

8 REASONS WHY AUTONOMOUS MOBILE ROBOTS BEAT TRADITIONAL AUTOMATION



TABLE OF CONTENTS

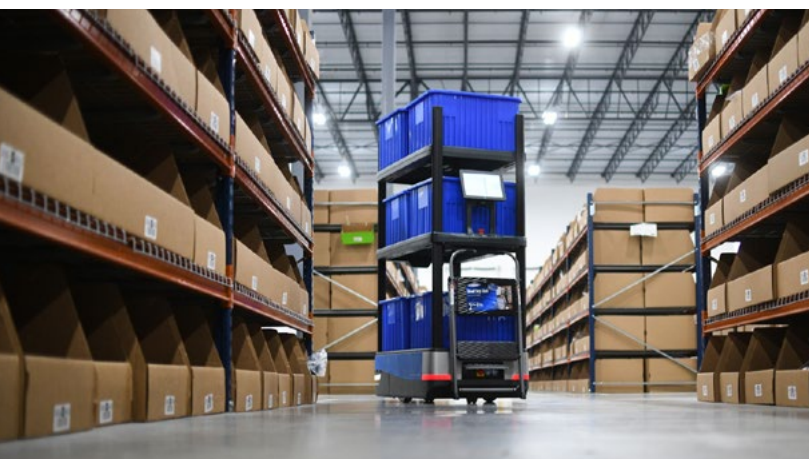
OVERVIEW	3
SAFETY	5
FLEXIBILITY	6
PRODUCTIVITY	7
VISIBILITY	8
COST	9
SPEED	10
SCALABILITY	11
RELIABILITY	11
REFERENCES	12
ABOUT 6 RIVER SYSTEMS	13

OVERVIEW

In 2021, global retail e-commerce sales amounted to \$4.9 trillion dollars worldwide and is expected to accelerate by 50% over the next four years¹.

The Amazon effect is at the heart of this e-commerce boom: consumers are empowered to demand what they want and when. These demands aren't what they used to be, catching retailers and service providers ill-equipped to keep up. With shrinking store footprints and faster product turns, warehouse operators have been shifting to accommodate more SKUs and lower order quantities, while struggling to staff for growing demand and supporting service level goals. This new fulfillment landscape is forcing the hands of supply chain executives, leaving them no option but to automate or fold.

Warehouse operators traditionally turn to large-scale automation solutions to handle these challenges. They buy multi-million dollar conveyor, shuttle and automated storage and retrieval systems that take up to a year to implement and nearly six years to see return on investment. The only problem? Suppliers without the regular-season volume or space to justify the cost and size of such systems are left out. These smaller operations can't justify the bolted-down, caged-off systems, which add complexity and cost to warehouse layouts and budgets.



A new way to automate

Most logistics leaders agree that warehouse automation is a must to remain relevant in today's economy. It's no longer a matter of if they will automate, it's a matter of when and with what technology. And now, there's automation that provides the flexibility of manual cart picking with the performance of traditional automation. Autonomous mobile robots (AMR) have emerged as the leading solution to help fill the gap for fulfillment providers, with the likes of XPO Logistics and others already using robots to fulfill orders.

What are warehouse robots?

There are a few different types of warehouse robots on the market.

- **"Lead me" approach:** The robot is integrated into the site's Warehouse Management System (WMS). It leads the picker by displaying the item and quantity of the pick at each location.
- **"Follow me" approach:** The robot, an automated cart, acts like a tugger pulling other carts behind it. It follows a picker who controls the bot with a device.
- **"Swarm me" approach:** The robot, integrated with the Warehouse Management System, waits for nearby pickers to interact with it.
- **"Holy Grail" approach:** The robot has piece-picking capabilities and travels autonomously to a pick location and does the picking. This approach does not involve humans.²



Defining autonomous mobile robots

Autonomous mobile robots work alongside humans in the warehouse. The “lead me” approach most closely resembles the spirit of this definition, as these robots continuously work with warehouse associates throughout the day. These robots lead pickers through their work and help them stay on task by systematically directing their workflows and improving their productivity, even providing gamification to stimulate competition and drive up performance.

