

Autonomous inventory tracking for 3PLs

Essential innovation
for warehouse
optimization



For 3PLs, embracing warehouse inventory automation is essential for warehouse optimization

Third-party logistics providers (3PLs) have pushed the boundaries of supply chain innovation for decades. During and following the Covid-19 pandemic, disrupted supply chains and warehouses overflowing with overstocks served as an urgent wakeup call for retailers and manufacturers who were struggling to manage inventory on their own.

Suddenly, the value of a trusted 3PL became abundantly clear. Fast forward to 2024 and 3PLs are facing a wakeup call of their own. An increased awareness of the importance of flexible, optimized supply chains combined with fast-changing consumer behaviors and expectations is forcing 3PLs to innovate and automate in order to meet the demands of their own customers and to remain competitive in this dynamic marketplace. To excel, 3PLs are seeking solutions to replace decades-old logistics practices and technologies.

The change has already been dramatic. Robots and co-bots have become omnipresent on the warehouse floor to support the process of picking, sorting, and packing goods. The use of exoskeletal suits is growing rapidly to help warehouse staff lift more weight with less strain and to reduce the potential for repetitive-motion injuries. Warehouse Management Systems (WMS) and other supply chain management tools are used by 3PLs of every size and scale, and new, more powerful solutions are more accessible than ever before. These

and other advancements have helped accelerate fulfillment processes, improve operational efficiencies, and create a safer, more enjoyable workplace for warehouse personnel. For many, however, one critical advancement continues to wait in the wings: applying the power of automation to the labor-intensive task of inventory tracking.

Though automation technologies have helped alleviate many challenges, 3PLs still struggle to manage the new pressures. Global labor shortages make it more difficult to recruit and retain workers with needed skills. A massive uptick in ecommerce, the expectation of one- or two-day delivery windows, and the cost of storing overstock have pushed customer service requirements to extremes. Add the growing focus on the need for sustainable warehouses that use less energy, create less waste, and optimize every movement of goods, and it is clear that to remain competitive, 3PLs need to take advantage of available solutions that can help tackle one or more of these pressures—without the significant delays or high costs associated with many automation initiatives.

Automation addresses key challenges

While it is certainly no silver bullet (buyers should beware of any solution that claims to be just that!), leaders in the 3PL space are **consistently demonstrating the ability of inventory tracking automation** to address their most pressing challenges **quickly, effectively, and without disrupting warehouse operations.**

These challenges include:

Competition is growing

The ability to create a zero-error warehouse has become a major competitive differentiator in the space. In 2021, the global 3PL market was valued at \$936B and estimated to reach \$2,199B by 2030, growing at a CAGR of 10.7% over the next seven years. This staggering growth will bring new competitive pressures. Existing 3PLs will have to work harder to deliver the level of service customers demand, and new entrants will lack the luxury of time to prove their ability to get the right products to the right place, intact and on time, every time. At the same time, freight providers that have been quick to recognize the opportunity are already leveraging inventory automation to expand their reach across the supply chain, further pressuring the competitive stance of 3PLs. The result is an urgent mandate to implement proven automation that eliminates errors and accelerates inbound and outbound productivity to enable the best possible customer service.

Warehouses have grown dramatically

Twenty years ago, the average size of 3PL warehouses was 65,000 sqft/~6,000 sqm. By 2018, that average had risen to over 200,000 sqft/18,500 sqm¹. In 2021, a new US trend in mega warehouses saw that number jump much higher, with the average size of the 10 largest leases coming in at a stunning 931,860 sqft/~86,573 sqm². This growth is measured in height as well, largely because product is stored in a three-dimensional space, so true warehouse capacity is also dictated by the height of the warehouse. This, too, has increased, jumping from the historical standard of 20 feet/7 meters to as high as 50 feet/15 meters or more today³. While the change has exponentially increased capacity, it has introduced myriad new challenges, including everything from increased tracking complexity (and the inevitable potential for errors) to a growing crisis in workplace safety.

