

Zebra
Robotics Automation™

Flexible Automation: The Way Forward

Meet evolving market demands with autonomous mobile robots



Continued Shifts in Manufacturing and Warehousing

Automation technology continues to be a defining competitive edge across industries.

Like many other industries, the manufacturing and warehousing landscapes are in a state of change as organizations utilize innovative automation to increase output and decrease labor utilization for lower-value tasks. More than ever, operators are relying on the latest technologies to increase productivity, reduce costs, and optimize labor use. They are achieving success by installing it alongside existing traditional methodology.

This means supporting, bolstering or elevating labor through automation. Today's market brings many challenges, including workforce shortages, higher customer demands and tighter manufacturing margins. Operations can overcome these obstacles by putting automation to work in ways that allow their staff to be utilized more efficiently, as well as freeing up floor space, avoiding costly expansion or new construction.

One pertinent example of how manufacturers and distributors are eliminating some of these obstacles is autonomous mobile robots (AMRs). These robots help reduce heavy reliance on traditional fixed conveyors or the manual movement of products between workstations. By handling a significant amount of the manual movement of materials, they reduce unproductive travel time for workers. Flexible and scalable, both in functionality and configuration, they can be easily woven into workflows by integrating with existing conveyor systems that do not necessitate removal but could benefit from significant surges in connectivity, production efficiency, reduced downtime or the elimination of linear bottlenecks. Further, AMRs can replace the need for conveyance entirely — freeing up valuable floor space to be used for additional workstations, inventory or storage.

This paper will cover industry changes, the idea of autonomous mobile robots, and their role in transforming material movement through innovative and streamlined approaches.

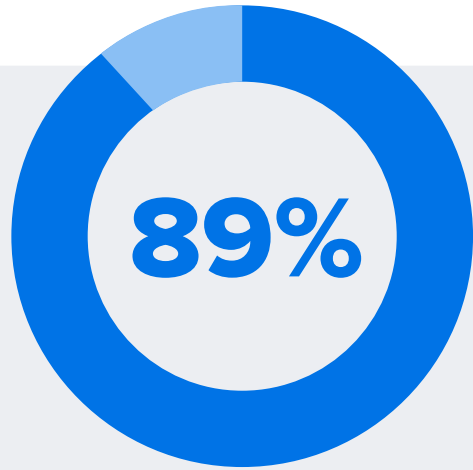


Seven Reasons Operations Choose AMRs

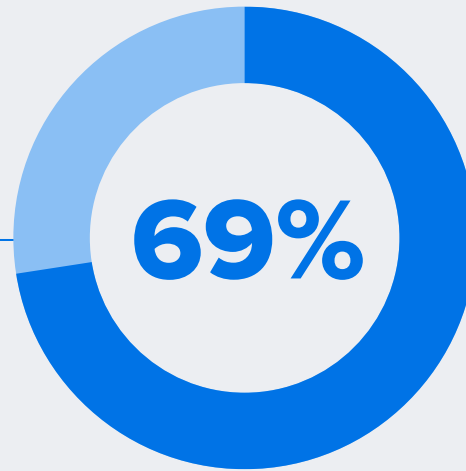
1. More efficient utilization of labor
2. Increased throughput
3. Space optimization
4. Flexibility
5. Scalability
6. Cost savings
7. Real-time data and analytics

The State of Automation in Manufacturing and Warehousing

Today, many approaches exist for innovative changes. But which is best, and why?



of manufacturing decision-makers plan to increase technology investments in 2024.



of warehousing decision-makers have automated workflows or plan to do so by 2024.



¹Zebra Technology Manufacturing Vision Study, The Rise of the Connected Factory, 2024

²Zebra Warehousing Vision Study, Making Modern Warehousing a Reality, 2023

New Solutions for Greater Productivity and Utilization

Many operators are achieving greater production efficiency by blending tradition with innovation.

