Robotics247

SPECIAL FOCUS ISSUE
JULY 2022

Precision and Automation in Manufacturing

PEERLESS
CONTENT CREATION

CONTENTS

Cover: Getty Images

EDITOR'S NOTE

Manufacturers are demanding ever-greater precision, accuracy, and reliability from industrial automation. Fortunately, sensors, robot arms, grippers, and the software to connect and guide them have become increasingly capable.

In response to the labor and supply chain challenges of the past few years, as well as the demands for personalization and rapid fulfillment, many factories and other facilities are looking to adopt robots or add them to their operations. In this Special Focus Issue, we look at how AI and machine learning are enabling more precise picking, among other applications.

Robotics 24/7 also examines the role of computer vision and innovative design as developers and suppliers race to provide affordable and easy-to-use robots. With Automate and Automatica, two of the biggest trade shows of the year, behind us, we also analyze robotics trends such as larger, more agile lift trucks and the need for integration with existing processes and environments.

The first half of 2022 has been a banner year so far for commercial robotics orders — don't hesitate to share your own successes and challenges with us!

Eugene Demaitre, Editorial Director
Comments? E-mail me at
edemaitre@peerlessmedia.com

EXECUTIVE CONTACTS

Group Publisher/International Sales
Tom Cooney
tcooney@peerlessmedia.com
973-214-6798

President and CEO, Peerless Media
Brian Ceraolo
bceraolo@peerlessmedia.com
508-663-1553

Editorial Director
Eugene Demaitre
edemaitre@peerlessmedia.com
508-380-5457

Associate Editor
Cesareo Contreras
ccontreras@peerlessmedia.com
508-663-1558

SALES

Western Regional Manager
Len Pettek
lpettek@peerlessmedia.com
805-493-8297 office
805-231-9582 Mobile

Midwest/Eastern Regional Manager
Michael Worley
mworley@peerlessmedia.com
508-663-1561

Advertising & Support Specialist
Michele Mittenzwei
mmittenzwei@peerlessmedia.com

CLIENT SERVICES

Director of Client Services
Mary Ann Scannell
mascannell@peerlessmedia.com
508-663-1560

Director of Marketing
Karen Bligh
kbligh@peerlessmedia.com
508-663-1550

Director Content Management
George Kokoris
gkokoris@peerlessmedia.com
508-663-1555

Director Online Technology
John Brillon
jbrillon@peerlessmedia.com

Webcast Project Manager
Steve Paul
spaul@peerlessmedia.com
617-281-7125

Office Manager
Laurel Peddie
lpeddie@peerlessmedia.com
508-663-1559

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Advances in AI, Testing, and Hardware Help Gripper Providers, Users Get a Grasp of What's Possible

Gripper makers are expanding their reach into new markets as increasing technological accuracy and robotics applications continue to grow.

BY CESAREO CONTRERAS

SOFT ROBOTICS INC. has learned a lot in the years it has spent primarily focused on automation in food processing.

The Bedford, Mass.-based company makes grippers and high-speed 3D vision software using artificial intelligence.

Harley Green, director of business development at Soft Robotics, said the company initially took more of a "shotgun approach" and tried to go after the automotive and pharmaceutical industries. For many businesses, however, the price-to-value proposition didn't exactly add up, he said.

RightHand Robotics demonstrates its RightPick 3 system. Source: RightHand Robotics

Soft Robotics expands from food to logistics

Soft Robotics realized that its best bet was to start with the food-processing market. The company sells standard end effectors through its mGrip product line and integrated systems that combine 3D vision, compliant grippers, and AI through its mGripAI line.

"The product market we found to be really successful is food," he said. "When we talk to customers in that space, they don't ever question pricing because they know it's going to cost more for a food-grade solution," he said. "We took a step back and said, 'Let's not get into the noise. Let's just double down and go after food.'"

The company recently announced that it is now marketing to the e-commerce and logistics markets. With a few years of experience in the food space and advancements it has made in its technology, Soft Robotics believes it can make the pivot.

"Focusing on one specific industry that was asking for our technology rather than trying to sell to companies that weren't asking for our technologies was a great move on our part," Green said. "It also helped us make that transition to e-commerce and logistics types of applications and help us develop our technology further and go after other opportunities."

Tool changing increases in speed, importance

As end-of-arm tooling [EOAT] technologies improve in precision and more industries look to automation, gripper makers have kept busy. Software advances are big driver, as user interfaces have become easier to use.

On the hardware side, there are new engineering feats such as the introduction of seven-axis collaborative robots and new grippers outfitted with force sensors.

Customers are always asking for more precision, speed, and flexibility, Green said. Getting customers the systems they desire takes a combination of many different types of technologies.

"You really need to marry a number of different technologies into an end-of-arm tool to be able to handle all of these different types of products that you're going to run into," he said.

Green mentioned advancements in automatic tool changers, noting that one of the biggest customer requests is the ability to eliminate the need for tool changes at all and to do it all with a single tool.

In the meantime, vendors such as Stäubli provide offerings such as the Safety+ System, which includes hardware and software for reliable and safe tool changing.

Accurate to the 99th percentile for e-commerce

Vince Martinelli, head of product and marketing at RightHand Robotics Inc., said pick-and-place automation really exploded about five to 10 years ago, in parallel with industry labor challenges felt across the board and the rise of online and mobile ordering.

The Somerville, Mass.-based company's RightPick System uses a gripper, a vision system, and control software. It's used for picking applications in the materials handling space. RightHand sells its system as a package, rather than each component piecemeal, since Martinelli noted that users want an integrated system.

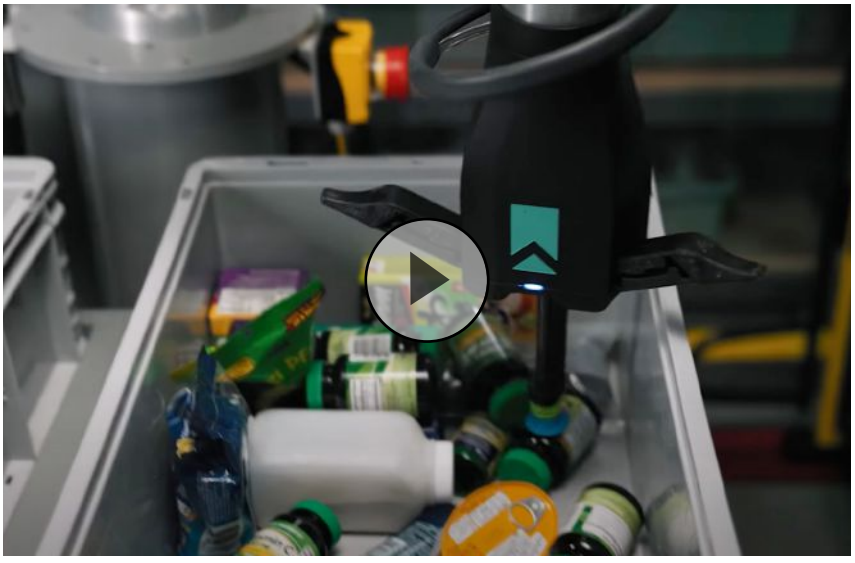
When RightHand Robotics launched RightPick 2 in 2019, it could do somewhere around 750 to 800 picks per hour at trade shows. Its latest version, the RightPick 3, can do 1,200, he said.

Accuracy and precision are of utmost importance on production lines, said Martinelli.

"If you get it right 90% of the time, seven or eight years ago, that's great," he added. "You'd see demos of the robots moving things, and people would say, 'Wow, that's incredible.' If you gave it to people who run warehouses, they'd say, 'What do I do with the other 10% of the time when it fails?'"

99% isn't even good enough, Martinelli added.

"You start [calculating]: If a robot does 500 to 600 tasks an hour in a particular job, if you fail one out of 100, that's five or six failures an hour," he said. "If you have 10 or 20 robots, someone's



spending a lot of time resolving issues. So, when we talk about accuracy and precision, it's about hammering out edge cases and issues and problems to get to 99.9% every time the robot is asked to do a task."

Testing is of paramount importance to making faster and precise systems. Martinelli explained that over the past two to three years, RightHand Robotics has focused on those capabilities.

"I'm not spilling any secrets here," he said. "If you want a highly reliable system, you have to invest in that."

RightHand spends a lot of time feeding data back to its grippers to help them grasp items more efficiently, said Martinelli. Machine vision, sensor, and camera refinements and dropping prices have also played an important role.

Martinelli cited Intel's RealSense depth cameras. Taking advantage of computer vision hardware and software, Intel said its cameras were "designed to give your products the ability to understand the world in 3D."

"We'll see where the camera technology goes because I think there is a big enough market across robotic applications," Martinelli said.

Electric versus pneumatic grasping

At the Automate 2022 trade show, OnRobot A/S showed off its new OnRobot Palletizer. Kristian Hulgard, the Odense, Denmark-based company's general manager for the Americas, said the EOAT maker is moving toward offering application-focused products rather than only selling grippers.

Hulgard said the palletizer uses both OnRobot's hardware and software.

"The hardware is a telescopic lift that can lift the robot up to palletize tall stacks of boxes," he said. "It also comes with two different tools to handle different types and different sizes of boxes."

OnRobot is trying to expand its horizons and sell more than just grippers, acknowledged Hulgard. "We've come a long way introducing the cobot as 'plug and play,' but there are still a lot other items or pieces of application that might not be easy to use," he said.

Hulgard said he is seeing increasing adoption of electric grippers over pneumatic ones because of their greater accuracy and control.

"More and more companies have a need to minimize their costs on the use of air," asserted Hulgard. "Being able to control your grippers with software is extremely key part of modern applications."

