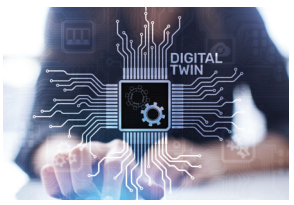

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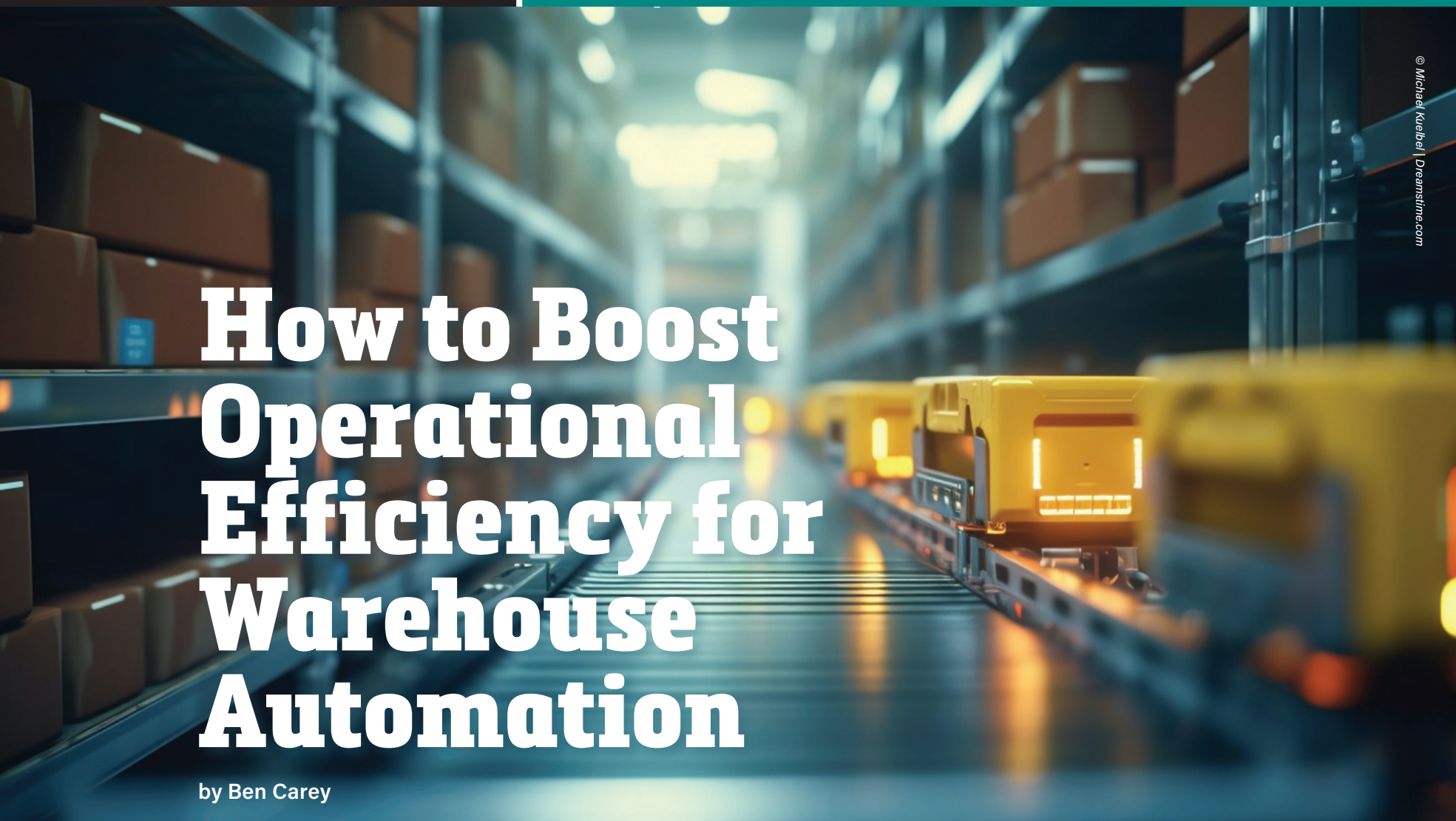


How to Boost Operational Efficiency for Warehouse Automation

by Ben Carey

Machine vision and barcode reading technology have helped logistics professionals keep pace with increasing demand and customer expectations. For years, warehouse automation has relied on machine vision for barcode reading from inbound to outbound applications that sort packages based on shipping label or destination. But now, supplier demand is driving the need for new levels of automation that require further inspection of item attributes, which has been difficult to address with rule-based machine vision due to the high variation and frequency of changes in package designs. New machine vision technologies, such as deep learning and edge learning, are being developed that are more flexible and can better handle the challenges of sorting items based on attributes.

Machine vision systems are hard to program for item detection and classification applications. Traditional rule-based tools struggle to handle unpredictable variations in size or shape, and it is time-consuming to optimize a vision system for each line. Furthermore, changes in package design can make machine vision systems difficult to maintain because of the large number of thresholds required.

Artificial intelligence (AI) presents a promising solution. AI, or more precisely machine learning and deep learning, can detect, classify and inspect objects, even those that are difficult to define using predetermined rules based on fixed thresholds and logic to determine the resultant criteria. However, the process of gathering and labeling the large datasets necessary to train deep learning AI models can be a hindrance to widespread implementation. The investment is often not transferable within the same applications, and even experienced vision professionals find that deploying deep learning solutions is time-consuming, and not every application justifies the investment required.

This is where edge learning, a specialized form of deep learning that is designed for industrial automation, can make a huge difference. Edge learning improves the accuracy and efficiency of inspections while enabling logistics professionals to scale, optimize operations and minimize manual work and equipment downtime, with zero experience and minimal skillset. Furthermore, edge learning's ease of use and quick implementation makes it practical for both low-tech facilities and fully automated warehouses.

Edge learning is already being used to execute tasks such as presence-absence detection on cluttered backgrounds, sortation of different items and packaging types, and process issue detection of stuck items that could cause equipment damage, conveyor jams and other shipment delays.

Package Variations Stymy Traditional Machine Vision

Traditional machine vision systems require skilled engineers to evaluate each vision task and create a specific rule to solve the problem. However, rule-based solutions are effective only when items of interest have consistent edges, intensities, or patterns. Conventional rule-based solutions fail to accurately identify features that are difficult to quantify or exhibit unpredictable variations from one item to another, as is the case with logistics packaging that includes boxes, poly bags, jiffy bags, flat packs and totes.

For example, some operations sort packages based on size, routing larger objects to specific conveyors to avoid tight bends while diverting smaller polybags away from roller conveyors, which tend to jam. However, determining whether a small item is a polybag or padded envelope still requires manual intervention, because size alone is generally not sufficient for differentiating between the two.

The maintenance and development of rule-based machine vision algorithms present ongoing challenges, often driven by variation and frequency of changing packaging designs, such as: changes in the appearance of apparel in polybags such as a shirt that gets crumpled and changes shape, or holiday packaging for Halloween, where the same item is wrapped in black and orange promotional packaging designs. Maintaining such machine vision systems necessitates highly skilled and expensive engineers with specialized knowledge, who are in high demand as automation becomes more prevalent across all industries.

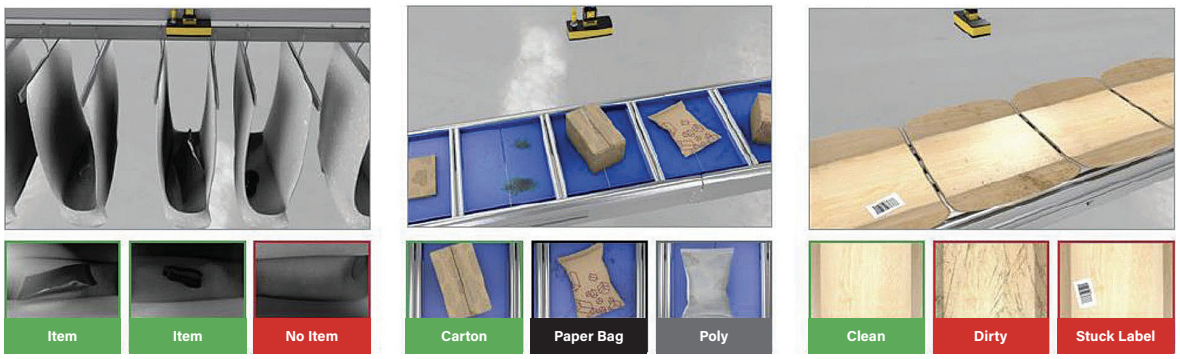
Deep Learning Evolution

A decade ago, deep learning was only accessible to data scientists with big budgets. However, recent advancements

Item detection
Detect presence/absence of any object on any background

Item sortation
Sort images into classes by characteristics

Process issue detection
Detect handling issues like dirty trays, conveyance jams, and stuck labels



Cognex

Edge learning is more accessible and cost-effective than conventional deep learning solutions, making it a viable option for numerous logistics applications that include identifying the presence or absence of objects on cluttered backgrounds, sorting different items and packaging types, and detecting process issues such as stuck items that could lead to equipment damage, conveyor blockages, and shipment delays.

in theory, computer hardware like GPUs, and the availability of data made it viable to apply deep learning in logistics and warehousing for machine vision applications and other operations. Deep learning has proven effective in scenarios that require subjective judgments, traditionally performed by human inspectors, and complex scenes with challenging image features that involve high complexity or extreme variability.

