USING AUTOMATION TO MANAGE GROWTH IN E-COMMERCE FULFILLMENT

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MANAGING UNPREDICTABLE DEMAND

The power of e-commerce lies largely in the broad exposure it provides. Not limited by the physical locations of retail outlets, e-commerce opens up products to the world. And, that world is increasingly embracing the choice and convenience e-commerce delivers, creating growth across the sector. But what makes e-commerce so powerful from a sales perspective can create challenges in the warehouse. Seasonal surges or steady growth can each stretch warehouse operations to the breaking point, ultimately delaying fulfillment and alienating customers just as a business is poised to take a step forward.

It's a challenge that is increasingly difficult to address by adding warehouse personnel, particularly during the holiday shopping season. The labor market is as tight as it has been in years and competition for seasonal warehouse workers has become fierce. Even with signing bonuses, higher wages and

other perks, many e-commerce operators have been unable to bring in anywhere close to the number of workers they require to meet demand during the holiday season. The result is overtaxed workers, higher costs per order, and slower deliveries, all of which threaten the long-term health of the business.

The obvious solution is automation. Yet, traditional warehouse automation solutions weren't designed to address the specific challenges of e-commerce. Instead of facilitating efficient response to growth in inventory or throughput, they rely on fixed systems that can make it more difficult to respond to change. Fortunately, a new generation of warehouse automation solutions has emerged that delivers the key attributes warehouse operators need to efficiently and cost-effectively manage growth.

KEY ATTRIBUTES OF E-COMMERCE WAREHOUSE AUTOMATION

Flexibility

The e-commerce supply chain is constantly evolving, creating the need to continually adapt to changes in throughput, product mix, and delivery times. Fixed conveyor systems can handcuff an organization as it attempts to deal with these changes. Today's warehouse automation must enable flexible management, not impede it.

That requires, first and foremost, modular technology that can be easily re-configured to accommodate changing processes and scaled incrementally without impacting operations.

The systems should also have the flexibility to move with the organization to a new facility. Many e-commerce organization start small without the luxury of a dedicated warehouse. As the business grows, fulfillment may move from converted office space to a small warehouse to a larger warehouse. With bolted-down automation, this evolution creates the dilemma of having to either delay the investment in automation until the business has fully scaled—introducing risks that slow or prevent growth—or continually re-investing in new automation with each move. Just as with other investments, e-commerce automation must be able to move with the business.

Finally, remaining flexible also requires embedded intelligence that allows warehouse technology to leverage emerging capabilities, such as machine learning, to adapt to change without human intervention. One example is the ability to detect a change in the demand for a certain product and re-slot inventory on the fly to make the now fast-moving product more easily accessible.

Responding to the continuous change inherent in e-commerce fulfillment requires flexible automation solutions that are easy-to-deploy and re-deploy, feature a modular design that scales incrementally and includes the embedded intelligence required to take advantage of machine learning and other developments.

Data-driven

Data is a powerful tool in warehouse management, but one that remains largely unharnessed. From bar codes on products to sensors on equipment, there is a wealth of data available today that can help improve equipment availability and efficiency, personnel productivity and safety, and process throughputs. The key to harnessing the power of warehouse data lies in the combination of the warehouse management system and the embedded intelligence in warehouse automation systems.

THE FUTURE-READY WAREHOUSE

Flexible / Data-Driven / Robotic
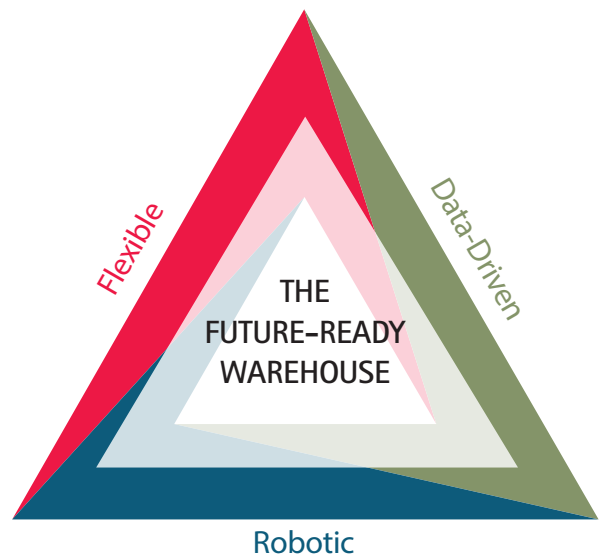
As warehouse management software has evolved, siloes have been created, with warehouse management, warehouse execution and automation control systems all operating in a way that leaves data isolated, limiting its potential to improve operations.