"In terms of accuracy, in terms of operations, the fact that you can control your gripper and monitor it to see how it performs as it should is definitely something that has a positive effect on the accuracy, operations, and quality," he said.

Still early days

Martinelli compared the automation space and the potential of EOAT to the airplane industry, noting that it is still "early days."

"Sometimes, we jokingly say we're past the Wright Brothers stage," he said, "but we're not at the point where you can book an international flight and get a meal and watch a movie and be on Wi-Fi."

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

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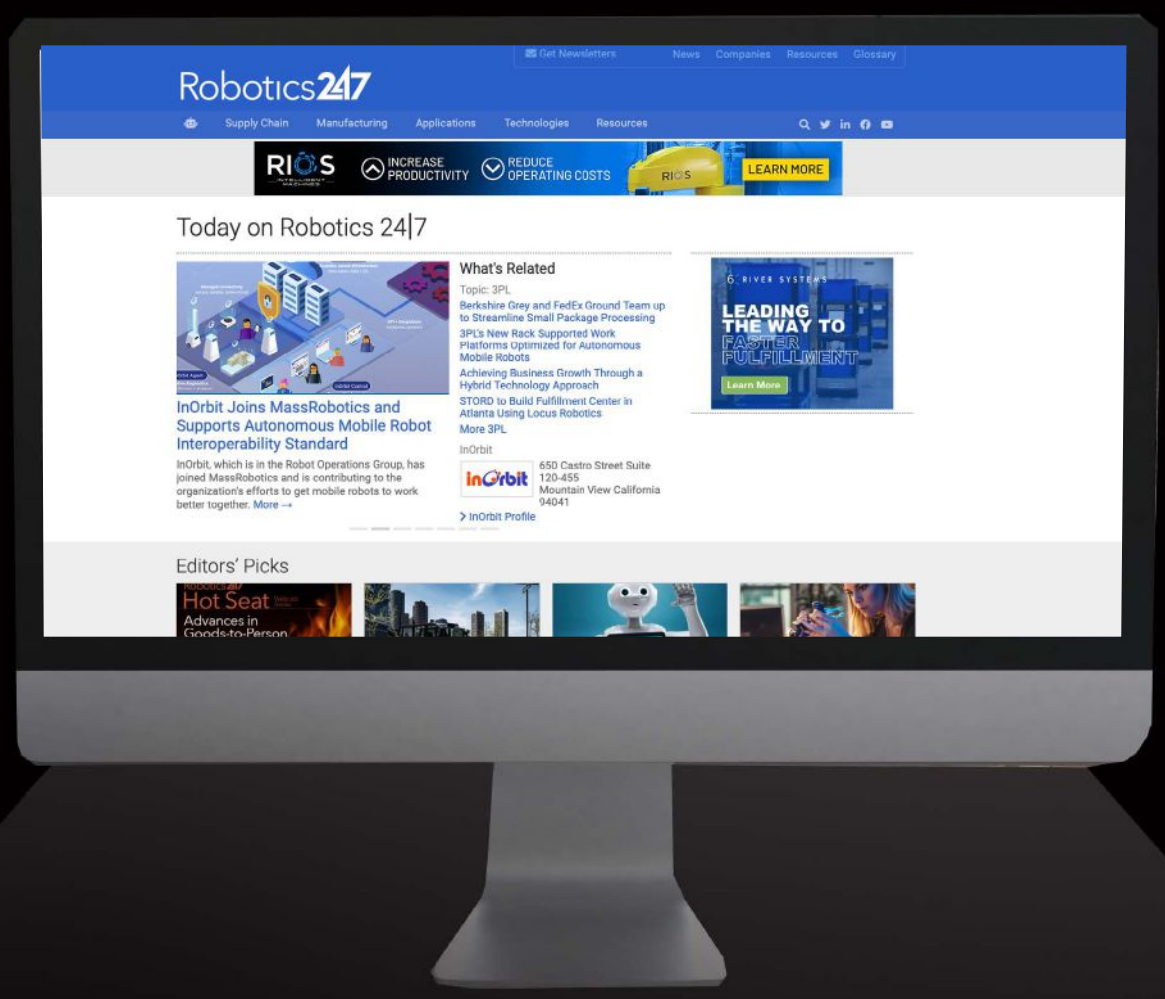

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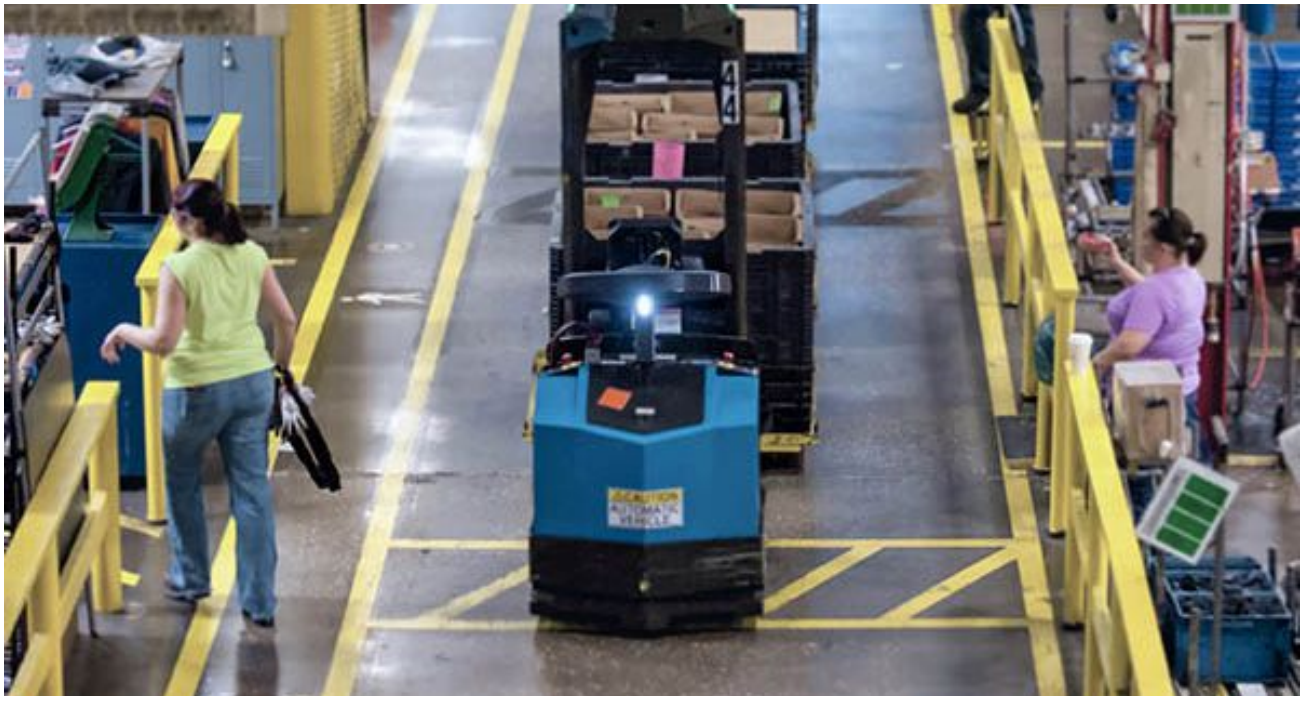
Perception Provides Precision for Mobile, Picking Robots



Perception systems enable Seegrid mobile robots and autonomous tuggers to operate safely around people. Source: Seegrid

Perception, from 3D imaging sensors to machine vision and controls, is necessary for robots to deliver precision in movement and safety.

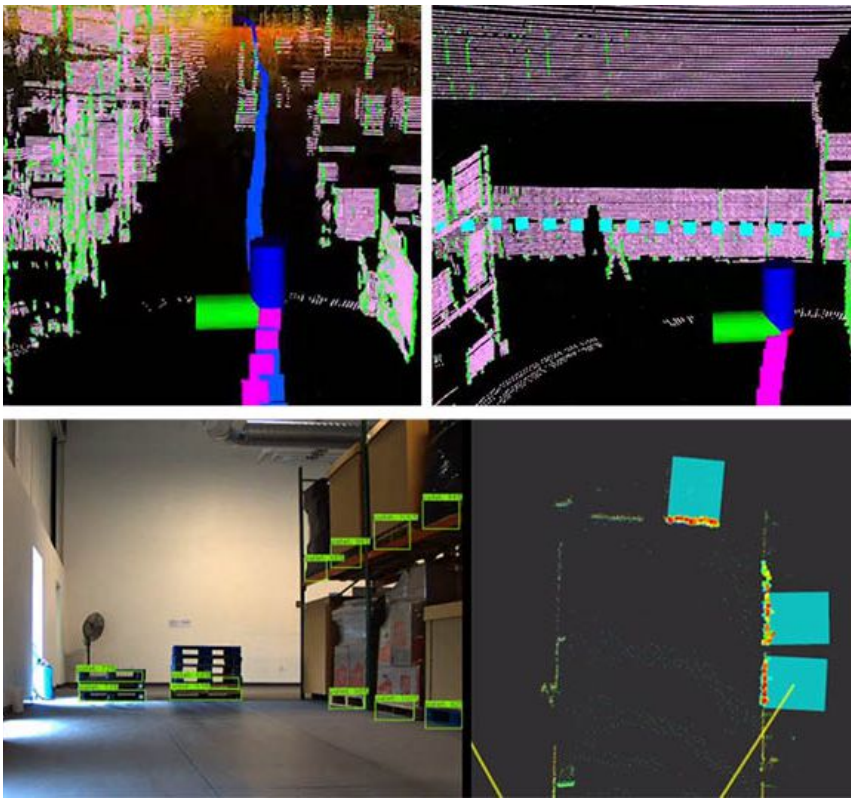
BY TOM KEVAN

Robotics companies are seeking to advance the ability of their technology to perceive and understand their work environments and by cultivating the capacity to adapt dynamic operating conditions on the fly. This situational awareness is enabled by a synergy between sensors and machine learning.