What is traditional warehouse automation?

Traditional automation includes the technologies warehouses and distribution centers have been using for decades to meet increasing demand. These systems include:

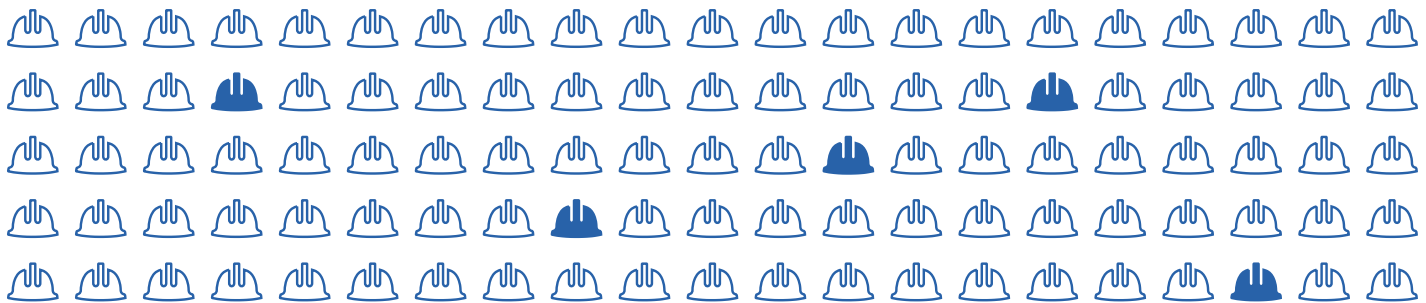
- Conveyor systems
- Pick-to-Light systems
- Pick-by-Voice systems
- Enhanced Cart Picking (with pick-by-voice or cluster picking capabilities)
- Automated Guided Vehicles
- Unit Sorters, with post-pick sortation of batch picked items
- Goods to Person (GTP) - AS/RS, Shuttle, or Kiva-like systems

Traditional automation is a viable approach to optimizing a warehouse, but autonomous mobile robots outperform traditional automation on several fronts. This white paper explores eight reasons why autonomous mobile robots are a better approach to automation than traditional options.

SAFETY

Since the pandemic started in March 2020, finding enough warehouse labor has been a challenge. There are currently only 6.5 million unemployed workers in the U.S. and 10.9 million open jobs. Additional, warehouse managers struggle to attract quality labor in part because of the physical demands warehouse work entails and the dangers that come with it.²

WORKPLACE SAFETY PER 100 WORKERS



In 2020, there were five workplace injuries for every 100 full-time employees in the warehousing and storage industry.

Source: U.S. Occupational Safety and Hazard Administration

Fully automated warehouses try to address safety concerns by removing human operators entirely from the picture. In fact, workers are advised not to touch conveyor equipment. But accidents still happen. In 2020, there were five workplace injuries for every 100 full-time employees in the warehousing and storage industry⁴. The U.S. Occupational Safety and Hazard Administration regularly logs serious and fatal accidents involving conveyor automation.

No one technology will create an injury-free warehouse. But autonomous mobile robots offer a better solution for employee safety and ergonomics:

- **They're designed to work with humans.**
Robot technology meets OSHA and ANSI standards, and autonomous mobile robots adhere to rigorous stop accuracy.
- **They navigate around obstacles.**
Using sensor technology, robots know where they are going in the warehouse, and they know how to move around humans and other equipment.
- **They create a hands-free picking environment.**
The machine moves on its own, creating a hands-free environment for operators to work safely.

