

Robots as Mobile Data Platforms

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EDITOR'S NOTE

Most autonomous robots require an array of cameras and sensors to operate independently. Beyond navigation, those sensors already capture a huge amount of data about environmental conditions and the robots themselves.



Some robots are designed specifically to collect information, such as inventory location, cycle-counting or structural defects. Wearable robotic equipment collects data on human movement to improve ergonomics.

Technological advancements in data collection, analysis and connectivity allow organizations to harness the information already at their fingertips better than ever before. With robotics and automation generating mountains of valuable data for humans and neural networks to sift through, organizations can accurately monitor and track their inventory and workflows.

When combined with generative AI analytics, robots can serve as mobile data platforms, informing decision-making and improving operational efficiency for commercial and industrial end users.

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Dexory delivers real-time visibility for warehouse operators

Telescoping AMRs, AI-enabled digital twins support insight sharing across supply chains

BY DONALD HALSING

People say knowledge is power, and that adage absolutely applies to [supply-chain](#) decision makers. Before any decisions can be made, data must be collected from facilities to inform the decision-making process. But unless your facility has a camera pointed at each and every location, gathering accurate and up-to-date data can present a complex challenge.

Andrei Danescu, CEO and co-founder of [Dexory](#), said the U.K.-based company was built around the principle of providing real-time site visibility for [warehouse](#) environments where it's difficult to collect information. Using a combination of robotics and AI [software](#), Dexory gathers and analyzes data to deliver impactful insights to its customers.

"Collecting the data is one bit. What can you use this data for? And how does this transform business operations on a daily basis?" he said. "I can collect all this information - so what? Well, I can transform it into insight - so what? I can make decisions to really take my business to the next level of efficiency."

A warehouse is a very big space to monitor, so it's unmanageable for people to review all the data captured by Dexory's robots.

"Where the AI tools come into play is allowing you to go a lot deeper into this data, allowing you to extract a lot more insights from what you're collecting," Danescu said. "You can collect the information, but unless you turn it into valuable advice and insight, it's not going to drive the impact that we hope to drive."

A robot that rises to the occasion

Dexory deploys autonomous mobile robots ([AMRs](#)) designed as collaborative robots ([cobots](#)) that can operate around people and other warehouse vehicles.

"As we were bringing this technology to market, we spoke

to a lot of customers, and one of the big things people were telling us was, 'We want to be able to avoid any kind of disruptions.'"

The Dexory team developed a telescoping design outfitted with cameras and barcode scanners



Combining telescoping AMRs with AI-enabled DexoryView digital twin software enables the company to help improve efficiency across supply chains by delivering data-driven insights. Source: Dexory

on each section that can reach upwards of 40 feet high, allowing robots to scan entire racks in a single pass while still being able to fit through small openings when needed.

“You have doors and you have multiple rooms, especially in the bigger warehouses. So you can’t have a robot that is continuously in its tall, fully extended form,” Danescu said. “So we thought, ‘How do you create a system that can operate and collect the whole rack in one pass?’ And that’s basically how we came to the concept of the telescopic tower.

“We can scan over 10,000 pallets an hour. We can scan over a million square feet in a day,” he added.

AI insights from environmental conditions

DexoryView, the company’s AI-enabled [digital twin](#) software platform, can create a simulated map of warehouse racking and floor locations, interpreting barcodes and performing 3D image analysis to create a complete inventory data set comprising every location. Dexory also measures environmental conditions, including temperature, brightness and humidity.

“All this information allows DexoryView - which is the platform that gives and generates all these insights - to create these learnings over time and to inform whoever is running the warehouse either how to optimize things or flag any kind of discrepancies, flag any kind of issues,” Danescu said. “You can start



Dexory's robots feature telescoping sections, which allow them to scan entire aisles in one pass and collapse down to fit through doors and small openings. Source: Dexory

using some of the more advanced AI features to allow you to better organize the way you store goods in the warehouse.”

DexoryView can help warehouse operators rearrange

products within their facilities as weather and seasons change to keep them stored within appropriate conditions. For example, Danescu said leather goods need to be stored in a cool, dry environment. DexoryView might suggest moving a pallet of leather goods that arrived in the winter out of a hot, humid area of a warehouse come summertime.

“If it’s [stored] in the wrong conditions, it’s completely unusable. So you can eliminate a lot of these inefficiencies and a lot of wastage by leveraging this technology that we have,” Danescu said. “We recognize that we won’t know everything about the industry early on. So there’s going to be other use cases that we’re going to be wanting to add on top of the existing technology.”

Over time, Dexory’s [AI](#) algorithms can determine the best locations to store products within customer facilities, suggesting



DexoryView, the company's AI digital twin software platform, analyzes data to deliver insights that can help improve efficiency and reduce product damage from adverse environmental conditions. Source: Dexory



Andrei Danescu, Dexory CEO and co-founder, said DexoryView helps deliver a “single source of truth” for supply-chain level decision making. Source: Dexory

direct put away locations as products arrive.

Sharing supply-chain level knowledge

Danescu said DexoryView helps deliver a “single source of truth” for warehouse operators about their facilities.

“Imagine you have a platform where anything you want in that warehouse - any location - you can just search for it, and you will see what the stats are,” Danescu said. “What product is there? Is it the correct product? What is your occupancy? How much product do you have available? Has that product been moving around the warehouse? You literally have the complete journey of what’s going on in that space.

“You have these huge spaces, these massive warehouses. And then you have the ability - from anywhere you are in the world - to have complete visibility over the operation in that space,” he added. “And not just that space, but if you have the technology in 10 locations, over the entire network. That was really the aha moment, because we thought, ‘Wow, this really has the potential to completely transform the way you run operations.’”

DexoryView can also make it easier to share insights across facilities without sending managers who have learned operational best practices to other warehouses.

“It’s very easy to copy and paste the learnings because you have the single source of truth,” Danescu said. “All this learning - all this information - it becomes available to your entire network

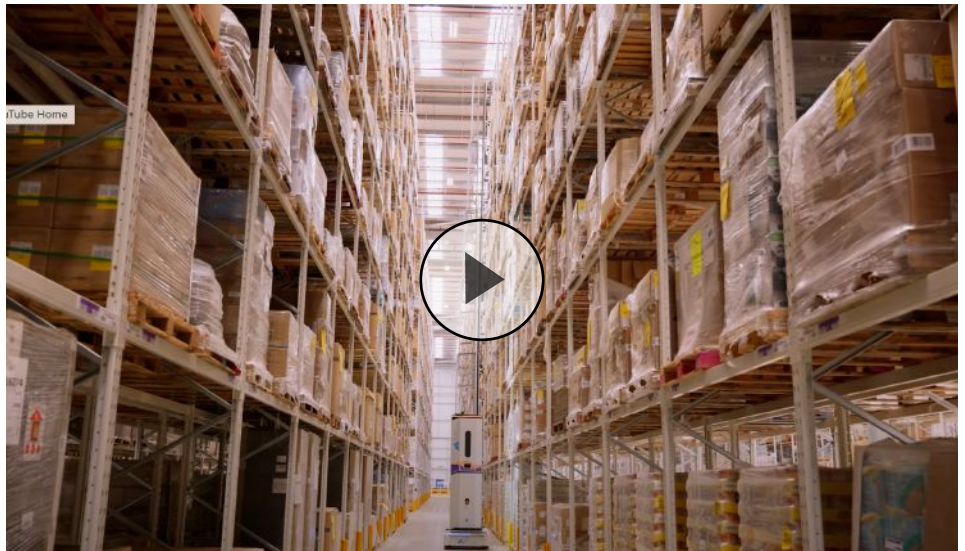
of warehouses, your entire supply chain.”

Dexory expands into North America

Dexory announced at Manifest 2024 that it was entering into the North American market. In mid-September 2024, the company the opening of its North American headquarters in Nashville, Tenn. Danescu said setting up a base in the U.S. helps Dexory support local customers faster.

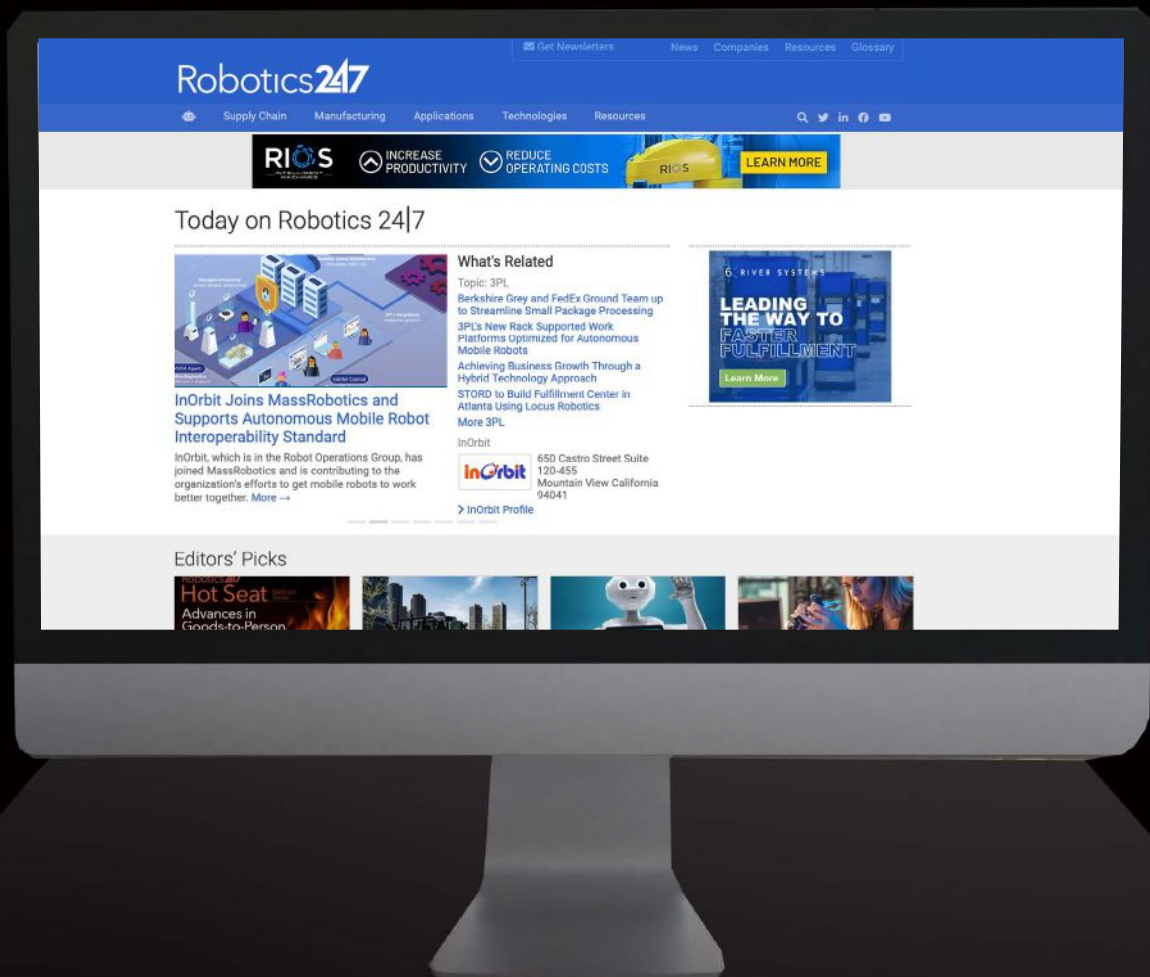
“The other big thing is to make sure that we onboard as many people as we can onto the platform, because this will, in turn, allow us to perfect the offering for the American market,” he said. “The more we learn, the more we work with customers, the more powerful DexoryView becomes, and the faster it is at bringing bigger and bigger amounts of value to them.”