By giving mobile and picking robots more human-like perception of their physical environments, developers are also increasing the level of precision that users can expect from them. This in turn has expanded the range of tasks and services that robots can perform autonomously.

"Robotics is often defined as an intelligent connection between sensing and acting," said Sean Johnson, chief technology officer at Locus Robotics.

"The sensor data is fed to algorithms that allow robots to actively map their working environments, recognize known objects as well as unknown obstacles, predict the movement of objects, predict congestion, and then make the right decisions that are critical, not only for operational effectiveness and productivity, but also worker safety."



Vecna's AMRs use 3D sensor fusion for perception and route planning and object recognition for obstacle avoidance and pallet detection. Source: Vecna Robotics

Perception is the first step toward precision

The addition of perception has fundamentally changed in the way that autonomous mobile robots (AMRs) navigate the workplace and continues to redefine their relationship with human co-workers. No longer moving from point to point based on x, y, z coordinates plotted in space, AMRs now rely on a type of real-world situational awareness.

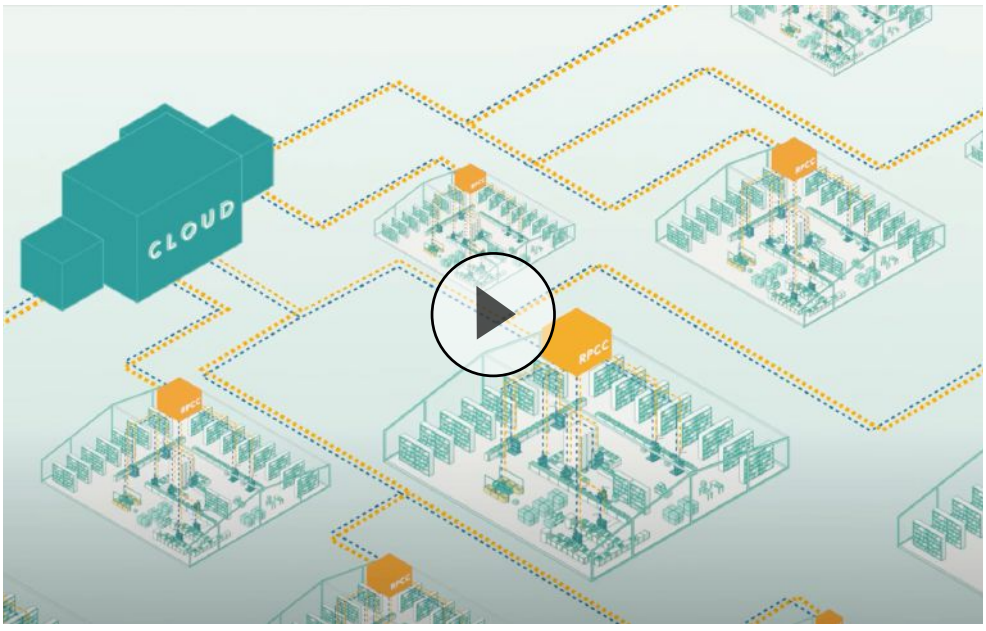
"Sensors enable robots to understand their environment," noted Matt Cherewka, director of business development and strategy at Vecna Robotics. "Advanced, intelligent sensing that fuses multiple sensor types together for 3D perception and applies machine learning and AI for image recognition gives robots a more human-like understanding of their environment for real-time adaptive planning."

"This gives robots the flexibility to perform more complex tasks and service a broader range of use cases and operating conditions, such as being able to identify and pick a specific SKU or payload from a random position that they haven't necessarily been hard-programmed for," he explained. "Using advanced perception in robots results in a flexible system that can adapt to the day-to-day fluctuations in business activity while operating at peak performance and uptime."

Data-rich sensors enable greater precision

To advance the capabilities of AMRs, developers can deploy a variety of sensors to measure factors like distance, force, and torque. Of all these sensors, robot designers rely most heavily on imaging.

"In the past decade, the most impactful sensors have been depth imaging sensors," said Tom Galluzzo, founder and chief technology officer of IAM Robotics. "In these applications, 3D cameras and 2D and 3D lidar are used to provide data points about the physical features of an environment for autonomous robots. These sensors are capable of measuring the distance of physical objects and providing



the geometric information back to the robot."

To further improve perception and achieve greater precision, developers are enhancing the mix and number of sensors deployed.

"For additional situational awareness, we use multiple 3D sensors to identify moving and stationary objects in proximity to our robots and safety-rated 2D lidar scanners around the robot to ensure we meet and exceed regulatory safety requirements," said Todd Graves, chief technology officer of Seegrid. "Today, we're also using 3D lidar advancements to augment our ability to accurately map the infrastructure around us—things like tables, racks, conveyors, and payloads."

"This increased perception helps the robot identify and interact with its immediate surroundings and infrastructure," he added.

Bear in mind that to extract the full benefit of the mix and number of sensor technologies in play, robot developers have also had to harness high-speed, high-capacity processors and the latest machine learning tools and techniques.

"It's really the convergence of advanced sensing, processing, and AI trends and capabilities that enables robotic perception that senses and understands the environment and can execute the task at hand," said Vince Martinelli, head of product and marketing at RightHand Robotics.

Perception enables dynamic, real-world applications

Leveraging intelligent perception, autonomous robots are now capable of high levels of precision, which allows them to provide value in an expanding range of industries. These include such applications as e-commerce order fulfillment, store replenishment, and material handling. Companies deploying these systems are realizing increased throughputs and higher efficiency.

One example of the role of perception can be seen in evo's deployment of the collaborative LocusBots from Locus Robotics.

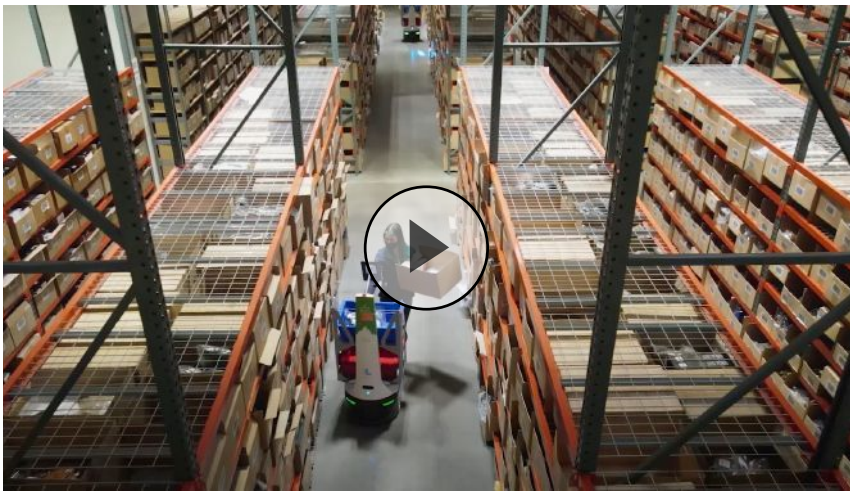
The e-commerce retailer rolled out 10 AMRs in its 165,000-sq.-ft. fulfillment facility to streamline picking operations. evo needed the robots to better meet the demands of seasonal peak sales, compensate for labor shortages, and accommodate pandemic safety requirements, such as social distancing.

With perception capabilities, the LocusBots automatically learned the most efficient travel routes through the warehouse and were able to handle multiple container configurations. Furthermore, the collaborative mobile robot met a wide range of tote and multi-bin picking requirements, and its lightweight structure enabled it to safely operate alongside workers, even in tight working conditions.

The LocusBot system was implemented in 53 days. Workers who were picking an average of 35 units per hour (UPH) with manual carts started to pick an

average of 90 UPH with LocusBots. Some workers picked as many as 125 UPH.

"In the future, we see an opportunity in directed putaway, as well as transporting goods from one part of the warehouse to another," said Spencer Earle, director of supply chain at evo.



ZF Group uses machine vision for manufacturing

In an example of autonomous robot perception at work in an industrial setting, German automotive supplier ZF Group wanted to automate machine tending in its high-volume milling stations, where it manufactures gears.

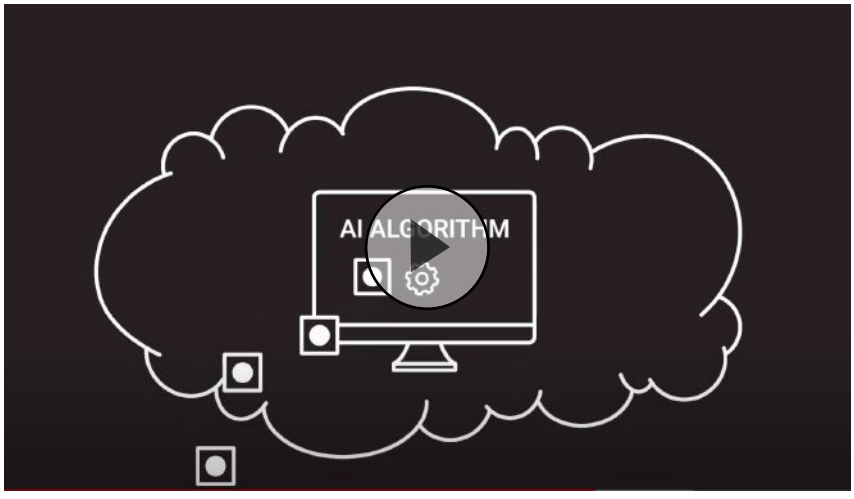
To perform this application, ZF deployed a system that consisted of a MIRAI kit from Micropsi Industries, which included a control box and a camera. It also included a Universal Robots UR10e collaborative robot arm, an OnRobot force-torque sensor, and a Schunk gripper.