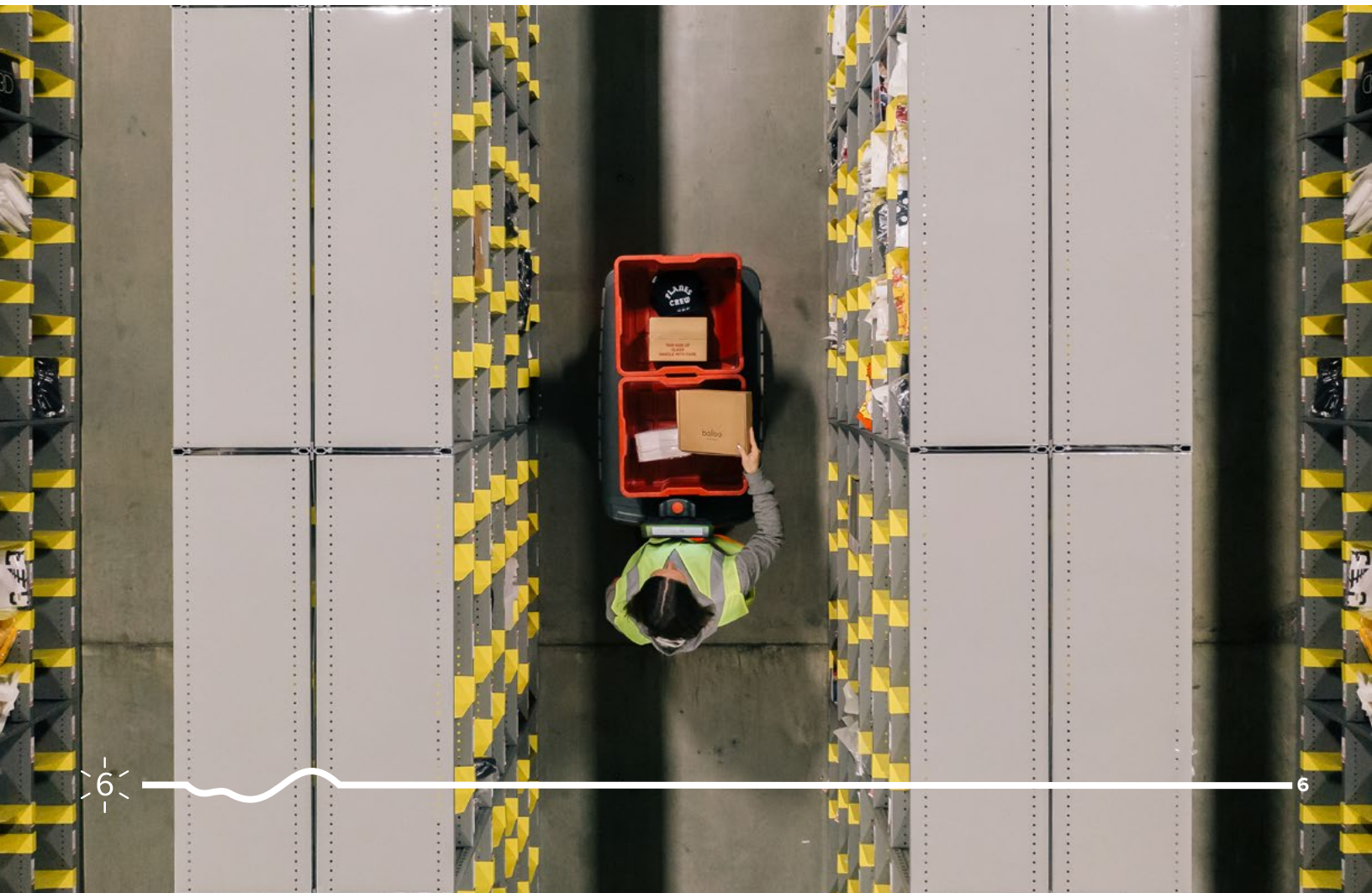
FLEXIBILITY

In a 2022 survey, warehouse and distribution center managers showed heightened concerns for supply chain risks⁵.

A flexible solution to manage just-in-case inventory is the new trend which is far from the traditional just-in-time (JIT), lean inventory practices. Traditional automation solutions are the opposite of flexible: they are bulky, anchored down systems that demand significant space, leaving warehouses less adaptable to the future. What happens when their business, or the economy, changes?