In contrast to rule-based machine vision, which relies on experts to develop new algorithms, deep learning relies on operators, line managers and other subject matter experts to label images as good or bad and classify the types of defects present. This data-centric, learning-based approach reduces the dependence on experienced machine vision specialists and minimizes the engineering resources needed for deploying and maintaining machine vision solutions. If any changes occur, individuals familiar with the application can potentially retrain the model by capturing and labeling new images.

Deep Learning Toolkit Challenges

While deep learning tools have simplified the implementation of learning-based machine vision systems, there are still challenges that need to be addressed. Successful deep learning projects often require significant financial and time resources, as well as expertise from vision engineers and data scientists to establish the initial system.

Some projects, despite offering improvements, may not provide enough savings to justify the costs. Development of models can be time-consuming, requiring the tagging of hundreds or even thousands of images. Additionally, it may not be practical to gather and label images for every possible variation.

Another challenge involves lighting and image formation. Just like in any machine vision application, the quality of image acquisition hardware is crucial for the success of a deep learning solution. A well-designed imaging system is essential, ensuring reliable and repeatable imaging techniques that can effectively distinguish features or objects of interest.

Edge Learning Bridges Logistics Gaps

For many logistics applications, rule-based machine vision solutions are inadequate, but the return on investment (ROI) may not justify the development and upkeep of a complete deep learning solution. To tackle this issue, machine vision companies have introduced edge learning, an AI-based approach that bridges the gap between deep learning and traditional rule-based vision.

Edge learning is a specialized form of deep learning designed for industrial automation. It comprises two stages: pretraining and specific use-case training. This process requires one to two orders of magnitude fewer images compared to deep learning. For example, showing an edge learning-based system pictures of a small white box and a medium-sized brown box can help it learn to recognize and classify all types of boxes based on their characteristics.

Edge learning also places fewer demands on the hardware, often eliminating the need for a GPU. Embedded smart camera solutions, which combine sensors, optics, processors and illumination, offer quicker and simpler setup and acquisition. As a result, they reduce the complexity of the system and minimize hardware integration issues.

Importantly, edge learning reduces costs and increases flexibility. High-end GPUs can significantly increase hardware expenses and may be challenging to retrofit into existing logistics processes that already have vision PCs without GPUs. In contrast, a smart camera equipped with an embedded NPU or even just a CPU may be capable of training and running edge learning tools.

Edge learning offers major benefits compared to conventional rule-based and deep learning solutions:

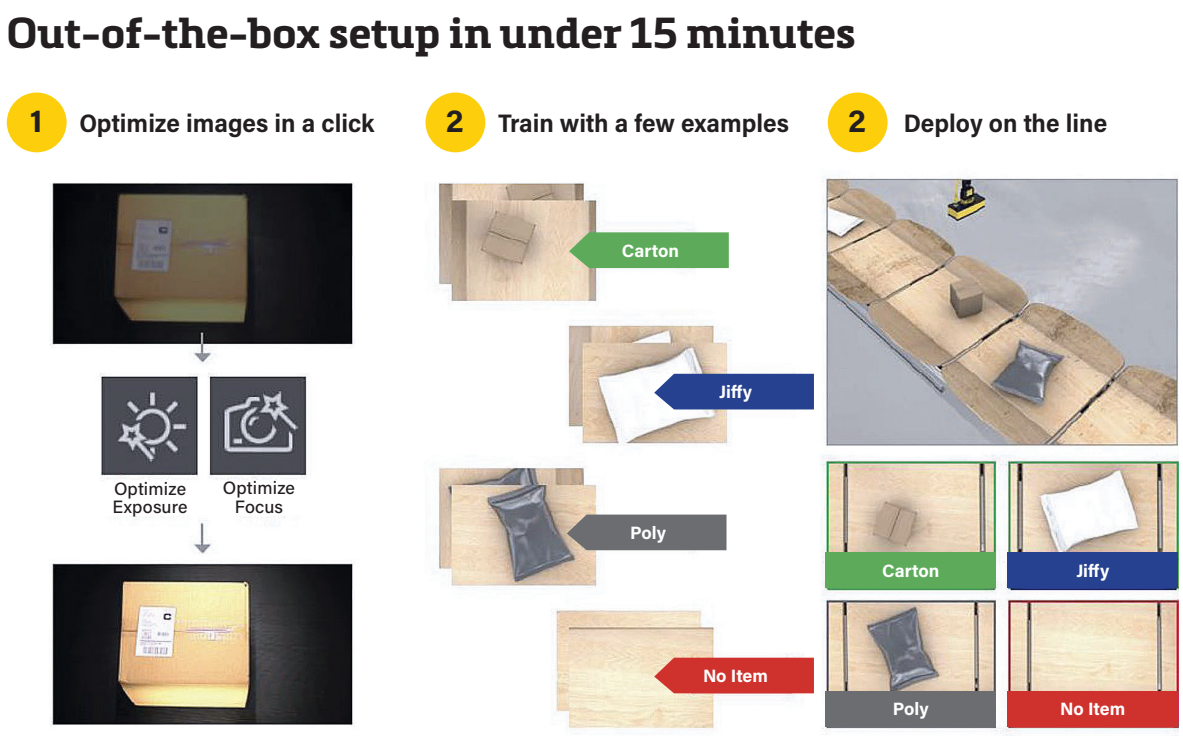
- By requiring fewer images, these systems enable users to assess the feasibility of a project with just a few example packages.
- Once a project is approved, the development cycle becomes significantly faster.
- The process becomes much simpler, eliminating the need for data science experts.
- This flexibility is advantageous since adjustments can be made directly on the warehouse floor using embedded smart camera hardware, to quickly adapt to changes in illumination or package type.
- Furthermore, it is very easy to modify; if a new scenario or unexpected result arises, simply add it to the existing model.

Edge Learning: User-Friendly and Scalable

Logistics professionals must increasingly rely on technology to ensure accurate sortation, quick processing, order accuracy and customer satisfaction. As companies strive for faster delivery options to stay competitive, embedded smart camera platforms with user-friendly edge learning capabilities offer a solution for warehouse applications that are too challenging for conventional rule-based machine vision, but do not warrant the investment of a complete deep learning solution.

Compared to traditional machine vision tools, edge learning can quickly and effectively perform accurate inspections using only a few examples. This can significantly reduce the time and investment required compared to traditional deep learning approaches. Anyone who knows what a defect looks like can now set up a model for the majority of sensing applications in as little as 15 minutes. Edge learning technology is effective for inbound sortation because it can classify objects based on their type without needing a large database of images. As a result, edge learning simplifies swift adaptation to high variation and frequency of changes in package designs, allowing for system adjustments with minimal images required for on-the-go model updates.

Edge learning technology can also be used to classify other types of objects, such as polybags, jiffy bags, totes, and even specific item classes with various permutations.



Training edge learning tools requires only a few images per class and a few minutes, while traditional deep learning solutions may demand hours to days of training and hundreds to thousands of images.

The system can be taught to handle these objects differently based on their unique characteristics. Additional edge learning applications include detecting the quality of seals on packaging, checking if totes are empty before they are stacked, and detecting small items in totes, all of which are difficult to accomplish with traditional sensing methods.

The ease of training and setup that comes with edge learning can help logistics professionals understand and implement the technology to achieve fast results.

Edge learning enhances inspections, facilitating the expansion of logistics enterprises, streamlining operations, and reducing the need for manual labor and equipment downtime.

Additionally, the user-friendly nature of edge learning allows for its practical implementation in both low-tech facilities and fully automated warehouses. It enables the execution of various tasks, including detecting the presence or absence of objects against complex backgrounds, sorting diverse items and packaging types, and identifying process issues such as stuck items that could lead to equipment damage, conveyor obstructions, and delays in shipments. ■

Ben Carey is director, logistics product management, with Cognex Corp., a provider of vision systems, software, sensors and industrial barcode readers.

	1D SENSOR	2D RULE-BASED	IN-SIGHT 2800 DETECTOR WITH EDGE LEARNING
Setup and deployment	Requires engineering integration	Requires expert programming	Anyone can setup in <15 minutes
Object variation	Complicated logic required to cope with any variation	Unpredictable variation requires continuous expert modification	Handles a wide range of variation without skilled intervention
Background and hygiene variation	Requires clean backgrounds	Requires clean, consistent backgrounds	Any background
System intelligence	Binary	Limited	Rich, customizable output data
Flexibility	One process at a time	Requires new setup for each process	Easily adjusts to any process type

Cognex

Edge learning fills the application gap between traditional rule-based machine vision and full deep learning solutions delivering fast, accurate results by harnessing the potential of AI-based technology to analyze images directly on the device.

The X Factors in Building a More Resilient, Responsive Supply Chain

by Georg Kube

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If nothing else, these past several years have taught the industrial manufacturing sector plenty of hard-earned lessons about why supply chains were so prone to disruption, and how important collaboration beyond company walls is to minimizing disruptions going forward.

