

ON THE MOVE

VOLUME 2 • ISSUE 2



WINTER 2020



OPERATIONAL RESILIENCY

8

Micro-Fulfillment
Strategies for the Future
of Omnichannel Retail

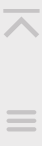
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Empower Your
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Connect to More
Predictable
Maintenance
Operations

Honeywell
Intelligent[®]



NAVIGATE A SHIFTING LANDSCAPE.

Looking back at the events of 2020, it's clear that the onset of the pandemic was an inflection point for the distribution and fulfillment (D&F) sector. Companies that relied on their supply chains for omnichannel retail fulfillment suddenly found themselves on unsure footing. Retailers were forced to quickly adapt to new workplace safety challenges amid unprecedented [e-commerce](#) acceleration. Consumers embraced contact-less, online fulfillment options – across all retail sectors and many for the first time – while distribution center (DC) managers implemented workplace safety measures aimed at improving worker confidence and well-being.

🔗 E-COMMERCE GROWTH HAS ACCELERATED 4 TO 6 YEARS FASTER THAN ANTICIPATED.

- Online sales are **up 77%** year-over-year.
- Newly formed online purchasing behaviors are becoming permanent.
- Curbside pick-up has become widely accepted.



🔗 INVESTMENTS IN AUTOMATION AND ROBOTICS ARE ON THE RISE.

- Respond to increased supply chain pressures (picking, packing and shipping).
- Mitigate the risks of slowdowns or shutdowns.
- Keep up with increased competition for talent in a tight labor market.



🔗 THE CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC) RECOMMENDS THE FOLLOWING WORKPLACE GUIDELINES.

- Device sharing is only recommended in conjunction with proper cleaning measures.
- Personal protective equipment (PPE) – such as face coverings and gloves – is now a necessity.
- Workers should follow social and/or physical distancing recommendations.
- Employees should be continually screened and monitored for elevated temperatures.
- Adherence to personal hygiene standards is integral to improving workplace safety.



To navigate this rapidly shifting landscape, companies will need to utilize all available tools, technologies and fulfillment strategies to enhance workforce safety and drive peak productivity levels in their DCs. If these sound like all too familiar challenges, we've dedicated this issue of our On The Move publication to you. From contact-less building access and facility monitoring to [labor management](#) optimization and [remote maintenance](#) enablement to [robotics integration](#) and [micro-fulfillment centers \(MFCs\)](#), you'll find the very latest technologies and strategies for addressing new throughput requirements and workplace safety challenges.

Our goal is to give your company the tools to help protect people and places, drive labor productivity, and optimize operations for future success.

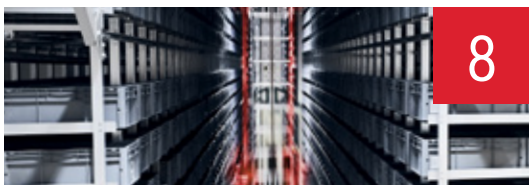
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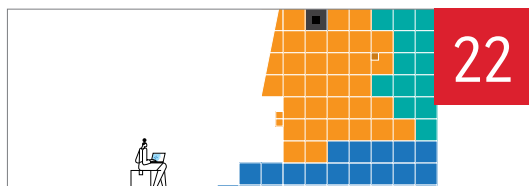
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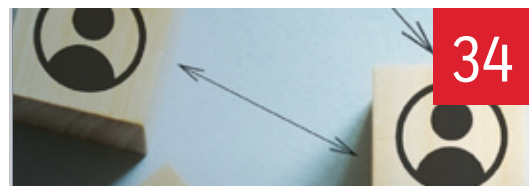
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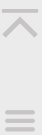
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THE ADVANCEMENT OF DC FULFILLMENT TECHNOLOGIES

Optimizing the Present and Future States of DC Operations With
AS/RS, Robotics and Software



The transition to advanced automation is well underway in distribution and fulfillment (D&F) operations. Within the four walls of distribution centers (DCs), traditional labor-intensive process and material handling strategies are being replaced by more automated alternatives. Retail leaders are beginning to automate and upgrade specific aspects of their DC operations that are bowing under the weight of e-commerce pressures.

Retailers at the forefront of this transition are driven by a desire to mitigate risks to profitability and business continuity by:

- Reducing the dependency on labor
- Increasing throughput rates to meet service level agreements (SLAs)
- Enabling the flexibility to adapt to peak seasonal fulfillment demands
- Keeping pace with year-over-year growth forecasts

New automation investments are focused on achieving strategic supply chain advantages in critical picking, inventory storage and retrieval processes — where peak labor efficiencies are no match for escalating [e-commerce fulfillment](#) complexities and SKU proliferation. As throughput levels rise, delivery windows shrink and labor becomes more unpredictable, retailers will find it more difficult to sustain productivity and grow profit margins.

At the same time, emerging advanced automation solutions with integrated software offerings continue to improve, presenting operators with attractive and attainable returns on investment (ROI).

PROGRESS CONTINUES ALONG KEY FUNCTIONAL AREAS

High-speed sortation equipment still plays an essential role in large DCs with high throughput levels, high-level order volumes, and associated shipping and receiving requirements. But while the prospect of unbolting traditional sortation and conveyor

equipment is still largely unfeasible, integrated automation systems offer opportunities to upgrade the core of many DC operations: picking, inventory storage and order fulfillment orchestration.

Automated Storage and Retrieval Systems (AS/RS)

[AS/RS](#) can be deployed within existing DCs to maximize throughput and improve receiving, order consolidation and shipping efficiencies. These flexible solutions offer higher storage densities within reduced operational footprints and the flexibility to adapt to a variety of configurations.

High-speed AS/RS shuttle systems are ideally suited for replacing manual picking in high-volume operations. The modular design of racking and storage frameworks enable the addition of new levels and aisles to accommodate future growth in storage demand. Shuttle systems are typically designed with goods-to-person (GTP) and goods-to-robot (GTR) configurations to eliminate picking travel times and allow fewer labor resources to be more productive.

When full pallets are required for wholesale distribution, AS/RS unit load systems rely on one crane per aisle to pull pallets from storage racks and stage them for truck loading.

Robotics Integration

The increased integration of robotics is also helping DC managers alleviate growing e-commerce fulfillment pressures. [Robotics strategies](#) are focused on replacing undesirable, unsafe and repetitive manual tasks to free up available labor resources for more thoughtful, high-value roles. And in many cases, retailers are turning to robotics to drive productivity levels beyond human capabilities.

While the vision of a fully autonomous robotic fulfillment operation is far from being realized, recent advancements in robotics are helping to transform a multitude of critical workflows, processes and applications:

- [Sorter induction](#)
- Each, case and pallet picking
- [Palletizing and depalletizing](#)
- Case packing and unpacking
- Transportation of materials (pallets, goods, cartons)

These flexible robotic options can be adapted to benefit DC operations in a variety of ways:

- They can be activated or deactivated as needed to supplement manual resources and flex for peak seasons.
- They can be quickly reprogrammed for new routes and tasks.
- They can be orchestrated into a variety of automated workflows with a modern warehouse execution system, such as Honeywell Intelligated's [Momentum™ WES](#).

In addition, modern robotics solutions operate using universal control platforms — such as the Honeywell Universal Robotics Controller (HURC) — allowing them to continually adapt to changing DC conditions via robot-to-robot, machine-learning technologies.

SMART SOFTWARE AND SIMULATION

As D&F operations become more automated and complex in order to keep pace with demand, the integration of advanced warehouse automation software is playing an increasingly important role. Historically speaking, warehouse software was designed to serve very specific functions, which ultimately has added to DC operational complexities. These problems can typically be traced to the presence of multiple software vendors for various automation systems and robotics platforms, which can result in disconnected islands of automation and a continual cycle of obsolescence and upgrade challenges.

Often, this traditional, multi-vendor approach to software makes full DC fulfillment system orchestration next to impossible. Today, retailers and DC operators need to rethink their software strategies and deploy smart warehouse automation software platforms designed to reduce complexities by:

- Unifying disparate automation systems
- Orchestrating all automation systems for full warehouse execution
- Simplifying software support and upgrade management

Modern warehouse automation software like Momentum is designed to provide a single, unified platform for enabling advanced automation in complex DC environments. Momentum gives DC managers the tools to:

- Leverage operational data for workflow optimization and business insights
- Apply machine learning for intelligent decision-making
- Align order release and processing with customer SLAs and priorities
- Maximize AS/RS storage and inventory availability
- Ensure labor productivity and utilization
- Orchestrate advanced AS/RS and robotics into DC workflows

WES systems are even beginning to assume upstream, inbound warehouse management system (WMS) processes and may potentially eliminate the need for separate WMS and WES systems.

