Robotics247

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How Mobile Robots Can Collaborate with Humans

PEERLESS
CONTENT CREATION

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OSARO said it created the program to lessen the burden customers face when trying to bring automated systems into their facilities.

IFR Shares Five Trends That Will Shape the Robotics Industry in 2023
The International Federation of Robotics said thanks to improvements in efficiency, training tools, and AI, 2023 will be a big year for the industry.

EDITOR'S NOTE

While "collaborative robotics" often refers to cobot arms, mobile robots can also work alongside human staffers. In picking, goods-to-person, and other applications, robots can relieve people of the need to walk miles pushing heavy carts while fulfilling e-commerce orders.

In this Special Focus Issue, *Robotics 24/7* looks at how automated guided vehicles (AGVs) and autonomous mobile robots (AMRs) can provide efficiency and flexibility, especially for existing warehouses and factories. While such platforms are not yet commoditized, the past few years have seen an increasing focus on software, interoperability, and data.

Automation can make floor associates' lives easier, thus helping with recruitment, training, and retention amid ongoing labor shortages.

We also look at whether the quest for "lights-out" facilities makes sense and when newcomers to robotics should consider adoption and deployment. (Spoiler: As soon as possible.)

Whether you need to justify investigating and investing in robotics or want to know how the industry and technology are maturing, this issue should help.

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COVER PHOTO: MOBILE INDUSTRIAL ROBOTS

DENSO Increases Efficiencies, Improves Morale with Fleet of MiR250 Autonomous Mobile Robots

DENSO, a leading mobility supplier, has increased efficiencies, improved employee morale and ergonomics, and managed a tight labor market by deploying six MiR250 autonomous mobile robots to transport materials in its 800,000 square foot powertrain component production facility in Athens, Tennessee. According to a new case study from Mobile Industrial Robots (MiR), DENSO has successfully executed more than 500,000 missions since deploying its first MiR robot in 2020, recognizing a return on investment (ROI) in less than a year along with an ongoing need for more AMRs for additional logistics applications

MiR

mobile-industrial-robots.com

Worker Collaboration Is Still Essential to Future of Industrial Automation

While automated systems continue to increase in flexibility, accuracy, and speed, humans are still needed to drive efficiency and address AI edge cases.

BY CESAREO CONTRERAS

Humans play an important role in warehouses and distribution centers. That will continue as they become more automated, experts said. Source: Getty Images

Customers in the materials handling and manufacturing sectors are turning to automation to increase throughputs and to address labor challenges, but robotics vendors and industry analysts have continued to argue that human workers will be key to drive progress.

So if that's true, how are these automated systems being designed with worker interactions in mind?

Robotics 24/7 spoke with several robotics suppliers to learn how they take humans into consideration when designing their products.

Vecna's Pivotal takes humans and robots into consideration

With its Pivotal orchestration software platform, Vecna Robotics said it is working to integrate humans and machines into one system for better workflow management.

Anthony Moschella, senior vice president of product management at Vecna, told *Robotics 24/7* that the company is not interested in helping customers have "lights-out" facilities. A lights-out facility is one where there are no humans, only machines.

"When we go into designing a solution, we actually take into account the human element," he said.

That integration starts with understanding a customer's warehouse management system (WMS) or manufacturing execution system (MES).

"In a big distribution center, for example, the WMS will be staging all of your orders as they come in to go to your retail stores," he said. "Today, those orders are overwhelmingly handled by human operators. As we start to layer in autonomy, we figure, 'OK, which portions of these missions makes the most sense for our robots to do?' and that may not be a one-to-one correlation."

"We don't necessarily take every individual human task and replace that task with the robot," Moschella added. "We look at the overall system view and try to identify which aspects of the tasks are best suited for autonomy."

Vecna's Pivotal software suite allows customers to better supervise operations and gain deeper analytical insights.

Moschella said the company has begun testing with a few third-party logistics customers (3PLs) alpha versions of the software that allow for greater collaboration between human agents and robots. He noted that the first application Vecna is exploring with the new version is case picking, which he said is "probably the highest-labor touch point in a distribution center."

Ideally, these new features should help reduce worker travel within a facility and better optimize a worker's time, noted Moschella.

At ProMat this month, Vecna plans to reveal which customers are using the new alpha version of its Pivotal software.

6 River Systems develops more resilient machines

Rylan Hamilton, co-founder and CEO of 6 River Systems, said the company has made its mobile robots more robust over the years to take into account the desires and needs of its customers.

6 River Systems has also seen a lot of growth with 3PLs. Hamilton attributed that growth to reluctance among some retailers and merchants to make investments in warehouse technologies themselves. It's easier for those companies to instead partner with 3PLs and scale automation.

As these systems become more mainstream and mature, however, customers can more easily integrate robotics into their warehouses, he said.

Since launching in 2015, 6 River Systems' Chuck mobile robot has gotten more reliable, can handle higher payloads, and has increased modularity, explained Hamilton. That has enabled workers to more easily integrate the robot into their workflows.

"In some ways, we think our primary customer is the warehouse associate," he said. "We want to make their job as easy as possible, so we do that with both a directed workflow and with a mobile workstation on the back of the robot."

Chuck can be used for a range of fulfillment tasks, including system-directed picking, case replenishment, and returns

putaway. The robot includes a multitouch tablet and a range of sensors and lights to help floor associates complete their tasks, said Hamilton.

6 River Systems has also developed software that has allowed its customers to take advantage of its picking services even when they are not using Chucks, he added.

Humans address AI shortfalls and drive progress

Firdaus Pohowalla, a managing director at Cascadia Capital, said we are years out from having autonomous systems that can operate autonomously 24/7 and address every edge case. Humans will continue to be important part of the process for the foreseeable future, he said.

Pohowalla helps lead the investment bank's robotics, automation and artificial intelligence division.

"The human-in-the-loop [system] allows for two things," he said. "One, it allows for an exceptional level of control when you are dealing with problems and having a human able to solve that problem. That's collaborative by definition."

"The second piece is the data capture that results from those edge cases and exception cases," said Pohowalla. "The net with the human supervision is that you are able to identify when an edge case or an exception occurs."

Humans can then label those edge cases and exceptions, put them back into the training pipeline, and improve the AI models.

"That's why we are big fans of the idea," Pohowalla said. "We think it will accelerate the adoption of robots, both from a collaborative standpoint, but also from a path toward full autonomy."

DENSO sees value in MiR mobile robots

Mobile Industrial Robotics recently profiled DENSO, an automotive parts company that recently installed six MiR250 robots at its 800,000-sq.-ft. facility in Athens, Tenn.

DENSO has used the robots to automate its conveyance process. Workers now have to walk much less and can do more value-added tasks, the company said.

What are those specific value-added tasks?

Travis Olinger, a logistics and automation engineer at DENSO's manufacturing facility in Athens, told *Robotics 24/7* that a number of employees have moved over to the production and quality aspects of the job.

"Their new roles could be in a direct production environment operating a machine, inspecting products for quality requirements, or any of the many processes to ensure DENSO meets customer demand without sacrificing part quality," he said.

Both the team members and the company benefit from eliminating walking time, said Olinger. Those who do interact with the robots are assessed using error-tracking dashboards, he said.

"Through this data, we can see trends in error occurrence and retrain a team member if needed, or [we can] troubleshoot a layout for improved interaction," Olinger said. •

Cesareo Contreras *is associate editor at* Robotics 24/7.

Autonomous Mobile Robots Offer an Answer to the Labor Shortage

AMRs can increasingly work alongside people and other machines to not only move items, but also hand them off, note industry experts.