Worker safety is in the spotlight

This need for increased safety cannot be overstated. In 2022, more than 1 in 20 warehouse workers suffered an injury, and fatalities more than doubled between 2021 and 2022⁴. In July 2023, the US Department of Labor's Occupational Safety and Health Administration launched a [national emphasis program](#) to help prevent workplace hazards in warehouses and distribution centers—a move reinforced by data that shows injury and illness rates in these environments are more than twice as high as those in private industry.

Labor is in short supply

The post-COVID labor market has made it more difficult than ever before to hire and retain skilled workers who are knowledgeable about the products in the warehouse, are skilled in inventory tracking techniques, and who are trained in the effective use of WMS systems. In this constrained environment, dedicating many hours of human labor to the task of manual inventory tracking takes workers away from other high-value tasks and diminishes productivity. As a result, inventory counts are not performed frequently enough to prevent errors from accumulating. Even when manual wall-to-wall counts are required for customer audits, the impact on labor and productivity often forces workers to focus on simply getting the job done rather than turning their attention to data accuracy.

Pressure on margins is intense

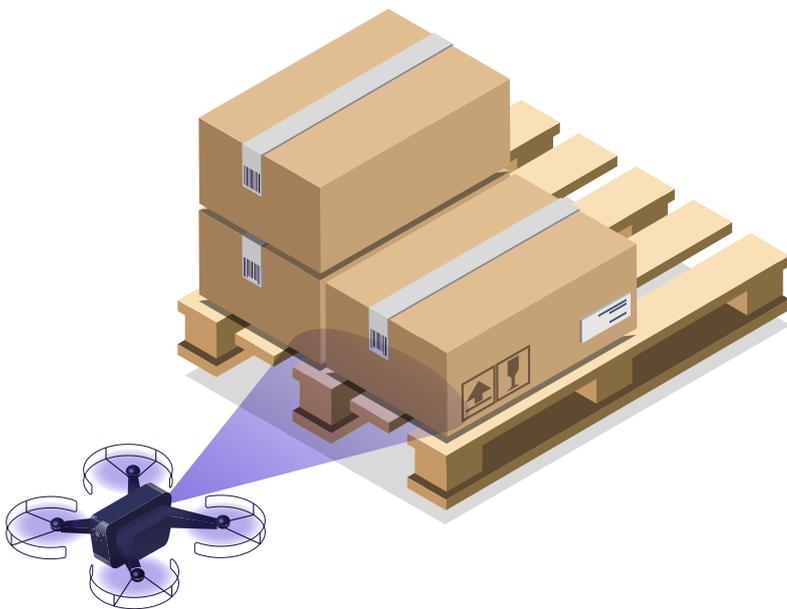
In 2022, 3PLs experienced the fourth-best growth year on record⁵. Still, increased costs and competition have all eyes focused on margins and profitability—both persistent challenges for 3PLs. Without automation, meeting customer requirements increases both complexity and costs. And while automation of all kinds has been proven to drive operational efficiencies, obtaining these game-changing technologies often requires a significant capital investment, as well as the luxury of time.



Autonomous inventory drones are a proven, effective solution that helps address each of these concerns. Warehouse drones offer 3PLs all the competitive advantages that go hand in hand with greater accuracy, total consistency, faster throughput, and the ability to meet and exceed customer expectations—even as the market expands and labor and business pressures increase. Self-flying drones typically take flight during non-operational hours,

scanning inventory across warehouses of any size. And because they are fully autonomous, each task is completed without the aid of a human operator. Automating the time-consuming, tedious, and often dangerous task of scanning stored inventory reduces the potential for workplace injuries and makes it possible to cut inventory errors to zero—no matter how much inventory flows through the warehouse every day.