BEGIN YOUR TRANSITION

Honeywell Intelligrated is providing the advanced technologies and integrated software to help retailers transition from traditional fulfillment workflows to fully integrated automation strategies. We're leveraging multiple AS/RS solutions, state-of-the-art robotics and our Momentum warehouse automation software to create robust, scalable and supportable technological infrastructures that lay a strong foundation for continuous growth.

Powered by a unified approach to software and advanced data science techniques, these tools can provide complete automation system orchestration while minimizing integration complexities. With decades of material handling industry expertise, we take a consultative approach to develop automation solutions that help forward-thinking companies solve their biggest fulfillment challenges and achieve rapid returns on their investments.

Wherever you are on the continuum of automation, we can help you achieve robust fulfillment capabilities today and accelerate your progress toward an ever-more automated future. ◀

SIMULATE WHAT'S NEXT

Among the cutting-edge features of modern WES software platforms include the capabilities to deliver extremely accurate projections of advanced automation and system performances — before, during and after implementation — with simulation, emulation and digital twin models.

Simulation benefits include the abilities to:

- Evaluate full system and individual robotic cell prototypes
- Test automation system interdependencies
- Validate and refine operations to improve layout and product flow
- Identify where AS/RS and robots will provide the greatest ROI
- Create a fully functional digital twin of a live fulfillment operation:
 - » Enable scenario-based testing and response planning
 - » Save time and money during the physical commissioning stage

TO KEEP YOUR WORKFORCE, EMPOWER THEM.

By dedicating robots to tedious tasks, your workforce can focus on higher-value functions. Working together, we help you to achieve more.
Learn how robots can empower your workforce and your operations.

THE FUTURE IS WHAT WE MAKE IT

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MICRO-FULFILLMENT STRATEGIES FOR THE FUTURE OF OMNICHANNEL RETAIL

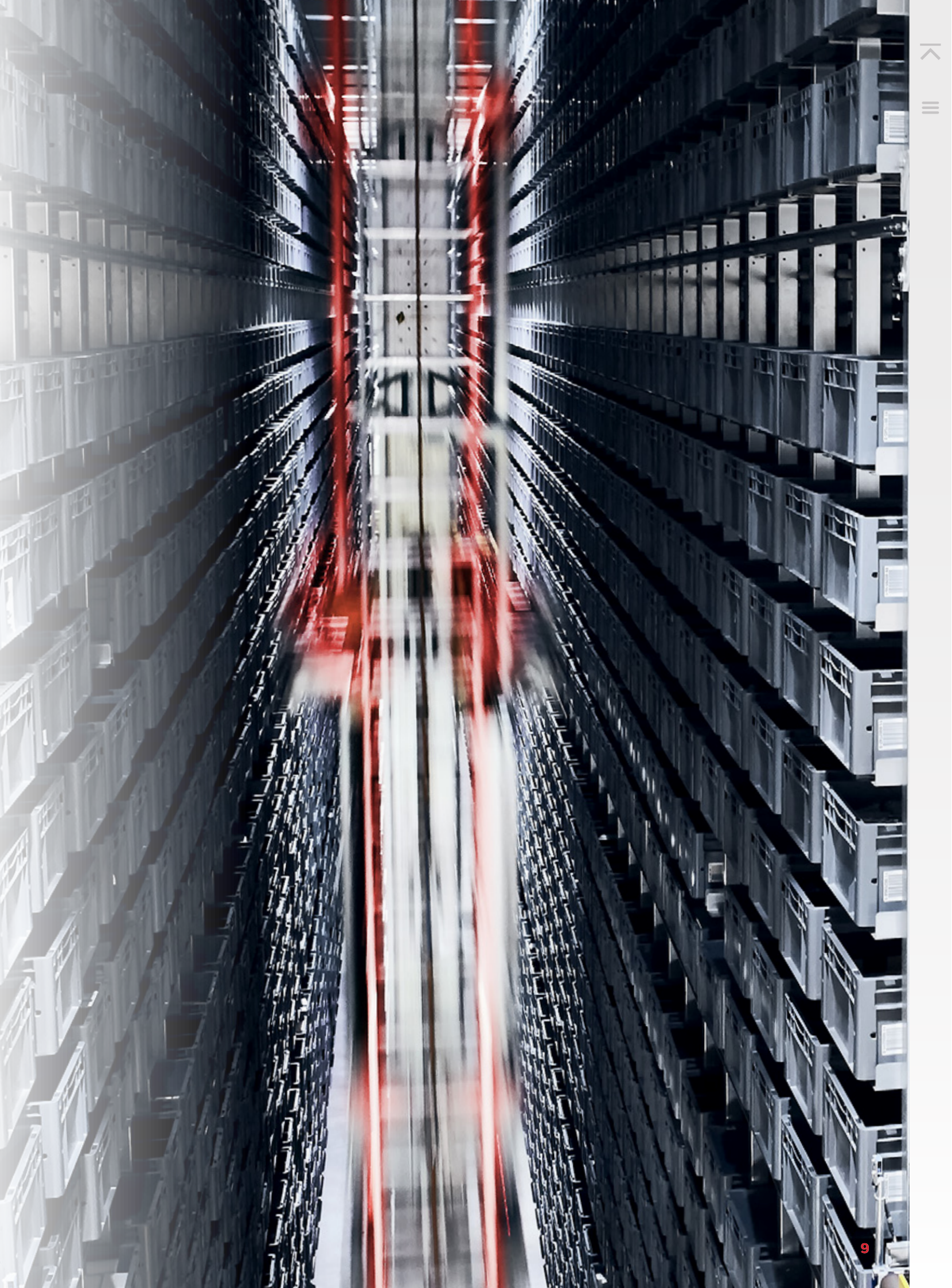
What's Driving the Emergence of Micro-Fulfillment Centers?

Companies in every sector of the retail landscape are facing unprecedented [e-commerce](#) and omnichannel fulfillment pressures. More consumers than ever are purchasing through online channels, with worldwide e-commerce now accounting for more than 14 percent of all retail sales, and predicted to reach 22 percent by 2023¹.

This not only dictates faster order fulfillment and delivery, but also the ability to support the growing consumer preference to buy online and pick up in store (aka BOPIS or “click-and-collect”) — not just the next day, but often within a few hours. For grocers and big-box retailers, the emergence of BOPIS service level agreements (SLAs) can present significant disruptions to both their in-store operations and profit margins.

Combined with escalating labor challenges, the scarcity of real estate and the need to digitize fulfillment and supply chain logistics, e-commerce pressures have created a perfect storm of market conditions for [micro-fulfillment \(MFC\) strategies](#) to emerge. Key drivers include:

- **Customer demand for faster delivery** — Demanding SLAs for next-day and even same-day delivery are dictating the need for improvements to last-mile or last-hour delivery methods, such as moving inventory closer to consumers.



- **Increasing urbanization** — A growing percentage of the world's population lives in urban areas. Smaller facilities close to these high-population centers significantly improve last-mile (or last-hour) delivery. Brick-and-mortar retailers can also leverage existing stores.
- **Lack of warehouse space in urban areas** — Opportunities for new facilities are limited, especially in densely populated urban areas. In these hypercompetitive markets, automation fulfillment solutions that can be deployed within smaller spaces offer ever-increasing advantages.
- **SKU proliferation** — Unprecedented expansion of product diversity magnifies fulfillment complexities. Grocery retailers have the added challenges of managing dry goods, refrigerated and frozen inventories.
- **Labor challenges** — High turnover rates, staff shortages and rising minimum wages remain the leading drivers for the acceleration of automated fulfillment processes.
- **In-store fulfillment challenges** — Fulfilling BOPIS orders has proved problematic and unprofitable for grocers and big-box retailers alike. Many are quickly realizing that using traditional in-store inventory for online order fulfillment is not a sustainable long-term strategy.

MICRO-FULFILLMENT CENTERS — A NEW APPROACH TO DISTRIBUTION

In a micro-fulfillment center model, retailers can expand their capabilities relatively quickly by leveraging existing distribution hubs while implementing high-density automation technologies in urban facilities and retail stores. MFCs are also ideally suited to capitalize on the unique challenges confronting today's retail sector. Here are three reasons why:

Small Physical Footprint

Compared to traditional automated distribution and fulfillment (D&F) centers, which typically range from 200,000 to one million square feet or more, MFCs typically occupy spaces less than 20,000 sq. ft. This compact footprint offers the flexibility to be located within a small, stand-alone facility or integrated with (or bolted onto) a retail store.