BY TOM KEVAN

Apparel manufacturer Bespoke Manufacturing streamlined its workflows with Zebra autonomous mobile robots and fleet management software. Source: Zebra Technologies

The convergence of emerging market trends and recent technological advances has opened the door for autonomous mobile robots, or AMRs, to take on more tasks in manufacturing and supply chain operations. The changes don't stop there, however.

Today, adopters of AMRs have begun to shift into high gear, transitioning from pilot projects involving small numbers of robots to "fleet-size" imple-

mentations. For example, Zebra Technologies' roller-top AMRs are making inroads into factories, warehouses, and distribution centers.

These robots, built on Fetch Robotics' Freight 100 bases, are taking on more and more collaborative roles. This is thanks to advanced sensors, artificial intelligence, and increasingly capable fleet management systems.

Labor challenge is a catalyst for change

One of the factors driving this metamorphosis across industries is the current labor shortage.

"It has become increasingly difficult to attract, hire, train, and retain workers in warehouse operations and manufacturing," said Jim Lawton, vice president and general manager of robotics automation at Zebra Technologies. "Turnover rates are over 40% in both sectors, so labor is a constraint that must be dealt with."

"AMRs can quickly fill the labor gap. When AMRs collaborate with people, operational productivity, efficiency, and accuracy significantly improve," he asserted. "Deploying even a small fleet of AMRs—as few as a dozen—that work autonomously with humans also adds a valuable measure of control."

The rise of autonomous mobile robots would not have happened without a number of technical advances, further convincing users of their value.

"We have seen a kind of testing phase for AMRs in the production and logistics sectors," said Johannes Ritt, technical sales at 4am Robotics, a brand of SCIO Automation Group. "Now, several manufactures have proven the reliability of the systems, and customers' trust has soared."

As AMRs move beyond the proof-of-concept stage, increasing numbers of companies have come to realize that they can help overcome labor shortages and supply chain disruptions. In addition, companies have begun to reconsider the scale of their AMR deployments.

"Customers are sizing fleets for production needs, not for one-off pilot projects," observed Matthew Cherewka, director of strategy at Vecna Robotics. "Furthermore, given that AMRs tend to deliver the highest returns in larger, high-throughput facilities that operate 24/7, customers are deploying fleets accordingly to meet those needs."

Meet new and improved autonomous mobile robots

"While today's AMR may look similar to its predecessors from the outside, advancements in robotic technology have given AMRs different capabilities, with different ROI [return on investment] profiles," explained Gerard Andrews, product marketing manager for robotics at NVIDIA.

"For example, advances in AMR development, such as visual SLAM and AI-based computer vision, make the robots more intelligent and more cost-effective to install," he said. "In addition, machine learning enables safe operation in more unstructured environments, as well as more intricate machine handshakes and successful object manipulation."

As a result of these advances, vendors now offer robots with skill sets well-suited for industrial applications. One of these features is driving intelligence.

"AMRs must always know where they are in dynamic

environments," noted Jay Judkowitz, vice president of product at OTTO Motors. "They must also be able to maximize average speed without sacrificing safety. This means optimizing for fast and safe turns and pivots, not just worrying about achieving maximum speed down a straight unobstructed aisle."

Fleet management grows in importance

Complimenting this intelligence is support from fleet management software such as Seegrid's Supervisor. This collection of control functions is proving essential to the successful deployment of AMR fleets.

"It's not about 100 robots in a list," says Judkowitz. "It's about 100 robots with excellent intelligence, traffic management, job management, and charge management so that they keep moving smoothly and without backups all day long."

Furthermore, AMR fleet managers must be able to interact with other systems so that they can better manage job instructions from systems like ERP, WMS, and MES platforms.

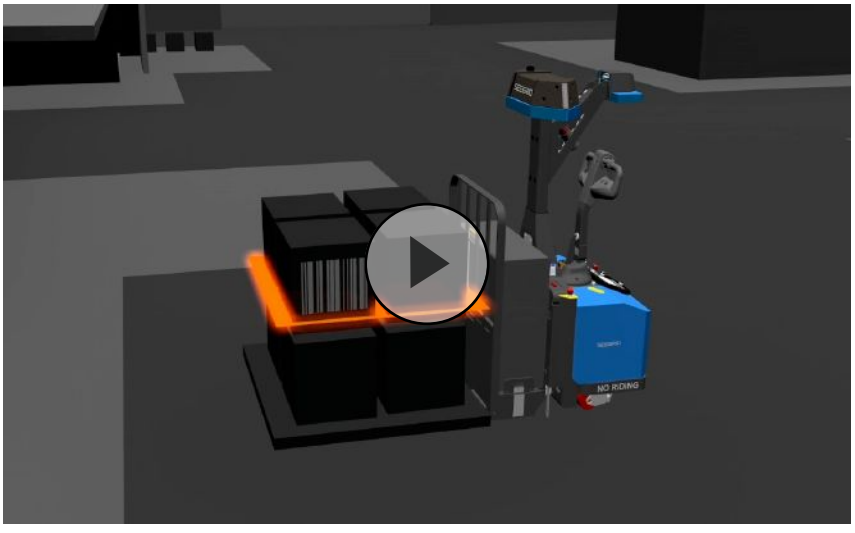
"AMRs are becoming more valuable in warehousing and manufacturing because of their ability to interface with other machines for material pickup and drop-off behaviors, otherwise known as 'machine handshakes,'" said Andrews.

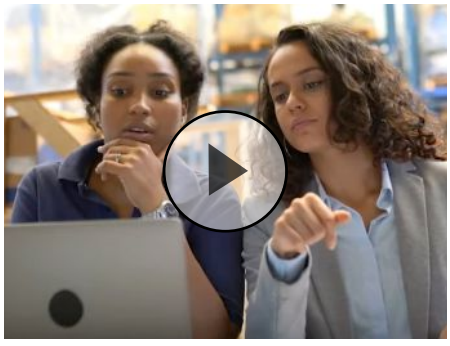
'Mobile' becomes the operative word

Enhancements to navigation and control now enable autonomous mobile robots to provide intelligent mobility to a range of industrial applications.

"Collaborative robotic solutions are bridging the labor shortage gap by shortening warehouse coverage areas," said Samay Kohli, co-founder and CEO of GreyOrange. "Some of these solutions include goods-to-person picking, zone transport and sortation, vertical height utilization, person-to-goods co-working bots, heavy payload transport, and robotic picking arms."

"Combined with multiagent orchestration platforms, collaborative robots are creating a balanced working environment, where workload and task needs are dynamically assigned to human operators and robots to maximize productivity, speed, accuracy, and safety in end-to-end inventory fulfillment operations," he said.





One area where AMRs are particularly valuable is the flow of pallet-sized loads. Such workflows are continuous, complex, and often difficult to manage, but they make up the bulk of the costs and time for warehouse personnel. Moving pallets is thus a perfect application to automate.

"Companies are deploying fleets of AMRs—alongside humans—to automate various pallet movements, which increases reliability, safety, and productivity without significant changes in infrastructure," said David Griffin, chief sales officer at Seegrid. "Furthermore, given the flexibility of AMRs, fleets can fit into inbound, inter-facility, and outbound workflows seamlessly."

AMRs have all the right moves

An example of the value that fleets of collaborative AMRs bring to industrial operations can be seen in the upgrades that apparel manufacturer Bespoke Manufacturing Co. (BMC) began last fall.

In this case, BMC selected Zebra's end-to-end industrial automation with an eye toward enhancing the load-leveling in its facility. In previous workflows, BMC used conveyor belts, but these proved to be inflexible, drastically limiting process change and inhibiting its ability to effectively respond to rapid shifts in market demands.