Autonomous mobile robots are a modern and customizable approach to warehouse automation. Many warehouse robot companies offer flexible rental pricing structures that operators can take advantage of during peak seasons. This means that companies can rent more robots to meet seasonal demand, and return them when demand is back to normal. Instead of sizing an automation solution around a few big months of seasonal demand, operators can use robot rentals for busy months and make a capital purchase only for what they need now.

Additionally, AMRs require no new physical infrastructure. Unlike traditional automation, they don't require racking, bolts and shuttles to get started. Therefore, autonomous mobile robots are quick and easy to deploy, with minimal operational disruption.



PRODUCTIVITY

When it comes to productivity, warehouse managers are concerned about two things: adequately staffing their businesses, and equipping their staff with the right equipment and tools to get work done as fast and safely as possible.

But adequately staffing a warehouse is no easy feat these days. The pandemic skyrocketed unemployment with 2.2 million people leaving the workforce since 2020. And while unemployment is rebounding, the number of open jobs continues to increase³.

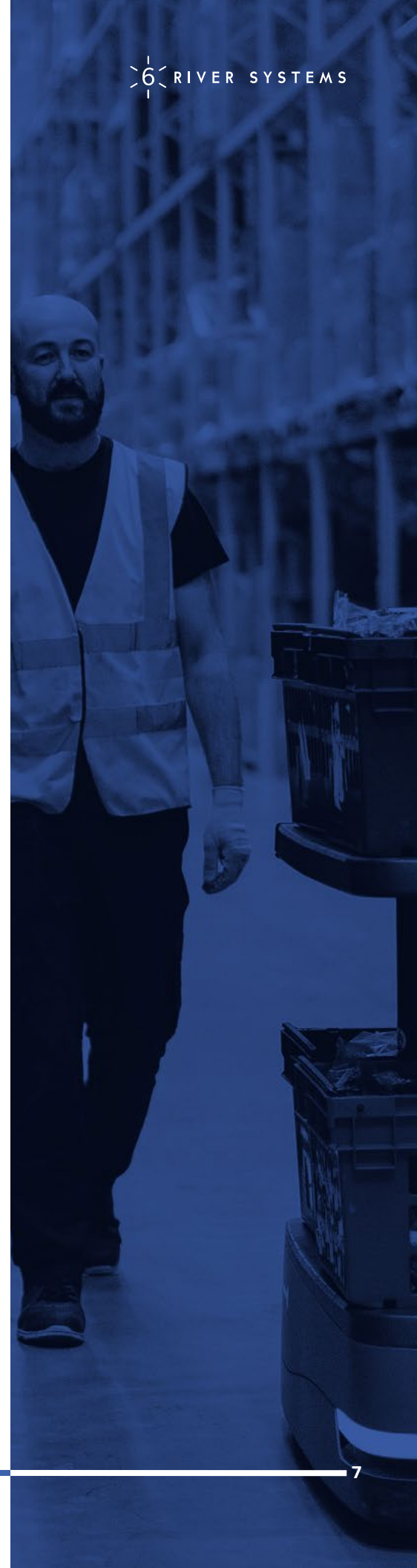
Warehouse operators struggling to hire labor are looking for ways to optimize their current workforce to reduce costs and get orders out faster. In short, they are looking to improve their workers' productivity. They turn to traditional automation or ask more of their legacy WMS systems, only to find that both options are lengthy and costly to implement or adapt.

Alternatively, autonomous mobile robots help warehouses achieve rates that rival goods-to-person solutions. Sites using AMRs report anywhere between 2–3X increase in productivity, reduction in picking errors and happier associates. Onboarding time is reduced and time to productivity is measured in days, not weeks. When operations need to scale for peak, training new associates can be as fast as 15 minutes. Often times autonomous mobile robot solutions come with software that can enhance the existing WMS and WES.

Intelligence

Traditional goods-to-person automation — technologies that bring inventory directly to associates — nearly eliminate walking for each pick. But warehouse operators' jobs go beyond picking, and tasks take planning and preparation to achieve maximum productivity. What if there was a smarter, faster way to group those tasks together?