The MIRAI vision-based control system uses artificial intelligence to enable robots to deal with complexity in production environments. Once fitted with MIRAI, a robot can perceive its workspace and correct its movement where needed to perform a task. A background in engineering or AI is not required to train or retrain MIRAI.

The metal rings in the crate arrive in layered beds, with the workpieces laid closely together on their flat sides. The UR10e cobot has been programmed via its native controller to move above individual rings in the crate.

Once the robot is above a ring, the MIRAI system takes control, moving the UR10e to the nearest ring and placing the gripper in gripping position. After this position is reached, the robot's native system reassumes control. The cobot then picks up the ring, moves it to the conveyor belt, and places it on the belt.

Micropsi said the MIRAI-based picking system proved to be faster and more reliable than classic automation, which would be either unable to deal with these complexities or very expensive to set up. Even when customized, classic automation systems would be tailored for this task alone and no others, said the company.



__Tom Kevan__ is a freelance writer/editor specializing in engineering and communications technology.

Modern Machine Vision Helps Robotics Provide Value

Machine vision is enabling robotics researchers to develop applications with commercial promise.

Getty Images

BY JIM ROMEO

Researchers are developing new ways for vision systems to aid robots in industries such as real estate, agriculture, and entertainment.

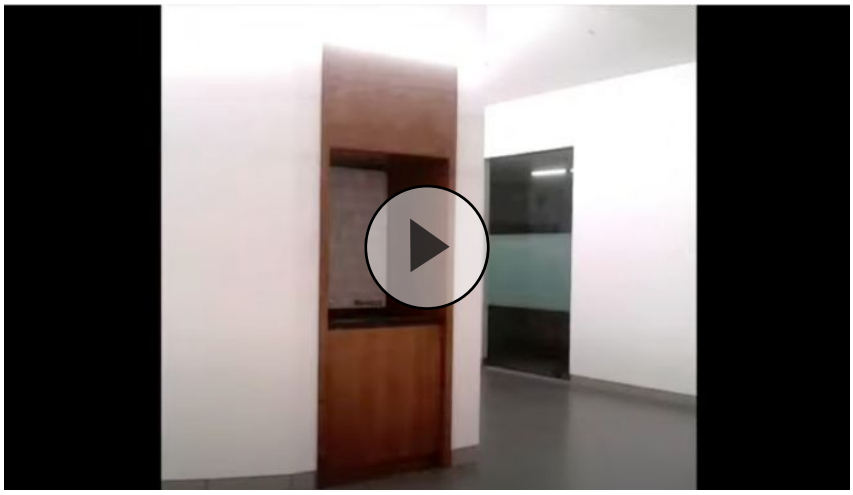
The vast scope of robotics innovation is enabling machines to not only relieve humans of tedious tasks but also perform at superhuman levels. From picking operations in warehouses to complex surgical procedures, robots are becoming more dexterous and autonomous. And with artificial intelligence, they can operate more consistently and with fewer errors over time. Vision technology is enabling a host of new robotics applications.

Robots and drones might be able to spot anomalies or defects, but they need contextual judgment to know what to do next. Similarly, can robotic vision discern aesthetically pleasing scenes and then snap a photo?

That's precisely what a graduate student at Cornell University is working on. Hadi AlZayer came up with the idea during a nature walk. It led to AutoPhoto, a robotic system developed with the help of other researchers at Cornell Ann S. Bowers College of Computing and Information Science. The digital technology allowed a robot to survey an interior space and take photographs that people would find pleasant.

The system used AI and machine learning to build what Cornell researchers called a "learned aesthetic" model. A robot would visually document a space by taking "smart" photographs.

With AutoPhoto, a robot could travel around a real estate property to promote it for sale. Or, it could observe dangerous areas in an industrial setting or gather surveillance data for security purposes.



Robotic vision on the farm

Moving outdoors, robotic vision systems could assist with agricultural tasks such as pruning apple trees, estimating fruit yields, thinning out crops, or picking mushrooms.

Cornell University researchers have developed technology that could make a big difference in the growing of grapes. Powdery mildew is a harmful fungus that invades the leaves of wine and table grapes. It leaves white spores on leaves and fruit.

To counter the fungus, growers must precisely and consistently apply fungicides. The whole process of finding and treating such leaves to kill the fungus is laborious and costly.

The Cornell scientists developed robot prototypes capable of scanning grape leaf samples automatically, using a robotic camera they named "BlackBird." The robot can gather information "at a scale of 1.2 micrometers per pixel—equivalent to a regular optical microscope. For each 1-cm leaf sample being examined, the robot provides 8,000 by 5,000 pixels of information."

In addition, researchers at Penn State have developed a machine vision system that allows robots to see objects while on the move. It uses a powerful LED flash that rapid fires on a target so that an image can be identified without blur or other disturbances such as vibration from passing over rough terrain.

The researchers stated that the technology could expedite some processes in challenging agricultural environments.

"Artificial intelligence does well with images that are really rich with information, so the important thing is capturing high-quality images," said Omeed Mirbod, a doctoral student in agricultural and biological engineering. "For agriculture, we need images that are invariant to outdoor lighting conditions."

"If you capture an image in which a fruit is very saturated with light due to the sun, and then capture another one in shadow where there is little sunlight, the artificial intelligence that you're training to detect the fruit might struggle to identify it," he said.

Chess player a first move to smarter robots

Machine vision can also help robots with more entertaining things, like chess. Even games can develop and demonstrate apabilities that lead to more demanding use cases for robotics and AI.

Many innovations begin with the interest of a single individual with unique curiosity. That's what happened at the Rose-Huhlman Institute of Technology in Terra Haute, Ind., where a mechanical engineering student chess aficionado who saw a relationship between AI, robots, and problem solving.

Using trial and error and "principled AI," Josh Eckels put a robot to work to find solutions to chess problems, with the intent that the underlying technology could solve problems in other scenarios.

His system used a camera mounted about 36 in. above a chess board watches the pieces and their movements. The camera captures the movement and feeds it into an AI-based chess engine that determines the next best move.

But the model is physical. A gripper then moves the piece per the engine's direction, and the robot waits for the next move by its human opponent. waits for a move to be made by the live person (see video below).

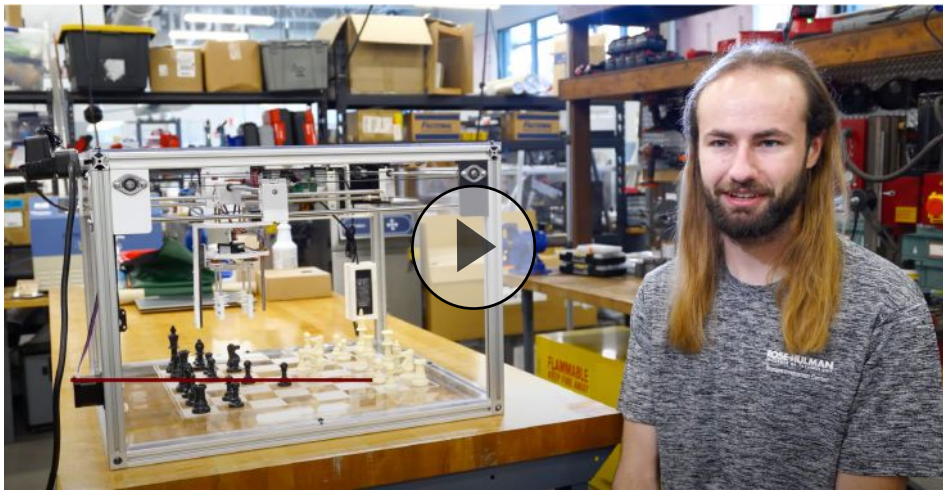
The innovation behind this approach isn't just about chess; it's about how cognitive AI can guide a robot's physical reactions.

Vision provides power for robotics

University researchers are imaginatively exploring ways in which machine vision can inform robotics movement, manipulation, and task planning, from fashion photography and fruit tending to chess.

This is just a mere sampling of the ways in which researchers are combining vision technology with robotics to produce new capabilities. Despite their use in many manufacturing, logistics, and warehouse tasks, they're by no means mature, with many more applications to come.

Jim Romeo *is a freelance writer and contributor to* Robotics 24/7 *based in Chesapeake, Va.*



Rizon 10 Robot from Flexiv Given ‘Best of the Best’ Award in Red Dot Design Award Competition

The robot arm was lauded for its “discreet design language” and “highly developed functionality.”

BY ROBOTICS 24/7 STAFF

Flexiv Ltd. recently announced that it has been given the “Red Dot: Best of the Best” award for its Rizon 10 adaptive robot.

Flexiv described itself as a “general-purpose” robotics company focused on developing and manufacturing adaptive robots. The Santa Clara, Calif.-

The Rizon 10 has seven degrees of freedom. Source: Flexiv

based company claimed that its innovative turnkey systems and services serve customers in various industries.

The Rizon 10 is one of Flexiv's latest products, featuring industrial-grade force control, computer vision, and artificial intelligence technology. Capable of lifting a 10 kg (22 lb.) payload and extending 1,015 mm (39 in.), the Rizon 10 is adaptable and safe thanks to precise feedback sensors, the company said.