Danescu added, “We’re very excited about the market, and mostly very excited about the way people are perceiving the technology and the benefits it brings to them.” •



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Atlantas Marine receives royal business award

Underwater ROV inspection company honored with King Charles' Award for Enterprise

BY ROBOTICS 24/7 STAFF



Atlantas Marine team members celebrate their King's Award for Enterprise for International Trade outside the company's new Yeovil, Somerset, U.K. offices. Source: Atlantas Marine

Remotely operated [underwater](#) inspection equipment provider Atlantas Marine was recently honored with a King's Award for Enterprise for International Trade.

The King's Awards for Enterprise, previously known as The Queen's Awards for Enterprise, were renamed last year to reflect King Charles' desire to continue the legacy of Queen Elizabeth II by recognizing outstanding U.K.

businesses. First established in 1965, the [award](#) program is now in its 58th year.

The King's Award for Enterprise was presented to Atlantas Marine by Charles' personal representative in the county, the Lord Lieutenant of Somerset. In addition, a special reception for recipients of King's Awards for Enterprise was hosted July 9 by King Charles at Windsor Castle.

Inspection cameras for offshore wind, oil, gas and defense

Founded in 2000, and based in Somerset in southwest England, Atlantas Marine designs and manufactures underwater [inspection](#) cameras and equipment that enable [marine](#) inspections to be carried out using unmanned submersible remotely operated vehicles ([ROVs](#)), controlled from the surface by specialist ROV operators.



Charlie Foll (left), Atlantis Marine managing director, and Mike Underwood (right), head of engineering and designer of the Storm Camera, which is shown mounted on top of a VideoRay Pro5 ROV. Source: Atlantis Marine

Atlantis has been a U.K. dealer of VideoRay ROVs since 2001, supplying over 400 systems. It also provides subsea offshore inspection services, technical support and [training](#) to customers worldwide, working across a range of industries including offshore [wind](#), oil and gas, and defense.

“It is a great honor to be recognised in this year’s King’s Award for Enterprise,” said Charlie Foll, Atlantis Marine founder and managing director. “We have a fantastic and very loyal team of people working at Atlantis Marine, and this award is testament to their experience, skill and professionalism.”

Atlantis exceeds international business growth expectations

Atlantis Marine is one of 252 organizations across the U.K. to be recognized with a King’s Award for Enterprise. The company was recognized for its excellence in international trade, with its international earnings growing by more than 300% over a three-year period. Its international turnover rose from 30% of its total turnover to 51%, with key export regions including Central and South America, Asia and Africa.

“Together we have far exceeded the growth forecast in our current business plan, written with support from the Cranfield

Business Growth Programme,” Foll said. “We hope this award will propel us to further export growth, shining a spotlight on the work we do, and helping us to expand our presence in key industries such as offshore wind.”

As a result of its recent growth, Atlantis Marine now employs 16 staff members at its new offices in Yeovil, Somerset. With turnover in excess of £7 million (about \$9.2 million) and expected to exceed £10 million (about \$13.1 million) by 2027, the company said it plans to further expand its sales and inspection services over the coming years, particularly in the offshore wind sector. •

Aerobotix demonstrates mobile cobot arm for aerospace and defense at WESTEC/AeroDef

Company previously helped build system for U.S. Air Force maintenance depots

BY ROBOTICS 24/7 STAFF



Aerobotix has designed mobile robots for aerospace and defense. Source: Aerobotix

Aerobotix Inc. demonstrated a new mobile mobile robot for the [aerospace](#) and defense industries during the WESTEC/AeroDef Manufacturing Conference in November 2023 in Long Beach, Calif..

“As Aerobotix continues its groundbreaking work in

mobile robots, we’re excited to bring this new technology to WESTEC/AeroDef,” said Josh Tuttle, [Aerobotix](#) business development manager.

“Mobile robots are widely used in general manufacturing and warehousing but are still new to the aerospace and defense industries,” he added. “They support

the ‘factory of the future’ concept and offer significant benefits in labor and cost savings, output quality and worker safety.”

Aerobotix builds inspection robots

Aerobotix said it creates systems for high-value, high-precision [components](#), aircraft and vehicles. The Madison, Ala.-based company



Aerobotix and CTG developed the award-winning ARDS. Source: Aerobotix

claimed that it has installed more than 130 robots in the U.S. and abroad, “providing exceptional results and savings for [its] clients.”

With partner Compass Technology Group (CTG), Aerobotix said it built a collaborative mobile robot for [U.S. Air Force](#) maintenance depots.

Developed under the Air Force’s Small Business Innovation Research (SBIR) program, the self-navigating Adaptive Radome Diagnostic System (ARDS) uses microwave signals to non-destructively evaluate aircraft radomes and identify defects such as delamination or water ingress.

The ARDS won the top Defense Manufacturing Technology Achievement Award (DMTAA) at the 2021 Defense Manufacturing Conference.

“The new mobile robot we’re demonstrating at WESTEC/AeroDef isn’t self-navigating like the ARDS but could be reconfigured

to become self-navigating if the customer has that need,” Tuttle said. “A key strength of mobile robots is that they’re highly configurable and can be rapidly repurposed to serve multiple objectives in multiple locations.”

Robot debuted at WESTEC/ AeroDef

Aerobotix offered hourly demonstrations of its new robot at the

WESTEC/AeroDef conference. It said these were the first public demonstrations of the system.

The company said its robot can be configured for aerospace and defense applications including sanding, painting, and inspection. The demonstration robot performed automated tasks on aerospace components.

The global market for collaborative mobile robots could expand from \$543.3 million in 2019 at a compound annual growth rate (CAGR) of 26.3% by 2030, projected Prescient & Strategic Intelligence. It cited growing demand for [industrial automation](#), the [automotive](#) industry’s adoption of mobile cobots, and increasing robot payload capacity to serve manufacturers.

Interact Analysis, a global research firm also saw similar growth and demand in the mobile robot front. The research firm released a study in October 2022 that demonstrated a 70% increase in mobile robot shipments in 2021. •



Gecko Robotics launches cantilever asset management product

Cantilever includes robotic inspections, data integration, analysis tools and user modules

BY ROBOTICS 24/7 STAFF



CEO Jake Loosarian with Gecko Robotics systems. Source: Nate Smallwood

Gecko Robotics recently launched its Cantilever platform, which it said integrates data from its robotic, fixed-sensor and partner systems to help customers analyze asset health and make sound decisions.

“Cantilever is designed to become the primary operating system for the physical world,”

said Jake Loosarian, co-founder and CEO of Gecko Robotics.

“Every day, at hundreds of customer sites around the world, our robots are keeping power plants online, military assets ready, and factory doors open. That’s only possible because our robots and fixed sensor networks are collecting data at a quantity and quality that’s never been seen before.

“Cantilever begins with that unique data and combines it with the customer’s own data to create the first end-to-end solution, transforming decision making in the built world,” Loosarian added.

Gecko provides actionable data

“In the 21st century, most industries have been fundamentally changed by advances



Cantilever's Data Systems analysis platform uses AI to process those layers and determine key insights, like corrosion rate or remaining life. The analyses are then imported into Cantilever's software modules to empower customers to make targeted repairs, prioritize capital investments and shift from reactive to [predictive maintenance](#).

Gecko said Cantilever is already helping customers in the [defense](#), manufacturing and [energy](#) sectors. The [U.S. Navy](#), an early adopter of Cantilever, uses it to combat the significant challenge of ship availability.

Commanding officers and maintenance teams can generate and then act on repair plans in minutes. That process that previously took weeks or months to complete, Gecko said.

The company added other industries are using Cantilever to optimize capital spending, extend the life of key assets, and prioritize maintenance spending to reduce costs, increase uptime and improve safety. •

in robotics and smart sensor technology," Gecko Robotics noted. "However, the way asset health data on critical [infrastructure](#) is gathered has not changed in 50 years and is still primarily carried out in dangerous environments by hand.

"That leads to incorrect, incomplete, and insufficient data," the company said. "Even the most sophisticated AI algorithms are not able to produce accurate results with insufficient data."

Pittsburgh-based Gecko Robotics said its robots can climb pipelines, boilers, tanks, ship hulls and more in search of damage. They capture high-fidelity data for the company's software, which it said enables human experts to contextualize that data and translate it into actions.

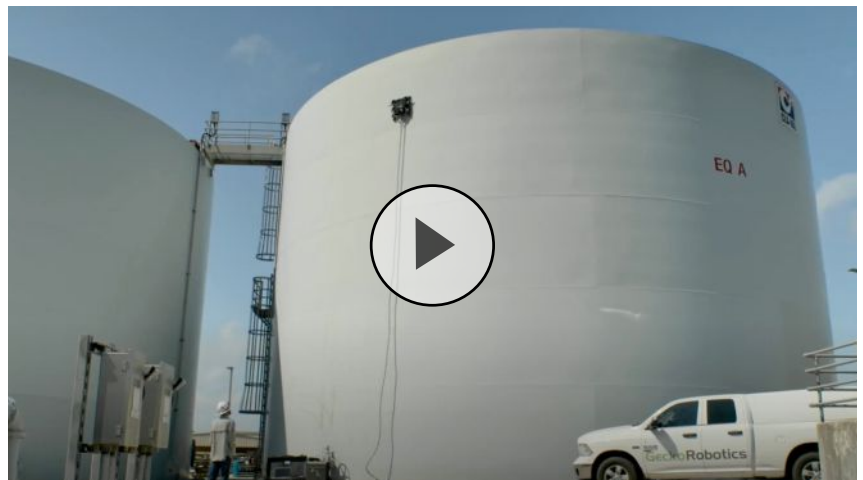
Cantilever analysis to optimize outcomes

Cantilever brings data layers together in ways that were not previously possible, according to Gecko Robotics. The company

said its new software can assist customer decision making to increase uptime, decrease costs and eliminate safety issues.

Cantilever works "out of the box" to immediately address customer challenges. Gecko said the Cantilever process begins with first principles.