From equipment manufacturers to chip manufacturers, companies across the manufacturing value chain are realizing that to create a more resilient and efficient supply chain, they'll need to willingly share certain information in real time. That could include information from multiple tiers of suppliers about inventory, production capacity (current and planned), forecasted sales and demand, quality, deliveries, and potential bottlenecks across multiple tiers of suppliers. The goal: give all members of the value chain visibility into the availability and whereabouts of equipment and components so potential disruptions can be anticipated sooner, and so companies can quickly and collaboratively mobilize to address any disruptions that do arise.

This level of visibility is also critical to ensuring that companies (and entire supply chains) can fulfill their mounting carbon-reduction and ESG (environment/social/governance)-related responsibilities. To do so, they need track-and-trace capabilities to more closely monitor and manage carbon emissions, resource consumption and other sustainability-related information, giving them a clear line of sight into carbon footprint and other metrics, not only from their own operations but beyond company walls. That means they'll need to rely on their supply chain partners to provide trusted, auditable data on emissions, resource consumption, material origin and the like.

And let's not overlook another area where collaboration can bolster resilience, and that's among factory equipment manufacturers themselves. Because manufacturers often rely on factory equipment from multiple suppliers, data-sharing and cooperation among those suppliers can help optimize the entire manufacturing process, avoid disruptions and boost shop floor production efficiency by minimizing unplanned downtime.

Bringing Value to the Supply Chain

Business networks and industry ecosystems are providing the framework for this level of collaboration. Not long ago, for example, Vestas Wind Systems, a Danish wind turbine manufacturer, moved to a single, unified business network platform in order to gain full data visibility and transparency across its supply chain, which includes thousands of suppliers worldwide to support manufacturing operations around the globe.

Daniel García López, IT director for Vestas, said the end game is "full traceability of our components and complete stock visibility for suppliers so that we can improve planning, optimize spend, and ensure we have the materials we need right when we need them—all in the same platform where we manage our supplier contracts. Ultimately, it's about supply chain collaboration."

Vestas expects to capture at least €20 million (in excess of $21 million) in savings over the next five years as a result of supply chain collaboration and end-to-end transparency.

In another recent example of supply chain collaboration enabled by joining a business network, a global manufacturer of earth-moving equipment connected to a business network platform that enables it to share forecast and planning information with strategic trading partners, and incorporate supplier forecast commitments as part of monthly and longer-term planning cycles.

To make all this work, members of the business network must feel confident that sharing data with other entities provides them value and that their data will not be misused. The more members of the value chain that endorse, trust and engage in specific scenarios and use cases via a network, the likelier the network is to deliver value. The more value that stakeholders realize by participating in a network, the likelier they are to engage further in it as they seek to realize more value. To reinforce that confidence, they need the ability to scale the level of transparency and access to information according to the urgency of the issue, the competitive sensitivity of the data, and other factors.

In both the aforementioned examples, a single business network, operated by a trusted party, provides the framework for collaboration. This has become a successful model for many companies across industries.

The Manufacturing-X Factor

At the same time, data ecosystems based on open standards are emerging across the industrial manufacturing landscape to serve as catalysts for building supply chain collaboration. Initiatives like Manufacturing-X are establishing a framework to preserve data sovereignty within a more decentralized data ecosystem that multiple parties can connect to, and that have clearly stated and enforceable standards and rules. Existing business networks can connect to these ecosystems just like individual companies can, as long as their data standards and tech capabilities meet the ecosystem's requirements.

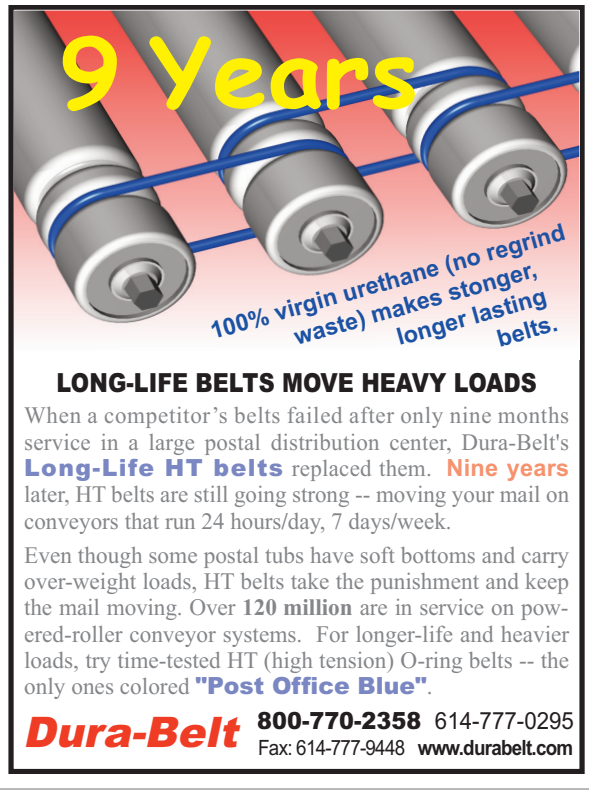
Members of Manufacturing-X are working to establish "an international, interoperable data ecosystem," within which "companies will…autonomously and jointly use data across the entire production and supply chain" to build resiliency, sustainability and competitiveness.

The 'X' in Manufacturing-X stands for "exchange," whereby "companies can share…data while still maintaining control over [it]. Companies can individually determine who has access to their data, when and how they may be used. This concept of data sovereignty enables cooperation between all constituents in value creation networks and promotes the willingness to share data."

Under the umbrella of Manufacturing-X, multiple interoperable data ecosystems, focused on different value chains, are emerging. Catena-X for the automotive industry is expected to go live this fall, while Factory-X, focusing on the industrial manufacturing industry, is still in the early stages of establishing a framework to enable manufacturers that share a factory floor to also share information. Data ecosystems for the chemical industry, high-tech and other verticals also are on the horizon.

Ultimately, collaboration through business networks and ensuring these networks are interoperable with industry data ecosystems through standards are essential steps to making industrial manufacturing supply chains more resilient and sustainable. ■

Georg Kube is the global head of industry data ecosystems at SAP SE, a provider of enterprise resource planning software.



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Digital Twins Are the New Cutting Edge in Supply Chain Visibility

by Inna Kuznetsova

Most of the news coverage surrounding recent supply chain crises has focused on retailers failing to keep their shelves stocked. The consumer's pain felt at the shelf was so visceral and so thoroughly covered by the media that it often overshadowed the very real supply chain challenges faced by manufacturers as they struggled to meet demand.

In May 2021, the manufacturing sector reached a record high on its Backlog of Orders Index, at 70.6%, while Backlog of Services peaked at 65.8% in June that same year. The Covid-19 pandemic created a vicious cycle—labor shortages, raw material shortages, production delays, increased costs, and shifts in demand, all of which culminated in many manufacturers folding, being absorbed by competitors, or simply unable to fulfill orders.

There's still volatility today, and macroeconomic conditions have further underscored the need for innovations that increase supply chain visibility. A global pandemic, instability in Eastern Europe, climate crises, forest fires, hurricanes, even the recent threat of a UPS strike add to fluctuations in supply and demand and the ability to deliver, increasing risk of bottlenecks in global supply chains.

Supply chain visibility is needed at every point in the value chain, whether raw materials, goods being shipped, inventory at hand or elsewhere. Advances in AI and Machine Learning are starting to enable a more flexible and transparent supply chain, which can help manufacturers weather volatility in a way that forward-thinking retailers are beginning to use.

How Digital Twins Can Provide Value

At the cutting edge of these advances are Digital Twins, virtual representations of the supply chain that leverage real-time data to accurately know the position of goods on a real time basis, and predictive analytics to optimize operations. With a digital twin, organizations no longer have to wait multiple days to update their inventory status; instead, there's instant visibility into the entire cache of products and where they are located.

For manufacturers, digital twins increase efficiency by seeing inventory in real time, creating visibility into decision postponements, updating possible alternative transportation models, and updating or rethinking the possibility of shipping not only from warehouse to stores but directly to the consumer. A digital twin creates the ability to analyze scenarios and sense not only external changes but any internal changes in the system, enabling it to suggest alternatives. This technology is still in its nascency but will be gaining in importance as its benefits are better understood.

The ideal digital twin not only communicates frequently but comes out of the box ready to make an immediate impact. In a global supply chain that has seen exponential growth in ecommerce, digital twins will soon become a necessity.

Changes in Purchasing

What has precipitated the need for this higher level of visibility? Organizations must increasingly be able to adjust to today's complex, interconnected retail market. Previously, items were both sold and fulfilled to a customer through one channel. Now the customer can choose to purchase an item through multiple channels—the web, social, mobile, wholesale, in-store, or marketplace.

These purchasing methods, multiplied with the many new fulfillment channels—local delivery service, ship to store, ship from store, warehouse, BOPIS, and dropship—have created a modern supply chain that is too multifaceted to comprehend manually. Additionally, product development, manufacturing, transportation, and ultimately consumption now span many international borders. These more interwoven and complex supply chains create greater ramifications if any link in the chain is broken. Automation is needed to account for more variables than the human mind has the capacity for.

Manufacturers might see this as a problem on the retailer's end—supply chain on the manufacturer's end has usually been more traditional, based on a combination of previous orders and a supply chain manager's instincts and experience. In short, it has been less tech driven. However, in today's complex demand environment, and as manufacturers move toward the Direct-to-Consumer (D2C) business model, this approach is increasingly outdated.