EVOLVING RETAIL SEGMENTS DRIVE FULFILLMENT TRENDS

The quickly evolving retail landscape is disrupting traditional brick-and-mortar outlets and dictating new approaches to meeting consumer demands. Here are a few of the key trends that are reshaping the retail landscape:

1. **E-commerce in food retail** — Amazon's acquisition of Whole Foods in 2017 permanently reshaped the [food retail landscape](#). To maintain market share, many leading grocers, thrust into unfamiliar waters, were not equipped to meet the demand for online fulfillment. Since then, grocers have made inroads but still are working to develop cost-effective and efficient click-and-collect and home delivery fulfillment models. Online sales are expected to increase from 2 percent in 2019 to 15–20 percent of all grocery sales by 2023².
2. **Hub-and-spoke fulfillment model** — The unrelenting growth of e-commerce and increasing delivery expectations are dictating significant improvements to last-mile (or last-hour) logistics capabilities. This shift, disrupting traditional logistics strategies, is resulting in the emergence of hub-and-spoke distribution models. The approach relies on large regional hubs and strategically distributed spokes with smaller facilities located near population centers.
3. **Flexible, timely implementation** — The ability to respond quickly to dynamic market demands has become a true strategic differentiator for retailers. Extenuating circumstances — such as natural disasters and supply chain disruptions — can create unexpected surges in online demands. Retailers need flexible and scalable micro-fulfillment solutions that can be implemented quickly to meet unpredictable e-commerce demands.

Distributed Fulfillment Agility

An MFC approach supports a hub-and-spoke distribution model with a regional distribution center (DC) as the hub and multiple spokes located within proximity to urban population centers. This shortens the distance for last-mile or last-hour delivery, while supporting in-store pickup for retailers offering BOPIS fulfillment.

Flexible Automation Solutions

MFCs can maintain an inventory of 8,000–15,000 SKUs with the automated efficiencies to enable accurate, high-velocity fulfillment. Depending on specific fulfillment requirements — such as speed, SKU counts and throughput targets — solutions can range from partially to completely automated scenarios, with proportionate investments in automation and robotics equipment.

MFCs often benefit from supplemental inventory from an attached store or a regional fulfillment center hub. In addition, they can help to reduce the

cost of reverse logistics associated with returned goods by reducing return shipping costs. For some products, the time and costs for restocking returns can also be minimized.

EMERGING TECHNOLOGIES FOR MFC AUTOMATION

From [automated storage and retrieval systems \(AS/RS\)](#) to sophisticated warehouse automation equipment and robotics, D&F technologies have progressed rapidly in the past decade. Equipment manufacturers are leveraging technological advancements like these to innovate new MFC solutions.

AS/RS Goods-to-Person (GTP) Shuttle

This solution utilizes proven AS/RS shuttle systems but on a much smaller scale. The shuttle retrieves goods from one or more aisles of high-velocity inventory — such as dry goods and refrigerated items — and delivers items directly to an operator station for picking and order consolidation. The goal would be to stock the majority of the SKUs in the MFC and allow the remainder of inventory to be picked off the store shelves or other nearby pick locations, including those in a freezer.

In a typical food retail scenario, a bolt-on MFC would handle 600–2,500 totes per hour, depending on scale. Completed orders could be loaded for delivery to consumers or placed in a refrigerated locker for in-store pickup.

Enhanced Robotic Integration

Advanced MFC systems aim to minimize reliance on manual labor and maximize fulfillment accuracy and productivity. Storage systems can be equipped with mobile robots in a goods-to-robot (GTR) configuration and even have the potential to integrate robotic arm and artificial intelligence (AI) technologies for picking.

With this approach, systems like AS/RS shuttles are still responsible for storage and retrieval, with the addition of [mobile robots](#) integrated into the decanting, consolidation and picking processes. But instead of manual labor, mobile robotics transport goods from the workstations on the floor — while robotic arms perform each picking at GTR workstations. These

powerful [robotic solutions](#) are capable of processing high volumes of data for faster decision-making and offer the flexibility to adapt to a full spectrum of process workflows.

PREPARE FOR THE FUTURE OF MICRO-FULFILLMENT

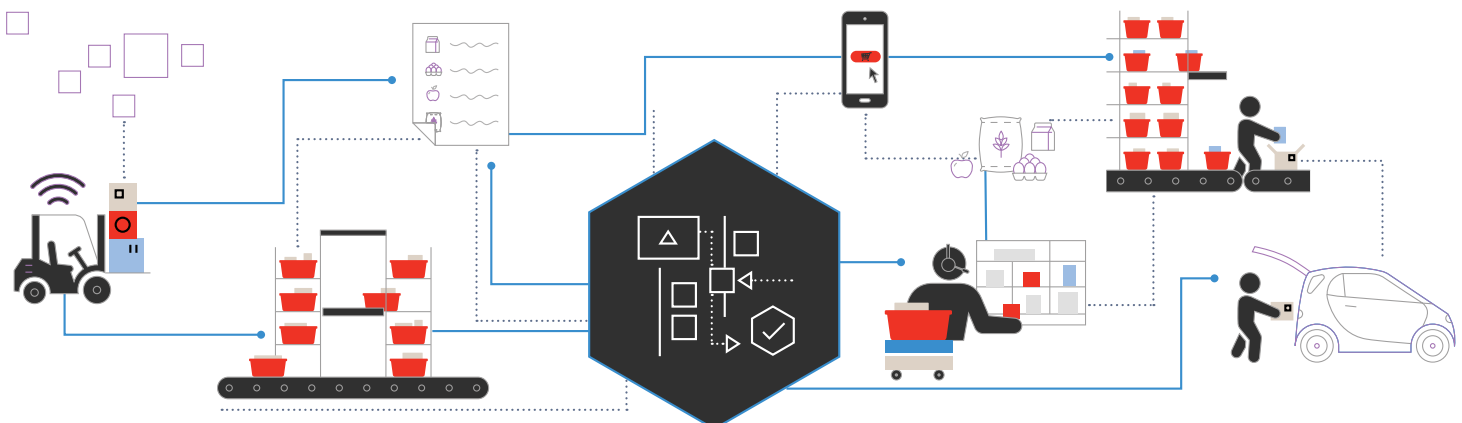
Rapidly evolving market conditions are dictating innovative, flexible and automated approaches to e-fulfillment — both in traditional DCs and in emerging micro-fulfillment strategies.

As retailers brace for ever-increasing fulfillment demands, their abilities to meet next- and same-day deliveries (or in-store pickup) expectations will be the key to survival in this hypercompetitive marketplace. Those retail leaders who are already adopting micro-fulfillment strategies are gaining a first-mover advantage.

Warehouse automation solution providers like Honeywell Intelligated are combining robust automation equipment and robotics with advanced execution software to meet the demands for micro-fulfillment across the retail spectrum. Today, our relentless pursuit of innovation is enabling leading retailers to establish stand-alone MFCs or micro-fulfillment strategies within their retail stores. <

FOOTNOTES

1. <https://ecommerceguide.com/ecommerce-statistics>, accessed on 10/5/2020. Note that this website is updated monthly, so statistics quoted are subject to change.
2. <https://www.forbes.com/sites/brittainladd/2019/02/01/crossing-the-rubicon-why-2018-was-the-point-of-no-return-for-online-grocery/#269d02834467>.



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KEEP WORKERS SAFER

AND MORE PRODUCTIVE WITH
VOICE-GUIDED WORKFLOWS.



