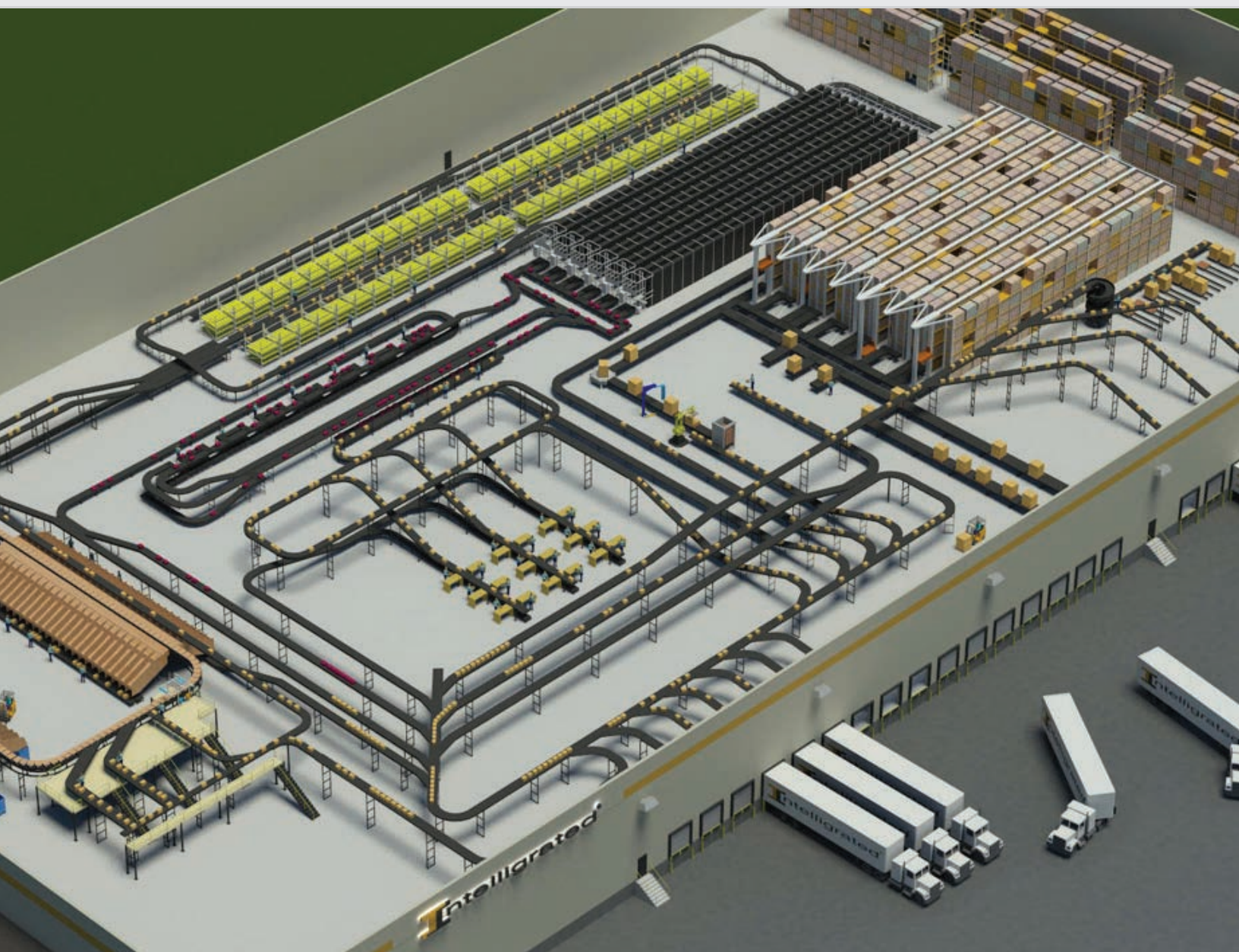


# Conquer High-Volume E-Commerce With Goods-to-Operator Order Fulfillment

Highly Automated Solutions and Workflow Adjustments Bring Maximum Speed, Accuracy



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# Conquer High-Volume E-Commerce With Goods-to-Operator Order Fulfillment

Highly Automated Solutions and Workflow Adjustments Bring Maximum Speed, Accuracy

## E-Commerce and the Transformation of Distribution and Fulfillment Operations

E-commerce continues its prolific rise. The U.S. has experienced [26 straight quarters with year-over-year e-commerce sales growth at or near 15 percent](#). This offers great opportunity but also real challenges – chief among which is meeting customer expectations through every step of the purchasing cycle. In e-commerce, [fulfillment operations provide much of the customer experience](#), assuming responsibility for order accuracy, timely shipment and ultimately, customer satisfaction. With brands competing on customer experience, the race to deliver merchandise when and how customers desire is key to defending and growing market share.

