AUTOMATE ORDER PICKING AND INVENTORY REPLENISHMENT.

How AS/RS Can Increase Distribution Operational Speed, Accuracy and Reliability

Honeywell

Intelligrated®

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INTRODUCTION

Automated storage and retrieval systems (AS/RS) are essential for achieving high-density storage in space-constrained omnichannel fulfillment and distribution center (DC) environments. With the emergence of advanced warehouse execution software (WES), AS/RS can now be integrated with these platforms to create an optimum solution for addressing the growing challenges of e-commerce via inventory storage, replenishment and order picking. This white paper introduces the capabilities and benefits of integrating AS/RS with a WES and outlines the key considerations business leaders can evaluate as they determine how to leverage AS/RS to improve DC performance.

ADDRESSING THE ESCALATING CHALLENGES OF E-COMMERCE

Order picking and inventory replenishment today require complex operations, significant capital investment and reliable labor. Escalating product volume and order velocity drive the agenda. Traditional retailers, joined by the booming number of e-commerce buyers, expect rapid deliveries. Compounding the problem is the industry-wide lack of qualified workers available. Regardless of their industry or location, businesses face chronic labor shortages that limit their capability to fulfill orders efficiently, accurately and profitably.

In response, suppliers of material handling hardware and software are introducing advanced functionalities with the combination of AS/RS and WES. As a result, AS/RS capabilities are significantly expanded to now enable improved picking accuracy and help deal with persistent labor shortages.

What's more, strong business growth, fueled by e-commerce and omnichannel requirements, has driven investments in AS/RS to augment goods-to-person (GTP) processes, in which automated shuttles pick totes from racks and deliver products to people at picking stations. There's a strong business case to be made for this approach.

KEEPING UP
WITH CUSTOMERS

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Top Challenges: Labor Shortages, Rapidly Changing Buyer Behaviors

Distribution is a growth business. DCs and warehouses now handle an average of 13,985 SKUs, up nearly 7 percent in 2018 from the previous year.

E-commerce sales direct to consumers continue to transform retailers and manufacturers, who now must compete for buyers by speeding up processing and shipments in order to offer next-day or two-day delivery. More often, customers are requesting delivery within hours on the same day.

These market expectations are game changers.

"We're seeing a big shift from traditional retail-oriented fulfillment, which used to mean a large DC where you may have more than 1,000 people working. Now businesses apply two principles to DC operations.

"First, you're trying to ship quickly. You're going to open smaller distribution facilities closer to urban areas to get faster deliveries. Then also you're supporting an omnichannel delivery system to ship e-commerce products quickly while also fulfilling the inventory needs of your brick-and-mortar stores."

— Integrated systems product manager at Honeywell Intelligrated

ADOPTION OF AS/RS TECHNOLOGY
Manual processes are widely used to pick and process orders, but increases in the number of SKUs and orders have businesses boosting their investments in automated material handling. Here's how many DCs now use AS/RS:

2%   **2017**

12%   **2018**

WHAT'S DRIVING
ADOPTION OF AS/RS?

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> Operators of distribution centers and warehouses invest in automation, including shuttles and/or AS/RS, for a variety of reasons, but labor tops them all.

Labor is scarce across markets, but even where workers are available, they cannot always be counted on to show up. That introduces unpredictability into the distribution workflow. Humans also become tired or lose concentration when picking, which can lead to order errors.
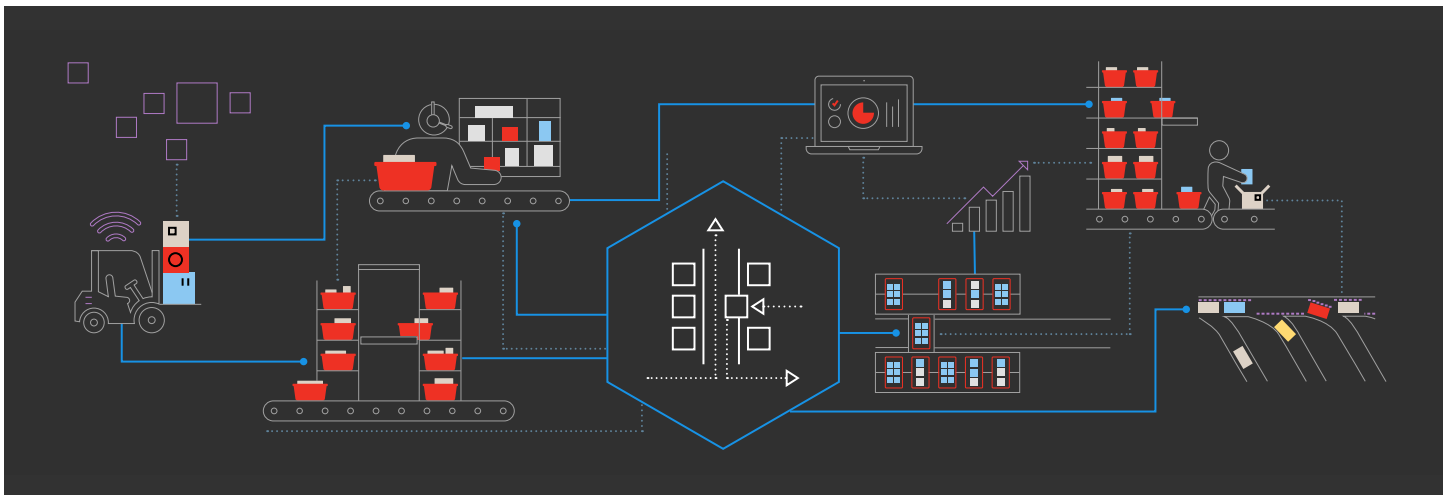
Another major challenge: Distribution operations nowadays are being asked to contribute more to overall business objectives. That requires managers to streamline processes, reduce costs, and maximize the return per square foot on the capital investments companies make in distribution facilities.