To address these shortcomings, BMC deployed 15 Zebra RollerTop AMRs and a number of FS20 and FS40 fixed scanners, which provide visibility into the movement of each piece in production.

The deployment also included Zebra's FetchCore software, which directs the AMRs throughout the workflow to advance articles of clothing from one destination to the next.

"One of the most important features of these AMRs is their ability to connect with our main computer system, iCreate," says J. Kirby Best, CEO of BMC. "With autonomous navigation, the RollerTops can navigate pre-determined tracks, locate the appropriate workstation, and load and unload totes and bins."

This integrated intelligence empowers these robots with high-level decision-making capabilities.

"The AMRs deploy pieces and products where they're needed at the different sewing and assembly stations," explained Kirby. "By filtering through a series of detailed questions, the AMRs can help determine what machine is needed in a certain sewing pod, what color of thread should be used, and finally which worker has the most time to complete the next task. Then it chooses the one with the least amount of work and travels to that station to deliver the appropriate materials."

According to Kirby, this combines robots with systems that can anticipate the needs of the factory workers they work alongside. This has helped BMC achieve new efficiencies, he said, ultimately allowing the company to scale to meet growing demand for its products. •

Tom Kevan *is a freelance writer/editor specializing in engineering and communications technology.*

The Manifest 2023 show floor shortly before it opened. Source: Eugene Demaitre

Manifest 2023 Speakers, Attendees Say Why Supply Chains Should Add Robots Now

While many warehouses have yet to automate, they should not hesitate, according to robotics users and suppliers at the Las Vegas event.

BY EUGENE DEMAITRE

LAS VEGAS—The Manifest 2023 conference here last month featured panel discussions and exhibits around many of the latest supply chain technologies, from autonomous trucks and mobile robots to automated storage and software.

With post-COVID-19 e-commerce shifts, ongoing labor shortages, and recessionary fears as a given, most of the speakers, exhibitors, and attendees at this year's Manifest were still bullish on automation.

They acknowledged the challenges of identifying the best robots for a particular job, as well as the growing needs for interoperability and easy ways to collect, analyze, and present data.

Manifest attendance doubles in second year

More than 3,000 people attended Manifest at Caesar's Forum—at least double the 1,500 attendees at last year's inaugural event, according to event organizers. Conference sessions began on Tuesday, Jan. 31, but the show floor with about 200 exhibitors wasn't open until Wednesday, Feb. 1.

Attendees included Fortune 500 companies, numerous investors, and robotics startups. The first group was the most sought after by exhibitors as potential customers, but the latter two could have learned about supply chain and logistics innovations in the keynotes and panel discussions.

Several established robotics vendors told *Robotics 24/7* that they were attending the event to assess whether to exhibit next year.

Manifest offered a rendezvous area near reception and a more successful meeting area in the middle of the booth displays. Caja Robotics' robotic storage system was among the robots near the front and center of the exhibit hall. Self-driving and semi-autonomous trucks from companies such as Kodiak Robotics and Torc Robotics lined the back aisle.

Networking events included meals and drinks, evening receptions, and a Women's Luncheon on Thursday, Feb. 2. One of the most popular booths wasn't dedicated to autonomous vehicles or robots; it was Geodis' "Puppy Park," where attendees could take a break with actual puppies.

MMH's Bob Trebilcock moderated a session with Drew Bailey, vice president of design engineering at Geodis; Zac Boehm, vice president of innovative systems at Hy-Tek Intralogistics; and Stanislas Normand, managing director for North America at Exotec. Source: Eugene Demaitre

Geodis' "Puppy Park" at Manifest 2023. Source: Eugene Demaitre

It's never too late to start with robotics

"People don't know where to start," said Zac Boehm, vice president of robotic solutions at Hy-Tek Intralogistics in a panel on trends, opportunities, and challenges of warehouse robotics. "A lot of our customers say they want a robot, and we kick into educational mode. There's board-driven versus operations-driven decisions."

"What industries are most interested in robots?" asked Bob Trebilcock, moderator and executive editor of Modern Materials Handling (a sibling site to *Robotics 24/7*).

"Apparel, e-commerce, food and beverage, and fulfillment," replied Boehm.

Companies of all sizes should carefully evaluate both technologies and partners, according to Manifest speakers. DHL Supply Chain has 500 sites in North America, so coordinating research and development and finding the right robots to solve its problems are real challenges, said Brian Gaunt, senior director at the third-party logistics provider (3PL).

"We look for best-of-breed technologies and partner with companies of all sizes," he told *Robotics 24/7*. "We have a very structured process—our innovation playbook looks at creativity and functionality, as well as a laundry list of other things, such as autonomy and how a robot interacts with associates."

Unlike some other 3PLs, DHL is open to re-engineering its processes to maximize efficiency with robotics, Gaunt said. "But you can't just drop robots into Steps 3 to 7 of a workflow," he said. "You have to consider support, safety, multiple deployments, and service-level agreements."

DHL has relationships with AutoStore, Boston Dynamics, Locus Robotics, and Vecna Robotics, among others.

"The balance between existing, fixed infrastructure and flexible automation and ROI [return on investment] is based on the customer," said Gary Allen, vice president of supply chain excellence at Ryder Supply Chain. "AMRs [autonomous mobile robots] need one and a half years, while an ASRS [automated storage and retrieval system] may take one to two years, depending on volume."

RaaS helps manage risk, ROI

The robotics-as-a-service (RaaS) model can also help businesses adopt or scale robotic fleets, but they need to understand the difference between pay-per-pick, leasing, and other financing arrangements, said multiple Manifest speakers.

"RaaS is a great option for customers to manage risk," said Patrick Kelleher, global chief development officer at DHL Supply Chain.

At its Manifest booth, DHL Supply Chain showed real robots, as well as Lego models of an autonomous fork truck, Boston Dynamics' Stretch, and a Locus Robotics LocusBot. Source: Eugene Demaitre

RaaS and AMRs can deliver immediate value, observed Ryder's Allen. "We've got 15,000 drivers and have evaluated 250 technologies," he said.

"It's about lines or shifts per day," Allen added. "Locus robots are good for higher SKU count for CPG [consumer packaged goods], while autonomous forklifts are a better option for moving pallets."

"We serve automotive, aerospace, healthcare, food, retail, and oil and gas," he said. "About 20% of our 400 warehouses have some automation, and we manage a total of 50 million to 60 million sq. ft. We've developed our own modeling tools based on automation category."

Ryder acquired omnichannel provider Whiplash last year and is developing its own integrated warehouse systems so that it has control over the data it sends customers. "We have our own analytics team and are keeping it in engineering rather than in IT to stay with operators," said Allen.

"We only give merit to proofs of concept in production, not laboratory or limited site demonstrations," said Thomas Evans, robotics chief technology officer at Honeywell. "It's about building confidence on the customer side and proving adoption at scale."

However, "customers should have some skin in the game," noted Caja's Barkay. "I prefer a hybrid model, or it's too easy to just move choke points in the process."

Flexibility and scalability are 3PL mantra

"We evaluate different robots by where they add value, automating repeatable tasks," said Marv Cunningham, chief operating officer and chief information officer at GXO Logistics. "Then we look at scalability, reliability, and flexibility. Our design tenet is 'Does it solve a problem for the customer?' We want to be a true design partner."

However, there is no one-size-fits-all solution, he told *Robotics 24/7*. "We have yet to see a single vendor that solves the entire warehouse," Cunningham said. "There's little standardization or interoperability among systems from multiple vendors today, so GXO's differentiator is our ability to seamlessly integrate our operations with those of end users."