In contrast to typical high-cost automation technologies that require years for approval and lengthy project timelines, **lightweight and nimble** autonomous inventory drones are often considered the 'low-hanging fruit' of warehouse automation: they require **less investment** to install and maintain, require negligible space in the warehouse, take just weeks to implement, and can deliver **ROI in less than a year**.



¹["2018 Benchmarking Costs, Prices, and Practices for North American Warehousing Available in a New Report from Armstrong & Associates, Inc."](#), Armstrong & Associates, February 1, 2018.

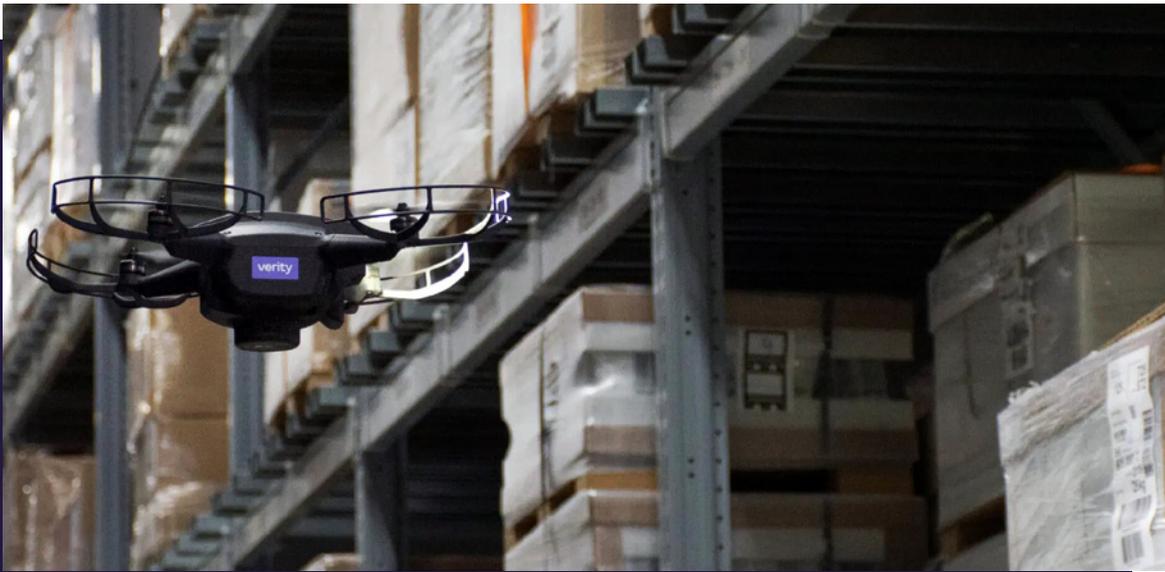
²["Bigger and Bolder: Large warehouse leases fueled US Industrial & Logistics Market in H1 2022,"](#) CBRE, August 15, 2022

³["2022 Warehouse/DC Operations Survey,"](#) Logistics Management magazine, November 7, 2022

⁴US Bureau of Labor and Statistics [Industries at a Glance](#), Warehousing and Storage subsector

⁵According to Armstrong & Associates as reported in [Logistics Management](#) magazine, June 2023

Automation in action at leading 3PLs



DSV and **Maersk**, two of **the world's top 3PLs**, have been leading the industry by implementing inventory drones in their warehouses—and documenting the benefits. The successes of these two companies have created a significant push for other 3PLs to follow suit to remain competitive in the rapidly changing 3PL marketplace.

DSV and Maersk are not alone in their quest to add inventory counting to their automation toolkits—a move that complements other global initiatives to increase warehouse efficiency, improve margins, and elevate service levels for their 3PL customers.

These and many other users of Verity's warehouse drones are transforming how inventory tracking is executed in warehouses everywhere.

DSV

Improving safety, boosting accuracy, and delivering cost efficiencies

In 2021, DSV completed its **first installation of Verity's autonomous inventory tracking system** powered by self-flying drones in Denmark. Soon after, the company made the decision to **expand its use of the system** across its distribution centers in Europe and North America to extend the benefits of **increased inventory accuracy** and **decreased labor costs**.