AMRs are an intelligent automation solution that do just that. Decisions are made in real-time based on current work assignments and status of the warehouse floor. Using machine learning and artificial intelligence, they reduce needless walking by making pick paths as dense as possible and reducing steps in between every task, helping associates accomplish more tasks in the same amount of time. Instead of allowing the user to decide the path, the system-directed workflows provide a continuous flow of work, increasing productivity.



VISIBILITY

Data for logistics has grown, but solutions providers are often focused solely on the inbound and outbound of goods.

In doing so, they've left a gap in evaluating the supply chain within the four walls of an operation. Improvements from data insights are limited by warehouse function (put or pull only) and hardware centric systems.

Beyond the physical operation, a WMS tracks inventory quantities and movement. However, it misses the chance to learn from an operator's entire warehouse. Individual data systems can be siloed and fragmented, which is great for protecting sensitive information, but less than ideal for making improvements and spotting macro trends that affect the entirety of an operation.

AMR providers that take a holistic view of a system and a warehouse - the marriage of hardware and software - can create efficiency. This offers an opportunity to fill in the gaps in the blackhole of data that is caused by inventory movement within the warehouse. An example from AMR companies is to not just track movement of goods from point A to B, but also to know which SKUs are fast versus slow movers and move or slot them accordingly to optimize the use of a physical space. When combined with picking and active associate data, AMR providers can predict demand fluctuations and help achieve SLAs for an operation.



COST

Logistics leaders need cost-effective automation solutions with a reliable return on investment. While warehouse automation comes in many shapes and sizes, traditional automation tends to be the most expensive, intrusive type of automation available, with lengthier ROI.

Affordability

Traditional automation comes at a hefty price. Depending on warehouse sizes and business needs, traditional solutions start at \$1 million, while fully-automated solutions can cost \$25 million or more⁷.

In addition to up-front costs, traditional automation can cost warehouses in a number of other ways:

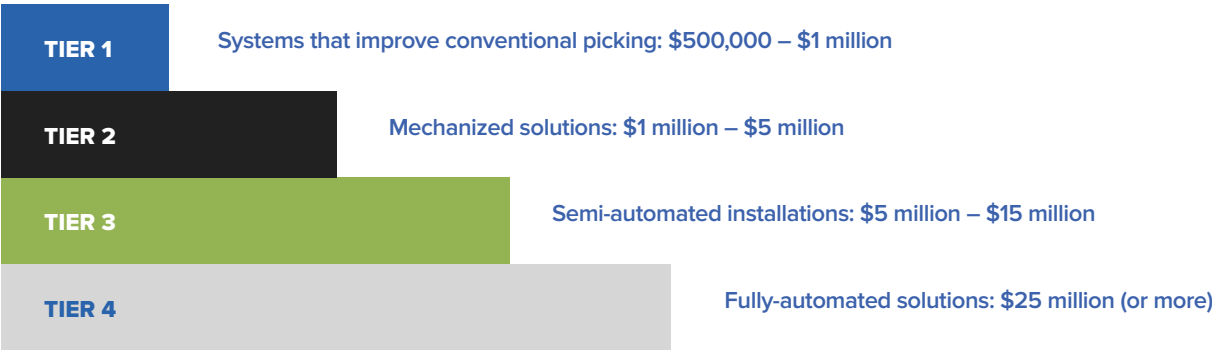
- **Continuing costs:** Because of its scale, traditional automation includes more moving parts and requires higher levels of maintenance. Warehouses often need to budget for spare parts and technical expertise.
- **Time to go live:** As traditional automation is larger and more complicated, the project scope can expand and grow out of control, and any benefit (denominator on payback) is delayed until the project is live.

- **Cost of capital:** Spending \$25 million on an automation project today is expensive. Unlike traditional automation where most of the cost is in the expensive infrastructure and required services, the main cost drivers for robots is software, sensors and electronics.