"Robotics companies don't want to give up their 'secret sauce,' but depending on the use case, it would be nice if they shared location data for movement and safety around people, plus information about spills and right of ways," said DHL's Gaunt. "The industry will go there."

DHL Supply Chain has 12 innovation focus areas, including supply chain resilience, real estate footprint, and integrating the digital and physical worlds, noted Kelleher. "The innovation funnel is about managing risk," he said.

"We've deployed thousands of LocusBots for 150% to 170% improvements in each-picking productivity," said Kelleher. "We've seen different results between warehouses based on the people in them."

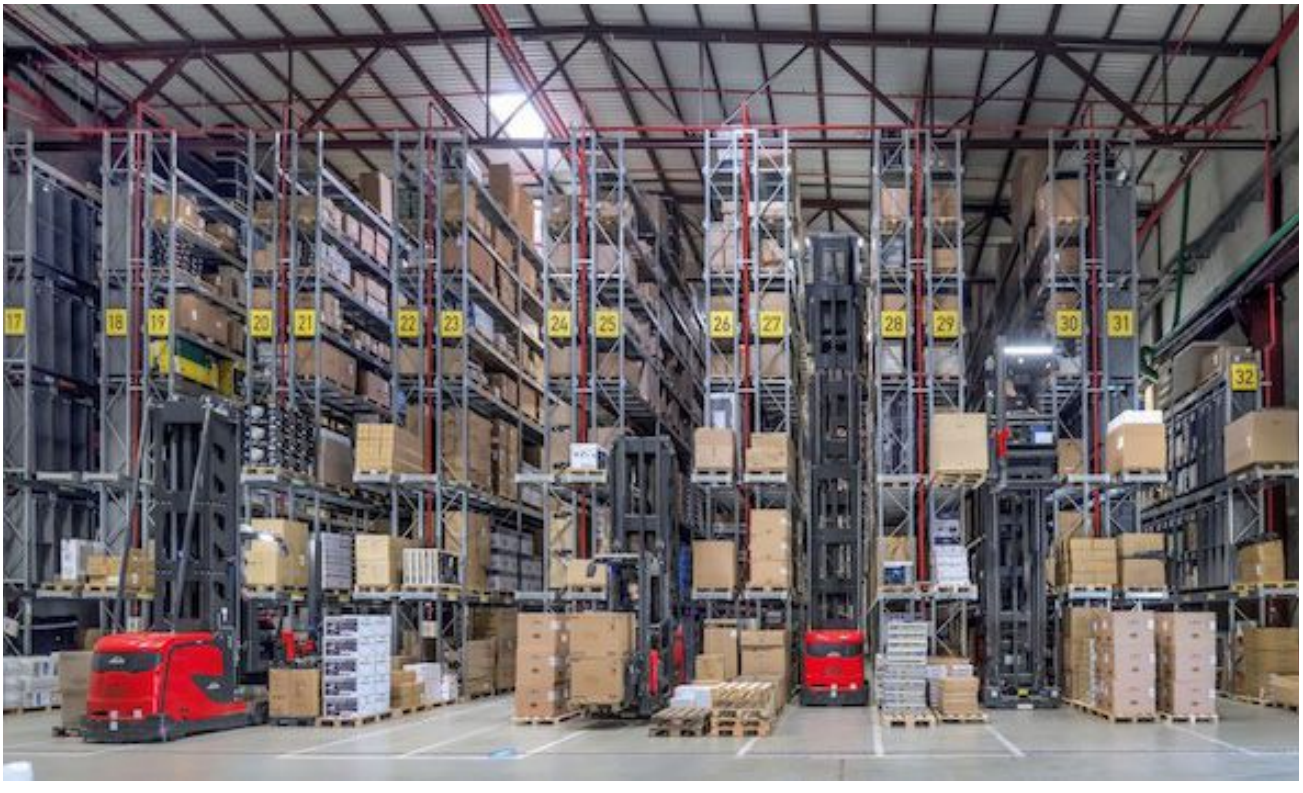
Software-defined automation is ideal for multi-tenant distribution centers, said Avihou Barkay, executive vice president and general manager for North America at Caja Robotics. Instead of the old method of segregating storage by product or brand, Caja's system does for physical storage what the cloud did for data processing—increase efficiency, he said. •

Eugene Demaitre *is editorial director of* Robotics 24/7.

Automation Has Multiple Positive Effects on Warehouse Efficiency, Says Wagner Logistics

From increased efficiency and safety to reduced inventory damage and employee turnover, warehouse operators have good reasons to automate now.

BY ROBIN ROMERO, WAGNER LOGISTICS

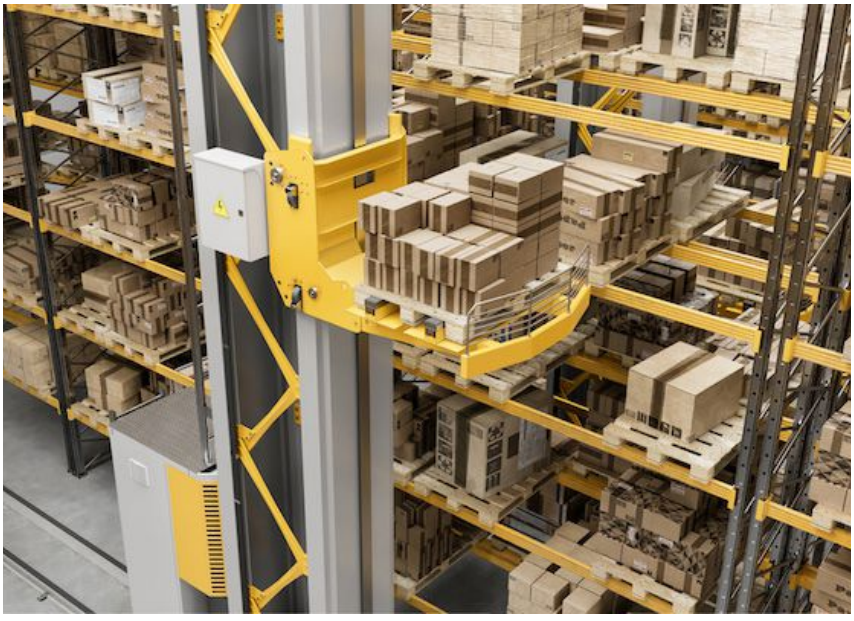


Linde has provided autonomous lift trucks for very narrow aisles at Wagner eCommerce. Source: Linde Material Handling

As in other industries, warehouse operators are struggling with a tight human labor market. Recent advances in robotics not only offer a way to supplement the work of hard-to-find workers. The technology also offers significant advantages when it comes to priorities like inventory overflow, damage and loss prevention, and safety.

Automation can also increase productivity while reducing operational costs and optimizing space within warehouses.

Though an estimated 80% of warehouses have little to no automation, now is the time to consider modernizing to increase process efficiency and decrease the effect of future wage increases. It's also time to enter the realm of those 5% of



Palletizing robots and vertical storage can help optimize usage of warehouse space. Source: Getty Images

warehouses using sophisticated automation.

The supply chain industry still needs hard-working, highly qualified people, so we don't envision a warehousing or logistics environment where machines would fully replace people. Businesses that deploy robots to improve key performance metrics while also making the employment experience better will ultimately be the successful ones.

Think outside the warehouse box for robotics

Deploying automation can affect warehouse design and equipment layout, which may require thinking outside the warehouse box to enable more efficient activities and materials movement.

For example, a few years ago, Wagner Logistics opened a large warehouse for a client in the southeastern U.S. The company managed all aspects of storing its paper goods to produce packaging like beer cartons.