Flexiv among competitors from about 60 countries

The Red Dot Design Award is an international German design competition for "product designs, communication designs, and design concepts," according to Red Dot GmbH's website. In 2022, designers, design offices, and manufacturers from around 60 countries entered products in the Red Dot Award in the Product Design discipline, following the motto "In search of good design and innovation."

Competing against roughly 20,000 other submissions, the Rizon 10 won the honor, Flexiv said. During an evaluation period lasting several days, the Red Dot Jury assessed the Rizon 10 on its level of innovation, functionality, and longevity.

"The Rizon 10 impresses with a discreet design language and almost seems to offer its services in a friendly and approachable manner," stated the jury. "With the perfectly finished aluminum-alloy surface, it breaks with the often predominantly industrial look of other robots."

"Based on the physiognomy of the human arm, the organic design of this robot is in harmony with its highly developed functionality and the far-reaching capabilities achieved thanks to artificial intelligence," the jury noted.

Rizon 10 on display at Red Dot Design Museum

The Rizon 10 is on display at the Red Dot Design Museum in Essen, Germany, from June 2022 to May 2023.

"Every designer dreams of being recognized with a Red Dot award, and my team and I are immensely proud to be on the list of Best of the Best this year," said Xuesen Li, Flexiv's director of product and the lead designer of the Rizon 10. "We spent considerable amount of time developing the product and have gone through countless design iterations to achieve a balance between functionality and aesthetics. With a pleasant appearance, Rizon blends well into people's everyday living environment."

In June, Flexiv showcased at the Automate 2022 trade show in Detroit. In addition to displaying the Rizon 10, the company also showed the Rizon 4 and the Rizon 4s.

Danish Robotics Producers Demonstrate Manufacturing Systems at Automatica

Danish robotics companies are working with Odense Robotics and other groups to show strength of country's innovation sector.

BY MALENE GROULEFF

AT AUTOMATICA in Munich last month, automation buyers from across Europe were able to see leading Danish robotics companies. The event, which which expected 45,000 attendees, will serve as an opportunity for Danish automation to gain the approval of demanding German customers, according to the Danish robotics cluster.

Eight vendors are working on the export promotion at Automatica with the Odense Robotics cluster, the Innovation Centre Denmark, and the Danish Ministry of Foreign Affairs.

The innovation and collaboration of the Danish robotics industry helps it serve global needs, said Mikkel Christoffersen, CEO of Odense Robotics. Source: Odense Robotics, via LinkedIn

"Robotics and automation are among Denmark's fastest-growing export industries, with a total exports surpassing €1.5 billion [$1.58 billion U.S.]—a figure expected to grow to close to €2 billion [$2.1 billion] by 2025," stated Mikkel Christoffersen, CEO of Odense Robotics. "The reason why Danish robotic companies experience such strong exports is that they develop innovative solutions that customers simply can't get from local suppliers."

He added that the collaborative nature of Denmark's robotics sector is a key contributor to its product innovation and global competitiveness. Well-known Danish robotics providers include collaborative robot leader Universal Robots, mobile robot provider Mobile Industrial Robots, and gripper supplier OnRobot.

Robots offer solutions to industry challenges

Odense Robotics said its exhibit at Automatica will host the following Danish robotics companies addressing the needs of German manufacturing:

- **Cobot Lift ApS** said its systems can help prevent injuries related to heavy lifting and provide a new way to retain employees amid recruitment problems and an aging population.
- **Enabled Robotics ApS** said its mobile manipulator, which combines a collaborative robot arm and a mobile robot, can automate varied internal logistics tasks so that manufacturers can stay profitable and competitive.
- **Fynbo Technology** said its adaptable, flexible robots enable fast delivery of varied products in response to market demand and reduces downtime.

- **Smooth Robotics**, whose automation can alleviate a lack of skilled welders that has created delivery problems. It also addresses increasing demands for a healthy and attractive work environment.
- **Spin Robotics ApS** automates screw tasks and changes of parts. As manual tasks, these have been time-consuming and limited the ability of automotive and electronics manufacturers to scale production. The company added that its systems can meet quality demands in the screw process by offering complete documentation that can be accessed live and as historical data.
- **STRECON A/S** provides robots that allow employees with the necessary knowledge and experience to "instruct" them to precisely polish injection-molded parts. This enables employees to have more varied and less strenuous jobs, it said.
- **Technicon** said it offers the "the highest level of reliability, hygiene, and safety" along with fast scalability for the pharmaceuticals, biotech, and medical industry. It delivers advanced automation to global healthcare leaders such as Novo Nordisk, Radiometer and Christian Hansen.
- **Trendlog.io ApS** said it supports German companies implementing Industry 4.0. It claimed that it can deliver insights into production, improve sustainability, reduce waste, and cut costs through data collection and digitalization.

In addition to the Danish robotics pavilion, visitors could meet seven more Danish robotic exhibitors on their own stands: Audite Robotics, Capra Robotics, FundingBox Research, JVL, Kassow Robots, Meili Robots, and Universal Robots.

The city of Odense also hosted a matchmaking event, the Odense Investor Summit, in Automatica's Start-Up Arena. Between 600 and 700 exhibitors showed their robotic systems in more than 66,000 sq. m (710,000 sq. ft.) of floor space at Automatica.

Danish robotics sector shows strength

With a turnover of €2.8 billion representing a 12% increase on the previous year, Denmark's robotics industry generated a strong growth in 2021. Odense Robotics provided more statistics in its "Insight Report 2022: Deploying Robotics in New Industries".

In terms of population, Germany is 14 times bigger than its neighbor country to the north. Nevertheless, cobots from Universal Robots rank among the most popular robot manufacturers on the German market, said HowToRobot.

Twenty-six percent of robot and automation suppliers in Germany supply Universal Robots, which ranks third among distributors. German vendor KUKA ranks first, followed by ABB in HowToRobot's analysis of the German robot market.

The annual global growth rate for sales of collaborative robots is 40%, according to Statzon.com.

More than 3 million robots are at work in the global manufacturing industry, reported the International Federation of Robotics (IFR). The IFR noted that the potential to automate more tasks currently performed by people is "significant." As a result, the Danish robotics cluster said it expects strong sales to continue in collaborative robots, where it claims innovation leadership.

10 Noteworthy Robot Exhibits at Automate 2022

A look at some of the interesting robot systems we saw at the show, from Epson's GX Series of SCARA robots to FANUC's delta food-picking robot.

BY CESAREO CONTRERAS AND EUGENE DEMAITRE

Thousands of people headed to Detroit to participate in the Automate 2022 trade show and conference last month. Automate was held at the Huntington Place convention center by the Association for Advancing Automation (A3). It was also the first time the show was held since the COVID-19 pandemic.

From cobots and AMRs to grippers and vision systems, the automation technologies on display were impressive. More than 500 exhibitors showed off their products at the show, as they look to the industry's future and grow their customer base.

FANUC's M-2000iA carries a Corvette. Source: Cesareo Contreras

Some of the most interesting technologies we saw were born out of partnerships. At its booth, Mitsubishi showcased how its robots can be used on top of other companies' hardware and software. Plus One Robotics showed off how its technology integrates with Tompkins Robotics' tSort system. Effidence's EffiBOT AMR was roaming around the show floor with a robot arm from Nachi Robotics.

Some of the biggest robotics companies in the world displayed for the first time at least one new robot or robot system. Epson Robots showcased its new high-end SCARA line. Yaskawa displayed its cobot welding work table. FANUC's booth included its new food-picking delta robot, along with the large FANUC 1000iA assembly robot.

Other companies, such as Universal Robots, showcased technologies that are still a little ways off. The Odense, Denmark-based company displayed a concept cobot that had a smooth exterior that could work well in food handling and medical environments. The company said it is showcasing the concept now to get customer feedback.

1 Doosan's mobile manipulator unloads van

Doosan Robotics' booth had a range of applications. One of the most notable was its mobile manipulator unloading the back of the van.

A heavy duty robot arm was placed on top of a custom-made automated guided vehicle. A gripper from OnRobot was used to pick up the packages.

Source: Eugene Demaitre

2 EffiBOT uses Nachi robot arm for mobile manipulation

While there were plenty of robots at booths, a few could also be seen moving around the show floor.

One of them was Effidence's EffiBOT. Attached to the mobile robot was a robot arm from Nachi Robotics Systems. Showing the EffiBOT at Automate was Effidence's U.S. partner A&M Industrial.

Thomas Trudell, business development strategist of corporate accounts at A&M Industrial, told *Robotics 24/7* the EffiBOT can work with a range of robot arms. At the show, the system was loading and unloading a CNC machine.

Trudell said the mobile robot/robot arm combo allows for a more integrated all-in-one system.

"The old technology goes back to one arm, one machine or maybe two machines," he said. "Then they moved into the rail system, a guided rail that a robot slides along and can load multiple machines. The next iteration of that would be something like what we did here, where we pair an AMR with an arm so that we can do a whole shop, not just tending the machine but fully automate an entire plant."