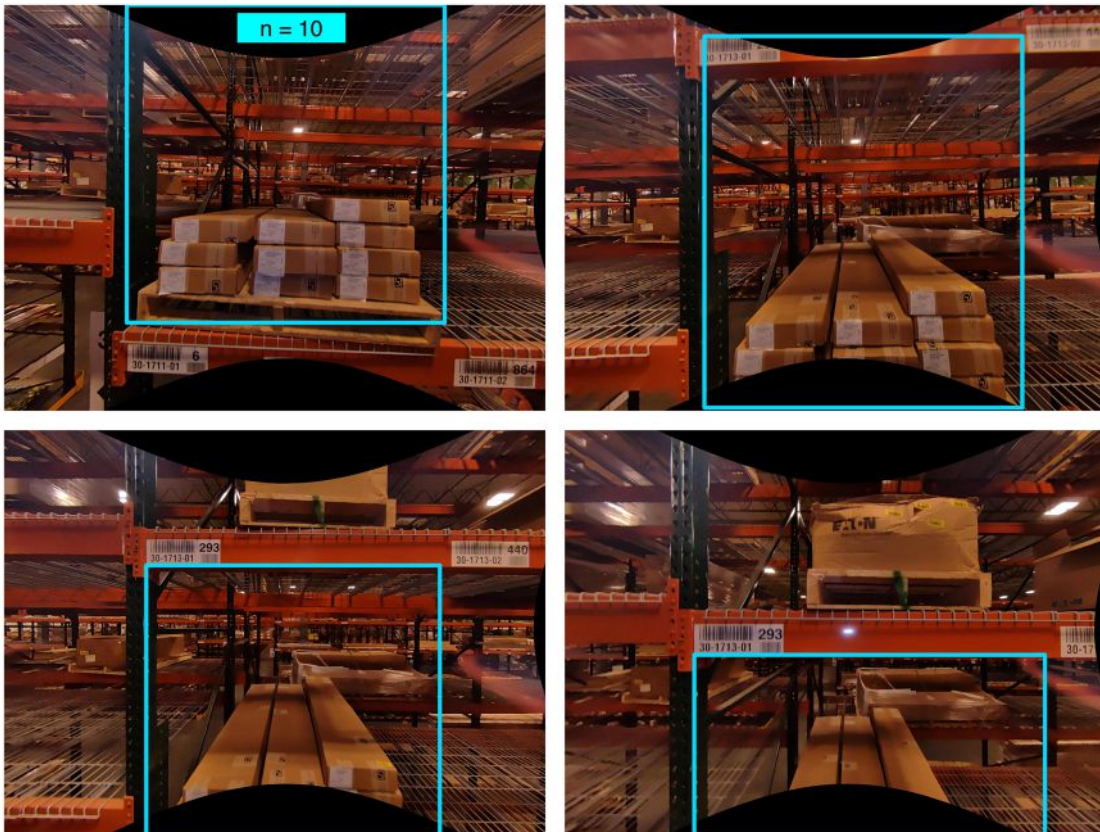
A combination of robots, drones and fixed sensors collect data, which is combined with historical health records, design files, operational data and other business metrics to create Cantilever data layers.



Nokia AIMS automates inventory monitoring with AI-enabled drones

Software from Nokia Bell Labs powers autonomous drone inventory counting service

BY DONALD HALSING



Coupling off-the-shelf drones with AI and machine learning algorithms, Nokia AIMS can provide autonomous inventory cycle counting for warehouse customers. Source: Nokia AIMS

For nearly 100 years, researchers at Bell Labs have developed countless technological innovations. The research institution is credited with inventing numerous electronics components that are commonplace today, including

the transistor, photovoltaic solar cells, and charge-coupled device (CCD) imaging sensors.

Now Nokia Bell Labs, the New Jersey-based research subsidiary focuses on commercialization opportunities for new technologies.

One project at Nokia Bell Labs involved flying drones equipped with cameras within vertical [farming](#) facilities. Drones enabled by AI and machine learning technologies allowed farmers to more efficiently monitor plant health



Off-the-shelf drones equipped with custom lenses and light bars enable Nokia AIMS to capture clear images for AI and machine learning software analysis. Source: Nokia AIMS

without manual inspection.

As the project continued, Nokia identified warehouse inventory monitoring as a commercialization opportunity, forming an internal startup to market its Autonomous Inventory Monitoring Service (AIMS).

Paul Heitlinger, general manager of [Nokia AIMS](#), said the small standalone business unit is now working with warehouse operators across the U.S. to automate inventory cycle counting using [drones](#).

Minimizing impacts to customers

Nokia AIMS launched commercially last year, announcing a [deployment](#) with Graybar in October 2023. Heitlinger said most AIMS customers count overnight during off hours, meaning that the average closure time of 30 minutes won't delay their normal operations.

“There's huge value for those customers,” Heitlinger added. “They're doing it much faster. We're getting more coverage than the human workers. They don't have to get on a scissor lift. They're not making mistakes. They're not having to stop to write things down. It's much more accurate.”

While the best time to cycle is during off hours, not all customers can dedicate time to count.

“The other issue with flying while picking is that the data will change,” Heitlinger said. “The best use case for this is where there's downtime while the drone is flying, because otherwise the data that the drone has captured is already stale by the time it's consumed by the user.”

One AIMS customer with fast-moving inventory needed to start picking immediately after counting. Even though items moved before the customer could

view their data, Heitlinger said they were still able to benefit from uncovering pre-count inventory mismatch trends.

Off-the-shelf drones with customized attachments

AIMS uses a customized drone platform, based on U.S.-made processors. Nokia implements its proprietary navigation, [autonomy](#), localization, and processing software - along with some specialized attachments - so the drones can accomplish their missions.

AIMS cycle-counting drones travel in saw-tooth patterns up and down storage racks and aisles, hovering to capture images of each location before flying off to the next one.

The drones are relatively small and lightweight, which allows them to fly in aisles as narrow as four feet. Lighter drones also use less energy, allowing AIMS to maximize flight time. “The smaller the drone, the more agile it is, the less intimidating it is for a customer,” Heitlinger added.

Cameras mounted on the drones are outfitted with customized lenses. The focal length is set to capture clear images at a distance from the rack where the entire location is visible in a single image.

The lenses are also designed to ensure pictures taken from multiple angles in focus, enabling AIMS to count items on pallets. They are also outfitted with a light bar to illuminate the tops and sides of pallets.

Edge computing to combat latency

Together, localization and autonomy software form a feedback loop that allows AIMS drones to fly to the correct positions at the correct speeds, pausing long enough to take clear pictures. Localization tells the drone where it is, autonomy tells it where to move, and then localization checks to ensure the drone is where it should be.

Low latency originally enabled AIMS to rely on cloud computing for real-time processing. But customer connectivity was not reliable enough to run navigation through the cloud. So AIMS recently introduced edge computing.

“The benefit of the drone that we use is that it has a very high level of compute capacity on board, even in a tiny little package,” Heitlinger said. “We actually ended up moving all that compute capability that we needed to make the drone autonomous and localized onto the drone.”

Now AIMS drones can autonomously fly round-trip missions from a launch spot without network connectivity. They only need a connection for the command to launch, and after landing will upload images and metadata to an on-location server as soon as they reconnect.

Structure-Based Visual Localization

Because indoor navigation cannot rely on GPS, some robots reference scannable fiducial tags placed around a facility for localization. “But we wanted to move away from that because we

wanted to minimize any impact that the customer would have to do to get onboarded,” Heitlinger said.

Nokia AIMS developed a proprietary [computer vision](#) system called Structure-Based Visual Localization (SAV-LOC). Customer onboarding requires a schematic of the warehouse.

“We look for certain structures in the warehouse based on a map that we generate,” Heitlinger said. “As it sees particular types of structures that are known, it can localize where it is in three dimensional space.”

After an onboarding period for the system to learn and map a facility, SAVLOC enables AIMS drones to fly at the correct distances from racking and capture images from the middle of each pallet location, providing clear images for both end users to view and for AI analysis.

Extracting and presenting data from images

AI and machine learning algorithms extract information from photos and present it to customers through a user interface ([UI](#)). Heitlinger said Nokia has developed barcode-detection and optical character recognition (OCR) software that can translate images into human-readable text.

“We can also start counting what is visible from the aisle,” Heitlinger said. “Even if it’s



Paul Heitlinger, general manager of Nokia AIMS, said the service can function as a “source of truth” for warehouse operators by providing accurate case counts. Source: Nokia AIMS

stacked within a pallet size, even if there’s multiple layers and they can’t be seen, we can count it. If a human can reasonably count it, then our system can reasonably do the same thing.”

AIMS can pull inventory data from a [WMS](#) or enterprise resource planner (ERP) to create a differential report against its count.

“We position this as we provide a source of truth to the customer, saying, ‘Regardless of what you think is there, here’s what’s actually there,’” Heitlinger said.

New inventory counting capability

Nokia AIMS recently launched an inventory counting capability. Unlike inferred case counting, the feature requires knowledge of how boxes are stacked on pallets and a sequence of images taken from multiple angles to count how many boxes have been removed.

“It’s the holy grail of cycle counting. We’re putting the ‘count’ in inventory counting,” Heitlinger said. “Not only can we tell you if the product is in the right place or the wrong place, but here’s how many of that item there are in that location.”

After recently testing with one customer, the inventory counting feature is now in production and available to all AIMS customers.

“We estimate about a 95% accuracy,” Heitlinger said. “Com-

binning with empty bin detection, plus their product locations, and the very quick and efficient way that we can cycle count - the value and the ROI to customers is really huge.”

Calculating items within cases a future goal

While drones can't count items within cases, Heitlinger said autonomous counting allows warehouse operators to assign human counters to picking locations with open, partial cases that can't be counted autonomously rather than the whole warehouse, which can improve labor productivity.

“Usually those open cartons are down lower on the racking,” he added. “It's much easier and quicker for them to get to those locations.”

AIMS plans to release an update that can pull quantities



within cases from WMS, allowing the software to calculate individual item counts.