Today's warehouse management systems integrate these capabilities in a single platform, while offering standard interfaces to ERP and other software systems to provide new insight into equipment availability and performance while also enabling new capabilities, such as virtualization.

Data is also the fuel for the artificial intelligence and machine learning systems that enable intralogistics systems to learn and evolve on their own. Through the power of data and artificial intelligence, warehouse systems can learn to recognize patterns, regularities, and interdependencies from structured and unstructured data to anticipate demand and adapt, dynamically and independently, to new situations.

The future will be driven by data and the warehouse software and hardware systems being implemented today must be capable of using data to increase visibility into operations, improve coordination across systems, and adapt to changes in real time.

KEY ATTRIBUTES OF E-COMMERCE WAREHOUSE AUTOMATION

Robotic

Advances in vision, gripping and navigation technology have allowed robotics to migrate from manufacturing, where they have been employed successfully for decades, to the warehouse.

Robotic-based warehouse automation systems resolve the issues with traditional approaches to warehouse automation that have limited its use in e-commerce. These solutions feature a modular architecture that delivers the scalability e-commerce operations require while enabling the move to goods-to-person picking.

Instead of having pickers walk miles each day to search for and pick products, a goods-to-person system brings the products to the picker. This dramatically reduces pick times and improves the ability to adapt to fluctuations in demand. This is particularly valuable in e-commerce where speed is paramount, and warehouses often support a wide range of SKUs that can increase the time and travel distance required for manual picking.

Two robotics-based goods-to-person picking solutions have emerged for addressing the specific challenges of e-commerce.

CarryPick

Swisslog's CarryPick system consists of mobile racks, autonomous mobile robots, ergonomic workstations with pick-to-light technology, and warehouse management software with integrated automation control capabilities. The mobile robots, controlled by the automation-friendly WMS, lift and carry mobile racks of products to workstations where workers can efficiently assemble orders.

The system requires minimal modification to the facility to support navigation and can operate in spaces with ceiling heights as low as 8 feet, making it an ideal "starter" system for e-commerce operators in the early stages of growth.

However, CarryPick is much more than a starter system. It has the ability to scale to meet the demands of a large operation as evidenced by the use of similar technology by Amazon to support its fulfillment operation. The software has the capability to intelligently manage a large fleet of robots, ensuring coordination, minimizing travel times and optimizing utilization.

Each component of the CarryPick system—racks, robots and workstations—is also mobile in the sense that it can be moved to a new location just like office furniture or other business assets.

CarryPick is also flexible in the type of products that can be supported. Each mobile rack can be variable and can be configured to support products in cartons, bins or single items and can be equipped with bottom inserts, compartments, drawers, bins or hanging bars. This allows storage of products with a variety of sizes and weights and makes it easy to accommodate product changes.