3 Epson debuts GX Series SCARA robots

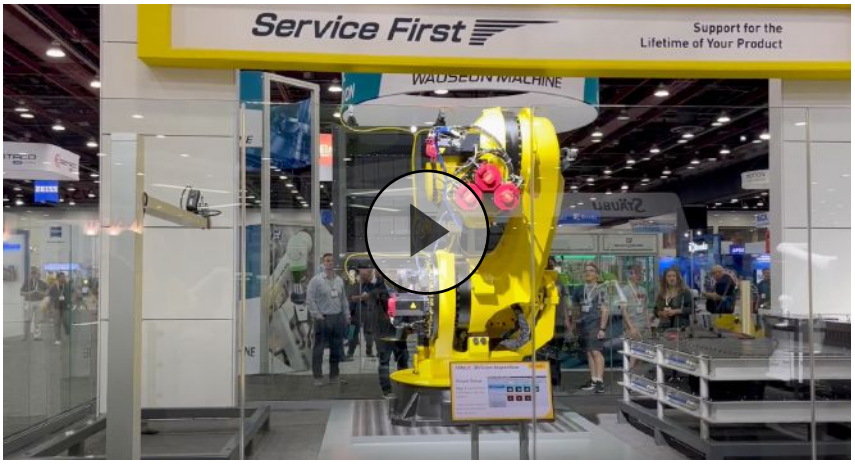
Epson introduced a new high-end line of SCARA robots at the show. The GX4 and the GX8 make up the company's new GX Series. The GX4 can handle payloads of up to 4 kg (8.8 lb.), and the GX8 can handle payloads of up to 8 kg (17.6 lb.). That's an increase of about 33% from the company's G-Series line of robots.

The company demoed the robots performing high-speed pick-and-place applications for the medical industry.

Tony Chandek, a regional sales manager at Epson Robots, told *Robotics 24/7* that the company is offering a number of different versions of the robot, including cleanroom and IP65-protected options.

The GX Series line of robots also have improved and higher-watt capacity motors, allowing them to operate more quickly. In addition, Epson's patented GyroPlus Technology, a vibration sensor that allows the robot to tune out servo vibrations before they happen.

4 FANUC's new battery-assembly robot carries 1,000 kg payloads



Capable of carrying payloads of 1,000 kg (2,204 lb.), the FANUC 1000iA was designed to be used for automotive component assembly, including the construction of battery packs for electric vehicles, Cathy Powell, FANUC America's public relations and communications manager, told *Robotics 24/7*. The robot has a horizontal reach of 3,253 mm (128 in.) and a vertical reach of 4,297 mm (169 in.).

Its "serial link construction" allows it to move its arm upright and rotate backwards, a novel feat given its size and payload capacity, the company said.

Wesley Garrett, an account manager of the authorized system integrator network at FANUC America, said the company developed the 1000iA to bridge the gap between the M900, which has a maximum capacity payload of 700 kg (1,543 lb) and the M2000, which has a max payload of 2,300 kg (5,070 lb).

5 FANUC showcases stainless-steel delta robot

One of the faster robots at the show was FANUC's new stainless-steel delta robot. The DR-3iB/6 STAINLESS comes equipped with a gripper from Soft Robotics and is designed for food processing.

FANUC designed the stainless-steel body to be "resistant to the chemicals and high pressure/temperatures required in strict wash down environments."

On the show floor, the robot was picking up and placing plastic pieces of food at great speeds.

The DR-3iB/6 STAINLESS has a 1,200 mm (47 in.) reach and a 400 mm height (15.78 in.).

6 Mitsubshi teams up with Realtime Robotics

For Automate this year, Mitsubishi Electric and some of its partners shared how their technologies work together.

One of the more interesting demonstrations was Realtime Robotics' collision management software, which allows multiple robots to work in proximity to one another in one work cell.

Three Mitsubishi robots, including the 7FRL, the 8CRL, and 5AS, simulated locating holes for screwing, picking up screws, and screw fastening.

Realtime Robotics' dynamic path-planning software prevented the robots from hitting one another.

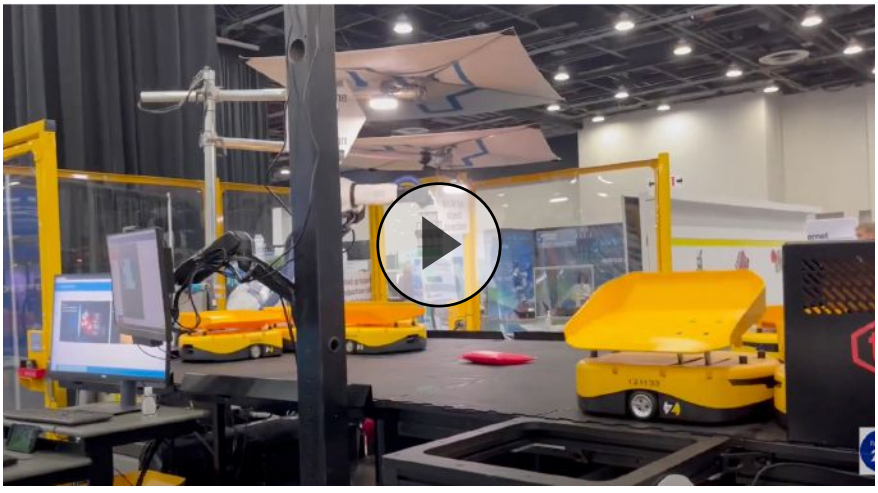
Patrick Varley , product marketing manager at Mitusbishi Electric Automation, said one of the best parts of the path-planning software is that it can easily be reconfigured and adjusted on the fly by workers on the floor.

7 Plus One Robotics demos tSort AMRs using its software

After announcing a partnership with Tompkins Robotics back in March, Plus One Robotics demonstrated the tSort system in action using its 3D and AI software at the show.

Plus One Robotics CEO Erik Nieves told *Robotics 24/7* the system combines mobility and manipulation.

"Traditionally, you think of Plus One as a manipulation house," he said. "We have the robot arm, and we have the cameras, and we tell the robot what to pick up. But in this instance, we're showcasing how that can actually be tied into a mobile robot platform."

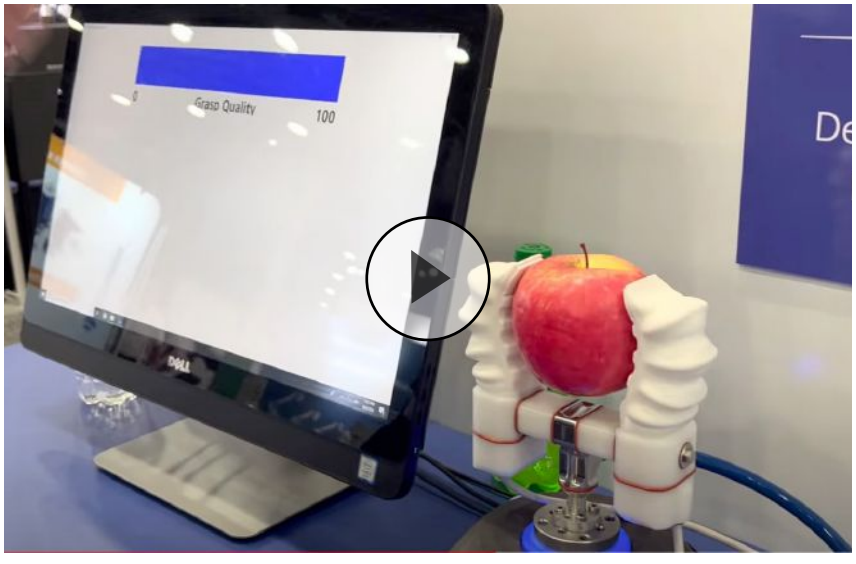


"I wanted to showcase this because these are two different supplies of automation for the same market, but we were able to work together because we have a defined set of connection points, APIs, IO, and the integration is very straightforward," he added.

8 Soft Robotics new gripper improves grasp quality

As part of its mGripAI platform, Bedford, Mass.-based Soft Robotics Inc. designed a new gripper with a host of sensors that can better assess what it is holding.

"What we did was embed force sensors in the fingers," said Harley Green, director of business development at Soft Robotics. "Now we can tell if we have a product in the gripper for grip confirmation, and we can also tell if we've delivered product."



The new gripper can also determine how strong of a grip it has on items and can adjust its acceleration to accommodate, Green said.

"We can actually machine learn on the products," he said. "If we are moving something like chicken flats, we know they are a little bit more rigid than a chicken breast, so we can actually machine learn on the product, so when the product is in a certain zone of the gripper, we're going to have an optimal grasp. We can change our grasp quality profile based on the product and the optimal gripping location."

9 Universal Robots shows concept cobot, partner apps

In addition to displays of collaborative robot applications with partners, Universal Robots A/S featured a "concept model" at the center of its Automate 2022 booth. The robot arm's smooth exterior and coating were designed for wipe-down environments such as food handling or pharmaceuticals. The concept cobot isn't sealed for full cleanroom or wash-down requirements.

The concept is a new approach to get user feedback, said a representative for Universal Robots. Kim Povlsen, the new president of the Odense, Denmark-based company, is striving for transparency and early user input, he said.

Universal Robots had technicians on site for conversations with users about additional potential capabilities for future products. Its booth was divided into areas devoted to assembly, metal fabrication, metrology, and palletizing and packaging.

"In 2019, we showed demonstrations of applications, but now we're showing real-world examples with partners," said Joe Campbell, senior manager of strategic marketing and applications development at Universal Robots. "For example, Melton is showing automated TIG welding for the first time, using water-cooled systems and URCaps."

Source: Eugene Demaitre

Campbell also introduced *Robotics 24/7* to Brian Knopp, founder of UR-certified systems integrator Cobot Systems. He showed the first U.S. demo of a cobot controlling an IPG LightWELD laser welder. It can weld items of different thicknesses and reduce jobs from 1.5 hours to six minutes, said Knopp.

In addition, Joshua Mayse, co-founder and vice president at UR partner Mid-Atlantic Machinery, showed how its Press Brake Operator Package can improve efficiency and safety.