At the time, the facility could hold 41,000 pallets in its racks. Due to consumer demand, those pallet positions were no longer enough to match the volume Wagner was handling.

Subsequently, inventory overflow forced the company to put some product on the floor. When volume exceeded capacity, Wagner was forced to consider how to optimize space with the future in mind.

It could look for a larger warehouse, but the cost of additional shuttling, employee attrition, retraining, moving, and occupancy far outweighed the cost of making more efficient use of the space with robotics. Automation allowed Wagner to install new rack locations with less human foot traffic, so the aisles didn't need to be as wide.

Another boost in capacity will come from robots picking up from the drop zone and going directly to the racks. Since the human traffic will be eliminated, Wagner can add more racked locations for pallets.

Outflow will also improve because robots work with the company's warehouse management system (WMS). A mobile robot can pick up all the items that need to go out from a given aisle, even if it's for multiple orders. Eliminating redundant moves like a person running back and forth is the foundation of automation value.

Robots can save inventory, jobs

More than 1,200 pallets go into and out of Wagner's largest warehouse—a 780,000-sq.-ft. facility—each day. Even with a well-trained workforce, there is still damage from miscues, as well as lost inventory from human error.

Continuous improvement is a constant imperative. Conventional wisdom says that, when processes are automated, it happens to the detriment of human employees. But that's not necessarily the case.

When robots are used to supplement manual labor, human workers can benefit in numerous ways. In pre-automation scenarios, people tend to be locked in certain jobs. For example, if you

With inVia PickerWall, the inVia Picker robots retrieve each day's ordered goods and bring them to a dynamic putwall. Source: inVia Robotics

drive a high-lift, you only drive a high-lift. If you drive a forklift, you never get to do the things a high-lift driver does.

But when you automate many of the functions that used to keep people stuck in monotonous jobs, you then open up opportunities for cross-training, which often leads to increased employee morale.

The same person who has always driven a forklift can now learn to drive a high-lift and might also be able to operate roll clamps when needed. When people can contribute more, their earning potential is higher, as is their job satisfaction. In addition, they're more likely to be valued and promoted.

Automation alleviates stress, improves safety

Robots can also make many jobs less stressful. For example, robots can work at height, improving safety and relieving the challenges for people who have acrophobia. Associates can keep their feet on the floor and contribute in numerous other ways.

In addition to increasing efficiency and ergonomics, automated systems allow a warehouse to create robot-only ones and human-robot collaborative environments. Each scenario calls for specific setups.

For example, warehouse designs with robot-only areas can install all racks in the middle of a workspace. Human-driven vehicles would stay on the outskirts of such zones, and staffers would only enter it if necessary to perform maintenance or other limited functions.

Mobile robots and robot arms can reduce heavy lifting and tedious tasks. Even housekeeping is easier and safer because robots don't throw any trash on the floor.

Let robots take the third shift

Most companies recognize that third shift is the least desirable of all shifts, but some employees are given no other option. Wagner Logistics plans to let robots do all the third-shift work. This will allow the best employees to transition to the first or second shift according to their preferences.

On the whole, automation opens up new possibilities for employees while offering to make warehouse operations more efficient and manageable.

As with any technology, robotics and automation require serious thought before investing and implementing it. Warehouse operators need to consider all the ways in which they can improve their operations, from types of robot hardware to orchestration platforms that assign work to the robots and manage workflow.

The technology available today unquestionably gives operators opportunities to take their warehouses to another level. •

Robin Romero *is an industrial engineer at Wagner Logistics, a leading supply chain management provider offering distribution center, warehousing, and transportation services across the U.S. since 1946. Wagner said its team provides systems to fit each changing buying habits and each customer's needs at the speed it requires.*

InOrbit Robot Space Launches in California to Give Hands-on Experience With RobOps

InOrbit's new concept store and community space provides a look at the future of robot operations.

BY ROBOTICS 24/7 STAFF

InOrbit CEO Florian Pestoni demonstrates robots at work in the new Robot Space. Source: InOrbit

Automation continues to expand, even as U.S. unemployment remains at historic lows. For more businesses to adopt robots, people need to be comfortable working with them. To that end, InOrbit Inc. recently announced the grand opening of the InOrbit Robot Space in Mountain View, Calif.

The community space, product showroom, and concept store are intended to show visitors the latest autonomous mobile robots (AMRs) in action and InOrbit's cloud-based robot operations (RobOps) software. Visitors can also see robots perform tasks such as restocking merchandise and delivering customer orders.

"Our goal is to demystify and raise awareness of the real-world application of robots," said Florian Pestoni, co-founder and CEO of InOrbit. "We're excited to exhibit robots from our partners like OTTO Motors and other industry leaders."

"This is a space for the robotics community at large to learn and advance the state of the art in robot operations," he added. "It's also a place for everyone else—from kids to older adults—to experience how robots can help with everyday chores."

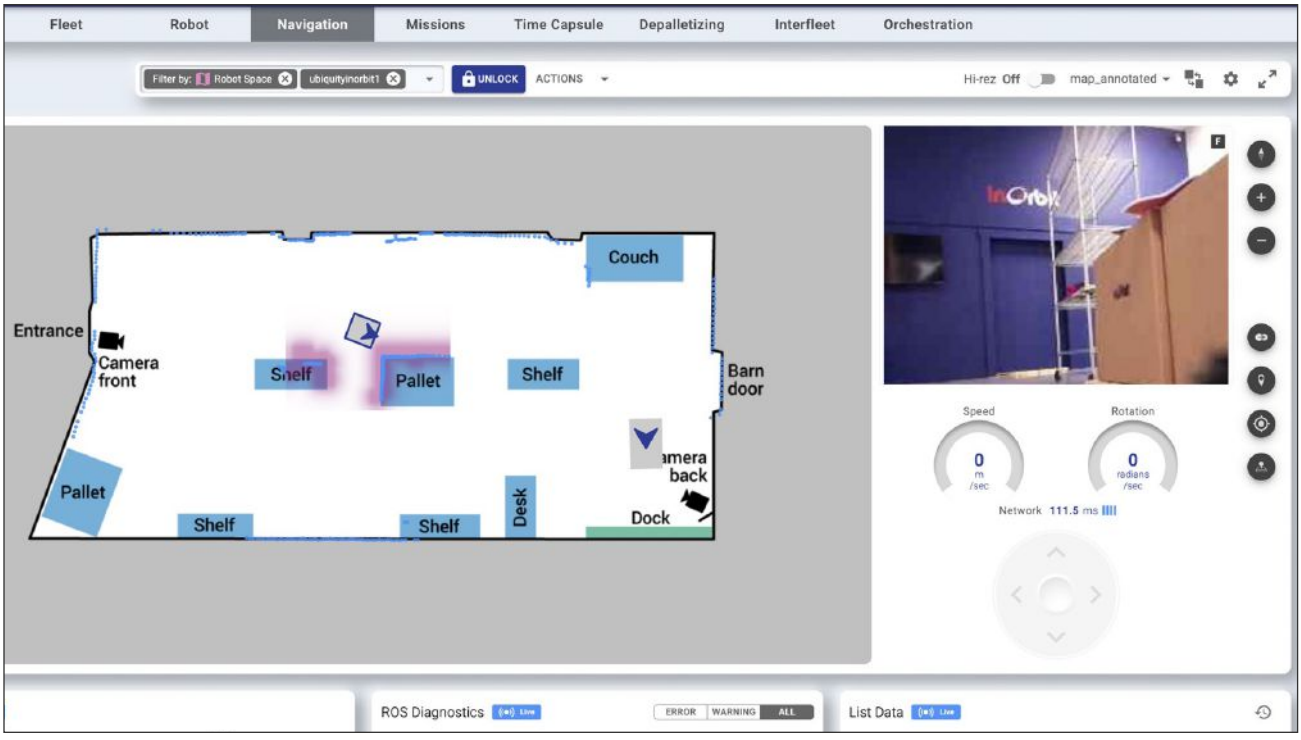
InOrbit addresses RobOps needs

"Amazon is adding about a thousand robots a day," according to Cathie Wood, chief investment officer and CEO of Ark Invest, as reported by CNBC.