Automated systems stabilize all of these variables because they're designed to precisely handle put-away and picking without human involvement or direct interaction.

FEELING YOUR PAIN
Businesses look to automation as solutions for these challenges:

- **55% — Labor shortages**
- **40% — E-commerce fulfillment**
- **38% — Outdated storage, picking or material handling equipment**
- **21% — Omnichannel fulfillment**

Automate Order Picking and Inventory Replenishment | What's Driving Adoption of AS/RS?

3

FOUR REASONS WHY DISTRIBUTION CENTERS INVEST IN AUTOMATION

Why do DC and warehouse operators invest in automated GTP systems based on their experiences? Here are four of the biggest reasons:

1. **Rapid Growth in Order Volume and Velocity**

   a. Without automation, more human pickers are needed to keep up with increases in SKU quantities. At some point, the number and frequency of orders expand to a level at which DCs have too many people walking up and down aisles. The congestion begins to impact the time required to pick orders.

2. **Popularity of E-commerce**

   a. Retailers and groceries offering click-and-collect services reach a point where they want to improve speed and efficiency by implementing micro-fulfillment systems that can relieve pressures on in-store inventory and staffing. AS/RS can be added inside existing stores or DCs and dark stores to support e-commerce pick-up and home delivery.

3. **High-value and Highly Regulated Products**

   a. Accuracy rises to the top of the priority list when picking expensive SKUs and items required to be tightly controlled, e.g., medical devices, pharmaceuticals and alcoholic beverages. Any order error is magnified by the cost of re-picking when access to the products is restricted in addition to the risk of regulatory penalties and fines.

4. **Need to Expand Capacity**

   a. Winning budget approval to add square footage to DCs (let alone for new construction) is always a tough sell. Increasing existing facility utilization requires an investment in new software or filling up the vertical space with more racking hardware and pick modules.

APPLICATIONS FOR
SHUTTLE AS/RS

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> The flexibility of AS/RS makes it possible to integrate automated systems with a variety of picking technologies, including GTP and goods-to-robot (GTR).

In applications with strict compliance requirements or the need to secure high-value products, AS/RS can be used in conjunction with other picking technologies. For example, AS/RS can work with enclosed A-frame systems for picking small items such as bottles, blister packs and boxes.

Material handling with shuttle AS/RS technology offers the flexibility and speed to handle applications ranging from e-commerce to omnichannel fulfillment. Automation provides a wide variety of other uses in distribution centers, retailing and manufacturing. AS/RS capabilities include:

- **GTP fulfillment —** Combines shuttles with conveyor systems and lights or voice picking to reduce human walk times and improve efficiency

- **Inventory management —** Responds to better inventory control while minimizing loss

- **Mixed-load, full-case and break-pack fulfillment —** Manage inventory to support advanced processes that meet customers' ever-changing orders

- **Product sequencing and buffering —** Deliver the right products and quantities

- **Route-based sequencing —** Optimizes truck load patterns for faster, more efficient deliveries

READY FOR AUTOMATION

43%

Nearly half of the SKUs were conveyable or could be handled robotically in 2018. And that's up from 29 percent during the previous year.

FOLLOW THE AS/RS PROCESS

Here's an example of how a shuttle AS/RS can automate material handling.

For Receiving

Some DC operators invest in dedicated decant or replenishment stations to receive and restock inventory. Depending on volume, many DC operators decide to pick orders during the first shift and replenish inventory during a later shift using the same material handling equipment, but essentially running it in reverse.

Shuttles in an AS/RS are ideal for this role, which can look like this:

- Replenishment stations are located near the receiving area, so palleted goods don't have to be moved far.