KEY ATTRIBUTES OF E-COMMERCE WAREHOUSE AUTOMATION
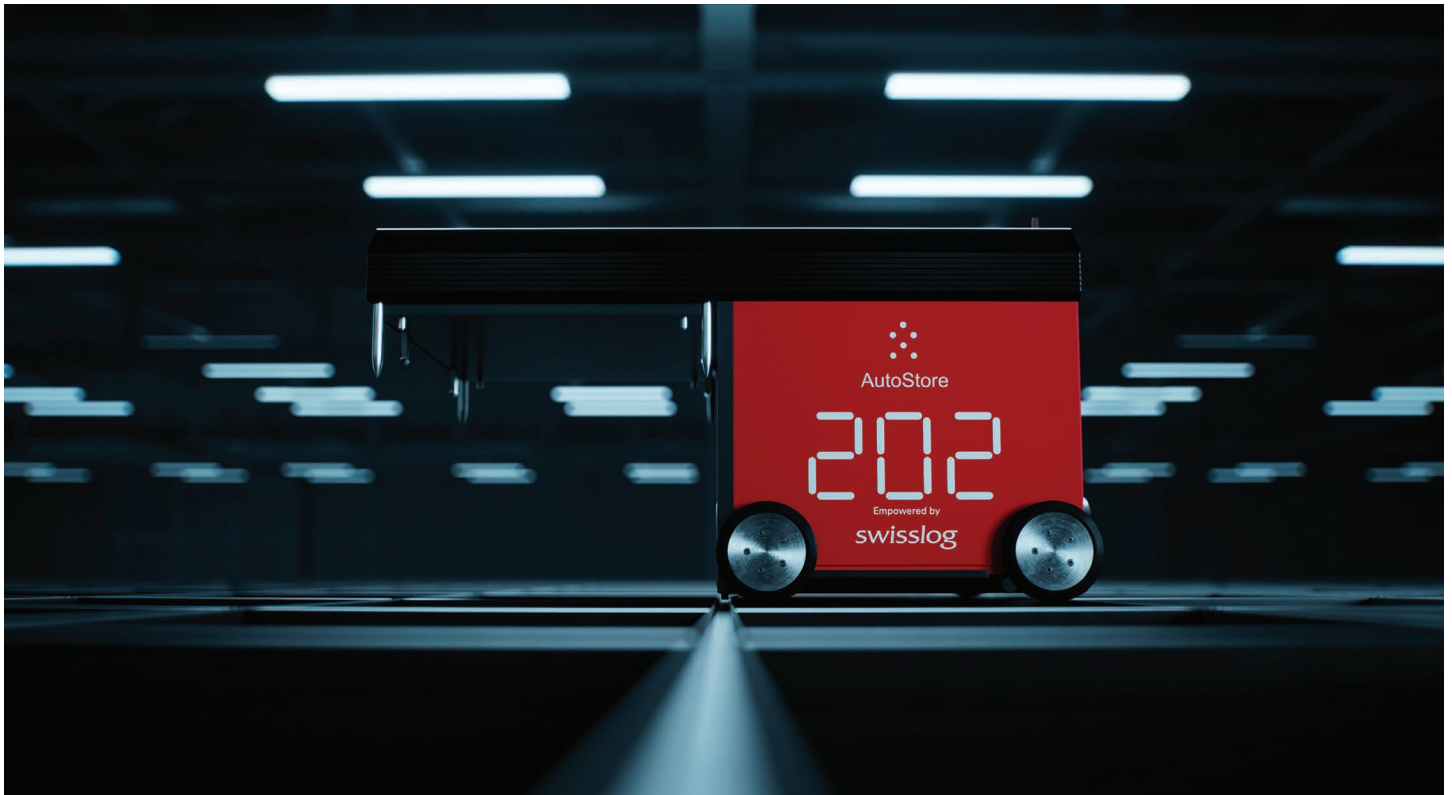
AutoStore

AutoStore is a compact, robot-based automated storage and retrieval system that supports goods-to-person picking. It is designed to handle high volumes of both fast- and slow-moving small-order and small-case-pick SKUs for fulfillment operations that require high storage density.

AutoStore consists of a three-dimensional grid of self-supporting bins that are moved to pick stations by independently operating robots. The robots are equipped with a lift for picking up, carrying and putting product into the bins that are stored within the grid. All robots can reach any position on the grid, eliminating the risk of single-point system failure.

The design of the system results in up to 60 percent better utilization of space than other automatic storage systems, and 300 percent better than a conventional rack system.

A variety of workstation configurations can be deployed to allow batch picking based on orders or SKUs. Any order can be redirected to any one of the pick stations as the need arises. Machine learning allows the AutoStore system to identify fast-moving items and keep them at the top of the grid for faster access.

AutoStore can be configured to fit different building heights, span multiple levels and even surround obstacles in the warehouse, such as pillars or walls. The modular design of the system also allows it to be disassembled and reassembled at a new location.

USING ROBOTIC SOLUTIONS TO SUPPORT SUSTAINED GROWTH

Both AutoStore and CarryPick can be configured to accommodate sustained growth in an e-commerce operation with minimal disruption to daily operations.