Amid so many industry changes, the shortfalls of traditional manufacturing and warehousing strategies have become apparent for the organizations, businesses and customers who rely on them. Three of the largest problems operations face are the need for new solutions to answer the current labor shortage issue, the restrictions created by linear bottlenecks in production paths, and the unused space due to these paths.

Today's labor challenges weigh heavily on the minds of many operations; from sourcing to training to long-term retention, demand has risen as workers have become increasingly scarce. However, by integrating mobile robots into an existing labor force, you can redirect the attention of those trained team members to higher value-added tasks and reduce the time they spend on non-value-added tasks, such as manually transporting materials.

It is important to note that both the labor shortage and rise in customer demand are not specific to just one industry; they will continue to affect multiple markets. Overall, global demand for manufacturing is projected to increase significantly, with 4% growth estimated annually over the next five years. Meeting this level of demand will be more challenging than ever before; high-level efficiency, worker retention and utilization across an entire manufacturing system will be essential to remaining competitive — and profitable.

The limitations of traditional fixed conveyors are another common challenge. No matter how well they are designed for today's requirements, what you will need tomorrow is anyone's guess. The cost to "rip and replace" these systems is considerable, so they are rarely modified once they have been deployed. That can be a big problem if your operation finds itself locked into a single workflow that cannot adapt to changing demands. Conveyors also occupy a lot of valuable floor space, potentially creating "dead spots" in your facility by blocking access and travel routes.

Additionally, fixed conveyors are linear by their very nature. A bottleneck or breakdown can disrupt every process further down the line. And even if they can be reversed, each line can only provide transport in one direction at a time. Divert errors can also cause items such as parcels, parts and assemblies to get stuck in conveyor loops, traveling around the system repeatedly until noticed — while putting production schedules, service agreements and customer satisfaction at risk.

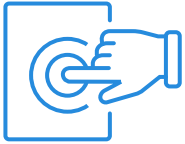
Replacing fixed conveyor systems with mobile robots can be a fast and efficient way to regain flexibility and increase utilization in your facilities. AMRs empower you to quickly pivot if market conditions change, adapt to new product mixes without missing a beat, change transport routes, and increase capacity at a moment's notice. Greater adaptability can also extend the longevity of other systems, equipment and facilities.

In addition, operators can benefit from the utilization and performance data that AMRs generate, which offers a clear picture of where, how and when they are best used.

³[*BISWorld Mordor Intelligence*](#)

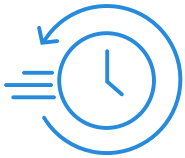
Manufacturing and Warehousing's Modern-Era Capabilities Expansion

As manufacturing and warehousing demands continue to rise, the implementation of automation technology offers immediate and long-term benefits.



Resource Utilization

AMRs enhance your operation's productivity by automating repetitive tasks, reducing wasted steps, and freeing up employees for higher-value work. They allow you to reclaim valuable floor space by providing more flexible ways to transport goods and seamlessly connect isolated systems.



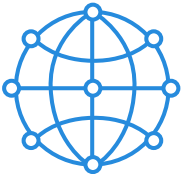
Flexibility

Fast-paced adjustments, with minimal loss or downtime, are essential in today's market. You can dynamically adjust and flex your operations and workflows using real-time, data-driven insights.



Adaptability

As your business model evolves, you may need to adapt or even overhaul your current system. AMRs allow you to change specific areas, processes or your whole system to adapt and address your business challenges.

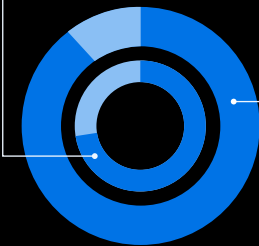


Scalability

Automation exists in many forms and can be used to increase productivity and capacity on a single line or streamline an entire global network.