"If you compare the number of robots Amazon has to the number of employees, it's about a third," she noted. "And we believe that by the year 2030, Amazon can have more robots than employees."

However, job growth has not yet been adversely affected by economic headwinds, said the U.S. Department of Labor. Corporate decision-makers and the general public need to understand the potential of robotics to help them, said InOrbit.

The company said its multi-cloud platform "enables efficient robot operations and provides observability through secure, real-time analytics and data collection, robot performance monitoring, incident response,



The InOrbit robot navigation dashboard at the Robot Space. Source: InOrbit

and root-cause analysis."

The InOrbit Connect certification program allows end users across industries to orchestrate robots and optimize productivity for multiple tasks, claimed the company.

Decision makers can observe orchestration in real time

Whether in person or remotely with multiple live-streaming cameras, decision makers can see robots from different vendors working together in real time at the InOrbit Robot Space. The company said its ability to "orchestrate multi-vendor robot fleets at scale through a single pane of glass is what sets InOrbit apart."

Robotics companies that are part of the InOrbit Connect ecosystem will also be able to showcase their robots in a realistic, scaled-down environment.

"We are happy to participate in the InOrbit Robot Space launch and are excited at the prospect of seeing our robots working in this new community space," said Jay Judkowitz, vice president of product at OTTO Motors. "InOrbit has been a great partner to OTTO Motors and shares our vision of bringing industry-leading robots and operations to life automating the world's dullest, dirtiest, and deadliest jobs."

InOrbit will demonstrate interoperability among multiple AMRs, including those of Mobile Industrial Robots.

A MiR100 AMR in operation at the Robot Space. Source: InOrbit

Robot Space to host organization meetings

InOrbit will host Women in Robotics (WiR), Silicon Valley Robotics (SVR), and Robot Operations Group (ROG) meetings at the Robot Space.

"In order to remain competitive, we need more high school girls and undergrad women to choose career paths in computer science and engineering," said Andra Keay, president of Women in Robotics and managing director of Silicon Valley Robotics. "The InOrbit Robot Space will be a great location for SVR and WiR events, helping attendees connect with successful women in robotics and get hands-on experience with the latest in robotics and robot operations."

"The Silicon Valley-based members of ROG will now have a place to meet in real life," said Joe Wieciek, director of technical operations at Outrider and co-founder of the Robot Operations Group.

"As a community for robot operations experts, we had a hugely successful RobOpsCon in 2022 and continue to meet throughout the year," he said. "We appreciate InOrbit's support as a founding sponsor and community host."

Pestoni is co-founder of the Robot Operations Group, which meets regularly online and in person to discuss RobOps.

The Orbito mascot is among the items for sale at the InOrbit Robot Space, whose grand opening was Feb. 3. Source: InOrbit

Robot space open to the public

Popular notions about robots are often shaped by sci-fi movies or outdated ideas about industrial automation, said InOrbit. In addition to showcasing the latest technology and selling merchandise for all ages, the InOrbit Robot Space aims to educate the public on the role of modern robots in everyday life.

Visitors can experience firsthand how the latest robots use artificial intelligence, sensors, and software to intelligently navigate around obstacles and carry out their missions, said the company.

To make the topic more accessible to all, the company has appointed its mascot known as "Orbito" as community ambassador. The robot avatar's role is to connect with burgeoning roboticists of all ages. 3D figures as well as T-shirts and other items featuring Orbito will be available for sale.

The InOrbit Robot Space will also be available for community events, meetups, and educational talks, allowing people to work with real robots, explore RobOps best practices, and learn about the orchestration of diverse robot fleets in real-world scenarios.

The InOrbit Robot Space is located at 293 Castro St. in Mountain View, Calif. Operating hours are Monday through Friday from noon to 6:00 p.m. PT, starting on Feb 20. •

The Future of Work Could Have Humans and Robots Working Better Together

The 'Great Resignation' was not the result of automation, but businesses must choose how to get the most value from human-robot collaboration.

BY JENS MARTIN SKIBSTED, VP FORESIGHT & MOBILITY

Designers can help industry by maximizing the benefits of robotics, AI, and human workers with devices such as exoskeletons. Source: Getty Images

It's no surprise that innovations in robotics and artificial intelligence are changing the workplace. For years, manufacturers have relied on automation, and industry observers have buzzed about the implications of robots replacing human workers.

More recently, the "Great Resignation" included millions of workers retiring early or seeking different types of jobs. Manufacturers and supply chain operators have recognized the need for automation, as well as the need to fully use the human talent they are able to employ and retain.

In fact, the Great Resignation was driven by things including anxiety related to the ongoing COVID-19 pandemic, mounting employee frustrations, and limited options for flexible work. In 2021 alone, more than 47 million Americans voluntarily quit their jobs, according to the *Harvard Business Review*. Many of them have yet to return to full-time employment—if they ever do.

With such a large exodus, many enterprises are turning to robots and AI. Some have touted automation as the only way to solve the workforce shortage. However, it didn't take long for companies such as Amazon and Tesla to realize that "lights-out" facilities are not necessarily as good as those with the right people.

That's why some design innovation experts are now saying that, in order for real progress to take place, businesses and societies must embrace strategies that allow robots and humans to collaborate to build a more sustainable workplace for the future.

While human and AI-driven robots have been working together for a while now, today's AI capabilities weren't even on the radar in the earliest days of computing. The sweet spot of optimal productivity from machines and humans came only after years of design work, understanding processes, and user experiences.

Don't fear the robots

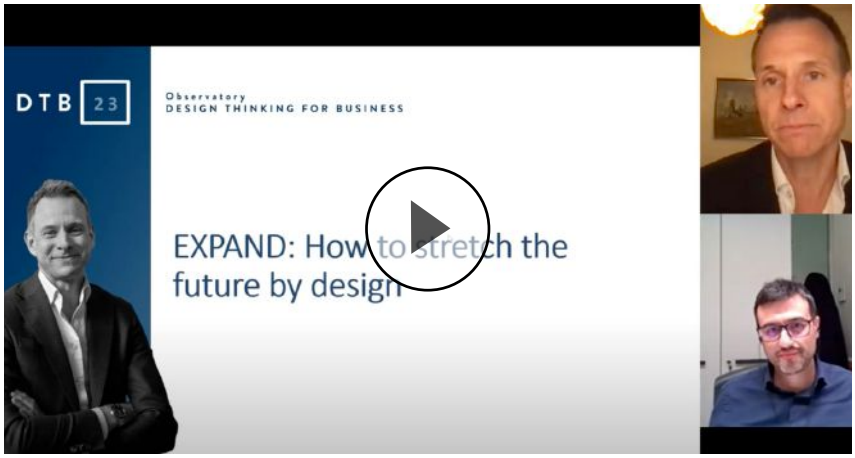
"We should not be sizing up the potential of humans or machines in isolation but taking both combined," noted Jens Martin Skibsted and Christian Bason, co-authors of *Expand: Stretching The Future by Design*. "We must instead investigate solutions whereby humans and machines complement each other, maximizing the potential of both."