Despite AIMS being a new venture, Heitlinger gave his kudos to the Nokia Bell Labs development team for their

accomplishments thus far. “With a small team, we've actually built a lot of really good tech in a very short amount of time,” he said. “I'm very excited to see what that next year or two will bring.” •

NOKIA AIMS AIMS Admin

Comparison screen | 7/30/2024 Export AIMS CSV Export WMS CSV

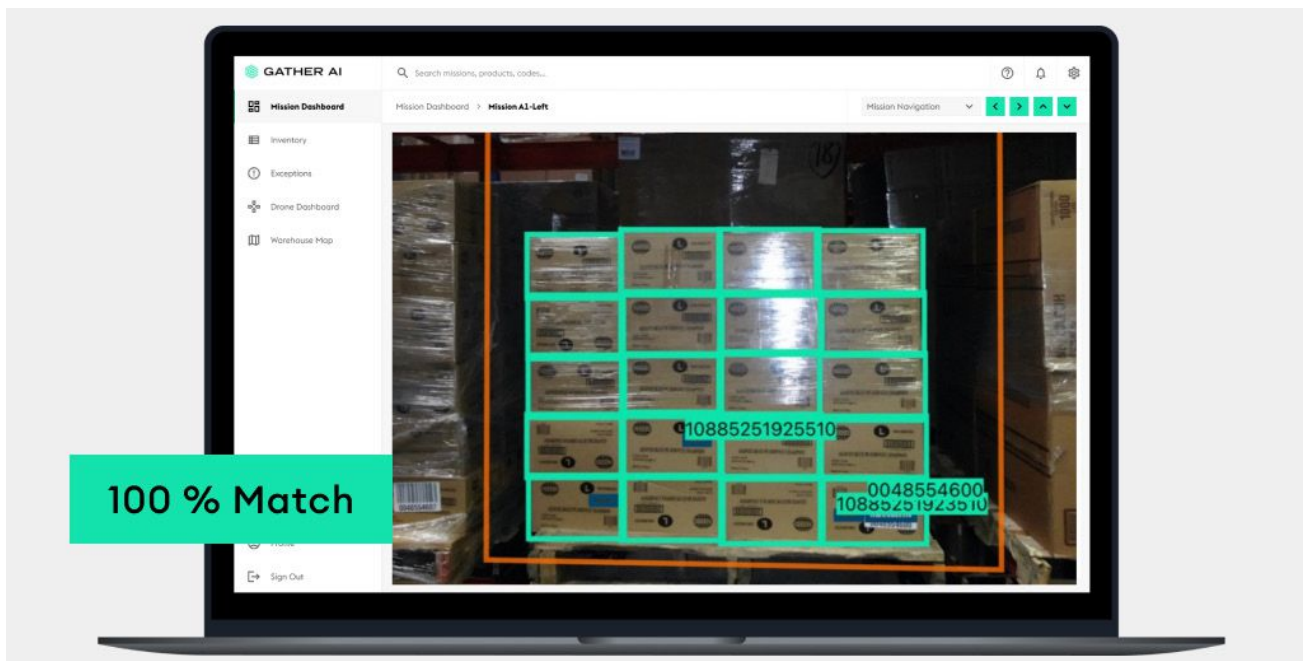
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<input type="radio"/> Found	23-2807-02	52350	52350	4	4	18 images	Select
<input type="radio"/> Misplaced	23-2615-02	15482	15482	Fully Wrapped Pallet	1	25 images	Select
<input type="radio"/> Match empty	23-2607-03	0193497	241983	2	8	18 images	Select
	23-2607-01	23328	23328	27	27	18 images	Select
	23-2407-02	61502	61502	13	13	18 images	Select
	23-2207-03	0181225, 370174	50825	4	6	17 images	Select
	23-2007-03	10244	10244	14	14	20 images	Select
	21-3007-01	0180389	0180389	2	2	17 images	Select

Nokia AIMS software can pull inventory from WMS or ERP and provide a differential report against cycle counts through a user interface. Source: Nokia AIMS

Gather AI to deliver inferred case count, location occupancy data

New capabilities for AI inventory control drone software can provide real-time insights, company says

BY ROBOTICS 24/7 STAFF



Gather AI said its new inferred case count capability, along with location occupancy detection, can provide real-time inventory management insights. Source: Gather AI

Warehouse inventory management service provider Gather AI recently announced two new capabilities for its systems: location occupancy and inferred case counting.

The company, which produces [machine vision](#) AI software for inventory-monitoring drones, said its new capabilities enable warehouses to get automated, digitized counts and location

utilization reports, unlocking higher on-time shipment rates while reducing dedicated counting labor.

“Our mission is to bring unprecedented real-time inventory insights to warehouse operators,” said Sankalp Arora, Gather AI CEO and co-founder. “Our computer vision and AI analyze inventory images offering warehouse operators access to a richer source of information than

barcodes. Our new inferred case counting and location occupancy capabilities push the art of what’s possible while solving for error-prone, labor-intensive tasks for our customers.”


Opportunities to improve labor productivity, space utilization

With Gather AI’s robotics-as-a-service (RaaS) drone systems, warehouses can scan up to 900 pallets per hour. Off-the-shelf

drones fly around warehouses autonomously, taking pictures of each location. Then, Gather's AI software analyzes the pictures, reading multiple barcodes, text, and detecting empty locations.

Gather AI's new offerings include:

- **Inferred case count:** Using this capability, warehouse operators can reduce the time spent on manual counts by 90%, Gather AI said. Computer vision and AI compare information extracted from images to estimate the number of cases on a pallet with what's stored in the warehouse management system (WMS). Pallets with few cases are flagged so they can be replenished before items run out and shipments are missed. Warehouse operators can prioritize labor productivity by having people count only the pallets that do not match what the WMS expects.
- **Location occupancy:** This capability lets warehouse operators know where to consolidate pallets, increase space utilization and improve

 **Case count mismatch (off by 10%)**



Gather AI's new location occupancy capability uses machine vision and AI to measure available space and identify consolidation opportunities. Source: Gather AI

fixed expense efficiency, Gather AI said. Computer vision and AI read images to measure the space available on a pallet. The system will then identify consolidation opportunities.

With Gather AI's newest capabilities, its systems will be able to show inferred case counts for full and partial pallets, as well as location occupancy percentages on the customer web dashboard. Gather said these features can reduce the time and labor of verifying case counts and

help warehouses find space to consolidate inventory, avoiding honeycombing.

"Several customers require us to count cases as part of our cycle counting program," said AJ Raaker, director of warehouse development at [3PL](#) company Taylor Logistics Inc. "Using Gather AI's drone inventory monitoring and the inferred case count feature is 87% more efficient than having our team do physical cycle counting. The efficiency gain enables our team to prioritize revenue-generating direct labor activities." •

Cypher Robotics releases Captis AGV for industrial scanning at MODEX 2024

Company partners with InDro Robotics, GreyOrange and Ericsson for new offering

BY ROBOTICS 24/7 STAFF

Cyper Robotics announced at [MODEX 2024](#) in Atlanta a new offering for efficient and accurate cycle counting and industrial scanning, the Captis autonomous guided vehicle ([AGV](#)).

[Cypher Robotics](#) also revealed partnerships with AI-driven organization [GreyOrange](#), technology company Ericsson and Canadian retailer InDro Robotics.

From air and ground in the warehouse

Cypher calls its offering ‘The Future of Warehouse Robotics’ because it combines both aerial and ground robotics technology into a single, integrated package.

The Captis AGV can find its way around warehouses all on its own. It won’t bump into people or objects, and requires no infrastructure changes. When it’s time for cycle counting, it uses drone technology attached to the ground robot with a tether - used to power the drone and for real-time data transfer. The drone ascends vertically and begins scanning products as the Captis base navigates its way down narrow corridors.

The system can capture data with 99.9% accuracy autonomously for up to five hours per mission, according to Cypher.

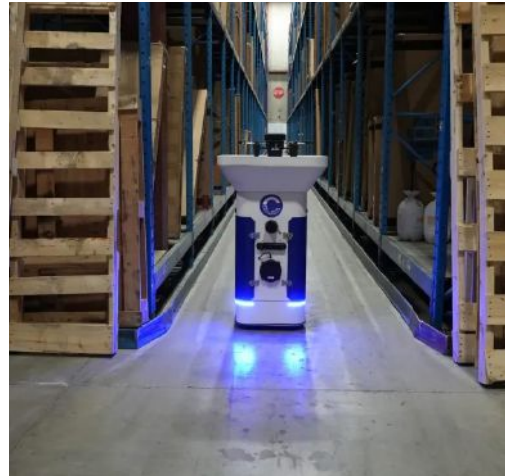
That data is automatically integrated with existing WMS, WCS and [WES](#) software. Captis can eliminate the costs associated with manual cycle counts, improve inventory accuracy and ensure high reliability.

“Captis is completely a hands-off product,” said Philip Reece, CEO of InDro Robotics. “When we say this is ‘the future of warehouse robotics’, we mean it. It completely eliminates the dull and repetitive task of scanning by hand, freeing up employees to do more satisfying work. It also frees up or eliminates the need for equipment like modified forklifts that have been previously required for the task.”

Partnerships with GreyOrange and Ericsson

Along with the new AGV news, Cypher also announced two partnerships at MODEX. The Ottawa-based company has partnered with GreyOrange and [Ericsson](#).

“The Captis autonomous cycle counting solution is powered by GreyOrange’s GreyMatter, our fulfillment orchestration platform,” said Akash Gupta, GreyOrange co-founder and



Cypher Robotics released its Captis AGV at MODEX 2024 in Atlanta. Source: InDro Robotics

CEO. “We are excited that Cypher Robotics has joined GreyOrange’s Certified Ranger Network (CRN) ecosystem. Cypher’s Captis solution is a great option for companies new to automation and robotics to begin leveraging such tech since only one bot is needed per warehouse on average.”

“Captis is an innovative solution that listens to the industry’s needs and efficiently answers them,” said Manish Tiwari, Ericsson Business head of private cellular networks. “Being connected to Ericsson Private 5G allows Captis to traverse warehouses while maintaining consistent connectivity which ensures the safety of employees and devices.” •

TOPODRONE, AGROWING collaboration advances drone thermal mapping

System performs detailed surveys and delivers thermal orthomosaic maps

BY ROBOTICS 24/7 STAFF

TOPODRONE, a Swiss-based designer and manufacturer of high-precision surveying equipment, recently released TOPODRONE PT61, a drone thermal mapping [sensor](#) that can perform detailed surveys and deliver thermal orthomosaic maps to create accurate 3D models.

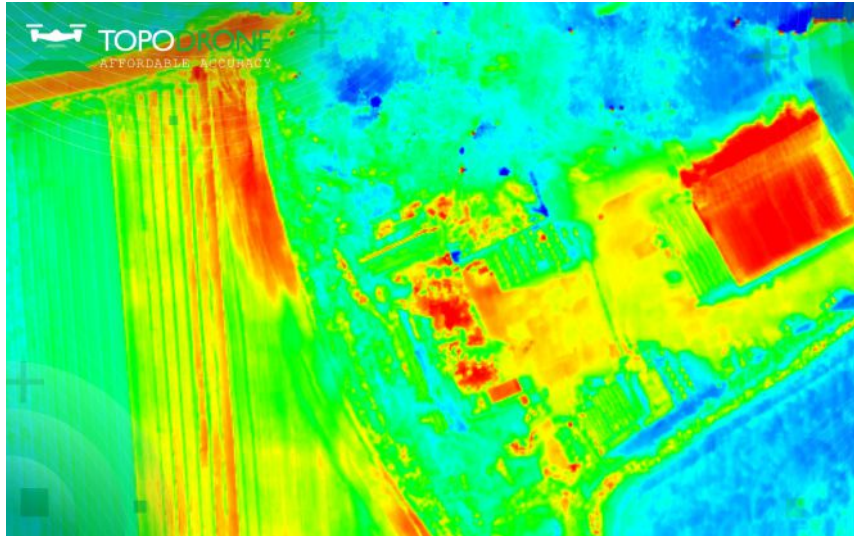
The new photogrammetry solution was initially developed in collaboration with AGROWING upon the request of a large North American enterprise client. Later, the work was modified to support wider use by drone surveyors.