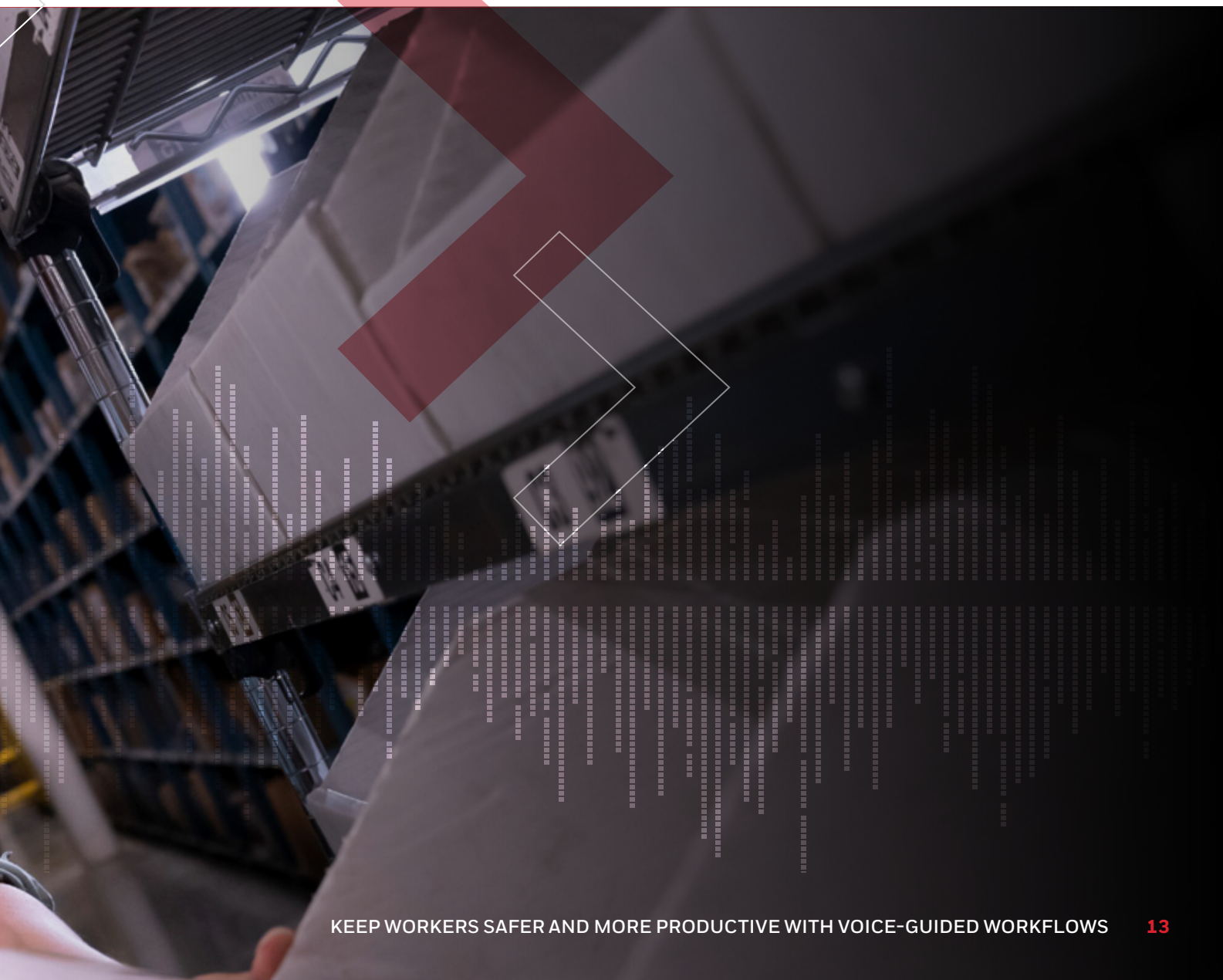
It's old news that COVID-19 disrupted supply chains, reduced in-store inventory availability, and made consumers skittish about shopping in brick-and-mortar retail outlets. Likewise, the resulting spike in online sales has been well documented. Yet, although inventory availability has stabilized across most categories, the transformation in consumer buying habits will likely persist as retailers selling goods of all kinds around the world are experiencing similar seismic marketplace shifts.

In an effort to keep up with the demands of increased online shopping, businesses have hired more personnel and invested heavily in equipment. But the costs associated with enhancing employee and customer safety are not expected to shrink anytime soon. Instead, business practices and governmental

regulations will likely continue to establish (or extend) social distancing boundaries and require more hygiene practices and personal protective equipment (PPE), such as N95 masks, safety eyewear and protective gloves.

As retailers adapt to a rapidly changing landscape and prepare for an uncertain future, they will need to utilize all the available tools, technologies and fulfillment strategies they can to enhance the safety and well-being of their workforce — and customers — while increasing employee productivity and accuracy. For those reasons, operations should consider voice-guided workflows to establish a seamless omnichannel experience for customers, whether they prefer direct-to-consumer delivery or click-and-collect fulfillment.

Regardless of the operation's size or type — including small, mid-sized or large distribution centers (DCs) and retail stores — [Honeywell Voice technology](#) streamlines these workflows, moving workers safely and efficiently. It makes their jobs easier and enables them to operate more productively, accurately and profitably — all while following new workplace safety and sanitation protocols.



FOUNDATIONS OF FULFILLMENT PRODUCTIVITY AND SAFETY

Voice technologies, such as Honeywell Voice software and mobile devices, have been a mainstay of distribution and order fulfillment operations for decades. Whether deployed in a store or a DC, they give employees clear, verbal directions that instruct them to perform a task — such as where to find a pick location and how many items to select from that position to fill a specific order. Once the task is complete, the employee speaks a confirmation into a microphone built into their headset. As a result, errors can be reduced by up to 50 percent.

In an era when touchless technologies are preferred, voice-guided workflows also eliminate handling paper and scanners so employees can stay safer and more focused on their work. By freeing up their eyes and hands, employees are much more aware of obstacles and trip hazards while walking around a DC or store. As a result, incidents can be reduced by as much as 20 percent. Further, voice-directed, hands-free associates are up to 35 percent more productive than those following paper pick lists or using hand-held devices.

Additionally, the wireless, mobile devices integrated with Honeywell Voice are powered by software capable of detecting and understanding spoken commands in more than 40 languages — even when uttered from behind a face mask. This enables the rapid training of a diverse workforce, including temporary employees and non-native speakers. Further, intuitive, voice-guided instruction cuts new employee training time in half, allowing new hires to begin working at much higher productivity and accuracy levels, all while wearing the appropriate PPE.

HOW VOICE ENHANCES OPERATIONAL SAFETY PROTOCOLS

Working seamlessly in conjunction with PPE, voice technology can help strengthen safety protocols for social distancing and sanitation on the job, whether employees are working in-store or on a DC floor. Honeywell Voice's proprietary TouchConnect™ technology automatically pairs headsets and terminals to minimize handling. This lessens health risks associated with cross-contamination and reduces shift start-up procedures from minutes to seconds.

Further, there are a variety of recommended best practices for the use and cleaning of Honeywell Voice mobile devices to help businesses enhance the safety and hygiene of employees. These include:

- **Assign and Replace Individual Consumables.** Consumable components — specifically the individual headbands and protective windscreen that shields the microphone on the SRX3 wireless headset — should be assigned to each individual worker and replaced at designated intervals. These can be removed from the SRX3 wireless headset and reattached at the start of each new shift. This is particularly critical to ensure proper hygiene in situations where the A700x body-worn terminals, Android devices and the snap-in radios on the SRX3 headset are shared among multiple employees.
- **Provide Individual Device Assignments.** To minimize the potential for cross-contamination, assign wearable units — including the [SRX3 wireless headset](#) and [A700x](#) body-worn computer and Android devices — to individual users (instead of shared among multiple personnel). If it is not possible to provide individual headsets and computer terminals to each employee, sanitization and cleaning protocols should be established and followed prior to every device transfer.
- **Cleaning Protocols.** Train employees on how to properly sanitize and clean shared devices before and/or after use. Equipment cleaning should be performed with a solution of 70 percent isopropyl alcohol and 30 percent water or a pre-moistened alcohol wipe. To ensure consistent adherence to these procedures, dedicated personnel can be assigned the tasks of receiving returned devices and cleaning them prior to placing them back into service for associates on the next shift to use. In addition, Honeywell Voice can be programmed to provide cleaning instructions at user-defined intervals.
- **Check-out/Check-in Procedures.** Establish processes for device receipt and return at the start and end of each shift in order to create and document a chain of custody for device tracking. This allows for the integration of proper cleaning procedures and contact tracing of used devices, should the need arise.
- **Training on Use of Voice Technology With PPE.** All employees should be trained on the aforementioned best practices, as well as on how to operate the device while wearing PPE such as gloves or masks that shield the nose and mouth. Additionally, demonstrate

to employees that their responses spoken into the microphone will not be diminished or hindered by wearing a mask.

• **Install Vehicle Mounts for Terminals.**

Honeywell Voice devices can be optionally mounted to a forklift or another vehicle instead of worn on the body, while still maintaining employee connectivity via wireless Bluetooth® headsets. This can reduce the risk of potential cross-contamination in a shared-device environment.