67%

of manufacturers plan to implement some form of AMRs, cobots or robotic arms **in the next five years.**⁴



86%

of warehouse associations and **88% of decision-makers** agree that implementing warehouse technologies, robotics and devices would help attract and retain workers.⁵

⁴Zebra Technology Manufacturing Vision Study, The Rise of the Connected Factory, 2024

⁵Zebra Warehousing Vision Study, Making Modern Warehousing a Reality, 2023

AMRs: A Competitive Advantage in a Changing Landscape

Discover how AMRs are enabling manufacturers and logistics operations to reach new levels of production and efficiency.

Autonomous mobile robots are designed to navigate and operate within various environments. Equipped with sophisticated sensors and cloud-based software, they travel dynamically, avoiding obstacles and adapting to changes in their surroundings without human intervention.

Unlike traditional automated guided vehicles (AGVs) that rely on fixed paths, AMRs offer greater flexibility and efficiency in navigating operational floors. This makes them key in the modernization of workflow processes for the enhancement of operational efficiency.



High-Level Benefits Review

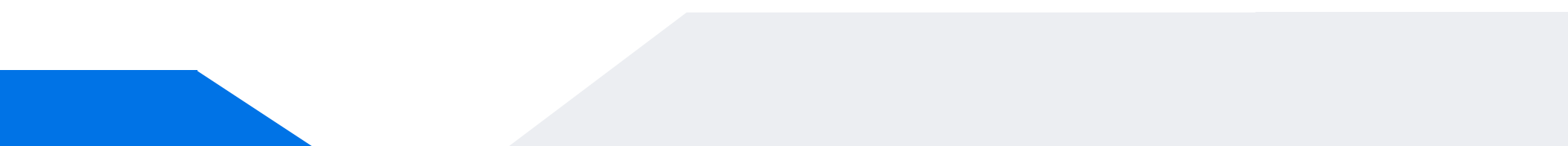
Operational Flexibility

- Traditional fixed conveyors take months to install and are expensive to modify once they have been designed and deployed. AMRs can be deployed quickly and their workflows modified by altering routes and tasks as needed without complicated programming.
 - Fixed infrastructure provides a single workflow. AMRs have the flexibility to serve multiple workflows.
 - Fixed conveyors primarily move in one direction and are prone to linear bottlenecks, which impact downstream operations if a section of the line goes down or is jammed. AMRs can transport goods in any direction, work in parallel with one another, and re-route around temporary obstacles.
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Open More Floor Space

- Fixed conveyors physically occupy a lot of valuable floor space while AMRs don't. In addition, AMRs can be deployed without requiring new infrastructure.
 - Replacing conveyors with AMRs can open up that floor space, which can be better utilized as storage, inventory, or future capabilities and production.
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Maximize ROI on Resources

- AMRs streamline processes and optimize workforce utilization, freeing up staff to focus on production tasks.
 - Each unit efficiently transports materials across operations, from picking to pack-out or production to shipping or work-in-progress (WIP) in between workstations.
 - Operations can easily scale up or down to meet changing demands as needed — whether your operation is growing or dealing with seasonal peaks.
 - Operators can reclaim significant floor space and optimize production capacity by replacing conveyor units with AMR workflows.
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Spotlight: Use Your Current Workforce More Effectively

The goal of AMRs is to enable more efficient utilization of your current workforce. Put technology to work completing low-level or repetitive jobs while freeing up your workforce to focus on higher-value tasks.

Contrary to common beliefs, most operations find that robots are *welcomed* by their staff. Many appreciate the assistance they offer and the shift in focus toward more satisfying work.

This leads to higher worker retention and, according to a report by Deloitte and The Manufacturing Institute, the U.S. manufacturing industry could face a shortage of 2.1 million skilled jobs by 2030. So retaining the right workers is more essential than ever.



So, What's the ROI on Implementing AMRs?

A majority of the tasks we've discussed so far require some form of movement — oftentimes walking. This baseline allows us to calculate the point where AMRs begin to provide labor cost savings and how quickly you can recoup your investment.

For example, let's say you're using manual labor to move cartloads from a picking or assembly area. Workers return with an empty cart on each round trip. If each worker needs to perform this task multiple times per hour across two shifts, the business case for AMRs quickly becomes compelling.