According to Diffusion's 2020 Direct-to-Consumer Purchase Intent index, 25% of American consumers were making nearly one-fifth of their purchases from D2C brands. If manufacturers want to meet the needs of today's brisk and complex marketplace, they need to take the data-driven, AI and machine learning approach to supply chain that some retailers have started to champion.

Modern, successful manufacturers looking to break into the Manufacturer-to-Consumer (M2C) model are investing in data unification to deal with this interwoven market, on the premise that piecing together many dissimilar systems

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can cripple an organization's potential. As retailers know all too well, a disjointed supply chain indeed often results in a negative customer experience: inventory unavailable to purchase, inconsistency across channels, and canceled orders. A piecemeal approach to modernization often results in additional operation complexity, which means higher costs, low fulfillment rates and a dependency on manual processes—all of which can lead, unsustainably, to waste.

Real-time Data

Digital twins can help. Both supply chain managers and customers benefit from the incorporation of real-time data. Real-time data empowers companies to provide better customer service and meet customer expectations. With real-time visibility into inventory levels, manufacturers and retailers can ensure product availability and reduce delivery lead times. In addition, by analyzing demand data in the moment, retailers use the resultant insights to personalize their offerings, anticipate customer needs, and provide a more seamless and tailored experience. This translates directly upstream to manufacturing, wherein if demand can be anticipated, sourcing of materials and components can be that much more accurate and waste-free.

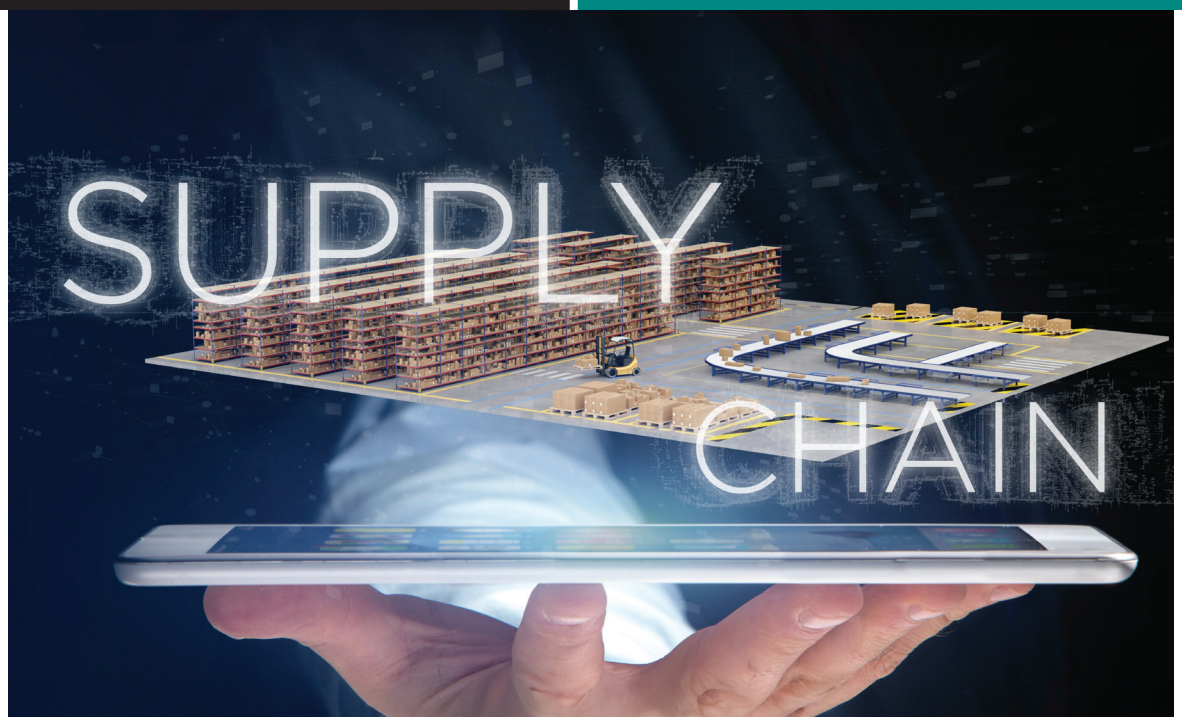
Therefore, even if a manufacturer has no desire to pivot to M2C, technology that increases supply chain visibility can still greatly benefit the organization. In choosing a supplier, advanced analytics can factor in cost, lead time, and transportation options to land on the optimal supply partner. Increased transparency means manufacturers and suppliers no longer have to play the blame game when dealing with logistical challenges.

The dashboard will pinpoint the inefficiency and who is responsible for remedying it. Counterintuitive though it may seem, taking out the human touch in this case can improve collaboration between supplier and manufacturer. Another value in real-time, advanced analytics is in the identification of alternative transportation routes and methods. The pandemic, the war in Ukraine, and extreme weather patterns and climate crises have brought this to the fore, as these systems have been able to create in-depth models for geopolitical, environmental, or global health challenges. When the next global supply chain crisis occurs, a data-driven approach stands to provide something of a safety net.

While increased supply chain visibility boosts profitability, it also creates sustainable business practices. AI-powered demand forecasting lessens a manufacturer's carbon footprint by decreasing waste. Enhanced supply chain visibility also allows manufacturers to trace the origins of raw materials. By having a clear view of the entire supply chain network, manufacturers can ensure compliance with sustainability regulations. In 2023, profitability is increasingly entwined with ethics—improved supply chain visibility allows manufacturers to accurately convey their sustainability initiatives and achievements to both retailers and consumers.

Next-generation supply chains will leverage machine learning and technologies such as digital twins to boost visibility. Increased transparency will foster improvements in forecasting, inventory management, sourcing raw materials, and sustainability. Manufacturers should embrace these changes—it's a fact that every instance of global volatility has led us, of necessity, to more resilient, efficient, and future-proof supply chains. ■

Inna Kuznetsova is CEO of ToolsGroup, a supply chain planning and optimization firm.



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Supply Chain Digitalization Trends for 2024 and Beyond

by Omer Rashid

The last several years have seen a massive influx of emerging digital technologies in the supply chain. Driven by dramatic changes in consumer needs and persistent labor shortages, these technologies have enabled increased productivity, resiliency and visibility.

Yet, the supply chain digitalization journey is far from complete. As we look ahead to 2024 and beyond, continuing technological advances have the potential to drive further improvements in all aspects of supply chain management. Here are five developments to keep an eye on in the coming years.

1. Analytics Take Center Stage

Advanced data analytics have already established a foothold in supply chain management thanks largely to third-party logistics providers (3PLs) who have integrated systems across the supply chain while also employing business intelligence and visualization tools in their solutions.

DHL Supply Chain, for example, is improving peak demand management by using machine learning to analyze historical order patterns, which includes the flagging of external factors that influence customer behaviors, such as weather and economics. The result is more accurate forecasts by workstream that enable the company to better prepare for demand fluctuation and efficiently manage extreme peaks without compromising service levels.

This is, however, still something of an isolated example as data remains siloed in many supply chains, and even where it is being aggregated and analyzed there are opportunities to expand the scope of these programs. Capitalizing on those opportunities will enable the transformation from reactive to proactive and predictive supply chain management.

2. The Cloud Creates Opportunity

Warehouse management system (WMS) providers have already introduced, or announced their plans to introduce, cloud-based software-as-a-service (SaaS) models for their systems.

This shift to the cloud has the potential to remove barriers to technology modernization for organizations operating with outdated legacy systems that can't deliver the visibility or productivity required today. Instead of making large capital investments to upgrade their management platforms, these organizations will now have the opportunity to convert system costs from capital to operating expenses while ensuring they are always operating on the latest generation of their chosen systems.

Equally important, the SaaS model will enable easier integration of data- and processing-intensive applications into supply chain systems, such as generative AI.

3. AI Expands its Role

While machine learning and predictive analytics are already delivering value in supply chain operations, other forms of AI have similar potential. According to a 2023 IBM survey, 46% of supply chain executives anticipate that AI/cognitive computing and cloud applications will be their greatest areas of investment in digital operations over the next three years.

Cognitive computing—t*he use of computerized models to simulate the human thought process in ambiguous situations* where the right answer can't be programmed into the system—has the potential to automate inherently dynamic processes, such as forecasting, inventory management and route optimization.

Generative AI, which has advanced rapidly this year and garnered massive media attention through the release of tools like ChatGPT, has similar potential. Due to data security concerns with publicly accessible tools, organizations are more likely to build their own tools to help inform planning, forecasting and risk management.

4. Robots Take Human Form

The next generation of robots to appear in the warehouse may look more like the humans they are working alongside than the systems in use today.

Most people by now have seen videos of humanoid robots dancing or demonstrating their mobility on a parkour course. These are truly impressive, but it's important to remember the robots are programmed to perform these activities and are doing so in a carefully controlled environment.

The typical warehouse presents a much more dynamic and unpredictable environment and the challenge of these robots operating in those conditions should not be underestimated. Nevertheless, as AI and robotic technologies continue to advance and converge, it is possible that the next generation of humanoid robots could have the intelligence to work within the warehouse. If so, they may prove to be the answer to some of the more difficult-to-automate processes in the warehouse, such as mobile carton picking.