NEW VOICE CAPABILITIES: SOCIAL DISTANCING AND CONTACT TRACING

Requirements for social distancing and other health measures implemented during the pandemic are expected to remain for some time. To help associates and their employers quickly determine if they are maintaining the social distancing parameters established by the operation, the Honeywell Voice A700x series' onboard Wi-Fi/Bluetooth connectivity capabilities can track a wearer's proximity to others. To verify appropriate spacing, associates speak a "check distancing" command and receive an "all clear" announcement when distancing has been maintained. If one or more other associates

Facilities using Honeywell Operational Intelligence software –

a remote asset management platform that helps DCs keep their mobile-equipped employees productive – can employ new health crisis response functions to further meet local site health and safety compliance requirements. Among these features are:

- **Asset Check-out/Check-in.** Assign unique devices or assets to specific users, creating a chain of custody that allows for device tracing data.
- **Device Cleaning Manager.** Set up configurable cleaning protocols for each asset scheduled on an hourly, daily or in-between shift basis. Each cleaning event is logged with the user, time and date for reporting.
- **Social Distance Proximity Detection.** Prioritize and monitor social distancing with a feature that detects the proximity between Honeywell device-enabled users and logs alerts if they get too close to each other.

have been too close, a verbal message directs them to step apart, and any transgressions are documented for analysis by third-party applications and further training as needed.

To learn more about how Honeywell Voice can help improve your operation's safety protocols, as well as its efficiency, productivity and profitability, please visit: www.honeywellaidc.com/voice. ◀

FOOTNOTE

1. The Bluetooth trademarks are owned by Bluetooth SIG, Inc. U.S.A. and licensed to Honeywell International Inc.

UPCOMING

EVENTS

| 2021 U.S. Shows | Location | Date |
|--|------------------|-------------|
| Automate Forward | Virtual | March 22–26 |
| ProMatDX | Virtual | April 12–16 |
| LINK Retail Supply Chain Conference (RILA) | Orlando, Fla. | Aug. 17–20 |
| Parcel Forum | Washington, D.C. | Sept. 14–16 |
| PACK EXPO Las Vegas | Las Vegas, Nev. | Sept. 27–29 |

| 2021 International Shows | Location | Date |
|--------------------------|--------------------|-------------|
| LogiMat | Stuttgart, Germany | June 22–24 |
| IntralogistEX | Coventry, U.K. | May 27–28 |
| IMHX | Birmingham, U.K. | Sept. 14–16 |
| CeMat Asia | Shanghai, China | Oct. 26–29 |

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PROTECT PEOPLE AND PROFITS WHILE THRIVING IN AN UNCERTAIN MARKET

For more than a decade, companies in the distribution and fulfillment (D&F) sector have been adapting to steady, predictable increases in the adoption of [e-commerce](#) business models. Many of these companies had also developed long-term plans to scale up their technological investments incrementally to match anticipated online demand. But with the onset of the coronavirus pandemic, many of these well-laid plans have been turned on their head.

Seemingly overnight, D&F operations experienced significant operational disruptions and an unexpected spike in e-commerce orders — accelerating to rates not previously anticipated for several years. Simultaneously, health concerns brought heightened scrutiny to operational safety and the imperative to protect employee well-being and confidence. As a result, distribution center (DC) managers across the retail spectrum have implemented new protocols, practices and processes to simultaneously enhance workplace safety and adapt to high order volumes.

The combination of demand spikes and [new workplace safety requirements](#) created a perfect storm of D&F challenges. Retailers and critical supply chain companies that were considered essential businesses quickly discovered the complexities of this rapidly changing D&F landscape. Many soon realized that they were unprepared to manage the influx of consistently high order volumes while addressing emerging safety considerations within DC environments.

But necessity is the mother of invention. Many retail and supply chain leaders have quickly adapted by creating operational strategies that other retailers can adopt to improve their abilities to survive — and thrive — in this uncertain and demanding market.

PROTECTING PEOPLE AND PLACES

The most critical priority for any D&F operation is to protect their essential workers and take the necessary steps to promote a safer working environment. An illness outbreak in a facility could have devastating impacts to both human life and operational continuity. From the moment workers enter a facility to the time they complete their shifts, DC managers can implement a variety of technologies to help them enhance workplace safety and maintain worker confidence.

Contact-less Building Access

Non-intrusive facial recognition and thermal scanning technologies allow workers to gain hands-free building access while enabling operators to detect elevated body temperatures of employees reporting for work. The Honeywell ThermoRebellion™ solution utilizes powerful artificial intelligence (AI) software to process individual pixels captured by its camera and quickly identify elevated skin temperatures.

Personal Protective Equipment (PPE)

Making PPE available for each DC worker is vital to meeting the Centers for Disease Control and Prevention's (CDC's) workplace safety guidelines and instilling confidence in your essential workforce. Honeywell offers a wide range of PPE, including customizable, individual-use PPE Safety Packs to encourage the use of masks, gloves and wipes in DC environments.

Mobile Device Tracking Integration

When equipped with smart software and device-tracking capabilities, commonly used scanners, printers and voice-directed systems can help DC managers implement new safety protocols, including:

- Compliance with social distancing
- Providing cleaning/hygiene instructions
- Device check-out/check-in management

Honeywell's suite of DC mobility devices and Honeywell Voice can be configured to perform these critical safety tasks by monitoring device proximity and issuing social distancing alerts. These proven tools also enable remote communication among team members and provide productivity enhancements.

Building Monitoring and Analytics

[Creating a healthier DC environment](#) improves the well-being, confidence and productivity of essential workers on the warehouse floor. DC operators need intelligent facility monitoring and analytics tools designed to help enhance various factors contributing to workplace safety — from clean air recirculation, ventilation and filtration to frictionless access and occupancy monitoring. Honeywell Healthy Buildings solutions and Honeywell Forge software provide workplace analytics that deliver visibility to facility trends, real-time safety alerts and data on worker procedure compliance.

DRIVING LABOR PRODUCTIVITY

Prior to the coronavirus pandemic, finding, training and retaining qualified labor were frequently cited as the single greatest collective challenge (and operational expense) for D&F companies. These resourcing challenges have only gotten worse in 2020, as increased competition for labor and rising wages present daily barriers to meeting throughput and profitability targets. As e-commerce adoption exceeds previous industry projections, DC managers need to leverage tools and technologies designed to drive productivity, keep pace with rising consumer demands, and address new safety protocols.

Labor Management Software

Maintaining a stable, productive workforce is essential for DC operational success. Modern [labor management software \(LMS\)](#) has become an indispensable tool for increasing productivity and safety, managing and measuring employee engagement, and retaining top-performing employees. An LMS helps DC managers build a culture of productivity while giving them the insights to make informed labor allocations based on order volume, available resources and customer service level agreement (SLA) priorities.

GoalPost® LMS from Honeywell Intelligrated allows DC managers to implement incentive-based performance programs designed to reinforce safety procedures while achieving productivity targets. Patented algorithms can detect behaviors that would indicate the potential for employee turnover, so DC managers can take action to retain top performers or proactively replace them.

Voice and Mobility Devices

Voice-directed systems, handheld scanners and printers have become integral mobility devices used in modern D&F operations. While these tools have provided productivity enhancements for decades, today they can also be leveraged to promote proper cleaning instructions, social distancing recommendations and device check-out/check-in tracking.

Honeywell's suite of productivity products and [Honeywell Voice](#) devices are designed with disinfectant-ready housings (DRHs), which utilize plastics capable of withstanding frequent cleaning with harsh disinfectants without compromising their lifespan. In addition, Honeywell Voice can be configured to provide periodic cleaning instructions (e.g., at the beginning/end of each shift).

Remote Maintenance and Training

Considering the CDC's social distancing recommendations, in-person maintenance assistance and workplace training may not always be viable options for many DC operations. However, modern augmented reality technologies, video-enablement tools and distance-learning modules can augment these critical functions and keep operations running at maximum capacity.

Honeywell Intelligrated offers [TechSight video-enablement services](#) and optional smart glasses to enable remote audio and video collaboration with experienced support experts who can provide step-by-step instructions and augmented reality overlays. In addition, the I-Campus distance-learning system allows key DC staff members to continue their career development at their own pace and access training courses that will allow them to excel at their jobs.

OPTIMIZING OPERATIONS

As more consumers embrace contact-less, online fulfillment options, companies across the retail spectrum face prolonged spikes in e-commerce order volumes and the added pressure to shorten fulfillment windows. In both DC and retail store environments, these emerging demands exposed weaknesses in companies' current e-fulfillment capabilities and introduced concerns about meeting ever-increasing SLAs.