But efficiently serving increasingly high volumes of e-commerce orders is no simple task. Rather than the larger pallet load orders many distribution centers were originally designed to handle for retail replenishment, the direct-to-consumer orders of e-commerce require handling larger volumes of smaller-size orders. As e-commerce continues to grow, these orders make up larger proportions of the fulfillment workload, challenging operations with diminishing returns and decreasing efficiency as existing fulfillment methodologies aim to keep up with performance requirements. For omnichannel operations serving both retail replenishment and direct-to-consumer orders, this means adapting established fulfillment processes and infrastructure to meet service level demands across both channels efficiently and profitably.



Goods-to-operator order fulfillment offers a solution that applies the right mix of equipment, processes and workflow adjustment to handle high volumes of direct-to-consumer orders with greater speed and accuracy.

This white paper, the second installment in a series of AS/RS materials from Honeywell Intelligrated, outlines how workflow adjustments and shuttle technology can increase efficiency for high-volume, e-commerce fulfillment operations.

## Finding the Right Fulfillment Methodology for High-Volume Operations

Operator-to-goods workflows involve employees using paper pick lists as they walk through aisles and select items from a pick face to fulfill one or more orders at a time, a process reminiscent of grocery shopping. This is the simplest fulfillment method, offering fast response time, short order cycle times and the ability to easily track picker accuracy.

However, travel time can cap labor productivity, with workers spending up to half their time walking between pick locations instead of

actually picking. The operator-to-goods methodology can also deliver diminishing returns when pushing to meet high throughput demands, as adding more labor does not necessarily mean more orders fulfilled. For example, scaling to meet 10,000 orders per hour would require additional labor roaming and congesting the same pick aisles, causing individual labor productivity and operational efficiency to drop. The limited vertical reach of pickers also restricts slotting options, requiring operations to build out rather than up, leaving a wide horizontal footprint that does not leverage cubic space.



Another fulfillment methodology, known as pick-and-pass or zone picking, involves assigning employees a specific zone in a pick area, with responsibility for picking SKUs in that zone. If a single order contains SKUs located in multiple zones, employees pick necessary SKUs as the order passes through each zone until completion. This workflow uses more sophisticated technology like voice or lights to manage the picking process and conveyor to move product through zones. Zone picking allows greater efficiency and productivity, fulfilling more orders in less time than with pickers walking around the warehouse. However, slotting restrictions limit effectiveness, as they require a large horizontal footprint and leave vertical space unused.

Eventually, order volumes, throughput demands and labor requirements push facility capacity to the limit, requiring operations to reevaluate fulfillment processes and consider highly automated systems.

## A Solution Built for E-Commerce: Goods to Operator Fulfillment

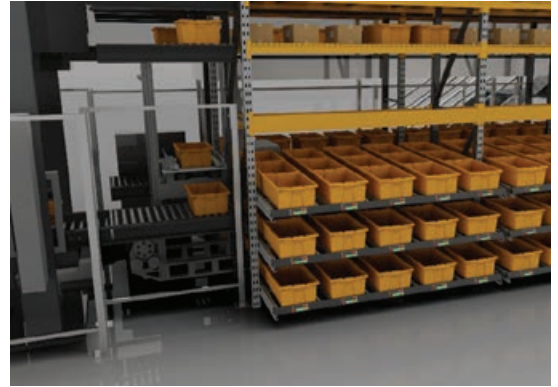
While goods-to-operator (GTO) order fulfillment systems are not a new concept, the high volumes of small-size, e-commerce orders means more operations possess conditions conducive to their adoption than ever. GTO systems use a variety of automated equipment and fulfillment technologies to increase facility efficiency and capacity for operations with 250 orders per hour or more. Automated storage and retrieval systems (AS/RS) technologies retrieve product from storage and a conveyor transports the required SKUs to pick stations, a process more evocative of picking up merchandise from the dry cleaners than shopping at a grocery store.

Facilities that use these systems are able to store product 20–30 feet high, using much more cubic volume than those operations limited by employee reach. This increased storage density can result in a 30–50 percent smaller footprint than operator-to-goods workflows, enabling operations to build or lease a smaller facility.

GTO systems are also designed to help operations get the most out of labor, improving individual productivity and minimizing pick errors. Bringing product to pickers eliminates the travel time that can account for as much as half of a picker's time spent on the floor. High-utilization work stations are designed for employee comfort, offering consistent product flow into the picker's ergonomic golden zone to enable more picks per hour. Furthermore, presenting pickers with a single SKU at a time combined with the use of fulfillment technology such as voice and lights drives greater levels of accuracy.