5. Orchestration Is On the Horizon

Expect to hear more about orchestration in the supply chain in the coming years as it represents the final frontier in supply chain digitalization.

A fully orchestrated supply chain would rely on a range of digitalization technologies to create near-100% accurate inbound forecasts and then develop and execute a plan to ensure all supply chain resources—people, systems and automation—are balanced and used optimally to execute on that plan.

It's a daunting challenge but like digitalization in general, orchestration will advance in stages, with each stage delivering value until the ultimate goal is realized. Initial efforts are being focused on orchestrating the activities of multiple automation systems within a certain environment to ensure systems are working together to achieve their common objectives in the most efficient way. The following stages will integrate other resources into the orchestration model.

Continuing the Journey

As we move into the next phase of supply chain digitalization, continuous performance improvements will be driven by both the maturation of technologies that have already proven their value on a limited scale and the emergence of new technologies that build on the foundation that has been established.

Leveraging both of these trends will require dedicated resources that bring together supply chain and technology expertise as well-established practices for evaluating, testing and implementing emerging technologies. ■

Omer Rashid is vice president of operations development with contract logistics provider DHL Supply Chain.

FROM THE COVER

IoT Fall Protection Wearable

Wearin' is an intelligent IoT platform that generates real-time insights by capturing data from connected sensors and devices. With automatic alerts and a digital platform to visualize key data, Wearin' helps detect and prevent health and safety risks, improve live coordination, and enable remote guidance.

The connected platform digitalizes the real-time status of people in the field—their location, environment, and well-being—to detect and prevent crises. Key data is sent to both the user and the decision-makers who need it, while intelligent alerts and 2-way communication facilitate coordination and response.

AI-powered data processing allows for incident detection, such as heat stress and acute stress, man down, and helps prevent future risks.

The configurable sensor ecosystem includes a range of sensors and devices to monitor gas, proximity, falls, biometrics, high voltage, noise, temperature, etc., as well as devices such as GPS, indoor positioners, radios, and cameras.

Wearin'

More online: newequipment.com/21279129

Camera Sorts Recyclable Plastics

The **allPIXA SWIR (Short-wave Infrared) Line Scan camera** offers real-time, non-destructive inspection and sorting of mixed plastics with a fast line rate. It accurately separates different plastic types by identifying and classifying plastics based on their spectral properties. It features an InGaAs uncooled sensor that handles wavelengths from 950 to 1,700 nm, has resolutions of 512 or 1k, pixel sizes of 25 and 12.5 µm, and a line frequency of 40 kHz.

Chromasens GmbH

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Snap-on Tools

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Cleaver Flipper Knife

The **MAAR Cleaver Flipper Knife** has a folding cleaver blade for large and small tasks. At 3.5 in., this blade is made from D2 steel for long-term use and durability. Despite its size, one-handed operation is simple, safe, and quick. It's built with a ball-bearing pivot system and locked into the open position with a liner lock.

True Knives

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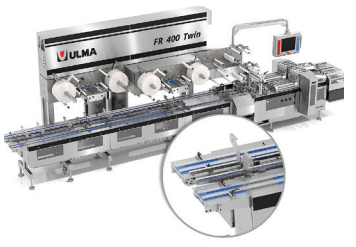

Double Flow Wrapper Doubles Output

With a space-saving design and high output, the **FR 400 TWIN Flow Wrapper** is a horizontal wrapper that's ideal for facilities with limited floor space or those wanting to expand packaging throughput. Delivering 2 machines, it doubles the throughput of a single, stand-alone flow wrapper—all in the same space. Sharing an HMI for centralized control, the machines operate independently to allow separate lines, regardless of the operational status of the other.

Harpak-ULMA Packaging, LLC

More online: newequipment.com/21278392

A2L-Compatible HVAC/R Tools

NAVAC's **A2L refrigerant-compatible series** has been extended due to new EPA requirements for greener refrigerants beginning January 1, 2025. Features include sparkless design, DC brushless motors, soft contact power switches, fans, and covered connections for all electrical terminations. Solutions include the Pro Series NP7DP2 Vacuum Pump, the NH5L Left-Handed Thread Hose, the N2A4B Manifold Gauge, the NP4DLM and NP2DLM Cordless Vacuum Pumps, and the NRDD and NRDC4M Recovery Units.

NAVAC

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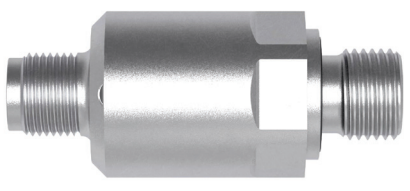

Compact Ceramic Pressure Sensor

A compact, mechanical pressure sensor ideal for continuous industrial use, the **P.Trace** is widely used to monitor and control the pressure of liquids and gases in machinery, equipment, and other processes. It has a small but dependable housing, an analog output, and a ceramic measuring cell. It can monitor pressure ranges from 0 to 8,700 psi.

MP-SENSOR GmbH

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Hydraulic Compensation Chuck

Converting standard ER holders to a repeatable, steerable hydraulic chuck for more precise machining, **Diatool ER Hydraulic Compensation Chucks** provide a <2-micron runout for ER 20, ER25, ER32, and ER40 collet chuck holders, offering the benefits of a hydraulic chuck without a high investment. It can be adjusted to compensate for any runout in the spindle, making it ideal for a wide range of uses.

Monaghan Tooling Group

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Powerful and Efficient Motor Grader

The **GD955-7 motor grader,** now availableto the North American market, offers operators control and precision to build and maintain haul roads for truck fleets of 100 tons and up.

With faster working travel speeds, it's engineered to increase grading efficiency while helping reduce maintenance requirements and TCO.

Komatsu

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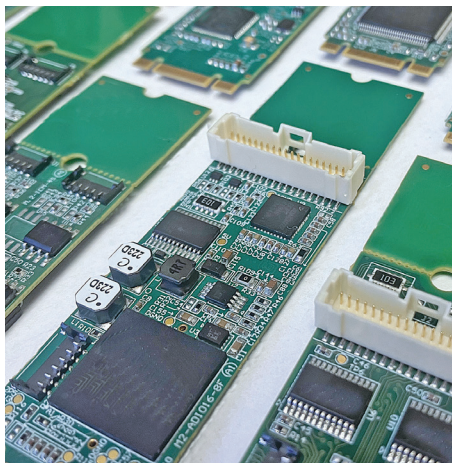
Compact Data Acquisition Cards



A more flexible alternative to PCI Express Mini Cards (mPCIe), the **series of M.2 (NVME-socket compatible) cards** offer 55 versions and are 2280 M+B keyed units with a breakaway for 2260-sized slot compatibility. With their multipurpose and small form factor, these cards support both smaller and larger footprints than mPCIe and consume less power, making them a great choice for a variety of embedded applications.

ACCES I/O Products, Inc.

More online: newequipment.com/21277845

Mini Handheld Videoscopes

The **TVGM Series**, a family of miniature, high-definition handheld industrial-grade videoscopes, is designed to support a variety of non-destructive testing and remote visual inspection tasks. Offered in 4 models, with a choice of either a 0.15 or 0.2-in. (4 or 6-mm) camera and either a 5 or 10-ft (1.5 or 3-m) videoscope probe length, the series features dual-key operation, a modular and ergonomic design, portability, one-handed operation, and end-user capability to easily swap out probe lengths for increased application adaptability.

Titan Tool Supply, Inc.

More online: newequipment.com/21278040

Durable 9V Forklifts

The **9V forklift series** uses Hyundai's powertrain to increase the durability of transmissions and drive axles and enhance comfort. It includes the 25/30D 35DN-9V Diesel Pneumatic Forklift Series which has a powerful, eco-friendly Hyundai diesel engine that meets all EPA/CARB Tier-4 regulations; improved capacity for heavy-duty handling; enhanced safety measures; and better ergonomics. The series is available in 5,000, 6,000, and 7,000-lb. (2,270, 2,700, and 3,175 kg) capacities.

Hyundai Material Handling

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Mitsubishi Logisnext Americas, Inc.

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The **TK-591 30-Piece Master Electrician Insulated Tool Kit** provides an array of tools designed to give any electrician all the tools they need in one convenient kit. It includes a 1,000 A digital clamp meter, a GFCI outlet tester, insulated pliers, insulated screwdrivers, wire strippers, crimpers, nut drivers, a tape measure, a voltage detector, a utility knife, and safety glasses all organized in a technician backpack.

Jonard Tools

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Hands-Free Benchtop Ionizer

The **Varistat Benchtop Ionizer** neutralizes static on charged surfaces. Using ionizing technology, it offers a hands-free solution that requires no compressed air and provides a constant stream of particulate-free and static-eliminating air. It's easily mounted on benchtops or machines, is manually adjustable, and works great for processes that need comprehensive coverage, like part assembly, web cleaning, printing, and more.