At the same time, DC and retail store managers were tasked with implementing comprehensive facility and enterprise-wide workplace safety measures aimed at improving worker (and customer) confidence and well-being. Market leaders are seeking new tools to manage these intensifying challenges and better optimize operations for future success. These companies are evaluating advanced automation technologies and software to improve fulfillment capabilities, increase productivity, and enhance safety in an uncertain marketplace.

Robotics Integration

In today's labor market, retailers are finding it more difficult than ever to fill undesirable and potentially unsafe jobs, such as repetitive picking, packing and palletizing tasks. It is also becoming more evident that DC throughput and productivity expectations are outpacing the limitations of manual labor. Preparing for inevitable increases in future demand will require augmenting the labor force with [robotics technology](#) and automated workflows.

Robotics can be integrated into a variety of DC processes to reduce the reliance on manual labor to drive both productivity and safety. From [palletizing/depalletizing](#) and articulated arm picking to [autonomous mobile robots \(AMRs\)](#) and automated guided vehicles (AGVs), Honeywell has robotics solutions to augment and automate a wide variety of traditionally manual workflows.

Voice-enabled Devices and Analytics Software

For decades, voice technology has been used in DC environments to boost productivity and accuracy while making fulfillment operations more efficient. Combined with analytics-driven insights, this flexible solution can now serve the



safety and productivity needs of modern D&F requirements. Honeywell Voice provides advanced data collection, automated documentation and analytics capabilities that allow DC managers to optimize workforce productivity while reinforcing compliance with new safety protocols. By assigning unique devices or assets to specific users, DC managers can utilize [Honeywell Voice](#) software to create a chain of custody that enables device and/or contact tracing data, should the need arise.

ALL THE ROOM FOR GROWTH WITHOUT THE GROWING PAINS.

Growth doesn't have to be painful. With smart warehouse automation software, your operations are free to grow wherever your business takes you.

Learn how to prepare for growth.

THE
FUTURE
IS
WHAT
WE
MAKE IT

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Micro-fulfillment Center (MFC) Strategies

[Micro-fulfillment center strategies](#) are rapidly emerging to help retailers shorten the distance between traditional fulfillment centers and their customers. These highly automated, higher-density, small-footprint MFCs can be utilized in stand-alone facilities, installed in dark stores or warehouses, or deployed within existing retail stores to address in-store, e-fulfillment models like click-and-collect or direct-to-consumer delivery. Honeywell Intelligrated combines robust automation equipment, robotics and advanced warehouse execution software to help retailers deploy micro-fulfillment strategies all across the retail spectrum.

DC Monitoring, Control and Visibility

Considering the confluence of concerns related to employee safety and fulfillment productivity, every DC operator needs the ability to monitor every aspect of their facility, its people and key assets in real time, including:

- Environmental climate quality control and building ventilation
- Flow of people and awareness of facility occupants
- Management of safety, security and building management systems
- Smart control of access, intrusion and incident response

Honeywell Building solutions, powered by Honeywell Forge analytics software, give DC operators a centralized dashboard view of key facility metrics while enabling autonomous building automation and control. This solution also provides access controls for monitoring and recording the movement of devices and the potential for mobility device tracking throughout the facility.

Data-driven Insights Into Asset Performance

Historically, the D&F sector has been slow to recognize the importance of operational data for driving continuous DC performance improvements, increasing system reliability, and transitioning to predictive maintenance programs. But in today's environment, many DC operations are accelerating their digital transformations by implementing connected, internet of things (IoT) infrastructures and leveraging the wealth of operational data found in equipment control systems.

[Connected Assets](#) from Honeywell Intelligrated is designed to help DC operators transition to a data-driven paradigm by giving them access to actionable insights pertaining to asset condition and/or related processes. The system notifies stakeholders of any issues that could potentially impact operations; provides trend analysis that could predict and prevent unplanned downtime; and uncovers opportunities to drive higher asset utilization and associated system productivity levels.

Intelligent Warehouse Execution

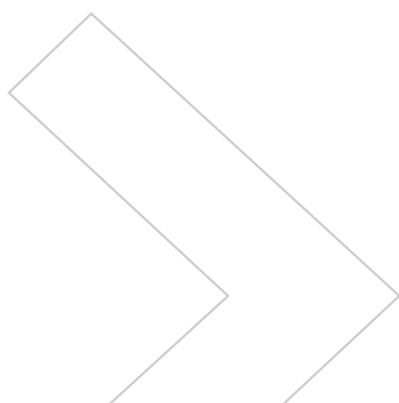
As order fulfillment cycle times continue to shrink, DC managers need warehouse execution systems (WES) and automation software capable of orchestrating nearly every aspect of the order fulfillment lifecycle — from disparate automation systems and integrated processes to labor management, workload balancing and real-time decision-making.

[Momentum™ WES](#) from Honeywell Intelligrated is equipped with advanced data science capabilities — such as machine-learning algorithms and artificial intelligence — to factor in all variables and give DC managers the decision intelligence to oversee various order priorities and address dynamic fulfillment demands. Whether you need to integrate a robotics cell, add an automated storage and retrieval system (AS/RS), or deploy a new micro-fulfillment center, Momentum is designed to provide a single, unified platform for enabling advanced automation in complex DC environments.

PREPARE FOR AN UNCERTAIN FUTURE.

Adapting to this rapidly changing landscape will require retailers to utilize all available tools, technologies and fulfillment strategies to help protect the safety and well-being of their workforce and maintain peak productivity levels. As a full-service technology provider with deep domain expertise and interdisciplinary solutions, Honeywell Intelligrated is uniquely equipped to help retailers build a foundation for success and prepare for an uncertain future.

We're ready to help you create a workplace where your employees can thrive and your operations can meet ever-increasing productivity targets — so you can move forward with the confidence knowing that you can adapt to whatever the future may bring. ◀