In the example below, this activity level delivers ROI in less than two months with 10 AMRs. But that is just the beginning of your potential savings. Other factors to consider include:

- Overtime wages
- Hiring and training costs
- Workforce speed to competence
- Continuity of operations
- Productivity improvements
- Flexibility of AMRs to make multifunctional trips across many work stations
- Ink, toner and paper savings

Two-shift operation



The potential effect on an operation is clear. And with such a defined scale of impact, it is easy to see how quickly a company, organization or business could expect a return on their investment. To discuss these figures further or start a conversation about your automation journey, speak with a [Zebra Robotics specialist](#) today.

Industrial Automation Insider: Here's Proof of What Automation Can Do — and How Flexible Manufacturing Can Be — in the Fashion World

- **Problem:** Bespoke Manufacturing Company (BMC) found that traditional fixed conveyor systems could not adequately support flexible, dynamic movement to multiple workstations in their daily operations. BMC wanted to route work in progress to the next available workstation based on availability, skillset of the operator and setup of the workstation. Based on their past operations, BMC knew that fixed conveyors were not able to provide the flexibility needed for their custom apparel processes.
- **Solution:** Build a dynamic and flexible factory around the idea of automation, seamlessly integrating staff, AMRs and scanning technology to maximize efficiency.
- **Result:** BMC realized a 3x increase in production capacity and 33% facility space improvement.