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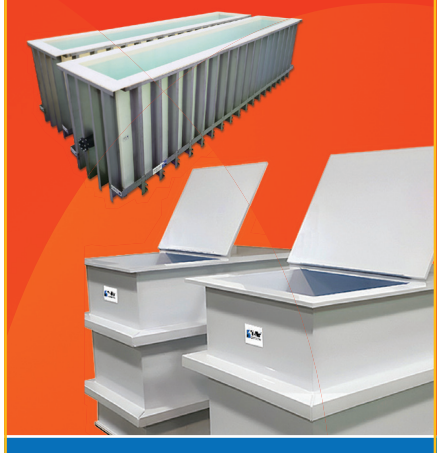

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Manufacturing in Owosso, MI USA
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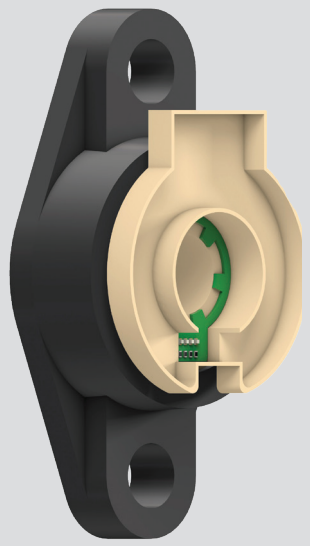
FROM THE COVER



Smart Fixed Flange Bearings

Intelligent **2 and 4-hole fixed flange bearings** with wireless sensors to detect wear enable condition monitoring and prevent machine breakdowns. Made from self-lubricating plastic, the bearings have an integrated abrasion sensor, thin circuit board, and cableless battery supply. Any wear on the bearing will interrupt the board's conductor paths, causing the electronics to lose the signal. The sensor then transmits a long-range network signal to an igus i.Cee switch cabinet module for analysis, including the percentage of abrasion.

Over time, the sensor wears away layer by layer—parallel to the bearing's running surface—and will continue to transmit signals on the bearing's condition. Users can see the remaining service life and maintenance requirements through a web-based dashboard, which they can access from a PC, tablet, or smartphone.

igus Inc.

More online: newequipment.com/21280748

Robot Picking Arm

A fully integrated robotic bin-picking solution, the **Movu eligo** robot picking arm automatically piece-picks from a single-SKU source bin and places the individual items into multiple mixed-SKU destination bins at 600 picks/h. Closing the gap between manual and fully automatic pick operations, it works through inconvenient hours at a reduced cost but with higher pick accuracy and quality.

Movu Robotics

More online: newequipment.com/21277813

Temperature-Sensitive Heated LEDs

Automatically able to monitor ambient temperature and turn heating functions on and off as weather conditions change, the **TLL75 Series LED flood beam work lights** and **STL13 Series 4-in. round LED stop, turn, tail lights** heat up quickly to melt ice and snow from their lenses and housings. They only heat up when temperatures drop below 50°F (10°C) and then stop when temperatures rise back up.

Optronics

More online: newequipment.com/21281542

Value Line of Proximity Sensors

AutomationDirect has added its value line of **AchieVe series of inductive proximity sensors**. These tubular inductive proximity sensors made from stainless steel are offered in 0.3, 0.5, and 0.7-in. (8, 12, and 18-mm) barrel sizes. Flush and non-flush mount styles offer a range of sensing distances up to 0.3 in. (8 mm).

AutomationDirect

More online: newequipment.com/21279351

Rugged USB-C Connector for Harsh Environments

USB3CFTV, based on the MIL-DTL-38999 series III standard, is a USB Type-C connector designed to withstand harsh environments and applications. The connector features a tri-start thread coupling mechanism that ensures resistance to shocks, vibration, and cable traction. It also provides a high level of sealing protection against external fluids and dust exposure—up to IP68—and provides enhanced EMI protection.

Amphenol Socapex

More online: newequipment.com/21280984

Industrial 5G Cellular Gateways

The **CCG-1500 Series of industrial gateways** feature high 5G speed, ultra-low latency, enhanced security, and dual-SIM support to ensure redundant cellular and seamless OT-IT communications over 5G. The gateways provide 3GPP 5G connectivity for both Ethernet and serial devices to simplify industrial private 5G deployments, such as AMR/AGV applications.

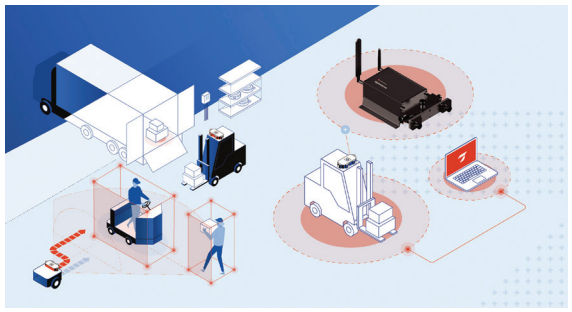
Moxa

More online: newequipment.com/21277851

Kit Lets You Test VSLAM Navigation

The **Alphasense Autonomy Evaluation Kit** lets mobile robot manufacturers test Alphasense Autonomy 3D Visual Autonomy technology quickly and easily. The VSLAM navigation technology accelerates the development and deployment of AGVs and AMRs while improving their performance and expanding their capabilities. It leverages 360-deg. views of the vehicle's surroundings and Visual SLAM technology to offer <0.3 in. (<4 mm) precise positioning in all indoor and outdoor environments, even over uneven floors and ramps.

Sevensense Robotics



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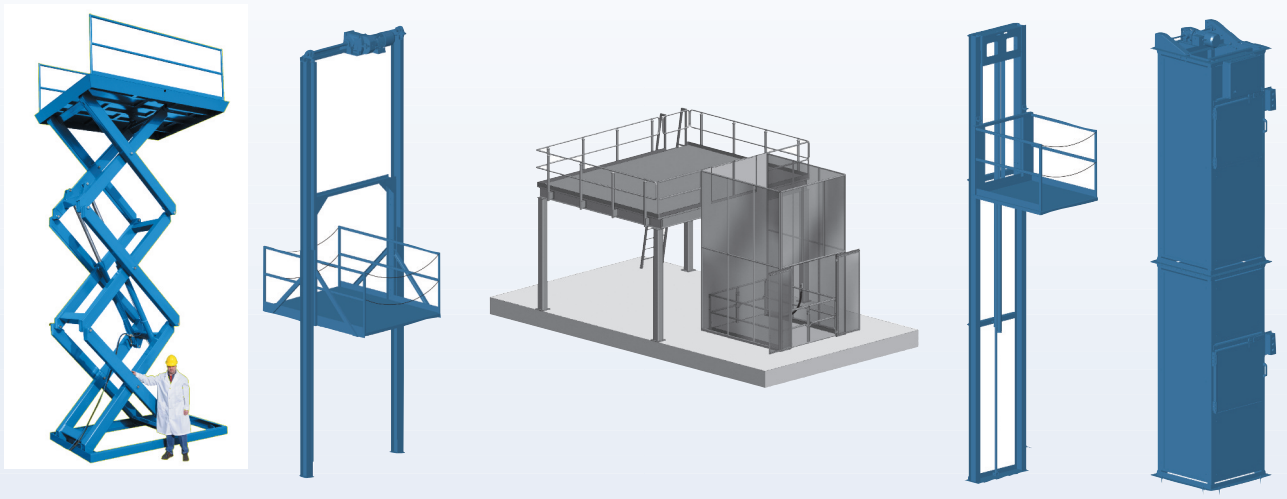

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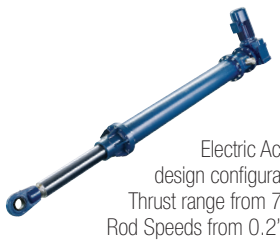

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The modular design of RACO ACME and Ballscrew Electric Actuators allow for a variety of design configurations while offering a Linear Thrust range from 70lbs to 225,000lbs, Linear Rod Speeds from 0.2"/sec to 30"/sec and Linear Travel (stroke) up to 20 ft.

RACO LM-Series

The RACO LM-Series is designed for high speeds and long travel (stroke) with capabilities that are frequently found in today's automation processes. The LM can be used as a single axis system or can be combined to form a multiple axis system.

RACO Rotary-Series
The Rotary Actuator is designed to automate the operation of valves, gates, dampers, louvers and other positioning applications requiring partial or multi-turn rotational movement.

RACO

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FROM THE COVER

Downdraft Table With Dust Collection

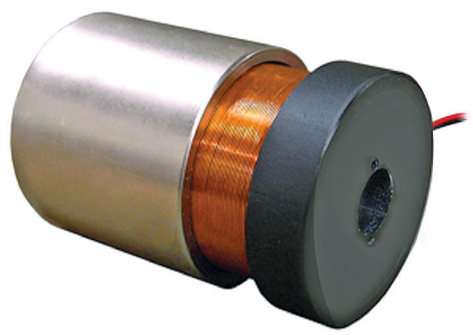
Tri-Nomic is an advanced "wet station" downdraft table with a particulate collection efficiency of 99% or higher. The ergonomic, commercial workbench for machine shops provides high productivity and a fatigue-free work environment. Its adjustable height minimizes stress and makes it comfortable for workers of all heights and sizes to use, even for a full shift.

Tri-Nomic was originally engineered for the efficient control of combustible dusts generated by sanding, deburring, grinding, and other machining operations in the aerospace industry. It's highly effective for a broad range of tasks that use power tools.

Optimal face velocity and distinctive system design remove particulates from the operator's breathing zone using quiet vacuum pressure without hindering movements or productivity. It also operates at low decibel levels, so it can be installed near other workstations without issue.

Tri-Mer Corp.