The Verity system is used to scan empty slots and 25% of the warehouse racks every weekend—performing more than 550,000 inventory checks each month for DSV. Wall-to-wall facility scans are completed once a month. Though errors inevitably accumulate during the work week, this scan cycle supports 24/5 warehouse operations while providing key insights that support the company's inventory and operational KPIs.

DSV's installation in Gauteng Province, South Africa, has been highlighted at global conferences and in the press. According to DSV, "Existing inventory management systems were no longer fit-for-purpose and innovative solutions needed to be found. Manual inventory management was labor intensive and prone to errors which spread through warehouses without being noticed. With a turnover rate of 8 times a year and two wall-to-wall inventories per year, just roughly 25% of pallets flowing through warehouses were being checked."

Judith Bezuidenhout, national inventory manager at DSV South Africa, shared impressive results in a presentation at the 45th SAPIOS Conference, including:



1 Verity's autonomous drones enabled warehouse employees to be more effective and improved investigation turn-around times.

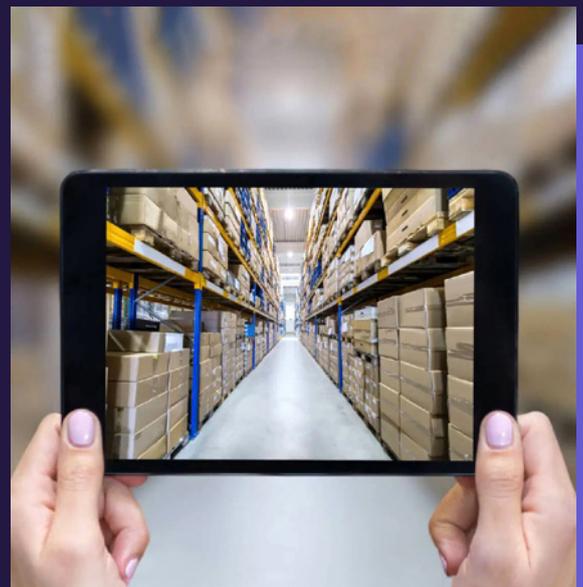
2 Hours dedicated to inventory tracking tasks decreased from 140 hours (~ 6 days) requiring 3 people, to just 18 hours and requiring only one person.

3 Tangible, measurable impacts have included automated inventory tasks, automated lost pallet finding, reduced labor costs, and reduced write-offs.

4 Less tangible impacts have included increased accuracy in forecasting and replenishment, improved brand reputation, root cause analyses and process improvements, higher data accuracy and higher frequency, release of valuable resources, fewer worker injuries and other labor issues, reduced CO2 emissions, increased forklift driver productivity, increased stock alignment, reduced order delays and less lost sales—and most importantly, happier customers.

At DSV, the combination of autonomous drones, warehouse status reports, improved client culture, and processes to work optimally with the Verity system have come together to help **achieve a zero-error warehouse**. The warehouse drones have boosted operational excellence through **full inventory accuracy** and created a **financial competitive edge** through digital transformation and cost savings.

LEARN MORE ABOUT DSV'S INSTALLATION JOURNEY [HERE](#). TO SEE THE WAREHOUSE DRONES IN ACTION AT DSV, SEE THE COMPANY'S PROJECT VIDEO [HERE](#).



Maersk

Delivering reliable, flexible, scalable inventory control automation

At **Maersk**, the search for an automation solution began after the company identified inventory control as an area of risk due to inconsistencies in inventory control processes when warehouse staff were tasked with urgent priorities. Maersk's key criteria for the search: **an inventory control automation solution** that was **reliable** and **flexible** enough to be scaled up to multiple sites.