61 MP camera with thermal imaging paired with Quad lens

The PT61 system comprises a [camera](#) with a 61 megapixel resolution and a built-in thermal imager.

There are also RGB lenses with different focal lengths, a built-in GNSS module and IMU, as well as an API for integration with any UAV. The combination of the PT61 camera with AGROWING's multispectral lenses establishes the camera as a dual-purpose RGB/Multispectral sensor.

Using the PT61 camera



TOPODRONE's PT61 comprises a camera with 61 MP resolution and a built-in thermal imager. Source: TOPODRONE

with AGROWING's Quad lens, the camera can provide 10 multispectral bands of 12 MP resolution, each along with the IR band.

Thermal mapping can provide data for renewable energy surveying

"This year, we observed an increased demand from surveyors for solutions related to renewable energy, said Iliya Shikov, TOPODRONE CTO. "Combining thermal and lidar data can provide deeper insights, in particular, in solar plant inspections and dam management."

Ira Dvir, AGROWING CEO, said the company welcomed

TOPODRONE's new thermal mapping sensor. "It's a significant step forward in the race to provide valuable data-driven insights into urban mapping, energy efficiency, and disaster response," Dvir said.

TOPODRONE post processing software has been upgraded to optimize remote sensing efficiencies and to deliver high-precision thermal orthomosaic maps.

In 2023, TOPODRONE released TOPODRONE SLAM 100 for mobile mapping, and a new lightweight 360 degree lidar model range: TOPODRONE LiDAR 200+, 100+, and 100. •



ProGlove wearable scanners MARK the spot in the warehouse

Lights, sensors provide feedback for warehouse associates

BY TIM CULVERHOUSE

The needle in the haystack. The twists and turns of a maze. The buried treasure on the map where X marks the spot.

Industrial warehouses flush with items sprawled across shelves and aisles can also seem like a never-ending maze. As associates take thousands of steps to cover the space for scanning and [picking](#) as part of the [logistics](#) process, they need a way to ensure that the picks are right and they're headed in the correct direction.

Enter [ProGlove](#).

What does an industrial warehouse worker want?

While the question above can seem like a loaded question, it was one that ProGlove founders Thomas Kirchner, Paul Günther, Jonas Girardet and Alexander Grots wanted to tackle. A 2014 "Intel Make it Wearable" contest in Silicon Valley served as the creative impetus for the company.

But, where do you start?

"As a human, what do you bring into this workforce? It's your hand-eye coordination," said Patrick Blitz, principal product manager at ProGlove. "You have brains. You have hands. There's



The ProGlove Index Trigger and MARK2 Multi Range in a warehouse. Source: ProGlove

all this stuff that humans can bring into the warehouse. Let's augment the hands. Let's make them as good as possible."

A decade, several [scanner](#) iterations and a Guinness Book of World Records record later, ProGlove is taking the human experience in a highly automated sector and using the data at hand to improve the worker experience.

"The hand was always set, this was always where we wanted to go," Blitz said. "Over a couple of iterations, the founders realized that the thing people need most is data capturing. Barcodes already do a lot of things. They're very important. You need to scan a lot of barcodes, so let's make that as good and as easy as possible."

The company name of

ProGlove stems from its earliest product versions, but now the focus is on the [wearable](#) scanner technology and the data captured from the [workforce](#) to improve warehouse operations.

Giving warehouse employees feedback they need

ProGlove produces five different scanners under two lines. The Leo scanner - the starter - can handle approximately 4,000 scans in one battery charge.

The MARK line of scanners has four different options for customers. Each MARK is roughly the same rectangular shape and size:

- MARK Basic comes in a Standard Range (10-90 cm) with LED dot aiming, and a



MARK Display scanner in a postal sorting environment. Source: ProGlove



A MARK Scanner in a warehouse scanning a barcode. Source: ProGlove

Multi Range (10-250 cm) with laser aiming. Both can handle approximately 12,000 scans in one charge.

- MARK 2 comes in a Standard Range (10-90 cm) with LED dot aiming, and a Multi Range (30-250 cm) with laser aiming. Both can handle approximately 12,000 scans in its battery life.
- MARK 3 comes in a Multi Range (10-600 cm) with laser aiming and can handle approximately 12,000 scans in one charge.
- MARK Display comes in a Standard Range (10-90 cm) with LED dot aiming, and a Multi Range (30-150 cm) with laser aiming. Both come with a screen display with visual cues for the wearer and can handle approximately 7,000 scans in one charge.

Regardless of the screen on the MARK Display line, each ProGlove scanner provides feedback for the wearer and generates troves of valuable data for the warehouse operator.

“What I always get is feedback on the device,” Blitz said. “The device will tell me if the pick was

right or wrong by colors, haptic and audio feedback. There’s lights, colors and a bit of movement in the device. With all the devices, no matter if it has a display or not, I have this type of feedback.”

Along with the scanners, ProGlove customers are able to access and ingest this data through a phone/tablet application. Warehouse workers wearing a MARK or Leo without a display can confirm their picking selection and next destination on the app. MARK Display wearers can receive a message, albeit with small text and screen space, with this same information.

ProGlove scanners utilize Bluetooth to send the data associated with scans to the app. Using this technology, compared to WiFi, allows for a shorter and easier integration window for customers, according to Blitz. Whereas WiFi transceivers would drain battery life faster, Bluetooth, and further enhancements to that technology, have enabled ProGlove to focus on other sensor elements on its scanners.

“Our scanners have all of these kinds of sensors to really make the

environment as worker-friendly as possible and get that information to both the worker and the supervisor on the shop floor to get a better understanding of what’s happening,” Blitz said.

Integration for data analysis warehouse operators require

Think of each scanner as a mobile data platform. The orange or blue ProGlove scanner takes the information associated with the barcode or SKU from an item on a shelf in a warehouse and sends that data to the other systems.

“There are so many WMS and WES that do route optimization and warehouse management pretty well,” Blitz said. “We see our job, besides making the life of the worker as good and as efficient as possible, is really about surfacing this information and giving you this understanding of what’s actually happening right now in my warehouse.”

Once warehouse managers obtain and analyze the data from ProGlove scanners, they can grasp the true nature of the work taking place every day. Were the picks per hour down in one sector? Was someone’s step count higher today compared to last week? ProGlove provides the data that leads the proverbial horse to water, but then the onus is on the operation to understand what changes to make with this information to improve labor productivity.

“We don’t presume that we can actually fix things ourselves,” Blitz said. “But we try to really empower the supervisors and the people on the shop floor to make the right decisions with that data.” •

German Bionic unveils 360 degree Human Augmentation Platform

Wearable Smart SafetyVest and Connect app debuted at VivaTech 2024

BY ROBOTICS 24/7 STAFF

Wearable robotics provider German Bionic recently unveiled its 360 degree Human Augmentation Platform at VivaTech in Paris, France.

The user-centered ecosystem integrates the latest versions of Apogee series [exoskeletons](#) with German Bionic's OS operating system, IO [data management](#) platform and was joined by two new human-machine interfaces that debuted publically at VivaTech: the Smart SafetyVest and Connect app.

“Our 360 degree Human Augmentation platform goes beyond mere technological advancement - it is about making sophisticated, human-centric solutions universally accessible, while promoting user agency,” said Armin G. Schmidt, German Bionic CEO and founder. “The platform is designed to enhance everyday life, ensuring that each individual can achieve more with greater ease, comfort and safety.”

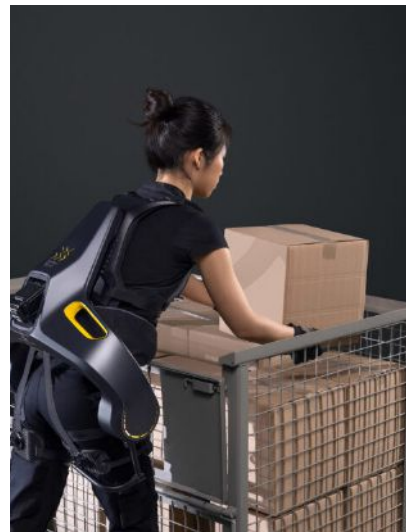
German Bionic said this integration of individual components into a single platform exemplifies its commitment to delivering highly accessible human-centric technology systems that are simple to use, empowering and designed to improve health and productivity.

German Bionic OS, IO integrate sensors and data management software

Central to the platform is the Apogee series of exoskeletons, which can provide up to 66 pounds of support per lifting motion as well as active walking assistance.

The proprietary German Bionic OS enables the hardware and multitude of integrated sensors in the exoskeletons to work together in unison. The operating system ensures that all components interact cohesively, enhancing device functionality and user interaction. German Bionic OS supports a broad array of applications and provides an intuitive, [multilingual](#) user interface that the company said can make it accessible to a global workforce.

German Bionic IO has the ability to ensure easy and full integration within the broader human augmentation ecosystem. The latest version of the machine learning software extends the capabilities of advanced data management, the company said. Besides providing insights into device performance and [safety](#) through AI-enhanced analytics, German Bionic IO can also deliver evaluations and



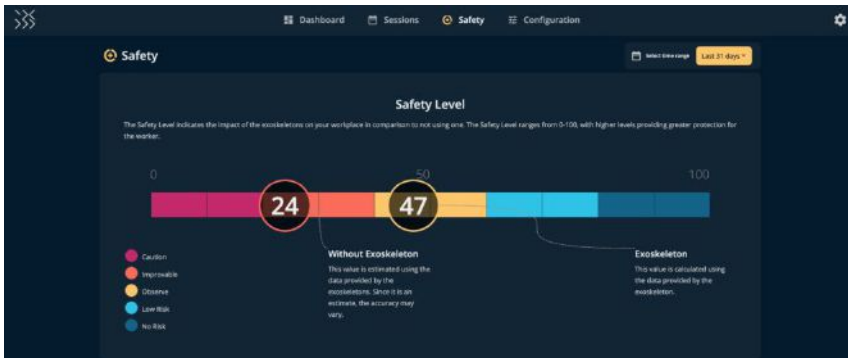
German Bionic's Human Augmentation Platform is centered around its Apogee exoskeletons, which can provide up to 66 pounds of support per lift and active walking assistance. Source: German Bionic

assessments as well as highlight process optimization potentials.

Safety-level monitoring for user teams along with AI-powered ergonomic recommendations have the potential to enhance the overall safety and effectiveness provided by the exoskeletons and other smart wearables, both now and into the future, German Bionic said. The “Smart Safety Companion” is incorporated in all components of the 360 degree Human Augmentation platform.

Connect app gamifies individual users experience

With the all-new German Bionic Connect app, data from German Bionic IO is also accessible to individual users, which the company said can provide maximum user agency. The app-based user interface allows users to control and cus-



German Bionic IO data management software uses AI-enhanced analytics to provide insights into device performance and safety, as well as highlight optimization potential. Source: German Bionic



Enhanced by subtle gamification features, German Bionic's Connect app allows users to control and customize their interactions with the technology. Source: German Bionic

tomize their interactions with the technology, ensuring they are active participants in shaping their own user experience.