Some estimates predict that 30% of jobs will be replaced by robots and AI. Manufacturing roles could be the most vulnerable to robots and machine learning, according to *TechJury*. Globally, 375 million jobs are at risk of being lost; in the U.S., this number is between 14 to 80 million, said the blog post.

Even as the global population approaches an estimated 8.5 billion by 2030, the world will have to adjust to the changing nature of work. At the same time, the increase in automation in the U.S. has coincided with historically low unemployment rates, which also exacerbate labor shortages.

The extent to which people and robots can work together will determine how this plays out in reality. New technologies will change tasks and processes such as piece picking, palletizing, and welding, but the amount of human-machine interaction for each should be the result of deliberate choice.

For instance, in goods-to-person (G2P) applications, the robots move materials, while employees do the picking, guided by intuitive user interfaces.



As robotics and AI grow more capable, executives, operators, and floor associates must decide whether to fear innovation or work with them as tools to solve problems.

"Instead of letting technology run its course as if we have no say and the future was predetermined, we must actively create the future we want. It is not given," wrote Skibsted and Bason. "We can and need to expand how we think about the future – and design new jobs with intent. Why not collaborate with machines?"

The sum of humans and AI is greater than its parts

The factories, warehouses, retailers, and restaurants of the future depend not only on increased productivity and quality, but also on finding the best combinations of people and machines. AI has a role to play here as well.

"Most activities at the human-machine interface require people to do new and different things and to do things differently," noted a 2018 *Harvard Business Review* survey of 1,000 companies working with AI.

Consider how much computing has transformed the workplace in the past few decades. With many robotics and AI applications in the early stages of development, it would be foolish to think that these tech advances don't have the same transformational potential.

There is no doubt that enterprises are facing many economic challenges. While automation seems to be an obvious solution to worker shortages, employers shouldn't neglect the need for human-machine collaboration, retraining, and good process engineering,

The sweet spot— where humans and machines harmonize – will be where much of the future's work is completed profitably. •

Jens Martin Skibsted *is an entrepreneur, author, and global partner at VP Foresight & Mobility. He is also a council member of the World Economic Forum's Future of Cities and Urbanization team.*

Berkshire Grey and Locus Robotics Announce Partnership Offering Cross-Platform Automation

The companies said their integrated automation requires minimal fixed infrastructure, enabling customers to maximize throughput, scale effectively, and optimize labor.

BY ROBOTICS 24/7 STAFF

Berkshire Grey and Locus Robotics have partnered to automate store replenishment and e-commerce order fulfillment. Source: Berkshire Grey

Berkshire Grey Inc. and Locus Robotics Corp. recently announced that they have integrated Berkshire Grey's Robotic Shuttle Put Wall, or BG RSPWi, with the Locus Origin and Vector mobile robots. The companies said their "end-to-end" automation will help retail and e-commerce customers maximize supply chain productivity and throughput and address growing labor challenges.

"Partnering with Berkshire Grey allows our customers to reap the benefits of enterprise-level robotic automation across some of their most business-critical supply chain processes," stated Mike Johnson, president at Locus Robotics.

"Berkshire Grey and Locus Robotics have been operating in the supply chain industry for many years now, and it's great to see us join forces to deliver seamlessly integrated, proven, and impactful automation solutions that help our customers grow and succeed, now and into the future," he said.

Wilmington, Mass.-based Locus Robotics said its autonomous mobile robots (AMRs) collaborate with human workers to double or triple order-fulfillment productivity, reduce operational costs, and improve workplace conditions. The company said it supports more than 100 brands and has deployed AMRs at over 250 sites worldwide.

Locus Robotics looks to help maximize throughput

Ongoing labor shortages and inflation are putting growing pressures on supply chain and distribution frameworks, said Berkshire Grey and Locus Robotics. Retail and e-commerce businesses are struggling to keep up with growing customer demands while managing these pressures and keeping operational costs in control, the partners added.

The companies said their customers are "demanding flexible and seamlessly integrated best-of-breed robotic automation solutions to address these challenges and deliver top-quality customer experiences."

Berkshire Grey and Locus Robotics explained that the integration of BG RSPWi with Locus Origin and Locus Vector is intended to help maximize throughput by doing the following:

- Delivering a fast and packaged solution for order fulfillment and store replenishment
- Processing a wide range of SKUs, surpassing SKU coverage of other alternatives
- Enabling a fully-automated, end-to-end supply chain ecosystem
- Augmenting supply chain operations with optimized labor and costs

Berkshire Grey explores more integrations

Berkshire Grey and Locus Robotics are also exploring future integrations of Berkshire Grey's Robotic Product Sortation (BG RPS), Robotic Shuttle Product Sortation (BG RSPS), and Robotic Pick and Pack for eCommerce Autobagging (BG RPPi).

With this package of robotics offerings, businesses could fully automate their order fulfillment, autobagging, and store-replenishment processes while seeing immediate return on investment (ROI), they said.

"We have seen a growing number of customers asking for solutions that they can deploy holistically versus piecemeal innovation," said Steve Johnson, president and chief operating officer of Berkshire Grey.

Locus Robotics has a distinct value proposition in enabling greater flexibility in the supply chain industry with their robotic automation solutions," he said. "Now with Locus Robotics, we believe we can take our combined solutions to a wider market."

Berkshire Grey said it combines robotics and artificial intelligence to automate fulfillment, supply chain, and logistics operations. The Bedford, Mass.-based company said its systems "transform pick, pack, move, store, organize, and sort operations to deliver competitive advantage for enterprises serving today's connected consumers."

Berkshire Grey's customers include Global 100 retailers and logistics service providers. •

OSARO Launches Robotic Partner Program That Includes FANUC, Pregis, and NPSG Global

OSARO said it created the program to lessen the burden customers face when trying to bring automated systems into their facilities.

BY ROBOTICS 24/7 STAFF

Working with a FANUC robot and a Pregis automated bagging machine, OSARO staff members collaborate with NPSG Global technicians to construct OSARO Robotic Bagging System cells at Zenni Optical in Novato, Calif. Source: Osaro

OSARO today has launched a partner program that aims to streamline the deployment of robotic solutions for e-commerce and logistics businesses.

The OSARO Partners Alliance program provides a range of collaboration and co-marketing opportunities for vendors, integrators, distributors, resellers, third-party logistics companies (3PLs), and consultants to deliver unified solutions, according to the San Francisco-based company.

The program is designed to optimize every stage of a customer's purchasing and deployment process whether it be with autonomous mobile robots (AMRs), automated storage and retrieval systems (ASRS), or other technologies, it added.

OSARO makes robotic piece-picking systems for e-commerce markets. It said its robots, which take advantage of machine vision and control software, are suitable for goods-to-robot use cases where key challenges include high SKU inventories, complex packaging, and fragile items.

The program's first members

The program's inaugural members include:

- FANUC America — a supplier of robots, CNC systems and factory automation
- Pregis — a manufacturer of end-of-line packaging solutions
- NPSG Global — a designer of e-fulfillment warehouse implementation services

The collaboration of these three partners and OSARO is emblematic of the benefits that can be achieved by working together. OSARO is currently deploying its OSARO Robotic Bagging Systems in a production environment at Zenni Optical's e-commerce distribution operations in Novato, California. Each system includes a FANUC robot arm, a Pregis automated bagging system, and is installed with automation expertise from NPSG Global.

"OSARO is solving the elusive challenge of automating the most complicated and labor-intensive task in the warehouse: the full automation of piece picking," said CEO Derik Pridmore. "The OSARO Partners Alliance provides a framework for the integration of our pick-and-place technology with the latest product and service innovations from proven partners. Our model allows partners to grow their businesses with our software, systems, and tools, and to tailor the program for their objectives."