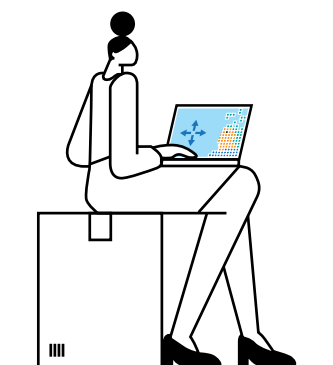


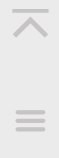
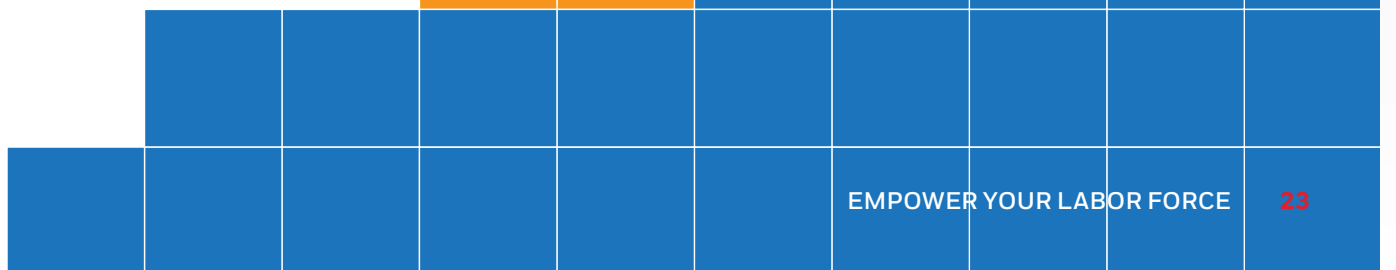
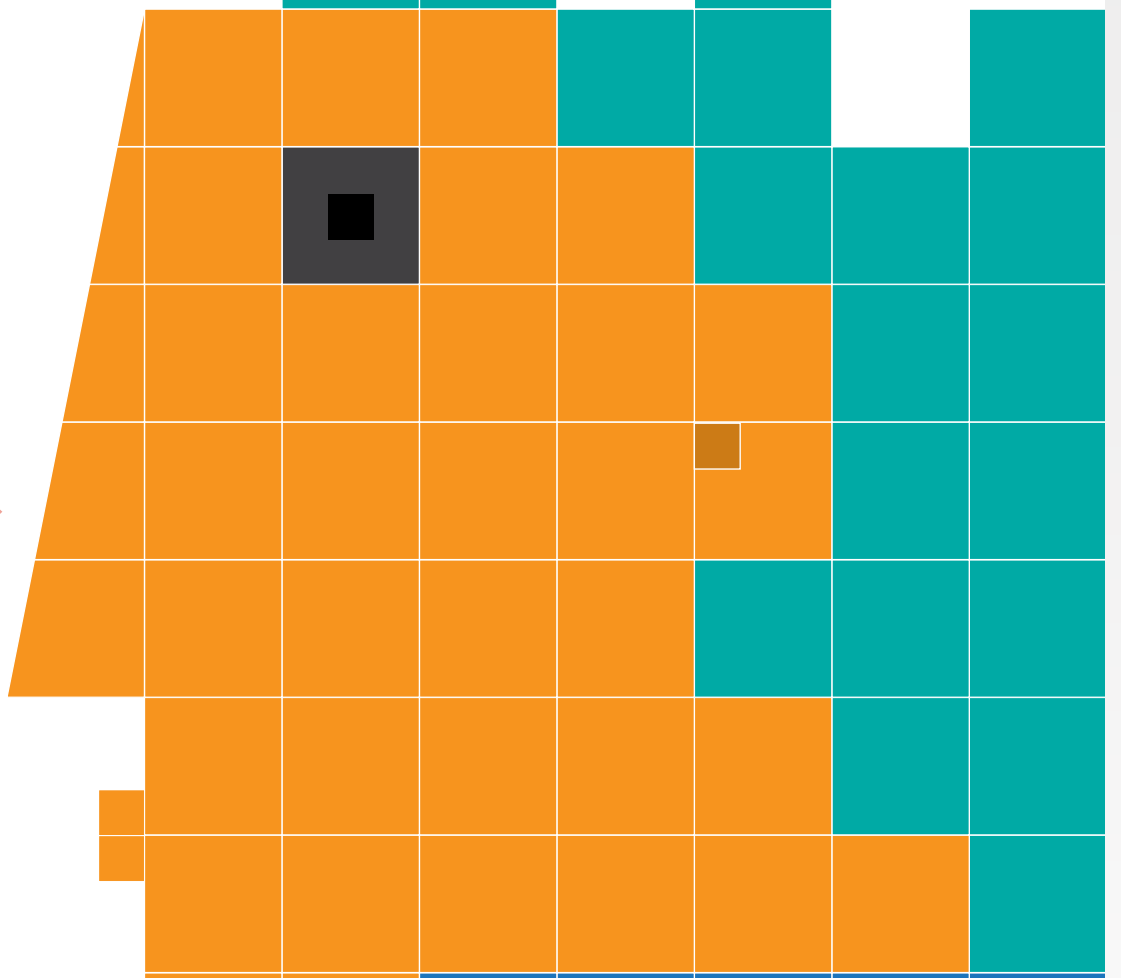
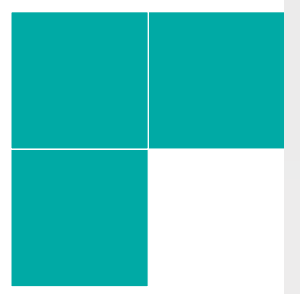
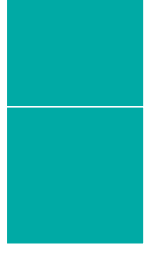
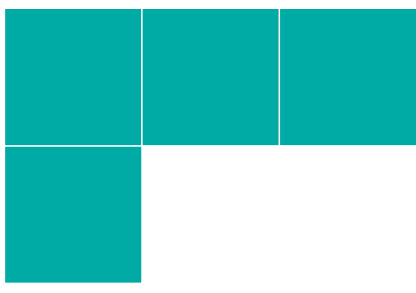
EMPOWER YOUR LABOR FORCE.

Build a Culture of Safety and Productivity With Labor Management Software Optimization

If we've learned anything from the unexpected events of 2020, it's that the concept of "business as usual" no longer applies to distribution and fulfillment (D&F) operations. Before the onset of the global pandemic in March, the inability to attract and retain a qualified hourly workforce was often cited as the leading collective challenge facing distribution center (DC) operators. These resourcing issues became even more acute after March, as competition for available labor increased exponentially with the inevitable spikes in e-commerce adoption.

At the same time, many companies suddenly found themselves running their DCs in a perpetual state of peak productivity — a scenario previously reserved only for seasonal fulfillment demands — which typically requires overstaffing by as much as 20 percent to keep pace. And with the threat of rolling employee outages due to illness outbreaks, DC operators also faced implementing new workplace best practices and safety protocols to mitigate potential risks to workers' health and limit productivity disruptions.





LABOR TRENDS AND PANDEMIC IMPACTS

Prior to the onset of the global coronavirus pandemic, labor represented the greatest challenges and costs to DC operations.



20% Overstaffing During Peak Times

Research shows that **labor** accounts for **50-60%** of all distribution center costs



Inability to Attract and Retain Qualified Hourly Workforce

55% of respondents cite as a major industry issue



Aging Workforce

Decreased productivity, decreased stability



Turnover Rates in DCs

20-40%



Competition for Labor: In March 2020

Amazon announced plan to hire **175,000 new workers**
Instacart announced plan to hire **300,000 new workers**



Costs per New Hire

\$4,425 plus OT and temporary staffing costs

As the D&F industry navigates this pandemic-driven reality, labor challenges have taken on greater urgency. New labor considerations include the needs to:



Operate at continuous peak levels



Keep employees engaged, safe and productive



Avoid productivity disruptions due to rolling illness outages

PIVOTING FROM PRODUCTIVITY TO SAFETY

[Labor management software \(LMS\)](#) platforms have a long history of driving labor productivity and providing necessary workforce cost control in D&F operations. LMS delivers labor cost optimization, visibility and predictive planning by incentivizing employee engagement, lowering attrition rates, shortening fulfillment time frames, and reducing direct labor spend. With respect to emerging 2020 labor challenges, LMS has also proven effective in expanding its role to address employee safety and well-being concerns.

To sustain the productivity levels needed to meet current demands, DC managers must empower their workforce with the confidence of knowing that their workplace is as safe as possible. But building a culture of safety also requires implementing new safety policies, understanding their impacts on productivity, and managing the various exceptions that may arise.

An LMS can help DC managers address these new world safety challenges by leveraging three fundamental capabilities that have been traditionally focused on productivity:

influencing employee behaviors, tracking results, and driving employee engagement. Let's examine each of these strategies more closely.

Influencing Employee Behaviors

The effectiveness of monetary incentives for driving productivity are well-known. The most common example is when an employee strives to meet a performance benchmark to earn an additional bonus to their hourly salary. An LMS can be leveraged to also drive other key performance indicators (KPIs) by factoring in additional variables in the bonus calculation, such as picking accuracy rates. Thus, if an employee meets their productivity target but has accuracy issues, then their bonus calculation may be reduced by a certain percentage.

Considering the present focus on [safety protocols](#), DC managers can also use their LMS to layer on other performance factors related to enhancing employee wellness. For example, these factors could be tied specifically to user-defined safety infractions, such as: insufficient distance between pick locations; not allowing enough time between shift transitions; or improper use of personal protective equipment (PPE), such as masks, gloves or safety glasses. As these infractions accumulate, an individual worker's bonus may be reduced proportionately or potentially removed altogether.

The underlying benefit of incentivization is clear: the specific employee behaviors a DC manager wants to reinforce can be tied to an incentive calculation or performance improvement program. LMS provides a framework for driving a variety of KPIs and assigning variables that help determine bonus calculations. Over time, these incentives can

help to engrain desired behaviors into the workplace culture, providing a self-regulating mechanism for continuous productivity and safety improvements.

Tracking Results

Peter Drucker — who is widely considered the father of modern management strategies — is often quoted as saying: “You can’t manage what you don’t measure.” An LMS is designed with this principle in mind. Modern LMS platforms are based on engineered standards that provide a performance baseline upon which DC managers can monitor and measure KPIs and become better equipped to make informed management decisions.

Today, we know that workers must incorporate a variety of safety protocols into their standard processes that could potentially detract from their productivity targets. With an LMS, DC managers can make adjustments which account for these emerging factors to ensure that both productivity and safety levels are being met — such as scheduling additional personnel or allowing more time to complete specific tasks. Simply put, engineered standards help DC managers understand the impacts of safety protocols on individual performances, while giving employees performance goals that are realistic and achievable.

LMS performance data also helps DC managers achieve an ideal balance of resources and safety precautions. One strategy may be to adapt traditional work schedules by staggering additional, smaller shifts with resources that have performance profiles which are most favorably suited for each shift. Essentially, an LMS gives managers the insights to staff each shift with the proficiency and skill levels needed to meet anticipated demand expectations — all while ensuring that workers can comply with requisite safety protocols.

Resource planning is another key management function that has become even more critical in today’s uncertain environment. Using an LMS, DC managers can proactively develop staffing models that address the potential for labor outages and make contingency plans for a variety of scenarios. While it may be impossible to plan for every uncertainty, LMS can help DC managers better predict, prepare and understand the impacts of different staffing models.