Planning for growth begins with system configuration. By analyzing order data and identifying trends, along with business growth objectives, systems can be sized to seamlessly accommodate projected growth in the near term.

But growth isn't always projected, and systems need to scale well beyond the near term. The CarryPick system offers the ultimate in modular scalability and is ideally suited to handle growth incrementally in small phases. With CarryPick, scaling the system can be as simple as adding individual robots to support throughput or additional racks to increase density.

This offers a huge advantage to organizations who want to shift equipment costs from their capital to their operating budgets. CarryPick's flexibility allows the automation spend to be integrated into the operating budget with additional robots, racks and workstations being added annually to accommodate growth. When the time comes to move to a new warehouse, CarryPick components can be simply picked up and moved to the new location.

CarryPick

USING ROBOTIC SOLUTIONS TO SUPPORT SUSTAINED GROWTH

With AutoStore, it's more important to get system sizing right during configuration as expanding the grid storage system does involve some disruption to warehouse operations. The grid is typically sized to handle some degree of growth without modification with the number of robots deployed based on current throughput requirements. Significant growth can thus be accommodated simply by adding more robots and increasing utilization of the existing grid.

With more than 130 AutoStore systems sold or installed, Swisslog has extensive experience in sizing the system to strike the optimum balance between initial cost and future flexibility.

With both AutoStore and CarryPick, the modular nature of Swisslog's SnyQ software enables plug-and-play operation that streamlines deployment. The software is able to handle

significant expansion of each system without modification and plays a key role in ensuring assets are fully utilized, inventory is re-slotted based on demand, and issues that could affect system availability are detected.

While the design of CarryPick provides greater incremental scalability, AutoStore has the clear advantage in density and, in traditional warehouses, can make better use of vertical space. Both systems support fast, efficient goods-to-person picking with clear grow paths that can extend well into the future.

Choosing the right one for a particular operation requires an evaluation of product type, density requirements, delivery speeds and facility requirements.
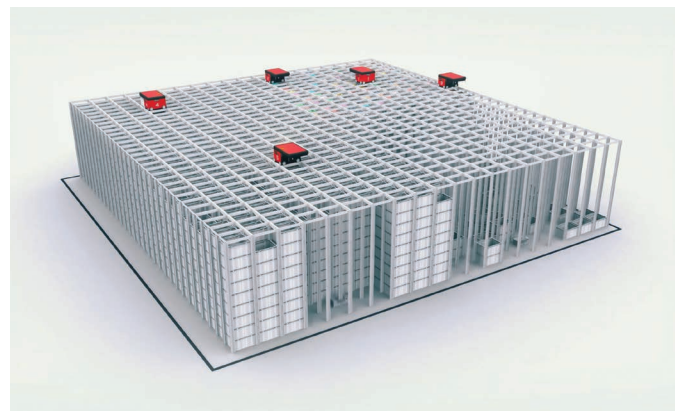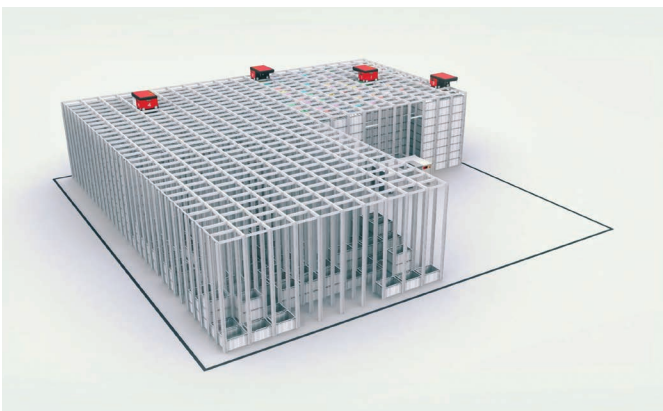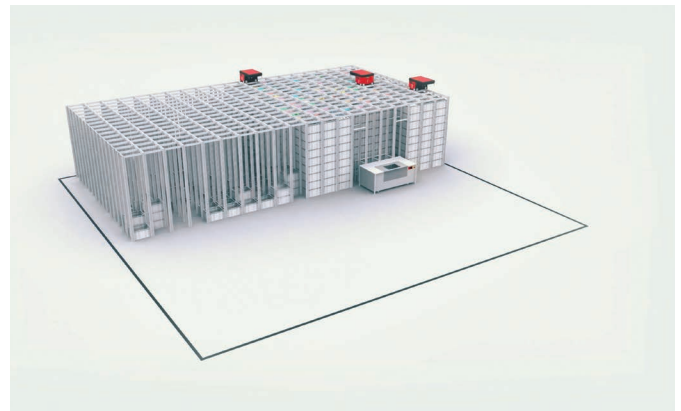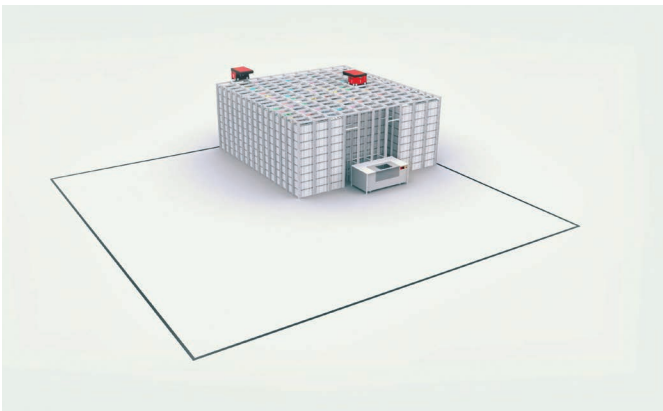
When a major expansion is required, additional AutoStore storage modules can be added to the existing grid. If it becomes necessary to move to a new warehouse, the modular AutoStore system can be disassembled and reassembled in the new location.