- At each station, empty totes are scanned, and the operator scans the inbound inventory items to confirm the quantity put into each tote.

- The AS/RS conveying system transports the totes to lifts that raise the products to a rack level where storage space is available.

- The totes are transferred to shuttles that travel up or down an aisle and put the totes into the racks.

The shuttle AS/RS coordinates with a WES to continuously calculate the best rack location for each container size. AS/RS also utilizes SKU information to spread inventory across aisles and levels and follows put-away rules that determine rack locations for specific items.

Inventory records are updated by a WES based on communication from the shuttle AS/RS. To ensure tight integration of the technologies, some AS/RS vendors sell and implement WES as part of their automation services.

For Picking

Inventory stored in the racks is identified by the WES, which instructs the shuttle AS/RS to pick and deliver products to GTP pick stations as follows:

- Shuttles drive up and down aisles between the racks.

- Shuttles run on every level of the racks and can pick totes stored on any aisle on a level.

- Shuttles deliver totes to the ends of aisles and place them on a lift.

- The lift lowers or raises totes to an outbound station on a mezzanine or floor level and releases the totes to a conveying system.

- The conveying system transports the totes to GTP stations, where each order is assigned.

- The operator picks items from the totes to fill each order.

- Picked items are placed by the operator into a shipping box or another tote that goes to another location in the building where other, different size items will be picked.

- When an order is completed, totes go to a shipping consolidation area for final processing into one box.
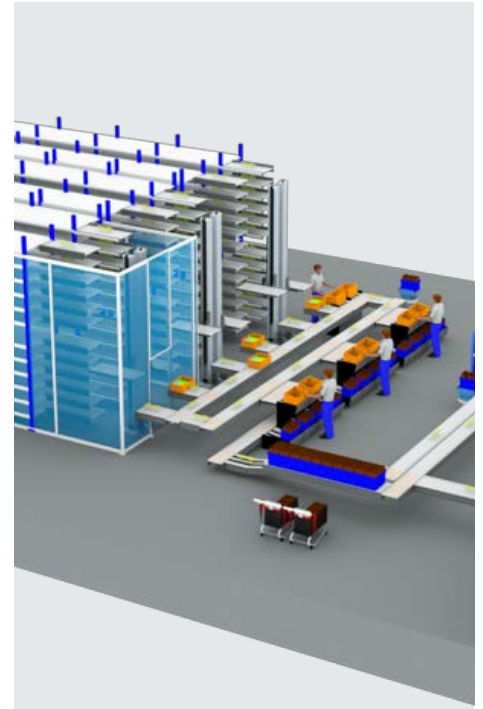
HOW TO EXPAND
WITH AS/RS

Scalability is a key advantage to AS/RS compared to older material handling technologies. If DC operators are considering adding inventory and thus need more storage, AS/RS racks and shuttles can be added to the length, width or height of a cube. If more throughput is needed, DC operators can add shuttles or another aisle.

As the technology advances, GTP picking stations will become even more automated, including through the addition of robotic systems that pick collaboratively alongside humans (or replace human pickers altogether).

GROWTH PATH

When additional DC capacity is required to meet future demands, DC operators will have multiple options from which to choose to expand their AS/RS:

- Add aisles or levels and GTP stations to make full use of the floor space and height inside the DC cube.

- Convert some of the GTP stations to GTR. Robotic pickers can increase throughput, and utilizing them to expand an existing DC can optimize an equipment investment. For example, to expand DC capacity, a DC operator may need to only invest in four GTR stations (compared to six GTP stations if the DC had been expanded with conventional processes and technologies).

- Upgrade DC software and racking and conveyance hardware to make better use of existing square footage and avoid the capital expense of DC expansion or new construction.
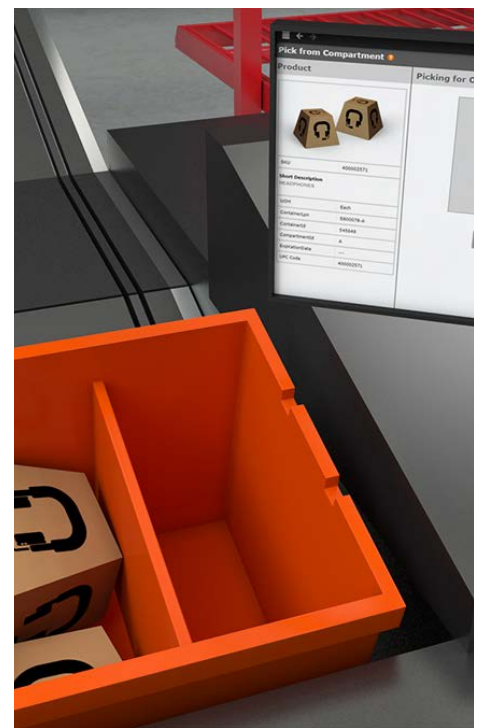
THE MORE COMPLEX THE ORDERS, THE MORE AS/RS VALUE GROWS

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Businesses will consider DC automation to keep up with business growth as well as demands for efficiency and accuracy. Material handling also has grown in complexity. Retail stores replenish their shelves with more split-case orders. This shift replaces full pallets with more frequent, smaller-quantity orders. In turn, the retail shift to e-commerce fulfillment requires significantly more labor for picking and sorting if a DC isn't highly automated.