An investment in autonomous mobile robots goes beyond just the technology itself. A 6 River Systems Fulfillment Execution System, for example, costs 20% of a comparable automation vendor, yet delivers 75% of the volume. 6 River Systems focuses on flexibility over throughput to adjust to changing market conditions and customer demands.

Meet Chuck - 6 River Systems' AMR

Traditional Automation Broken Down Into Four Tiers



Source: Viastore Systems

SPEED

The bigger the level of automation, the more complex the project becomes, and the greater the risk of delays and losses. Meanwhile, autonomous robotic solutions can go live within four weeks, and offer a one-year return on investment.

Autonomous mobile robots are quick to get to work for a number of reasons:

- **Design:** AMRs benefit from technology used to make autonomous cars. Robots can map out warehouses once they're on the ground. Traditional solutions, on the other hand, require months of design, slowing down implementation time.
- **Streamlined integration:** AMRs offer a quicker go-live through a streamlined WMS integration that focuses on a list of key tasks to get warehouse workers started. Some solutions don't even require warehouses to have a WMS.
- **Training:** Onboarding new hires is easier with AMRs, as training is built into the design of the solution. The system has fewer mechanical touch points and integrations, and leads associates through the pick process.
- **Lighter infrastructure:** Operators need less equipment with AMRs because robotic solutions are designed out for year one, versus year five to seven, like traditional solutions.

Traditional Automation



Rigid



Dull



Inflexible

Live in 12-24 months

Autonomous Robots



Autonomous

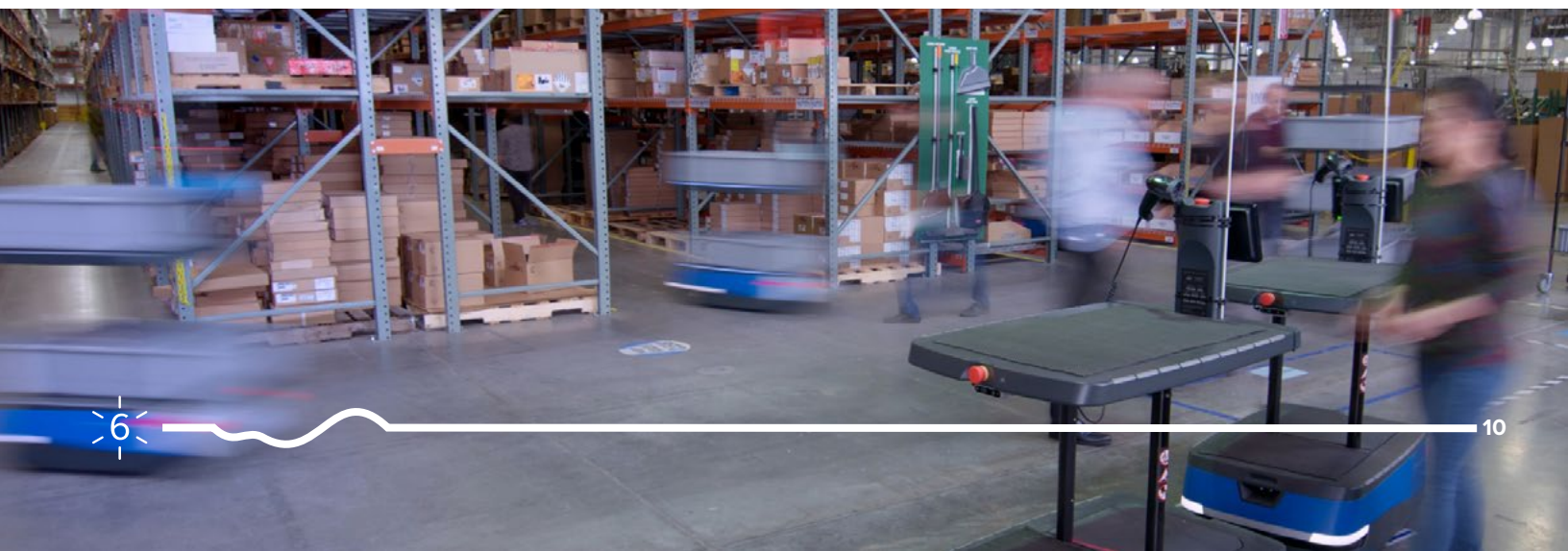


Insightful



Adaptive

Live in 4 weeks



SCALABILITY

There's no easy way to scale a traditional automated solution.