USING ROBOTS TO MEET PEAK SEASONAL DEMANDS

It would be ideal if some e-commerce companies had their peak periods in the early months of the year, some in the spring and summer and some during the holidays. But that's not the case. Almost all experience dramatic increases in sales during the holiday season, creating fierce competition for seasonal labor.

452K
ADDITIONAL
WAREHOUSE
WORKERS
NEEDED

According to a recent report from CBRE, the rapid growth of e-commerce will create demand for an additional 452,000 warehouse and workers in 2018-2019

Relying on hard-to-find labor during the most important season of the year significantly increases business risk. Use of robotic-based automation can mitigate that risk in multiple ways.

First, goods-to-person picking solutions increase the productivity of warehouse personnel. Many CarryPick and AutoStore customers find they can increase pick rates by as much as 50 percent using goods-to-person picking, significantly reducing the need to supplement staff during peak seasons.

In addition, robots don't have the physical limitations of human labor. They don't get tired, take breaks or need seven hours of sleep each night. That provides the flexibility to extend work shifts by, for example, having robots stage orders before human workers arrive on the job.

Another approach that is gaining popularity, particularly with CarryPick users, is to build a reserve of robots over time to handle seasonal demand. In this approach, a warehouse diverts some of the money it would spend on seasonal labor each year to purchase additional robots to help meet peak demands. This allows the organization over time to build ample reserve capacity and significantly reduce the need to supplement the labor force during the holiday season.

The robots are compact and consume very little warehouse space when they sit idle. Even if they are idle for ten months out of the year, the ability to gradually build reserve capacity over time, combined with the flexibility to instantly turn on that capacity to meet peak demand, can make this an attractive option for e-commerce providers seeking to reduce the risks associated with finding sufficient labor during peak periods.

MAKING THE MOVE TO FLEXIBLE, DATA-DRIVEN ROBOTIC AUTOMATION

> ## Bolted down automation systems can limit flexibility in the short and long run.

Robotic-based automation solutions enable the flexibility to effectively manage both seasonal and sustained growth.

They have emerged as the solution-of-choice for e-commerce operations seeking to leverage the benefits of automation without being locked into a system that can't adapt to change. Today, they are operating reliably and effectively in hundreds of warehouses around the world.

While the technology is inherently flexible, expertise in system sizing and deployment is required to leverage the full flexibility and capability these systems enable.

Swisslog's team of automation specialists, which has deployed more robotic-based automation systems than anyone, is available to help you select the right system for your business, configure the system to balance initial cost with future growth and enable a fast start-up.

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