## Building a Successful GTO System

Reaping full return on the promise of GTO fulfillment starts with the right system components. AS/RS plays a major part in enabling the operational benefits of GTO fulfillment. But with multiple AS/RS technologies on the market, selecting the right one requires further examination of each:



AS/RS TECHNOLOGY	HOW IT WORKS	LOAD TYPE	THROUGHPUT CAPABILITY	BEST-SUITED APPLICATIONS
<b>Unit Load</b>	Maximum one crane per aisle, serving all storage levels	Pallets		Wholesale distribution – pallet loads, agricultural storage
<b>Carousel</b>	Series of bins revolving on an oval track	Bins		E-commerce distribution – goods-to-operator order fulfillment; sequencing and buffering
<b>Mini-load</b>	Generally one crane per aisle, serving all storage levels	Trays, totes or cartons		E-commerce distribution – goods-to-operator order fulfillment; sequencing and buffering
<b>Shuttle</b>	Several shuttles serve a single aisle	Trays, totes, cartons or bins		E-commerce distribution – goods-to-operator order fulfillment; sequencing and buffering

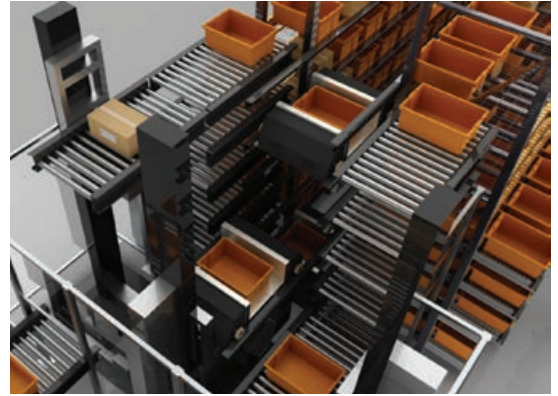
For high-throughput, e-commerce fulfillment operations, an AS/RS must provide speed and flexibility to keep product flowing to downstream processes in the right order at the right time. The unique design of shuttle systems provides advantages over mini-load, carousel and unit-load systems in terms of throughput and product handling ability. This enables the high speed, easy scalability, and more complex sequencing and buffering a GTO system requires to function most efficiently.

Of course, GTO fulfillment requires more components than just AS/RS, with each piece playing a critical role to complete an order, from conveyor and sortation to voice, lights and pick screens. The strongest systems leverage each piece for maximum overall output, balancing the workload to avoid congestion and throughput bottlenecks.

## Picking the Right Team

Choosing the right integration partner is key to realizing the benefits of a well-balanced system that works in harmony rather than as islands of automation. The simulation process enables collaboration with the vendor and systems integrator to model the effects of different fulfillment conditions and gauge the effectiveness of shuttles, lifts, conveyors, transfers and other critical points in the system. After installation, proactive maintenance keeps everything functioning as it should, with peace of mind provided by a data-driven approach made possible through a computerized maintenance management system. This not only minimizes the chance of an unplanned outage, but actually enables operations to schedule maintenance functions to avoid peaks and disruption of normal business.

The complexity and scale of a highly automated GTO solution requires a long-term partner with an understanding of each component, the system design and the necessary support to keep it running at full capacity. Asking the right questions can reveal important answers about the vendor's experience, reputation and capabilities. For example, can they provide support for the entire system from a single source? Where do they source equipment? Can they provide quick-response, local support?