The app can offer users full transparency concerning their personal data and the impact the exoskeletons have on their individual work. It can also facilitate easier onboarding for new users and enables users to both receive and give direct feedback, which German Bionic said promotes the highest levels of user engagement and operational transparency.

Enhanced by subtle gamification features, German Bionic said its app encourages exploration and interaction. It is now available for download

in the Google Play and Apple App Stores for Android and iOS devices, respectively.

Smart SafetyVest expands ergonomic safety monitoring applications

VivaTech also featured the first public appearance of the German Bionic Smart SafetyVest. German Bionic said its vest marks a significant expansion of the group of people that can benefit from its human-centric technology, as it is tailored not only for those working in physically demanding roles - such as logistics, [construction](#), manufacturing and [health-care](#) - but for anyone interested in monitoring and improving their ergonomic safety.

The Smart SafetyVest interface allows users to access data analyzed by German Bionic IO output in a user-friendly manner via the Connect app. The Smart SafetyVest is just one example of many future interfaces that can leverage German Bionic's 360 degree Human Augmentation platform to enhance people's general health and wellbeing, the company said. •



German Bionic said its Smart SafetyVest is for anyone interested in monitoring and improving their ergonomic safety. Source: German Bionic

Verve Motion showcased integrated data analytics platform at MODEX 2024

Verve Logic will integrate into the company's wearable robotics exosuits

BY ROBOTICS 24/7 STAFF



Verve Motion's SafeLift exosuits are now available with the company's Verve Logic analytics platform as a standard feature for gathering ergonomics data. Source: Verve Motion

Wearable robotics provider Verve Motion showcased its recently introduced Verve Logic software and data [analytics](#) platform at MODEX 2024. The Verve Logic platform will integrate into the company's SafeLift exosuit.

Verve said its combined product offering aims to pinpoint critical areas that pose injury risks to industrial workers as they work, while simultaneously offering coaching to enhance both individual and group performance.

Analytics software to autonomously identify risky movements

Now available as a standard feature for its SafeLift exosuit, the Verve Logic platform delivers a suite of safety analytics, actionable reports and insights, honing in on aspects such as [ergonomic](#) risk analysis, trend analysis and exosuit utilization.

“The SafeLift exosuit development was informed through extended testing of human subjects where we collected biomechanics data in a lab environment” said Conor Walsh, scientific co-founder of Verve Motion. “It is exciting now that Verve Motion is making this same type of data available to workers and their organizations through Verve Logic so they can understand injury risk reduction and optimize the use of SafeLift for their operations.”

Sensors embedded in the SafeLift exosuit collect 3D motion and force data while the suit is in use. The Verve Logic platform gathers data such as lift count, usage duration and weight offloaded. The software autonomously identifies risky movements, such as prolonged bending, excessive forward bending, twisting and side bending.

Verve Logic platform to provide individualized feedback

Verve said its data collection approach provides individual workers and leadership teams an understanding of each employee’s day-to-day risks, informing intervention, coaching and facility adjustments to minimize the likelihood of injuries.

Verve Logic creates safety reports that provide on-site safety trainers and leadership with clear, actionable insights related to safety. Individualized worker reports offer tailored coaching and feedback.

Verve Logic also offers a customized tool that allows on-site safety teams to pinpoint groups at greater risk of injury through analysis of factors such as job roles, shifts and experience levels. Verve said this data-driven approach facilitates targeted enhancements in coaching and ergonomics, with Verve Logic software streamlining prioritization of these initiatives based on actual distribution site metrics.

Verve said one of its recent customers studied the impact of using its SafeLift exosuit through Verve Logic analytics. According to the customer’s findings, 97% of workers reported the exosuit assisted in their daily tasks and 83% reported it improved their lifting posture.

SafeLift exosuit combines robotic assistance with motion sensing

Verve’s SafeLift soft exosuit offers adaptive assistance customized for each worker and task. The lightweight exosuit’s form factor wears like a backpack.

The wearable system combines real-time motion sensing with robotic assistance. Verve said its SafeLift exosuit alleviates about 40% of the strain on a worker’s back during a typical workday by providing assistance in parallel with their underlying muscles.

“The real-world impact of this technology stems from the exosuit’s dual function: it not only protects workers from injuries by supporting their bodies during ergonomically risky lifts but also lessens the effort needed for all lifts, including those considered ‘safe,’” said Christopher Buck, head of product at Verve Motion.

Verve Motion said its SafeLift exosuits have aided U.S. workers in lifting more than 300 million pounds since the wearable technology debuted in 2020. SafeLift exosuits have been deployed in a wide range of industries, including grocery, package distribution, 3PL, retail, supply chain distribution and [manufacturing](#). •

Zebra Technologies introduced new automation offerings to empower connected workers at MODEX 2024

Company showcased scanner, new wearable computers and AMRs at show

BY ROBOTICS 24/7 STAFF



The Fetch100 Roller Guide Autonomous Mobile Robot received enhancements at MODEX 2024. Source: Zebra Technologies

Zebra Technologies, an Illinois-based digital system provider that can enable businesses to intelligently connect data, assets and people, recently announced new enterprise mobile computing and intelligent [automation](#) solutions designed to enable an agile, resilient supply chain with the power of a connected workforce.

At MODEX 2024, [Zebra](#) highlighted its expanded port-

folio of options, including its new wearable scanner, wearable computer and AMRs.

The demand for increased operations

Operations leaders in the manufacturing, warehouse, retail, transportation and logistics industries worldwide continue to grapple with fostering resilient supply chains amid heightened omnichannel demands for speed and accuracy, ongoing labor shortages,

and economic uncertainty.

According to Zebra's 2023 Global Warehouse Study, 89% of decision-makers say if their organizations do not invest in technology to improve operations, they will not meet their business objectives.

"Managing the supply chain has become more complex with increased consumer expectations for inventory and same-day deliveries," said Andre Luecht, global strategy lead, transportation, logistics and warehousing at

Zebra Technologies. “Zebra helps businesses work in new ways with technology and automation to drive the right outcomes in their operations and build an agile supply chain through better accuracy, visibility, and efficiency.”

According to the study, eight in 10 decision-makers and frontline workers said using more technology and automation would help meet or exceed productivity goals. In addition, decision-makers (54%) and workers (49%) agree addressing worker comfort and ergonomics is a top workforce initiative.

Wearable scanners and computers

At MODEX, visitors saw how Zebra’s new RS2100 wearable back-of-hand (BOH) scanner can enhance productivity and deliver new levels of comfort to workers. The unique mount on the RS2100 leaves the palm completely unobstructed, providing greater freedom to handle items.

Zebra also launched the WT6400 and WT5400 wearable computers. Engineered to streamline hands-free workflows while enhancing comfort, the WT6400 and WT5400 can provide more flexibility for picking orders, sorting items and managing inventory with greater efficiency and accuracy.

With a larger display and integrated keyboard, the WT6400 is easily accessible for right- and left-handed workers, and its integrated angled camera captures images to document damaged items or completed tasks. The WT6400 is designed for demand-



The Fetch100 Roller Guide Autonomous Mobile Robot simplifies worker-robot collaboration and conveyor delivery into one offering. Source: Zebra Technologies

ing environments, including freezer operation (-30°C), while the WT5400 introduces a new class of wearable computers for hands-free retail workflows.

Handheld and mobile computers

A new addition to Zebra’s TC5X series includes the TC53e/TC58e/TC53e-RFID mobile computers. The TC5Xe series offers 5G, Wi-Fi 6E, integrated RFID, premium security features and contains 25% post-consumer recycled plastic by mass. The TC53e-RFID offers integrated short-range UHF RFID, enabling associates to count inventory in the backroom, validate tickets at a concert or verify all items in a shopping cart from up to nearly 4 feet away with the same device ergonomics as the standard TC53e.

The TC5Xe series, WT6400 and WT5400 are all powered by the [Qualcomm](#) 4490 octa-core

[processor](#) which can provide a longer lifecycle and more processing power. It can run multiple applications including apps powered by augmented reality and AI, apps designed for voice and line of business as well as simple ‘green screen’ legacy apps.

Beyond its new wearables and mobile computers, Zebra also showcased its recently launched MC9400 series, an ultra-rugged mobile computer designed to enhance workflow efficiency and device security across the retail, warehouse, manufacturing, transportation and logistics industries.

Fetch100 AMR, machine vision and scanning technology

The company also unveiled enhancements to the Fetch100 at the show, including the Fetch100 Roller Guide AMR, which combines simplified worker-robot collaboration and conveyor delivery into one solution.

Workers can easily see tasks, destinations and status via the Roller Guide’s integrated touchscreen and smart LEDs. Its ability to autonomously load and unload totes and bins from existing mechanized equipment - such as conveyors - can increase worker productivity. Together with its channel partners, Zebra also demonstrated several machine vision-based offerings at the show.

Scan tunnel, dock door and packing bench demos highlighted the efficacy of Zebra’s fixed industrial scanner and machine vision technology in reducing errors as well as improving productivity, visibility and overall operational efficiency. •

Brain Corp's Sense Suite helps address retail inventory challenges

Timely, accurate data collection empowers AI analysis for today and the future

BY DONALD HALSING



Inventory scanning AMRs, like the Dane AIR powered by BrainOS Sense Suite, enable retailers to keep track of their inventory and quickly address price discrepancies, low stock, and misplaced products.
Source: Brain Corp

Data is the key to everything, especially when it comes to automation systems and robotics. End users are always looking for more data and the right data. What if there was a way to utilize the data collected in facilities now - in some cases using robots already deployed - to improve operational efficiency for years to come?

[Brain Corporation](#), a software developer for autonomous mobile robots (AMRs), expanded its product offerings based on feedback from its customers to address a new use case - [inventory management](#). Not only did it create multiple options to suit different business operations, it also enabled opportunities for its customers to apply their data to future use cases.

From floor scrubbers to inventory management

Brain Corp initially developed its BrainOS software to provide autonomy for AMRs. As the software's capabilities expanded, the company built additional products on top of its core software, including BrainOS Clean Suite for autonomous floor scrubbers.

Gavin Donley, Brain Corp head of marketing, said the company initially targeted the retail vertical market. After finding success providing autonomy for floor cleaning robots, such as Tennant Company floor scrubbers, Brain Corp's customers shared a new idea.

"If these floor scrubbers are already navigating an aisle, what else can they do?" Donley said. "In partnership with our customers, it was identified that there's a



Tennant Company's X4 ROVR is powered by Brain Corp's BrainOS Clean Suite navigation software. The companies recently signed an exclusive technology agreement for floorcare machines. Source: Tennant Company

lot of issues that exist within the inventory management space."

Andrey Martsenyuk, Brain Corp director of software engineering, said the company learned over time the nuances and intricacies of retail supply chain management, working with customers to find opportunities where robots can integrate into operations.

"We learned of this problem from multiple retailers that we already had our cleaning robots at," Martsenyuk said. "From a product and engineering perspective, it's really nice not to have to both come up with a solution and also come up with the problem."