The program addresses an urgent need for better automation, OSARO claims

Advances in Al-driven robotics have created new solutions to tackle supply chain disruptions and labor shortages and to equip e-commerce operations with solutions that speed up delivery and boost productivity, it said. But tailoring the right solution requires a collaborative approach that includes software, hardware, and materials-handling experts with deep domain experience.

The OSARO Partners Alliance convenes the right set of players to deliver success to both customers and partners. It fosters a community where participants can share knowledge, resources, and expertise to support their mutual clients as they evolve their supply chain capabilities to keep e-commerce humming, the company argued.

Members of the Alliance can use OSARO's industry-leading pick-and-place vision software to create new opportunities, build new revenue streams together, and expand the range of solutions for fast-growing e-commerce and logistics businesses.

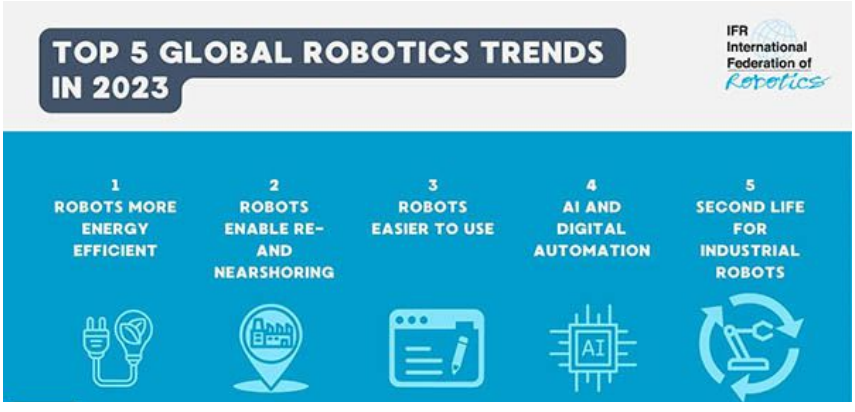
OSARO Alliance partners may take advantage of:

- Applicable OSARO licenses for demo or production use
- Joint OSARO webinars
- Joint press and social media outreach with OSARO
- Technical and marketing resources from OSARO
- OSARO Sales support
- OSARO lead sourcing
- Customer referencing
- Collaborative marketing planning
- Joint trade show participation by mutual agreement
- Shared marketing content creation and distribution
- OSARO annual business planning and quarterly business review
- RFP bid support from OSARO
- OSARO's partner enablement training program
- Partner logos featured on the OSARO website. •

IFR Shares Five Trends That Will Shape the Robotics Industry in 2023

The International Federation of Robotics said that, thanks to improvements in efficiency, training tools, and AI, 2023 will be a big year for the industry.

BY ROBOTICS 24/7 STAFF



The IFR shared where it sees the industry heading in 2023. Source: International Federation of Robotics

The International Federation of Robotics, or IFR, recently announced the five trends it sees shaping robotics and automation in 2023.

"Robots play a fundamental role in securing the changing demands of manufacturers around the world," said Marina Bill, president of the International Federation of Robotics, in a statement. "New trends in robotics attract users from small enterprise to global OEMs."

1. Energy efficiency

Energy efficiency is key to improve companies' competitiveness amid rising energy costs. The adoption of robotics helps in many ways to lower energy consumption in manufacturing.

Compared to traditional assembly lines, considerable energy savings can be achieved through reduced heating. At the same time, robots work at high speed thus increasing production rates so that manufacturing becomes more time- and energy-efficient.

Today's robots are designed to consume less energy, which leads to lower operating costs. To meet sustainability targets for their production, companies use industrial robots equipped with energy-saving technology: robot controls are able to convert kinetic energy into electricity, for example, and feed it back into the power grid.

This technology significantly reduces the energy required to run a robot. Another feature is the smart power-saving mode that controls the robot´s energy supply on-demand throughout the workday. Since industrial facilities need to monitor their energy consumption even today, such connected power sensors are likely to become an industry standard for robotic solutions.

2. Reshoring

Resilience has become an important driver for reshoring in various industries: For example, car manufacturers invest heavily in short supply lines to bring processes closer to their customers. These manufacturers use robot automation to manufacture powerful batteries cost-effectively and in large quantities to support their electric vehicle projects.

These investments make the shipment of heavy batteries redundant. This is important as more and more logistics companies refuse to ship batteries for safety reasons.

Relocating microchip production back to the U.S. and Europe is another reshoring trend. Since most industrial products nowadays require a semiconductor chip to function, their supply close to the customer is crucial. Robots play a vital role in

chip manufacturing, as they live up to the extreme requirements of precision.

Specifically designed robots automate the silicon wafer fabrication, take over cleaning and cleansing tasks or test integrated circuits. Recent examples of reshoring are Intel's new chip factories in Ohio or the recently announced chip plant in the Saarland region of Germany run by chipmaker Wolfspeed and automotive supplier ZF.

3. Robots become easier to use

Robot programming has become easier and more accessible to non-experts. Providers of software-driven automation platforms support companies, letting users manage industrial robots with no prior programming experience.

Original equipment manufacturers work hand in hand with low-code or even no-code technology partners that allow users of all skill levels to program a robot.

The easy-to-use software paired with an intuitive user experience replaces extensive robotics programming and opens up new robotics automation opportunities. Software start-ups are entering this market with specialized solutions for the needs of small and medium-sized companies. For example, a traditional heavyweight industrial robot can be equipped with sensors and new software that allows collaborative setup operation.

This makes it easy for workers to adjust heavy machinery to different tasks. Companies will thus get the best of both worlds: robust and precise industrial robot hardware and state-of-the-art cobot software.

Easy-to-use programming interfaces, which allow customers to set up the robots themselves, also drive the emerging new segment of low-cost robotics.

Many new customers reacted to the pandemic in 2020 by trying out robotic solutions. Robot suppliers acknowledged this demand with easy setup and installation. This included pre-configured software to handle grippers, sensors or controllers support lower-cost robot deployment.

Such robots are often sold through web shops and program routines for various applications are downloadable from an app store.

4. AI and digital automation

Propelled by advances in digital technologies, robot suppliers and system integrators offer new applications and improve existing ones regarding speed and quality. Connected robots are transforming manufacturing. Robots will increasingly operate as part of a connected digital ecosystem: Cloud computing, big data analytics, and 5G mobile networks provide the technological base for optimized performance. The 5G standard will enable fully digitalized production, making cables on the shopfloor obsolete.

Artificial intelligence holds great potential for robotics, enabling a range of benefits in manufacturing. The main aim of using AI in robotics is to better manage variability and unpredictability in the external environment, either in in real time or offline. Machine learning thus plays an increasing role in software that can provide benefits such as optimized processes, predictive maintenance, or vision-based gripping.

This technology helps manufacturers, logistics providers, and retailers deal with frequently changing products, orders, and stock. The greater the variability and unpredictability of the environment, the more likely it is that AI algorithms will provide a cost-effective and fast solution. For example, this can help manufacturers or wholesalers dealing with millions of different products that change on a regular basis. AI is also useful in environments in which mobile robots need to distinguish between the objects or people they encounter and respond differently.

5. Second life for industrial robots

Since an industrial robot has a service life of up to 30 years, new tech equipment is a great opportunity to give old robots a "second life." Industrial robot manufacturers such as ABB, FANUC, KUKA, and Yaskawa run specialized repair centers close to their customers to refurbish or upgrade used units in a resource-efficient way.

This prepare-to-repair strategy for robot manufacturers and their customers also saves costs and resources.•