After selecting Verity, the company began using the inventory drone system at its Performance Team warehouse in Miami, FL, where Verity is used to consistently track up-to-date inventory records and quickly highlight any discrepancies between the data reflected on the WMS and reality. According to the company's extensive analysis of impact on productivity, customer service, and cost savings, initial results highlighted a 90% reduction in warehouse personnel manually scanning and searching for items, a 50% reduction in management correcting errors, and significant financial savings. Based on successes across the board, Maersk created plans to roll out the system across the brand's US network of warehouses.

Erez Agmoni, now Global Head of Innovation at Maersk, led the initial drone installations at the company. "As a supply chain integrator, we are constantly looking for new innovations and engineering solutions in our warehouse operations. We wanted to deploy a safer, more accurate data-driven inventory solution that addressed our decarbonization goals for customers and prevented our workforce from working at heights. Verity's system has delivered data accuracy, safety, and speed, which makes our warehouse management system stronger, faster, and more effective for customer decision-making."

LEARN MORE ABOUT MAERSK'S USE OF VERITY WAREHOUSE DRONES AND HEAR COMMENTS AND INSIGHTS FROM MAERSK'S PROJECT LEAD [HERE](#).



Higher frequency drives greater value

Depending on a 3PL's specific business model and inventory tracking methodology, the scope and frequency of inventory scanning can range dramatically. In some instances, wall-to-wall inventory counts are required annually to comply with customer audits. In others, partial inventory counts are completed throughout the year (monthly, bi-monthly, weekly) to identify and correct errors and prevent error accumulation. In many cases, the cost and time required to complete these counts forces companies to limit the frequency

of inventory counts, reducing accuracy and allowing unfound errors to snowball into larger operational issues. Automating inventory tracking using self-flying drones makes it possible to cost-effectively increase the frequency of every type of inventory count—a shift that can help 3PLs both improve margins and reduce inventory-tracking-related costs for their clients. Doing so can help warehouse management achieve data completeness and data accuracy to ensure physical inventory is 100% aligned with inventory data stored in the WMS.

Wall-to-wall inventory counts

Performing full-facility inventory counts manually is highly disruptive to operations, often requiring shutting down the facility completely for multiple days until the task is complete. For this reason, many 3PLs opt to perform these counts infrequently—typically once or twice a year—when required by their customers. Under such time pressure, these counts tend to focus on data completeness rather than data accuracy. Automating this process accelerates scanning, significantly reduces operational disruptions, and improves accuracy by eliminating human error. Automated wall-to-wall counts provide >99% data completeness and data accuracy⁶. Combined with reduction in labor requirements, this shift makes wall-to-wall inventory counts possible at any time, enabling 3PLs to greatly improve data accuracy and reduce the accumulation of errors over time.