10 Yaskawa cobot welding table in development

In its Automate booth, Yaskawa Motoman displayed industrial automation, collaborative robots, and controllers. Don Doersam, senior exhibits manager at Yaskawa America Inc., pointed out a cobot welding table with a system still in development. It uses Yaskawa's HC10 robot arm, which will provide flexibility for users, he told *Robotics 24/7*.

The company said its ArcWorld RS and HS enclosed welding workcells require only 2.3 sq. m (25 sq. ft.) and 1.4 sq. m (15 sq. ft.) of floor space, respectively. They're designed to be easily integrated into existing processes, said Yaskawa. It also offers the six-axis GA50 robot for laser welding, cutting, and dispensing.

Yaskawa promoted its Universal Welcome Interface, a pendant application for Miller and Lincoln Electric controllers for arc welding. In addition, it showed the extended-reach GP70L robot, which can reach about 3 m (18 ft.) and is designed for tasks including palletizing.

Cesareo Contreras *and* ***Eugene Demaitre*** *are the editors of* Robotics 24/7.

Covision Quality Wins $10,000 Grand Prize in Cowen Startup Challenge at Automate 2022

Covision, which makes AI software for visual inspection, is hoping to expand its U.S. customer base.

BY CESAREO CONTRERAS

DETROIT—Last month at the Automate 2022 trade show and conference, Covision Quality was awarded the $10,000 top prize in "The Cowen Startup Challenge: Automate to Outperform" competition.

South Tyrol, Italy-based Covision Quality makes software using machine learning and computer vision that scales and automates "visual inspection and defect inspection on metals and plastics," according to its website. The startup is a spin-off of Covision Lab, which is backed by seven multinational technology companies, including Durst, Microtec, alupress, TTControl Hydac International, Microgate, Mirco Photon Devices, and Barbieri.

Covision Quality said its customers include manufacturers in the "downstream industry," including GKN Powder Metallurgy and Aluflexpack. Its partners include NVIDIA, the German AI Association, Tum.ai, and iMAGE S.

Covision Quality has made a lot of strides in the nearly three years since its founding, said Franz Tschimben, CEO of Covision Lab. He told *Robotics 24/7* that the company has customers in Italy, Germany, Croatia, and the U.S.

Left to right: Covision Lab engineer Pietro Buzzega and Covision Lab CEO Franz Tschimben. Source: Cesareo Contreras

Covision applies deep learning to inspection

The software company said it takes advantage of technologies such as deep learning, 3D modeling, and image processing to complete its work.

Tschimben said the main key performance indicators (KPI) Covision focuses on include reduction of scrap rate and deployment speed.

Startups compete at Automate

Covision Quality was one of 10 startups that competed in the Cowen Challenge. Others included Aivero AS, FLX Solutions, INNOCISE GmbH, InOrbit Inc., Neurocle Inc, NINOX 360 LLC, Quotebeam Inc., Scalable Robotics Inc., and Voaige.

Each of the companies nominated has raised less than $5 million since they were founded. Although there was only one winner, each of the finalists was given exhibit space on the Automate show floor. As part of the contest, each of the companies had to pitch their technologies to a panel of judges at the show. The competition was sponsored by Cowen Inc., an independent investment bank. The multinational company is based in New York.

Covision has U.S. ambitions

Tschimben said the company came to Automate "with a specific goal to win the competition in order to generate visibility in the U.S. market."

Covision Quality said it plans to use the $10,000 to cover some of its expenses, though Tschimben noted the biggest benefit of being recognized is the marketing value. He said the company is in the process of doing its first installation in the U.S.

The company also attended the show hoping to generate partnerships with systems integrators.

"When we go to a new production line, we would love to partner up with system integrators who have experience in setting up systems for whole production lines," Tschimben said.

Cesareo Contreras is associate editor at Robotics 24/7.

Automate 2022 Vendors Focus on Interoperability and Systems Integration

Automate speakers and attendees said integration is shaping up as the key to further value.

BY ROBERTO MICHEL

The Association for Advancing Automation, or A3, had some encouraging growth news at the start of its Automate show in Detroit last month: After a record year in North America for industrial robot orders in 2021, that momentum carried into the first quarter of 2022.

A3's figures showed that North American companies started the year by purchasing the most robots ever in a single quarter, with 11,595 robots sold at a value of $646 million. That's up by 28% by units and 43% in dollars over the first quarter of 2021, and 7% and 25% respectively over the previous best quarter, Q4 of 2021. Back in February, A3 reported that industrial robot sales in North America had a record year in 2021, up 28% over 2020 and 14% higher than the previous top year of 2017.

Erik Nieves, founder of Plus One Robotics, at Automate 2022. The booth's demo featured an integrated solution combining one of Plus One's cells with mobile sortation robots from Tompkins Robotics. Source: Roberto Michel

A3's figures are for industrial robots, which are mainly those with articulated arms that do tasks like picking and placing goods, as opposed to autonomous mobile robots (AMRs) that have gained a significant foothold in warehousing and materials handling.

Automate offered a varied mix of robotics companies

In my two days at Automate, that momentum was visible in the solid attendance at the event as well as the number and variety of exhibitors. By variety, I especially mean more AMR vendors with larger booths, compared with past Automate events.

Yes, the biggest exhibit spaces tended to be from major robotic arm providers such as FANUC, Universal Robots, KUKA, and others, but mobile robots were to be found at 20-plus booths, not just a handful. Then there were major, diversified technology providers such as ABB, Teradyne, or Zebra Technologies, which acquired AMR vendors and were showcasing mobile robots as part of their offerings.

This shift in exhibitor variety at the show is likely tied to companies facing underlying pressures in production and fulfillment operations. Everyone is dealing with acute labor challenges, tighter cycle-time pressures, and the need to move goods to end customers as quickly as possible once they can secure raw materials or receive finished goods to distribute. As a result, all types of automation are seeing strong interest. There are more robotic arm

solutions being sold, but often as part of integrated solutions which aim to accelerate overall operational speed and efficiency.

Given these larger pressures, many of the vendors I visited were talking about integration of fixed piece-picking robots with AMRs, as well as integration of robots with other forms of automation such as conveyors and automated storage and retrieval systems (ASRSes). They also talked about integrating robots with the software and devices that support human-centered workflows.

Industry leaders I spoke with said this trend toward converged, integrated solutions is driven by industry needs around speeding up the entire flow of an operation, not just one corner of it.

Plus One touts partnership with Tompkins

At Plus One Robotics, which provides vision software for logistics robots, integration was the focus. Its booth demo showcased a robotic arm driven by Plus One's vision software picking and placing a highly varied mix of parcels onto mobile robots from Tompkins Robotics. The two vendors announced a partnership earlier this year that allows Plus One's perception software to work with Tompkins' tSort AMRs to accelerate fulfillment processes in distribution centers (DCs).

Plus One's software provides robots the hand-eye coordination to pick and place objects in DCs that have high package variability, said Erik Nieves, founder and CEO of Plus One Robotics. The tSort system offers scalable automated sortation.

Last fall, Plus One also partnered with Locus Robotics to integrate AI-enabled piece-picking with AMRs from Locus.

Generally, Nieves explained, automation of all types needs to become more integrated—not just robots with one another, but with traditional fixed automation like shuttles. Companies want to accelerate the overall fulfillment process while offsetting the inability to find enough human workers to stick with the manual tasks that often exist on the edges of their operations.

Nieves foresees that more and more companies will turn to solutions from robotics partners to extend the benefits of traditional automation like an ASRS. That way, they won't have one big zone of automation in the middle of a DC with bottlenecks upstream or downstream, he said.

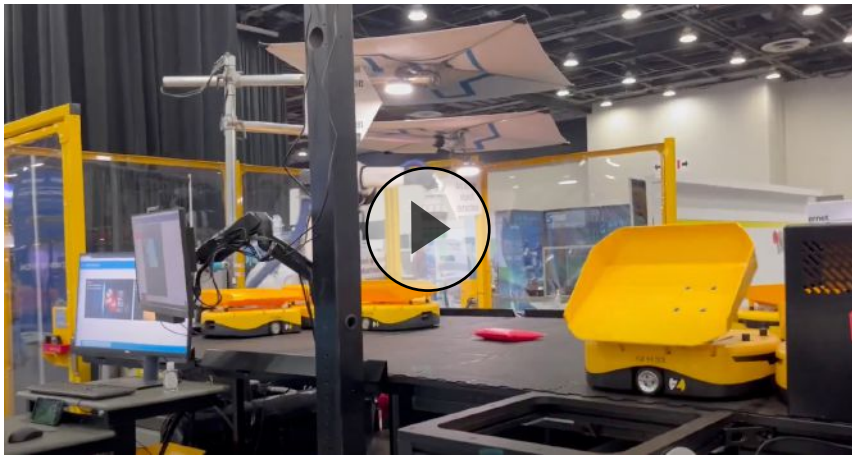
Locus Robotics was among the AMR exhibitors at Automate 2022. Source: Eugene Demaitre

"If you make gains by automating in one area, but what exists is downstream remains manual, all you are really doing is moving the bottleneck," said Nieves. "That is why fulfillment centers are going to turn to integrated solutions that can expand the benefits of automation out from the center, from something like an ASRS. That is where the value increasingly will come from—in deploying flexible robotics automation out from the middle, so you can have efficiencies not just in one area of your fulfillment center, but from one end of the building to the other."

Zebra CEO says AMRs need to be interoperable

Another robotics industry executive I got to meet with was Melonee Wise, vice president of robotics automation at Zebra Technologies. Wise joined Zebra through the 2021 acquisition of Fetch Robotics, where she was the CEO. Fetch's AMRs continue to advance with Zebra, with part of these advances coming in the form of integration with Zebra's systems for work execution, mobile devices, scanning, data capture, and label printing.