More online: newequipment.com/21280842



Mini Hollow Voice Coil Motor

The **HVCM-016-013-003-01 Hollow Core Voice Coil Motor** features an open aperture and high force-to-size ratio. It has a continuous force rating of 5.7 oz. (1.6 N) and a peak force of 17.9 oz (5.0 N) at a 10% duty cycle and features zero cogging or backlash when connected directly to a load. It offers a 0.125 in. (3.2 mm) diameter open aperture for optics, illumination, laser beams, or cable passage.

Moticont

More online: newequipment.com/21281560

Compact Valve Position Indicator

TopWorx DVR Switchbox entry-level valve position indicator uses a resin enclosure, a compact size, and a patented cam design to provide water & wastewater systems, food & beverage production lines, and industrial utilities a reliable valve position feedback tool. With a low-profile indication to provide easy-to-read local position feedback, it gives real-time data to technicians and plant operators. The cam design enables swift position configuration for faster, easier installation and maintenance. In addition, it's UV and corrosion-resistant.

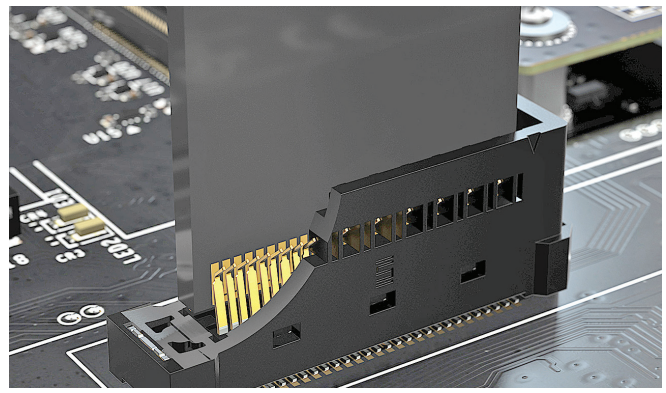
Emerson Electric Co.

More online: newequipment.com/21277848

Micro Edge Card Connectors

Generating high-speed, **HSEC6-DV** Series edge card sockets support 64 Gbps PAM4 (32 Gbps NRZ) applications and are PCIe 6.0 capable. They are used in prototypical PCIe 6.0 AI hardware designs serving as the interconnect between the motherboard and add-in cards. HSEC6-DV is compliant to SFF-TA-1002 x4 (1C), x8 (2C), x16 (4C and 4C+). The edge card socket strip is available with 28, 42, 70, and 84 positions per row and mates with 1.60 mm (.062 in.) thick cards.

Samtec, Inc.



More online: newequipment.com/21279160

Monitoring Gateways Make Predictive Maintenance Easy

Simplifying equipment monitoring and enabling predictive maintenance, the **Asset Monitoring Gateway with SNAP ID** and the **Asset Monitoring Gateway with BANNER CLOUD ID** lets users immediately capture data from sensors by attaching them to assets. Each system can be deployed without programming and automatically recognizes compatible sensors or sensor nodes, which gather real-time measurements of current, pressure, temperature, vibration, tank level, dew point, or other variables.

Banner Engineering Corp.

More online: newequipment.com/21278398

Gear Couplings for Misaligned Shafts

The **GC series** of gears and sleeves permit the connection of 2 shafts with minor misalignments. They are available in 3 sizes with 17 bore sizes and are made from 1045 carbon steel.

KHK USA, Inc.

More online: newequipment.com/21281688

Fire and Gas Controller

The **SENTRY io fire and gas controller** is an easily configurable, wall-mounted controller that supports up to 16 gas and flame detection channels. It delivers a streamlined experience, providing total control with its interface and dashboard. At a glance, you can monitor the status of each point of detection, access real-time data, and receive instant alerts.

MSA Safety

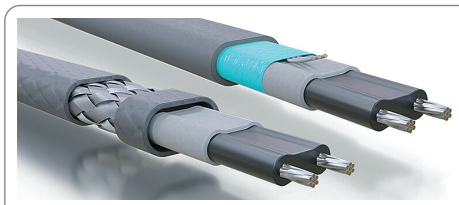
More online: newequipment.com/21279155

Milling Cutters for Ceramic Inserts

M2472 and M2473 milling cutters with ceramic button indexable inserts provide great reliability and toughness for better productivity. The M2472 cutter body accepts positive ceramic inserts, and the M2473 cutter body accepts double-sided ceramic inserts with 8 or more cutting edges per indexable insert. The cutting diameters range from 1 to 2 in. (32 to 63 mm).

Walter USA, LLC

More online: newequipment.com/21279169



Self-Heating Cable for Frozen Pipes

Transferring the warmth needed to protect piping systems from freezing, the **DSX self-regulating electric heat trace** provides a safe, reliable, easy-to-install, and energy-efficient solution. Marked for use in ordinary and hazardous locations, it's available in 9 and 18 W/m nominal outputs (@ 230V AC) and can be energized at 208 to 277V AC.

Thermon, Inc.

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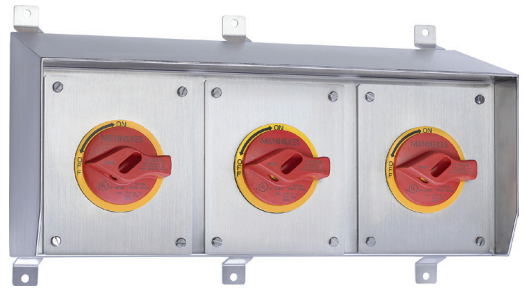

Multi-Gang Motor Disconnects

The **SLPX Series** of sloped-top motor disconnects lets plant operators prioritize sanitation while still meeting requirements for multiple disconnects. Available in 3 multi-gang enclosure sizes, the stainless steel enclosures feature a clean design for washdown and processing areas. Units are UL Listed, rated NEMA 4X and include a 15-deg. sloped roof to ensure liquid runoff.

Mennekes

More online: newequipment.com/21278727

Portable Surface Laser Cleaner

MobiLase Laser Cleaner is a portable fiber laser cleaner housed in an all-in-one, 60 lb. (27 kg) rolling suitcase. The 100 W fiber laser quickly removes rust, paint, oil, grease, dirt, and more by cleaning the material or coating while not disrupting the part. It eliminates the need for grinding, blasting, solvents, water, or chemicals due to its dry laser cleaning process.

Rocklin Manufacturing

More online: newequipment.com/21278735

Pull Type Tubular Solenoids

The **S-63-38 Series of Pull Type Tubular Solenoids** have a 0.38 in. (10 mm) diameter and feature 16 standard off-the-shelf solenoids to select from based on the voltage, duty cycle, force, and stroke requirement of the user. These miniature solenoids have a 0.66-in. (17-mm) long housing and when retracted are just 0.80 in. (20 mm) long. The captive plunger or actuator has a diameter of 0.095 in. (2 mm) and a stroke of 0.090 (2 mm).

Magnetic Sensor Systems (MSS)

More online: newequipment.com/21277615

One-Touch Indexing Clamps

One-Touch indexing clamps, also known as indexing plungers, are quick fasteners that slide or rotate with precise locating for position adjustment. They are designed for positioning applications that require fast and easy locating and relocating of work materials. When engaged, the nose of the plunger extends into the workpiece, helping to hold its location. They feature a quarter-turn knob with on/off markings along with a perceptible click when locking and unlocking. They come with or without spring pressure.

Fixtureworks

More online: newequipment.com/21281565

AI-Powered App for Enhanced Machine Optimization

An AI-powered search application, **igusGO**, uses AI to show the potential of igus' technology for over 450 industrial applications. The free app lets users take a photo of their application, whether it's a coffee machine, a bottling plant, or an excavator, and then provides recommendations on how igus products can be incorporated to reduce costs and extend service life without lubrication needs. It's available for download through Android or iOS, and also as a web version at app.igusgo.cloud.

igus Inc.

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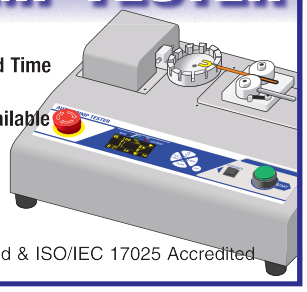

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Multi-Tote AS/RS Maximizes Storage Space

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Fabric

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Modular Seed Counters

The **CSC Series** of modular seed counting and dispensing machines provide fast and reliable counting solutions for crop and vegetable seeds of all sizes. These machines are easily scalable for varying production levels, allowing up to 3 modules to be stacked next to each other without increasing floor space. The series can count 12,500 seeds/min with one module and 37,500 seeds/min with 3 modules.

Cremer

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John DiPaola
Vice President & Group Publisher:
jdipaola@endeavorb2b.com

BRENDA WILEY ..... Production Mgr.
ROBIN DARUS ..... Bus. Service Mgr.

Circulation Customer Service
newequipmentdigest@omeda.com
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FROM THE COVER

Smallest, Lowest Power Bluetooth Chip

The **em|bleu Bluetooth 5.4 chip** is the smallest and lowest power product of its kind on the market, touted as providing premium quality and service.