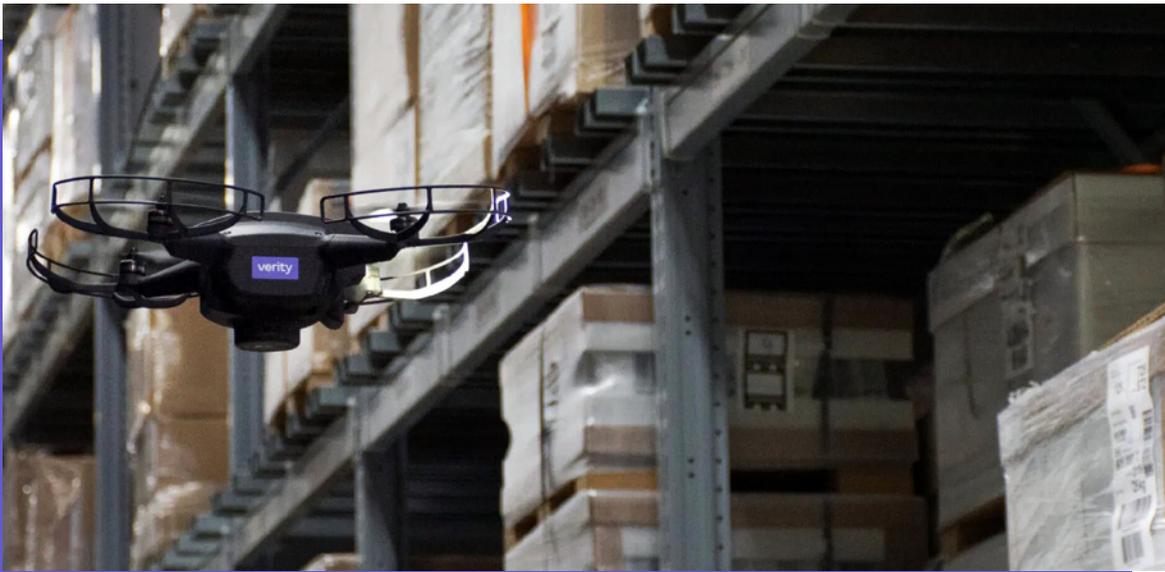
Cycle counts

Though less disruptive and more frequent than wall-to-wall inventory counts, manual cycle counts help reduce the risk of issue accumulation. The cost, of course, is labor. Here, too, data completeness often takes priority over data accuracy. Automating manual cycle counts gives 3PLs the freedom to verify inventory in a portion of the warehouse at any time to support customer-specific inventory tracking, as well as scan inventory in any designated area as frequently as desired—all with no added labor or operational costs. And by increasing the frequency of cycle counts, 3PLs can achieve the key benefits of inventory tracking automation, including improved data completeness and data accuracy, less time for errors to accumulate and escalate, more efficient use of human labor, and increased productivity.

⁶ >99% data completeness and data accuracy verified by external audit firm.

Self-flying drones

The next wave in retail innovation



The role of 3PLs is to solve logistics challenges for retailers and manufacturers around the globe. By taking advantage of the latest advancements in inventory tracking automation, 3PLs now have the power to solve their own challenges as well.

DSV and Maersk proved the value and reliability of automated inventory tracking. Their successes have opened the door for others to build on this momentum, using self-flying drones from Verity to fully automate the process of inventory tracking in the warehouse. The warehouse floor has been a breeding ground for innovation for decades. Now is the time for 3PLs everywhere to **take that focus on innovation to the sky**—and to reap all the benefits it has in store.

Why Verity?

Founded in 2014, deep-tech scale-up Verity delivers **fully autonomous indoor drone systems** that are trusted in environments where failure is not an option. Based in Zurich, Switzerland, with global operations, Verity's system is used in warehouses to gather valuable insights that **enable greater operational efficiencies**. The Verity system is **built in Switzerland** and engineered to optimize **safety, reliability, and performance** from the ground up.

The Verity system has completed nearly 50 million inventory checks and is installed and delivering benefits at more than 65 sites across 13 countries on 3 continents.

Current projects include large implementations at DSV, KeHE, Maersk, and Samsung SDS. Verity has a strong track record in the warehousing and logistics industry, with its roots going back to Kiva Systems (now Amazon Robotics), which disrupted an entire industry and helped Amazon become the world leader it is today. Developed by the world's leading experts in robotics and machine learning. The company is dedicated to applying advanced automated systems to enable the zero-error warehouse.

VERITY'S MOST SUCCESSFUL CLIENTS SHARE 2 OR MORE OF THESE ATTRIBUTES:

VALUE FREQUENT, ACCURATE

INFORMATION ON STATUS OF GOODS

MANAGE FACILITIES WITH INVENTORY STORED ON FULL PALLETS IN HIGH-BAY RACKING

EXPERIENCE A RAPID FLOW OF GOODS OR HIGH TURNOVER OF INVENTORY

HANDLE HIGH-VALUE GOODS

LOCATED IN A REGION WITH RELATIVELY HIGH LOCAL LABOR RATES