Multifunctional vs. single-function robots

Because Sense Suite - Brain Corp's inventory management software - is built upon the core BrainOS software, it isn't limited to one type of robot. Donley said one of the first Sense Suite use cases was deploying multifunctional robots for Sam's Club, which combined floor-cleaning AMRs with an inventory-scanning add-on module.

Floor scrubbers are large by design, enabling them to clean as much area as possible per pass. Martsenyuk said for customers like Sam's Club, with wide aisles in their warehouse-like wholesale clubs, the trade offs of adding additional scanners to floor scrubbers can be justified. But for other customers with narrow aisles, a standalone inventory scanning robot can provide a better [ROI](#) incentive.



One of Brain Corp's first inventory scanning technology deployments was with Sams Club. The wholesale retailer added inventory scanning towers to their Tennant floor scrubbers. Source: Sam's Club

For example, Brain Corp and Dane Technologies collaborated to produce the Dane AIR inventory-scanning AMR, which features a small, circular base and narrow profile. Unlike large floor scrubbers, Dane AIR can simply turn around in place if it encounters obstacles.

Martsenyuk said because floor cleaning and inventory scanning are two distinct workflows, they present two distinct routing challenges. "If you were to combine them, you'll probably be prioritizing one over the other."

When creating missions and path planning, customers can optimize for one task over the other if they want to scan inventory while scrubbing. Or, they can use the same robot to perform cleaning and scanning at different times of day. It all



Images, RFID scans, and other data collected by BrainOS Sense Suite is analyzed by AI models and can be presented to employees as a list of action items. Source: Brain Corp

depends on the specific goals of the customer.

“From a technology perspective, we support these different types of missions,” Martsenyuk said. “It’s nice to be able to support those different modalities, different use cases with a single kind of BrainOS system.”

RFID and computer vision combined with AI analytics

AMRs are equipped with sensors - including cameras and [lidar](#) - and processors to enable safe and autonomous navigation. Martsenyuk said high-resolution cameras and RFID scanners can be added to a robot - typically housed in a scanning tower - to enable inventory data collection.

“With those two technologies, you can achieve quite a bit,” he added. “We also have industrial inventory use cases that we’re working with that require a whole different set of sensors.”

Images are stitched together to make sense of full shelves or aisles from the front, while adding RFID tags to products allow robots to count items behind the front row of product. In cases where robots operate around shoppers and employees, BrainOS has to make decisions to help avoid occlusion of the shelves by people and obstacles when capturing images.

“Do I stop and wait for the person to move away? Do I try to go around? How long do I wait?” Martsenyuk asked. “You have to figure out how to deal with the corner cases of the world being not perfect and static while you’re capturing images.”

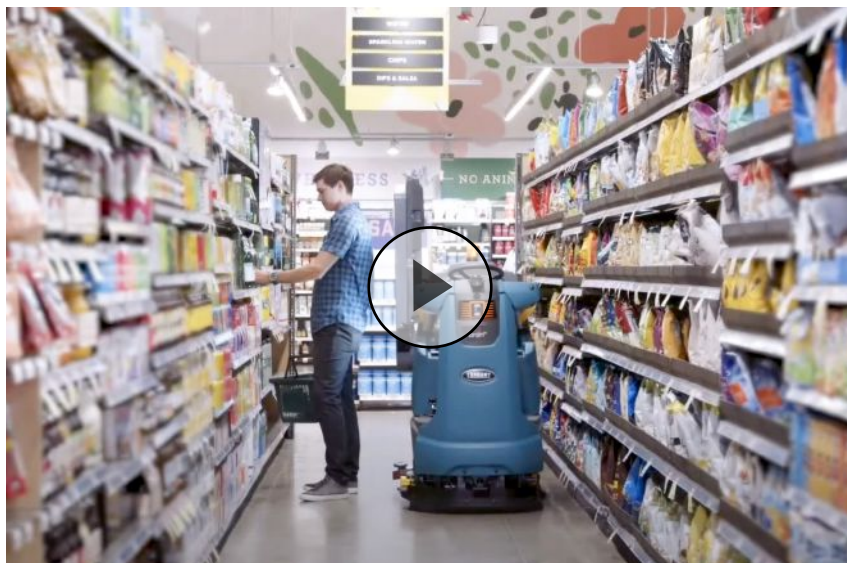
Using AI and [machine learning](#), BrainOS Inventory AI analyzes images and other data captured by the robots. Martsenyuk said Brain Corp’s algorithms can

not only identify which products are on the shelf, but they can also read price tags and SKUs on the shelf and associate those with visible products.

“The primary job of a shelf scanning robot or inventory analytics robot is ... to provide insights to a customer as quickly as possible,” Martsenyuk said. “To do that, you need to have relevant, up-to-date image or sensor data - whether it’s RFID or just vision - that you collect at least once a day, sometimes multiple times per day, depending on the use case.”

Presenting actionable insights through user interfaces

Data and insights are delivered to customers through a variety of user interfaces, including email reports, a cloud-based portal, and a mobile app. From a change management perspective, Donley said Brain Corp provides operations management tools to promote effective [fleet management](#) when they deploy new robots or features.



“What we like to be able to offer is a flexible approach in terms of how retailers or warehouses can get that data,” Donley said. “What we noticed was that some have different technological capabilities, different systems already set up.”

For customers without adequate inventory management software, Brain Corp built its own app that can provide employees with an action item list, including where items are out of stock, in the wrong location, or priced incorrectly. The app also enables employees to schedule robot missions and see where robots are in real time on a map.

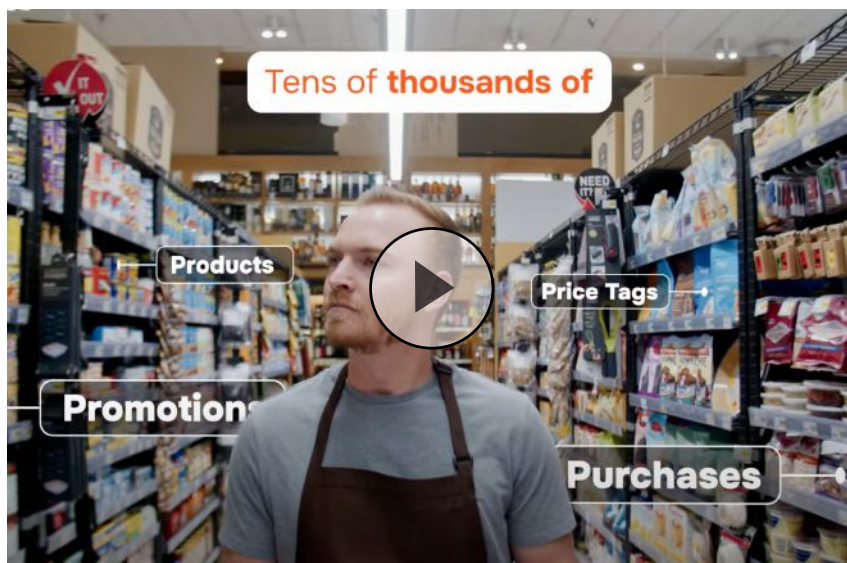
For customers who already have inventory management software, Brain Corp created APIs to integrate data from Sense Suite. In some cases, Brain Corp forwards data from its Inventory AI feature, but customers can also import the images and run analytics through their own systems.

“We are collecting the data, and we know there are specific use cases that we’re addressing today - out of stocks, price and accuracies, products and locations,” Donley said. “But with all the talk of AI, what else can you do with that data?”

Creating a wealth of data for tomorrow

At its core, Sense Suite is helping address a problem that Brain Corp’s customers identified: a lack of knowledge about their facilities for decision making.

“Imagine if you weren’t required to go find the answers,



but you were just given the answers. Right now you’re just going in with, ‘I don’t know where things are.’ Essentially, you’re going in empty-handed in terms of knowledge,” Donley said. “We’re automating that process and providing the answer. So instead of searching, you’re just reviewing the answers and then deciding from there what action should take place.”

One way Brain Corp’s data is empowering decision making today is through Virtual Tours, a feature of Sense Suite that allows employees to view the 360 degree images captured by robots during their missions. Donley said this remote site management tool allows users to confirm what their data is showing.

Operations management tools also allow users to see historical robot location data, which can show areas missed during cleaning and/or scanning. Donley said proactive communications with operators through

“autonomy services” help to ensure map data is healthy, telematics are in working order, and the robot is performing correctly. “If we keep seeing an assist in this area, maybe you should retrain the route so that it performs better through this space,” he added.

Donley said a big use for robots going forward is frequent data collection for supply chain decision making, especially because data being fed through AI models needs to be both timely and accurate.

“The data that the robot’s collecting is a huge part of this solution in the equation, even outside of the use cases that we’re addressing today,” Donley said. “Even if you don’t have that specific purpose in mind today, two years from now you’ll have a treasure trove of accurate, frequent data that you didn’t have before. How can your operations, how can your supply chains improve now that you have access to this data?” •

Swisslog to deploy third AS/RS for Walmart milk processing facility

Robinson, Texas facility to fulfill orders across southern U.S. stores

BY ROBOTICS 24/7 STAFF



Walmart's Robinson, Texas milk processing facility, which is scheduled to open in 2026, will feature Swisslog Vectura pallet stacker cranes and SynQ management software. Source: Swisslog

Central logistics warehouse automation and software provider [Swisslog](#) recently announced [Walmart](#) will install a Swisslog automation system within its Robinson, Texas facility.

Swisslog said Walmart's new system has the potential to

enable seamless material flow and increase uptime. Walmart is planning to break ground on the milk processing facility later in 2024, and it is scheduled to open in 2026.

The Robinson location is Walmart's third milk process-

ing facility to deploy Swisslog's automated storage and retrieval system (AS/RS) featuring SynQ software and Vectura cranes.

Walmart worked with Swisslog in 2018 to open its first milk processing facility in Fort Wayne, Ind. This facility

served as a blueprint for its second facility in Valdosta, Ga. expected to open in 2025, as well as for the just announced Robinson facility.

AS/RS to include KUKA palletizing and depalletizing robots

According to Walmart, the Swisslog AS/RS helps continue the company's commitment to building a more resilient and transparent supply chain to deliver its products. It also said the system can bolster its capacity to meet consumer demand for milk.

Products from the Robinson facility will serve more than 750 Walmart stores and Sam's Clubs throughout the South, including Texas, Oklahoma, Louisiana, along with parts of Arkansas and Mississippi.

Designed by Swisslog's automation team, the AS/RS brings together five Vectura pallet stacker cranes with [KUKA palletizing](#) and [depalletizing](#) robots, a ProMove pallet conveyor system as well as a [conveyor](#) system for small loads. The automation system operates on synchronized intelligence from Swisslog's SynQ software, which provides warehouse management, material flow and automation control system functionality in a single, [modular](#) platform.

"We are honored that Walmart continues to put their trust in our automation solutions and our people behind those solutions," said Sean Wallingford, Swisslog Americas president and CEO. "This has been a very collaborative relationship

as our two teams work together to create value for Walmart and ensure our automation solutions and software enable the company and its farmers to bring fresh, transparently sourced dairy to market."