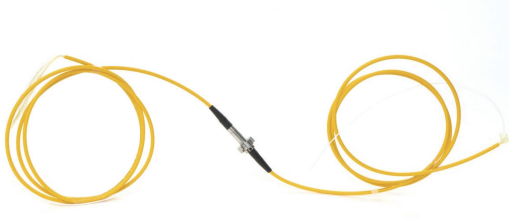
The em|bleu IC offers a sleek design with power efficiency in the wireless technology arena. Engineered for peak performance in the most demanding cases with the smallest footprint, this chip is the ideal solution for seamlessly embedding Bluetooth functionality into even the most size and power-constrained devices.

It enables reliable connectivity for a range of industrial and IoT applications due to its robust RF performance and energy efficiency making it a suitable choice for a variety of devices, from sensors to smart city components.

By incorporating the latest Bluetooth 5.4 standards, em|bleu further improves the connection reliability, while adding new functionalities that unlock new use cases and increase the value to the end customer.

EM Microelectronic

More online: newequipment.com/21280845



Fiber Optic Rotary Joints

Supporting either single or multimode operation with wavelengths of 1,310 or 1,550 nm, the **700 Series** of fiber optic rotary joint (FORJ) assemblies have an outer diameter of 7 mm for tight spaces. Each FORJ has an insertion loss of <2 dB and a return loss of >30 dB for high-speed transmissions over long distances. They have a bend radius of +25 mm, an operating speed of 2,000 rpm, and support Ethernet, LVDS, or HDMI protocols.

Orbex

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FROM THE EDITOR

Everything is Smart

At the end of last year, I wrote about a new pair of smart glasses called Lucyd that are AI, ChatGPT-enabled smart glasses. They are basically normal smart glasses that also let you ask ChatGPT questions and offer GPS navigation among a host of other features.

There are quite a few different brands with smart glasses on the market that live stream, take and make calls, let you listen to audio, etc. But Lucyd is the first to offer ChatGPT commands. You can ask it for brainstorming ideas while working for example.

As I was writing this blog, I kept getting angrier. It's a cool invention and I'm sure there are a lot of people who like this type of tech or even benefit from it, and that's not my issue.

My biggest gripe about these is not the technology per se, it's the idea that because we live in a world that's filled with multitasking, we must want more tech to help us keep that multitasking up. But why is this considered normal? Why are we blindly following the idea that we should be constantly busy, grinding, moving from thing to thing? I can barely keep ideas straight for my next article when creating the magazine. What are ChatGPT glasses going to do for me? Be another Alexa that I wear? Couldn't I just use my phone? Couldn't I brainstorm ideas by researching through the internet?

Personally, if you gave me a pair of these smart glasses, I would never remember how it answered my question and would I have to keep asking it as well as end up writing it down, but that's me.

I'm getting to a point where I'm just getting tired of everything turning "smart". At what point is enough, enough? I already worry my normal glasses might get broken since they're a fragile object, but when you add in the price of the tech that you get with smart glasses, forget it.

I'm all for smartening up equipment that can automate production processes or make work safer for employees, but I don't need smart glasses in an everyday life sort of way. I already have a phone. I expect the next thing is that they're going to turn the glasses into phones. Just read on your glasses. Surf the web on your glasses. Watch movies with your glasses. They've already tried to do it with watches.

I don't know, I feel some of these products are being made to make a quick buck in the luxury market. Next thing you know there's going to be smart water bottles that tell you when they're empty or need to be cleaned. "Oh no! Thank's water bottle for letting me know you're empty or else I would've never known!"

As you can tell, I'm getting snarky about this and I could go on forever, so I'll stop here. I still love technology and learning about its advancements, but I need a real purpose behind its development. Anyway, we'll see where this consumer technology goes this year. As we all know, there are a lot of hot tech products that get developed, put out onto the market, and then seem to disappear not much later, so I'll be watching.

— **Laura Davis,** *Editor-in-Chief*

Mastering Industrial Switch Challenges in Artificial Intelligence Deployments

by Henry Martel

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INDUSTRIAL IOT APPLICATIONS are increasingly incorporating artificial intelligence (AI) into the managing, controlling, and monitoring of operations. When properly implemented, AI empowers plant management to focus on the larger picture and gain visibility into uncovering new ways to optimize workflows, enhance safety and sustainability, streamline supply chains, improve asset reliability, or make more efficient use of resources. AI puts factories and plants in a continuous state of self-optimization, able to detect anomalies with advanced pattern recognition, conduct root-cause analysis, and take actions that minimize risk and maximize profits—all without human intervention.

Although AI is only in its early stages of adoption, it's already transforming industry and society as we know it.

With so many potential benefits of AI seemingly within reach, you are probably wondering how to implement AI in your organization. To begin with, you'll need access to significant computing resources. Basic AI workloads can be handled by CPUs, yet multi-core GPUs are required for machine learning, deep learning, complex algorithms, and specific tasks involving large data sets. Massive amounts of storage are also vital to hold training data, software, and models.

However, the focus of this article is not on GPUs, CPUs, TPUs, or the intricacies of cloud storage. Instead, we're looking at another key component of AI: networking infrastructure, and specifically, the hurdles faced when deploying AI with industrial switches.

AI is highly dependent on communications from sensors intelligent machines neural networks and other devices with neural networks. Only a high-bandwidth, low-latency neural network built on fast, reliable, and secure Ethernet switches can keep pace with the flow of data and ensure efficient management of the network traffic.

Below are five common industrial switch issues that may bottleneck an AI project and five effective strategies to overcome them.

Issue 1: Data Management and Synchronization

Industrial Ethernet switches handle vast amounts of raw data from diverse sources. Ensuring efficient data management and synchronization with machine learning and deep learning models is a significant challenge.

Solution:

Develop efficient data handling techniques, including data preprocessing and compression, to minimize data overload on industrial switches and enable smooth AI data integration for machine learning.

Issue 2: Real-time Processing and Low Latency

Demand for real-time decision-making in industrial settings requires industrial switches to process data rapidly and exhibit minimal latency input data only.

Solution:

Implement edge AI processing on industrial switches to reduce latency and achieve real-time machine learning, deep learning, and big data analysis without overburdening the central network infrastructure.

Issue 3: Security and Resilience

Integrating AI with industrial switches necessitates robust security measures to protect sensitive data and maintain system resilience against cyber threats.

Solution:

Utilize secure communication protocols and encryption methods to safeguard data transmission between industrial switches and AI-enabled systems.

Issue 4: Interoperability and Protocol Compatibility

Industrial switches must be compatible with various other industrial network protocols and existing network infrastructures to facilitate seamless AI integration.

Solution:

Deploy industrial switches with flexibility and adaptability to support multiple protocols, ensuring seamless compatibility with existing network frameworks.

Issue 5: Scalability and Redundancy

Achieving scalability and redundancy in AI-enabled industrial computer systems, AI tools, and computer vision systems is vital for ensuring uninterrupted and reliable operations, particularly in large-scale industrial environments.

Solution:

Incorporate redundancy and failover mechanisms in AI-integrated industrial switches to further network redundancy to ensure system reliability and minimize disruptions in critical operations.

AI-Ready Industrial Switches

Purpose-built to deliver speed and reliability, Antaira's industrial 10-Gigabit managed Ethernet switches check all the boxes for AI/ML applications. High port counts supporting both copper and fiber cables, combined with PoE up to 100 W, enable the deployment of multiple edge devices while industrial-grade housings and wide temperature ranges protect connectivity in the most extreme environments.

Antaira switches are available in DIN-rail mount models to fit inside tight control cabinets and in standard rack mount designs. NED

Henry Martel is a Field Applications Engineer at Antaira Technologies and has over 10 years of IT experience along with skills in system administration, network administration, telecommunications, and infrastructure management.

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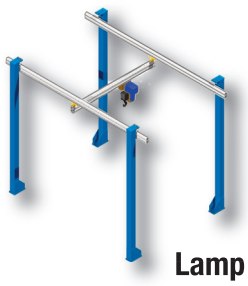
AL SYSTEMS Workstation Cranes are ideal for lighter weight installations, from 25 lbs up to 2,200 lbs. Also, ask about new AL-1 lightweight aluminum rails with capacities up to 500 lbs.



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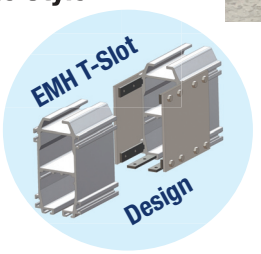
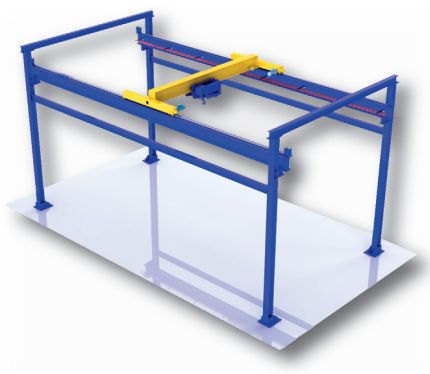


How NOMAD® Free Standing Cranes Provide Flexibility

When manufacturing needs change, crane needs may change as well. Don't lock in your decision for crane location into a building structure. Modular NOMAD® Free Standing Crane Systems are also flexible solutions when overhead crane installation is either difficult or impractical. With bolted assembly, the NOMAD is easily dismantled, relocated and reassembled.

NOMAD® Free Standing Cranes easily handle capacities up to 10 tons. For even more capacity, up to 20 tons and 60-foot spans, ask about new NOMAD® XW Free Standing Cranes.



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