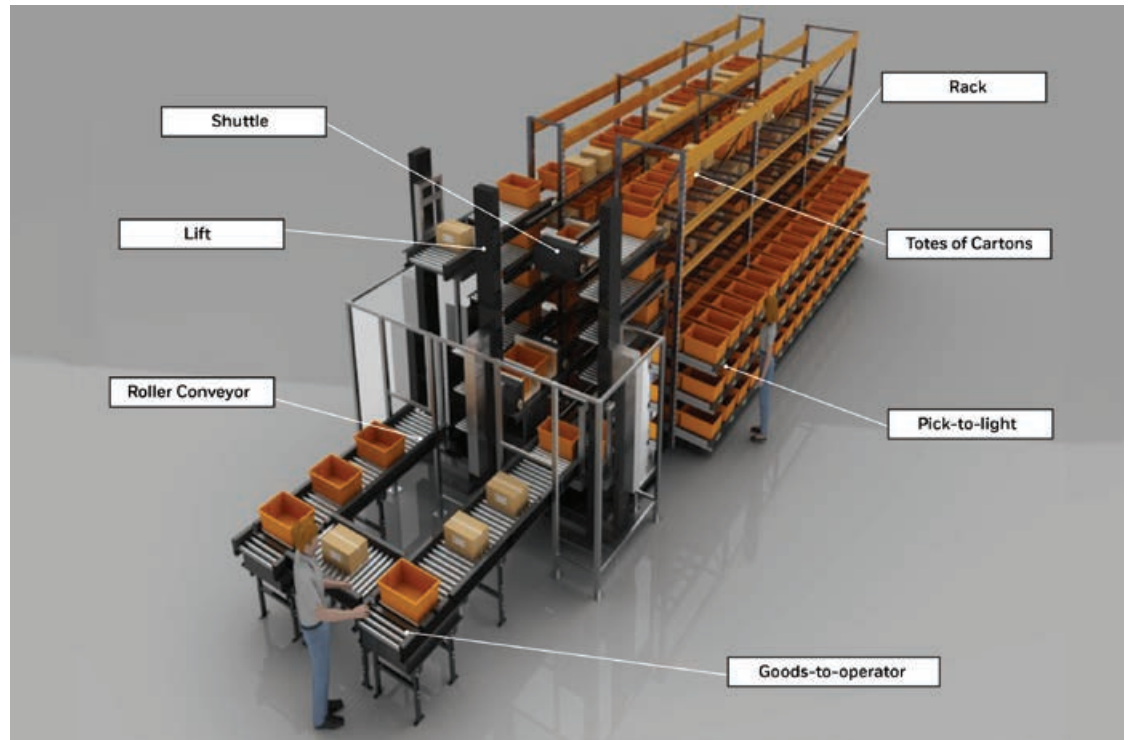


## GTO System Design

Designing a GTO system requires consideration of immediate and future business requirements to ensure sufficient capacity, product handling capability and workflow flexibility.

## Scalability

With enough space, shuttle-based GTO systems can scale as high as necessary. This enables operations to design for anticipated growth by communicating growth expectations to the system supplier and planning future expansions for enough capacity over a multi-year period. This insulates operations from risking insufficient capacity in the future and spreads out the financial burden of the ultimate, complete system.



At a more immediate level, while GTO systems are typically designed for peak operating requirements, they do provide the ability to scale down operations during base periods. For example, an operation may require 10 GTO stations during peak months but only five in the remaining months. The fulfillment center can deactivate the other five GTO stations when not needed, reducing labor requirements, conserving energy and saving system components from unnecessary wear and tear.

## Product Handling Flexibility

Product handling flexibility is meant to ensure that automated equipment can reliably handle the required product mix. Shuttles can handle loads of up to 220 pounds in plastic totes or cardboard cartons. As long as an item can fit inside a compatible container with necessary packaging, the system can handle it, with minimal risk to fragile products.

## Workflow Flexibility

Flexibility enables a system to most efficiently handle order fulfillment in a variety of operational conditions. At a basic level, this enables the best use of labor and auxiliary systems, such as software and hardware combining to handle tote induction or discharge automatically so that operators can focus on picking. This also speaks to system resiliency, or how susceptible a system is to an outage. For example, if one shuttle goes down, the whole system is not in jeopardy, as others are available to fill the void. By contrast, if a crane goes down in a mini-load system, that requires a more involved process to source and install a replacement, shutting down a storage aisle for several hours or even days.

Characteristics such as these enable a system to accommodate several workflows with a high degree of reliability. Such workflows include:

- **Batch picking:** This involves the AS/RS sending products for several similar orders to the picking station at once, such as 15 blue jeans and 10 red shirts. The AS/RS and

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auxiliary automated components take over much of the process, enabling operators to simply pick and place items in the appropriate container, then confirm the put. This can increase throughput by **33 percent** over batch picking without AS/RS.

- **Discrete picking:** A tote arrives in the pick module from the AS/RS. The picker pulls out the necessary product, waits for another tote to arrive with the final product to complete the order before placing both in a bag for shipping. This offers increased accuracy and speed compared to discrete picking workflows without support from automated systems.
- **Dual-ended AS/RS:** Normally, one end of an AS/RS is designated for picking and the other for replenishment. However, this layout enables operations to fuel picking operations from both ends of a system to provide extra capacity during daily peaks. Shuttles can accommodate this layout by locating lifts for shuttles in the middle rather than at one end, freeing both ends for picking.

## An Automated Way Forward

As e-commerce continues to occupy a larger piece of the contemporary retail puzzle, fulfillment operations must adapt to handle increasing volumes of smaller-size orders. As businesses look for the most efficient method to handle this new fulfillment reality, goods-to-operator systems offer a solution to provide the throughput, scalability and accuracy required to efficiently handle these complex order requirements. For more information on the application of AS/RS in material handling operations, read the [Honeywell Intelligrated white paper, What to Consider for a Successful AS/RS Investment](#) or [contact a representative](#).



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