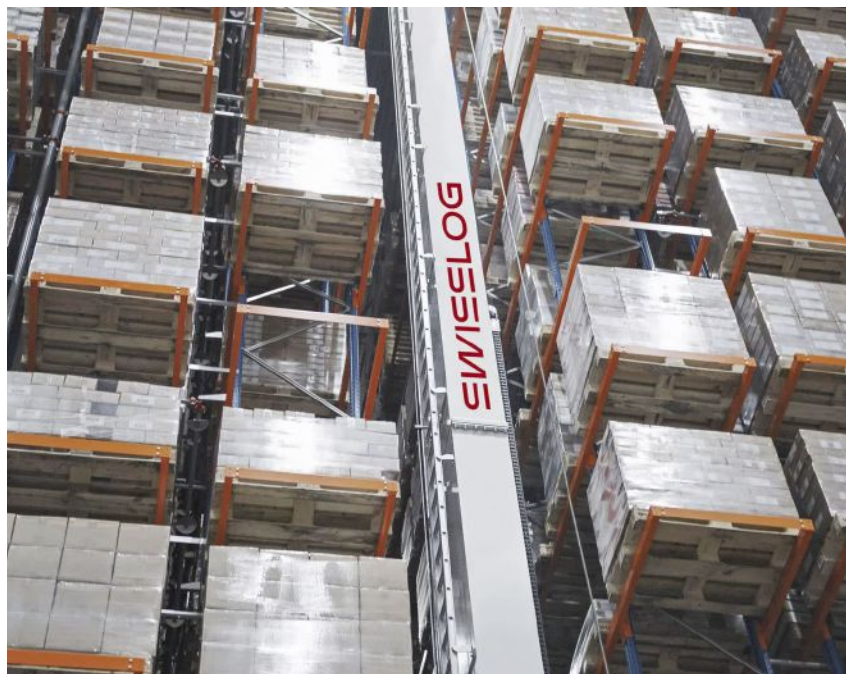
IT management services to ensure data driven material flow

Swisslog said its SynQ management software can not only optimize the flow of the equipment to increase efficiency and accuracy of an operation, but it can also [orchestrate](#) the operation of multiple subsystems.

SynQ can equip warehouse automation and IT systems with synchronized intelligence of people, processes and machines, which Swisslog said can boost the efficiency and [productivity](#) of warehouse processes and adapt

to changing market requirements. SynQ can provide inventory management and material flow capabilities that enable real-time inventory tracking and management of items to ensure freshness, quality and transparency of the [food and beverage](#) supply chain.

Walmart's latest project also includes Swisslog's IT Managed Services, which puts in place team members to proactively manage IT systems and software required to keep equipment running at peak performance. Swisslog said its 24/7 support can allow Walmart to free up internal resources from routine IT system administration, while also enabling data-driven proactive maintenance that helps reduce unplanned downtime. •



Swisslog's SynQ management software will help to synchronize data across automation and IT systems at Walmart's Robinson facility. Source: Swisslog

Formant introduces advanced analytics feature that allows users to gather more data insights

Formant Analytics enables users to get more out of data

BY ROBOTICS 24/7 STAFF

Formant, a San Francisco-based [cloud](#) robotics platform, recently announced the launch of its Formant Analytics feature to help robotics companies optimize fleet performance, make data-informed business decisions and easily prove ROI.

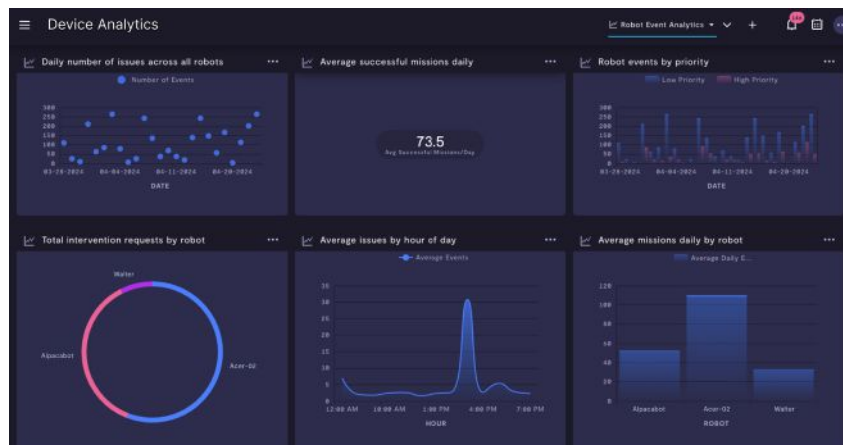
In response to the growing demand for data-driven insights in robotics, [Formant](#) has developed its a comprehensive platform to empower robotics companies and integrators to make informed decisions regarding robot productivity, efficiency and operational cost reduction.

Formant Analytics utilizes the power of AI, allowing users to gain insights with a simple request; everyone from engineers to business executives can use Formant Analytics to get the most out of their data.

Key highlights of Formant Analytics

“Our customers require actionable insights to optimize their robot operations and drive business success,” said Jeff Linnell, CEO of Formant. “Formant Analytics will provide teams with the tools they need to unlock the full potential of their data and prove automation value.”

As part of the new release, the company touted the follow-



The new Formant Analytics feature provides more data insights on the cloud platform. Source: Formant

ing features:

- *Optimize fleet performance*
Robotics companies need to ensure their fleets are performing as efficiently as possible. With Formant Analytics, all stream and event data ingested into Formant can be leveraged by this feature to evaluate robot performance.
- *Make better business decisions*
When businesses need to make decisions around automation, data-backed metrics can assist in making the right moves. Analyzing customer usage and performance metrics are just two examples of how users can better understand how customers use their robots, and track the success of scaling a deployment.
- *Prove ROI to customers*
ROI is one of the most vital metrics to prove when it comes to physical automation. By utilizing

Formant Analytics to demonstrate quantifiable improvements, users can prove to their customers that their fleet delivers a positive return. Plus, the ability to build customizable dashboards and monthly ROI reports enables them to showcase the value of robotic investments quickly and easily.

Formant Analytics is built on the Formant cloud robotics platform and offers a unified data offering, eliminating the need for complex data engineering processes. Non-technical users can use a simple click interface to create insightful visualizations, while developers with basic SQL knowledge can easily build and share dashboards. The platform also allows users to utilize the AI SQL module to help write queries to get the most out of their data. •

Foxglove digital twin helps Greenzie speed up troubleshooting

Data management, simulation software reduced incident time from days to minutes

BY ROBOTICS 24/7 STAFF



The Greenzie team can now collaborate simultaneously and more easily share data with its customers through shared layouts and shareable links within Foxglove's visualization tool. Source: Foxglove

Visualization and observability software provider Foxglove recently released a case study on the use of its digital twin platform for autonomous commercial [mower](#) provider Greenzie.

Atlanta, Ga.-based Greenzie is on a mission to free humans from repetitive outdoor labor. Specializing in the lawn care industry, Greenzie develops software to enhance the capabilities of commercial mowers through collaborative robotics operator assistance and [autonomous vehicle](#) technologies.

Greenzie's primary customers are commercial landscapers and lawn maintenance companies - which Foxglove said includes the largest landscaper in the U.S. - servicing large turf areas like athletic fields, industrial parks and educational campuses.

Data collection, analysis, sharing required manual effort

Before adopting Foxglove, Greenzie faced significant challenges in [data management](#), incident analysis and debugging. Its process required long syncs to get robot operating system (ROS) bag

files, sometimes even involving manually collecting data from the robots by mailing a physical hard drive to customers.

Greenzie works with lawn care companies all over the country. With over 21,000 acres mowed by Greenzie machines in 2023, the company found this process was a major hindrance, both for customer operations and for new product development.

The data collection process would be followed by time-consuming synchronization and playback using multiple tools such as RViz, Gazebo and Plot-



Before using Foxglove's simulation software, Greenzie had to mail physical hard drives with ROS bag files for manual synchronization using multiple visualization tools. Source: Foxglove

Juggler, Foxglove said.

Aside from the operational challenges of using multiple tools to visualize the robotics data, Greenzie also faced the challenge of sharing visualizations, both within its own team and with its customers, while working to triage issues.

Greenzie relies heavily on customer feedback to improve its product, so altogether this setup led to delays in problem resolution, hindering its ability to rapidly iterate and improve its products, Foxglove said.

Cloud-based simulation tools provide sharable, specific views

Greenzie opted to connect to its mowers over a VPN in order to use Foxglove directly. Using this setup allows Greenzie customers to focus on its own jobs - keeping lawns beautiful - without the hassle of manually offloading data from its mowers.

Foxglove said its cloud-based system enables rapid sharing of diagnostic information and visual feedback directly with clients, showing each mower's operational status and environment.

Using Foxglove has accelerated Greenzie's development and debugging processes, and ultimately its time-to-market with improvements, new features and capabilities, Foxglove said.

Greenzie uses Foxglove to quickly access and visualize robotics data without using multitudes of [simulation](#) tools it had to use in the past. The company makes use of both shareable layouts and links to view and share data in order to work collaboratively as a team.

"The fact that Foxglove just works with ROS, without any additional setup or software, has been a selling point for many members of our team, including our tier 1 support team," said Brian Cochran, Greenzie robotics software engineer.

Foxglove said Greenzie has also built its own plugins that allows it to view certain sensor-specific custom views within Foxglove. Its message converter extension for depth and spatial detections is available as open source.

Greenzie also makes use of Foxglove in its business development efforts. At conferences, Greenzie uses Foxglove to showcase the real-time [visualization](#) of mower operations, offering attendees a live demonstration of the technology in action.

Foxglove allows collaborative, automated incident response

On the customer-facing side, Greenzie customers no longer need to manually transfer data. Since customer data is now uploaded to Foxglove automatically, Greenzie can catch incidents before they are reported.

Foxglove said it has replaced multiple tools for Greenzie, reducing the time required to analyze incidents from a full day to under an hour, and sometimes even under 30 minutes.

"Before Foxglove, our incident triage process could take an entire day," said Charles Quinn, Greenzie co-founder and CEO. "Now, I can look at any incident in 30 seconds and have an answer."

Internally, Foxglove said it has enabled better collaboration, allowing multiple Greenzie team members to work on a problem simultaneously. Greenzie uses Foxglove events to mark incidents and shared layouts and shareable links to collaborate.

The gained efficiency has not only sped up internal operations but also improved customer trust and satisfaction by enabling faster response times to issues reported in the field, Foxglove said.

Foxglove said its ability to streamline the data analysis and visualization processes has allowed Greenzie to focus more on innovation and less on solving technical issues. The tool's extensibility and ease of use have fostered a proactive approach to product improvement and customer service, which Foxglove said ultimately enhances Greenzie's market position in autonomous outdoor lawn care equipment.

"Thanks to Foxglove we're no longer spending time fighting with tooling - we're developing revenue-generating product and helping our customers, which is why we exist," Quinn said. •