Shuttle AS/RS are quicker compared to conventional crane or mini-load systems, making them the ideal next technology to keep up with changing requirements. Designing and implementing AS/RS to meet volume and complexity requirements take time, however. Here's what's involved:

- The more sophisticated the requirements, the longer it can take from the consideration phase through to the go-live phase.

- Expect an automation installation to take at least 18 months once equipment has been ordered.

- Additional time is required for the preliminary evaluation and consultative processes, which can be conducted by either independent engineering consultants or process design experts from the automation vendor you select.

Choosing off-the-shelf AS/RS can accelerate the implementation timeline. However, when DC operators need automation that can scale with their business, they should consider an engineered AS/RS, which can produce a return on investment in two to three years.

FUTURE-PROOF MATERIAL HANDLING PROCESSES

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Operators of DCs and warehouses have started to address escalating volume, velocity, costs and the chronic workforce shortage by investing in shuttle AS/RS technology. They can rely on AS/RS to handle high volumes of smaller, lighter loads in cartons, trays, totes or bins.

Shuttle AS/RS can also provide flexible storage configurations and enable businesses to avoid the cost of constructing additional warehouse space. Most significantly, AS/RS can provide companies with a long-term solution to the shortages of qualified labor across markets.

HOW HONEYWELL INTELLIGRATED CAN HELP

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> **When evaluating automation solutions, be sure to consider how the hardware and software supplier or suppliers can integrate new technologies with your existing systems and workflow.**

Many material handling vendors provide standalone products only. Integration must be planned and implemented by other third-party consultants or the DC managers themselves.

"You want to look holistically to make sure that your integrator of choice can create a routing solution, a picking solution and a storage solution that all work in harmony," said Justin Peterson, integrated systems product manager at Honeywell Intelligrated.

Too often, businesses squander the potential storage capacity of AS/RS. One of the major benefits of investing in shuttle AS/RS from Honeywell Intelligrated is that we also offer Momentum™ warehouse execution software, which dynamically matches product size and shape attributes to available locations in the AS/RS shelving system, thus providing:

• Increased storage density and capacity of the existing footprint

• Automated dynamic location assignment based on product size and space availability

• Accommodation of variable SKU sizes without changing the square footage

Many fulfillment centers have difficulty consolidating and shipping orders comprised of products from varying locations and unique handling requirements. Momentum drives intelligent order assembly and release — taking labor availability, product attributes, value-added services and travel routes into consideration — to make sure products arrive at the shipping dock at the same time.

Modern distribution operations can't afford to blindly push work to operators without visibility to their workstation capacities, task lists or skillsets. Momentum eliminates these inefficiencies with intelligent workflows that release work to available, qualified workers and enables them to interleave multiple tasks for maximum productivity.

"We're able to use smart routing to calculate when and how to release orders. We leverage data science to determine the best pick path and optimize both your storage and retrieval solutions."

— Integrated systems product manager at Honeywell Intelligrated

THE
FUTURE
IS
WHAT
WE
MAKE IT
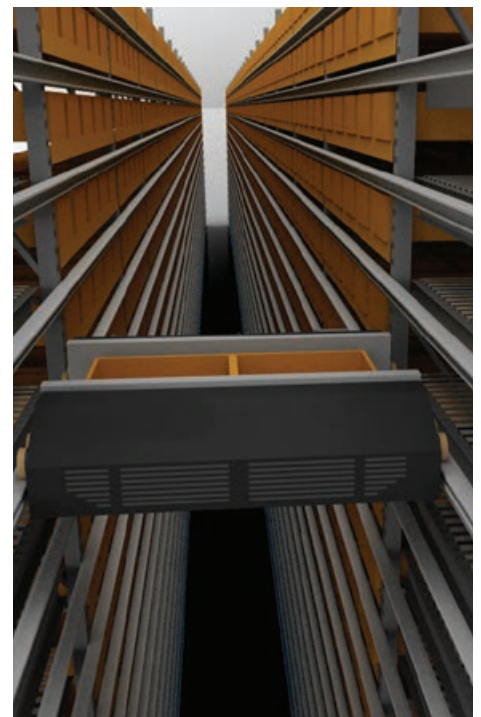
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