We met Tuesday afternoon, shortly after Wise was part of a panel discussion at the event's show floor theater, titled, "How Robotics and Automation Are Transforming the North American Economy," which also featured other top industry



leaders including executives from FANUC, Teradyne, and NVIDIA, as well as Greg Brown, vice president of the Advanced Technology Group at UPS.

During the panel, Wise observed that traditionally, robots have acted as "sole agents" focused on narrow tasks and are thus historically not adept at operating collaboratively in integrated, multi-agent settings. But that is changing via interoperability with other types of automation, as well as people-centered workflows and data capture devices and technologies like printers, she said.

After the panel, Wise said the value of mobile robots will increasingly come from how easily they integrate with other automation and with software and devices, so that user companies can speed the overall fulfillment process and have robots that work well in tandem with people.

"When you look at the needs of customers, what they are after is an end-to-end solution," she said. "They don't want just a robot; they want a solution to their problem."

And if their problem is how do I get something off the shelf, and packed out, and onto a truck on time, it involves addressing this cascading series of tasks," said Wise. "But if we can create this interconnected world that takes in mobile robots, and mobile devices, and things like printers, and packaging machines, then there is greater value for our customers, because they can optimize across their larger process."

Also after that panel discussion, UPS's Brown said that just in the past few years, advancements in artificial intellience and machine vision have made it possible to do more with industrial robots in logistics, because they now have the intelligence to be able to deal with more package variability.

"The technology is definitely maturing and getting better and more precise," he said. "Depending on the application, it's going to vary as to how useful it is today, but it's definitely getting to the point where is it becoming more useful and allows us to think about ways to incorporate it into our operations and day-to-day practices."

MiR customers install more AMRs than ever

AMR vendor executives said they are enjoying rapid growth, often driven by customers who started out with small proof-of-concept projects a few years ago, grew them into larger pilots, and have now expanded into production-scale fleets. Søren Nielsen, president of Mobile Industrial Robots (MiR), a subsidiary of Teradyne, said during a booth visit that this progression to larger fleets is fueling MiR's growth.

"It is expanding rapidly both with new projects, and also, existing customers who now have much larger fleets," Nielsen said. "The pattern we see is that they deployed maybe a few robots as a proof of concept, then expanded that further after 12 to 16 months, and now are increasing the size of their fleets to production scale. We now have customers with 100 to 200 robots in their fleets, and one customer with 86 robots in a single facility. And, at the same time, they are after better and better utilization of the robots."

As robots are more widely deployed, Nielsen said that users want to achieve very high utilization of AMRs and want to eliminate incidents requiring manual intervention. Typically, it's a matter of fine-tuning aspects like wireless network performance, the setup of docking points, or the analysis of traffic management patterns.

"AMRs are not toys anymore, they are becoming part of production environments, which is why we see this focus on utilization," he said. "This is what we see—larger fleets and higher interest in utilization."

MiR is known for larger-format AMRs, and while it is expanding its product line, there are many other types and potential use cases, said Nielsen. They include cleaning robots, inventory scanning robots, and assistive-pick AMRs.

It is inevitable customers will have AMRs from multiple vendors, with a resulting need for a layer of "interfleet management" software. Nielsen said that MIR isn't developing this capability itself, adding that some of its customers are looking at using software from Amazon Web Services (AWS) called RoboRunner for this purpose.

Other Automate exhibits of interest

SVT Robotics had a sizeable booth at Automate. The vendor, which offers a software platform to speed and simplify integration of robotics solutions with host systems like a warehouse management system (WMS) or an enterprise resource planning (ERP) system, has drawn significant funding from investors that see industry interest in rapid integration of robotics solutions.

Jim Hodson, vice president of marketing for SVT, noted it's not just deployment speed for one system that interests companies in SVT's SOFTBOT platform and its "connector" approach to integration. It's also the ability over time to reconfigure a deployment or to integrate additional robots to a host system using the same connector, rather than starting from scratch.

Startup InOrbit was at the show exhibiting its cloud robot management platform, and also as one of the finalists for Automate's Cowen Startup Challenge. Florian Pestoni, co-founder and CEO of InOrbit, explained that the company's software can help robot vendors and integrators improve the performance of what they offer to end users.

New "orchestration" features in the platform, along with a partner certification program, allow organizations to use the software to avoid conflicts between different types of AMRs without competing with the fleet software from each AMR vendor. For example, InOrbit's solution can be used so that cleaning robots don't interfere with large AMRs moving pallets, or to keep inventory counting bots out of the aisles being used by other robots.

"You want each system to do what it does best, without interfering with each other," said Pestoni.

***Roberto Michel**, is the senior editor for* Modern Materials Handling.

New SCARA Robots Offer Speed and Precision for the Next Industrial Revolution

These four SCARA systems can help manufacturers meet increasing demands for throughput and quality, says Allied Market Research.

BY KHADIJA SIDDIQUE, ALLIED MARKET RESEARCH

SCARA robots in electronics manufacturing. Source: Getty Images

Selective Compliance Articulated Robot Arms, or SCARA robots, continue to enable manufacturers to boost their productivity at low operational costs. Such technologies are the firm foundation for the next industrial revolution.

Although the COVID-19 pandemic disrupted the manufacturing industry in an unprecedented way, it has also increased the demand for automation to help maintain productivity while workers are scarce or comply with social-distancing protocols. The latest SCARA machines have become more affordable, faster, easier to handle, and more efficient.

According to Allied Market Research, the global SCARA robot market is expected to reach $14.78 billion by 2026, expanding at a compound annual growth rate (CAGR) of 9.8% from 2019 to 2026. The research firm cited the need for for mass production with reduced operational costs, the surge in demand for Internet of Things (IoT)-based systems, and the increasing adoption of Industry 4.0 as causes of this growth.

SCARA in large-scale manufacturing

The new generation of SCARA machines is quite different from its predecessors. Unlike earlier versions of robotic arms, SCARA has proved to be excellent at imitating the human elbow and shoulder and can move in numerous ways, independently and simultaneously.

Moreover, these robots can handle a wide range of operations, including moving objects from one location to another or picking and placing objects before assembly. SCARA systems can also perform processes such as dispensing, screwdriving, and engraving.

The accuracy, flexibility, and precision of SCARA robots enable them to perform demanding industrial tasks that require excellent repeatability. Their payload capacity allows them to be used for assembly or transfer of heavy workpieces, especially in the automotive industry. The majority of these operations are challenging for humans or lighter robots to perform, but SCARA can offer high performance at a low cost.

The increased demand for high-precision manufacturing processes led to new robots. In the past few months, major automation players have unveiled next-generation SCARA robots (see slideshow at right). These competitive offerings allow customers to evaluate and select the robots that best satisfy their needs.

The future of SCARA robots

As manufacturing and supply chain operators turn to automation for repetitive tasks requiring precision, SCARA robots and complementary technologies have a vital role to play, according to Allied Market Research.

For instance, integrated vision systems can extend their application and enable the robots to detect and track products on a conveyor. This can improve the accuracy for processes such as depositing adhesives during assembly.

Early versions of collaborative robot arms lacked the precision and accuracy offered by SCARA robots. Programming in the new generation of SCARA robots can account for controls, lighting, and image and data processing, significantly reducing equipment setup time.

We expect SCARA robots to continue to improve in capability and find more and more novel industrial applications. As next-generation SCARA robots offer ever-greater precision, faster cycle times, and easier programming, their adoption will increase.

1 **ABB builds IRB 920T for the electronics industry**

Recently, ABB expanded its range of SCARA robots with new IRB 920T, which is designed for the electronics industry, which has complex manufacturing processes. The new SCARA robot offers high accuracy, speed, and repeatability for assembly, picking, and placing tasks, according to the company.

The IRB 920T is intended to help manufacturers stay on top of market demands with its cycle time of 0.29 seconds and maximum payload capacity of 6 kg (13.2 lb.). ABB said the robot is up to 14% faster than its previous IRB 910SC SCARA robot.

2 Mecademic goes small with MCS500

Large robots can create a challenge in certain industrial environments, so several start-ups and established vendors have invested in minimizing the size of SCARA systems.

One such company, Mecademic, has launched MCS500, which it claimed is the world's most compact SCARA robot. The robot is a highly precise, easy-to-integrate automation component and is faster than previous models, said the company.

The MCS500 offers a high throughput and is suitable for high-precision applications, said Mecademic. The company added that the robot operates with fast cycle times at large payloads, making it ideal for pick-and-place and assembly operations along with lab automation and in the semiconductor industry.

Source: Mecademic

3 OMRON aims for ease of use

In addition to high speed and precision, SCARA robots need to be easy to use. Thus, major market players have invested a huge amount of money in launching such robots. For instance, Japan-based OMRON has launched the i4H, an industrial SCARA robot for lightweight operations.

The new robot allows customers to develop highly productive equipment by controlling and integrating end effectors and other peripheral devices at a high speed and high precision. Moreover, the robot can handle a payload of up to 15 kg (33 lb.), and the end effector can be mounted, which OMRON said allows for efficient transportation and assembly processes.

4 Epson RC+ Express software to help application developers

The world is conversing on autonomous industries, which has increased the adoption of SCARA robots more than ever. However, the software that handles the processes must improve with time.

Epson said its Epson RC+ Express provides an intuitive software development environment for Epson T-Series All-in-One and LS-B Series SCARA robots. It features an easy-to-learn, block-style robot teaching environment to get new users up and running fast.