Read the Full Story: www.zebra.com

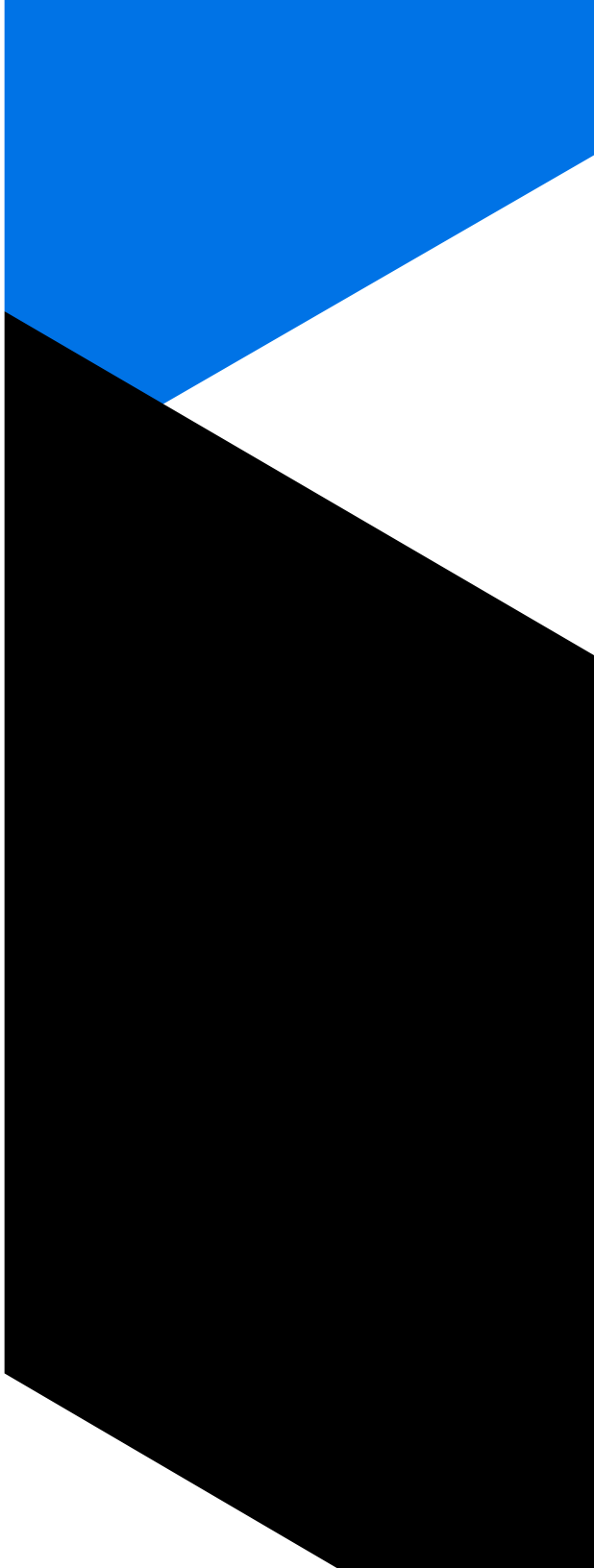


Electrical Component Distributor Increases Throughput by 25% With Autonomous Mobile Robots

- **Problem:** Waytek, a leading electrical component distributor, struggled to keep up with ever-increasing demand for their products amidst an aging conveyor system and worker and workspace shortages.
- **Solution:** Rather than make major modifications to their conveyor system, Waytek decided to replace it by deploying multiple AMRs to speed up their picking processes and fulfill more orders.
- **Result:** Today, Waytek boasts enhanced throughput, efficiency and space utilization. Specifically, they have realized a 25% increase in daily throughput and regained 13% of their existing floor space for storage. These gains have contributed to a five-year facility lifespan expansion enabled by a seamlessly integrated system.

Read the Full Story: www.zebra.com





Efficiency Is Just the Beginning

Integrating AMRs can bring transformative value to your current or future operations.

Autonomous mobile robots offer so much more than simple efficiency; they streamline workflows, reduce stagnation, and support your staff through flexibility and adaptability. Embracing this form of automation does not mean a total upheaval, remodel or restructuring of a system either. AMRs can integrate seamlessly into an operation, helping to increase overall value, productivity, utility and scale.

AMRs overcome the limitations and linear bottlenecks that exist when using traditional fixed conveyor systems. AMRs not only optimize floor space and time but enable workers to shift focus from low-level physical tasks like transport to more complex, higher value-added tasks.

Power Your Productivity With Intelligent Materials Movement and Fulfillment Solutions

The future of manufacturing and warehousing will change at a rapid pace, with requirements evolving every day. Zebra Robotics Automation is at the forefront of this movement. Our goal is to power productivity by freeing up your workforce and workspace through flexible, easily deployed solutions.

Your operation can better adapt to dynamic conditions with intelligent solutions for mission-critical materials movement and fulfillment with autonomous mobile robots (AMRs) from Zebra Robotics Automation.

Zebra acquired Fetch Robotics in 2021 and has since focused on designing and rapidly deploying fully engineered solutions that fit and scale operational needs. **We have built a team of logistics experts and specialists who are best-in-class when it comes to AMRs and can help you to:**

- **Enhance productivity** by automating unproductive work or repetitive tasks, freeing up employees to focus on higher-value activities.
- **Regain floorspace** in your facility by replacing fixed automation, reducing linear bottlenecks, and enabling increased storage or other value-added activities that lengthen the lifespan of your facility.
- **Gain flexibility** in your operations and achieve the lowest cost per unit possible — without sacrificing quality or performance.

Zebra Robotics Automation's robust, cloud-based portfolio features the Fetch100 series of AMRs and Symmetry™ software. Examples of how our customers integrate AMRs into their operations include:

- **Line-side or WIP delivery:** Automate delivery of materials and kits between workstations throughout the production cycle.
- **Post-pick transport:** Autonomously pick up and deliver orders from manual pick locations or automated storage and retrieval systems (AS/RS) to pack-out and shipping.
- **Fulfillment:** Automate fulfillment or picking by orchestrating the path of a picker with a team of robots that optimizes workflow and labor.

In addition, you can keep facilities running at peak performance with 24/7 support from the Zebra Technologies robotics operations center.

With over a decade of proven success in helping organizations optimize operations, choosing Zebra Robotics Automation as your partner in automation is the right choice.

Discover your potential to achieve what is possible.

zebra.com/autonomous-mobile-robots



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