It's fixed infrastructure that is meant to handle your volume all year round. But what if your volume shifts? Warehouse managers need to carve out lots of space to make way for traditional solutions. With warehouse space costing an average of \$6.83/square foot⁷, loading buildings with heavy equipment that isn't modular or scalable isn't the best use of capital.

Alternatively, mobile robots can be added at much smaller increments of capacity more quickly. They don't need any new infrastructure, so they scale far more effectively. Managers can choose to rent additional capacity during peak. They're also easy to relocate to different facilities, if needs shift across distribution and fulfillment centers.



RELIABILITY

Equipment reliability is essential to running a successful warehouse.

If warehouse operators can't depend on their systems to do the job, then they can't depend on getting orders fulfilled. Warehouses and fulfillment centers play an important role in a company's brand: as one of the final stops before an order reaches a consumer, fulfillment (or lack thereof) can make or break customer experiences.

Warehouse operators put all their eggs in one, large basket with traditional automation. For example, if a belt on a conveyor goes down, a whole warehouse can grind to a halt, leaving hundreds of workers standing around or being sent home. Meanwhile, if one autonomous mobile robot goes down, there's no impact to the warehouse's throughput or operation, because other robots pick up the slack. With autonomous robots, warehouse operators create a decentralized fleet of autonomous mobile workers, ensuring reliability across their entire operation.



ABOUT 6 RIVER SYSTEMS

6 River Systems is a leading fulfillment solutions provider—striving to make warehouses faster with flexible, human-first and innovative products that deliver immediate value. As part of global commerce company Shopify, 6 River Systems implements their flexible, easy-to-deploy solution powered by autonomous robotics and industry-leading software with companies of all sizes to enable efficiency and the ability to quickly adapt to changes in demand. 6 River Systems' solutions, including its autonomous mobile robot Chuck, are operating in more than 100 facilities in the U.S., Canada and Europe, fulfilling millions of units each week for companies including GXO, Office Depot, DHL, Crate and Barrel, Tagg Logistics and NRI.

Want to learn more about Chuck?
Visit us at **www.6river.com**



REFERENCES

1. "Retail e-commerce sales worldwide from 2014 to 2025," retrieved on April 19, 2022 from <https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/>
2. "NextGen Supply Chain at DHL", Bob Trebilcock, Modern Materials Handling, retrieved on April 19, 2022 from https://www.mmh.com/article/next_gen_supply_chain_at_dhl
3. "Less Hiring, More Re-Skilling: The Long-Term Solution to Supply Chain's Labor Problem," retrieved on April 19, 2022 from <https://www.supplychainbrain.com/blogs/1-think-tank/post/34773-what-is-your-post-pandemic-workforce-strategy>
4. "Work-related Fatalities, Injuries, and Illnesses", Bureau of Labor Statistics, United States Department of Labor, retrieved on April 19, 2022 from https://www.bls.gov/iag/tgs/iag493.htm#fatalities_injuries_and_illnesses
5. "Warehouse/DC equipment survey for 2022: It's 'go-time' for investment," retrieved April 19, 2022 from https://www.mmh.com/article/2022_warehouse_distribution_center_equipment_survey_go_time_for_investm
6. "15 Myths about Warehouse Automation Debunked", Viastore Systems, page 4, retrieved on April 19, 2022 from https://www.mmh.com/wp-content/viastore_wp_15_myths_warehouse_automation_020916.pdf
7. "U.S. Industrial Marketbeat Reports," retrieved April 19, 2022 from <https://www.cushmanwakefield.com/en/united-states/insights/us-marketbeats/us-industrial-marketbeat>