In the event of an illness outbreak, LMS can even serve as an alternative contact tracing data source. With the appropriate data connections between the mobile enablement technology and the host system, LMS is potentially capable of keeping a comprehensive record of individual movements and activities throughout a facility. While it may not replace a formal contact tracing system, it may serve as a first line of defense for DC managers trying to mitigate an outbreak.

Driving Employee Engagement

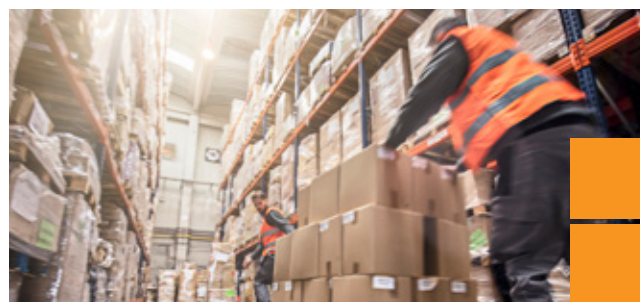
Contrary to the perception that LMS platforms can be detrimental to employee satisfaction, LMS ensures that employees are treated

fairly and given achievable performance expectations. With an LMS, employees understand that their performance ratings are based solely on their efforts. And when they put forth extra time or effort to exceed performance standards, they will be rewarded commensurately. Employees also know that LMS will account for the new safety requirements and adjust its performance evaluations accordingly.

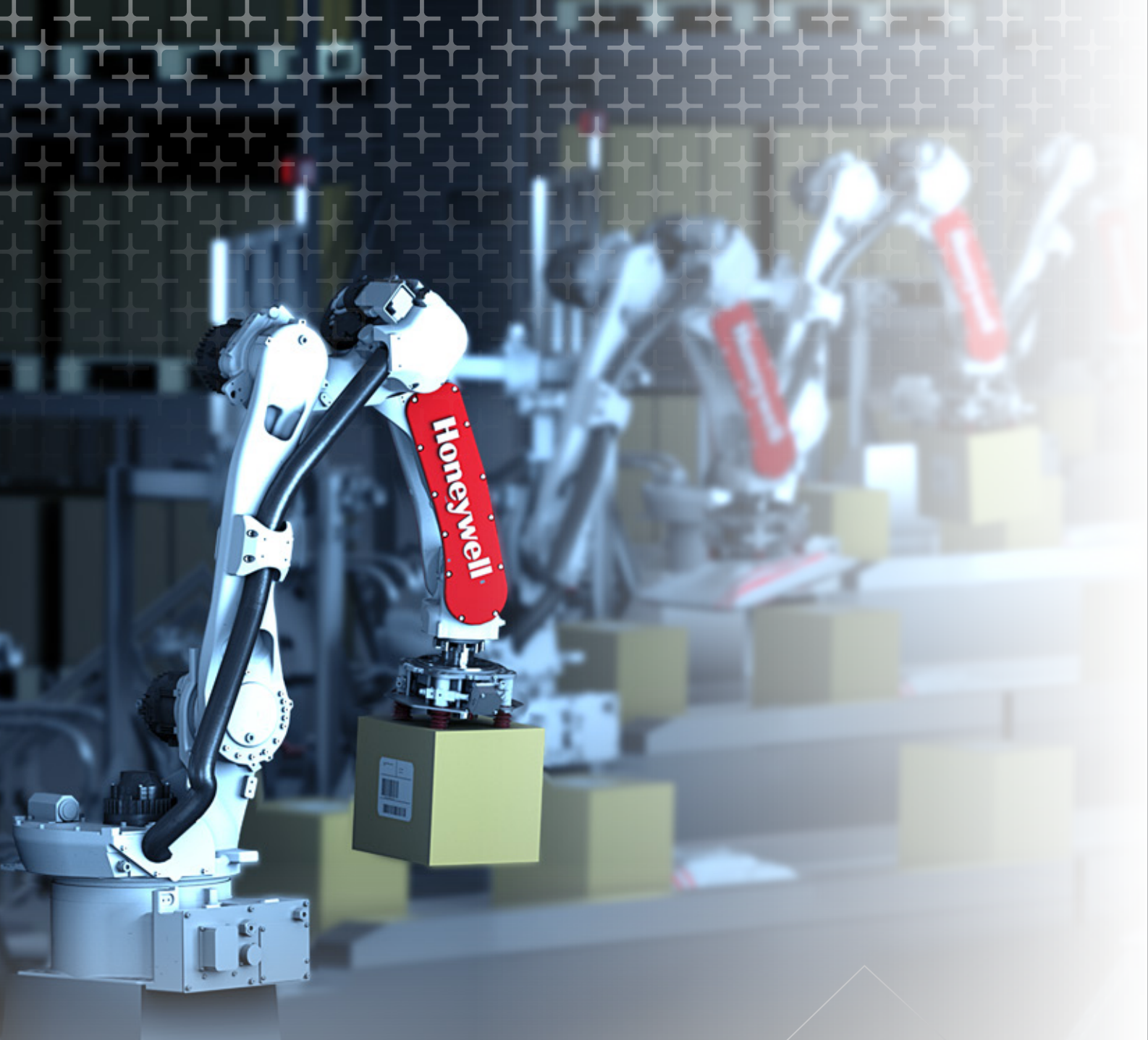
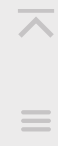
As a result, employees can work with the confidence of knowing that they are:

1. Achieving their bonus goals
2. Contributing to productivity and profitability
3. Helping to build a culture of safety

In addition, LMS can help DC managers discover when specific individuals are having difficulty meeting any of their performance targets or adapting to new safety measures. This allows them to quickly intervene and initiate coaching sessions that may help remove any barriers to employee productivity or safety. And by opening this dialogue and working through these challenges, they can identify opportunities to promote continuous performance improvements and drive engagement among all the employees.



A confident, healthy and empowered workforce is essential for creating a DC culture that is both productive and resilient to today’s market uncertainties. GoalPost® LMS by Honeywell Intelligrated is designed to achieve the benefits and incorporate all the best practices discussed herein. Our labor management experts are ready to show you how GoalPost LMS can help your DC operations maintain peak productivity levels while fostering a culture of engagement in which your employees can thrive today and in the future. ◀



THE BUSINESS CASE FOR

ROBOTICS IN DISTRIBUTION CENTERS

Market Forces and New Technologies Give Automated Distribution Centers the Edge

In the chaotic logistics environment that followed the outbreak of COVID-19, forward-looking distribution centers (DCs) with automation solutions in place enjoyed significant advantages. They could scale faster and respond to sudden market changes with greater flexibility. They also made the best possible use of scarce human labor, shifting workers where they were most needed and maintaining higher productivity.

These operations continue to thrive, despite rapidly changing conditions — proving the value of the latest next-generation logistics automation solutions. A confluence of innovative technologies is not only enabling unprecedented capability and performance, but making such systems significantly more integrated and cost-efficient than in the past.

MANUAL DCS CAN NO LONGER COMPETE

Around 80 percent of today’s DCs still lack automation for most jobs. Yet despite their mental and physical advantages, humans aren’t always the best choice for common DC tasks, which can be repetitive, tedious and even injury-prone. Productivity and safety also suffer when humans get bored or distracted.

What’s more, even though the number of available jobs is growing, the pool of qualified candidates isn’t keeping pace. Even before the pandemic dramatically increased the demand for workers, roughly 10,000 baby boomers were reaching retirement age every day — with fewer younger workers available to replace them. Unfortunately for DC operators, both trends are set to continue for more than a decade. And while virus-related unemployment in other sectors may temporarily increase the available labor pool in the short term, the problem is only going to get worse. DCs that want to remain competitive will need to act quickly as employment levels normalize.

Demand and other factors are driving up the cost of warehouse labor; turnover rates as high as 36 percent add even more costs. Replacement costs per worker can run from 25–150 percent of an employee’s salary, depending on which factors you calculate. Less tangible costs include a lack of continuity, covering for open positions and lost productivity. DCs also risk costly fines, charge-backs and lost contracts if they don’t have enough labor to meet service level agreements (SLAs).

And all these costs are adding up in a market that’s under more pressure to reduce costs than ever before.

MAXIMIZING PRODUCTIVITY

The runaway success of e-commerce has trained consumers to seek the lowest online prices — literally down to the penny. At the same time, COVID-19 has supercharged e-commerce demands for everything from groceries to prescription drugs.

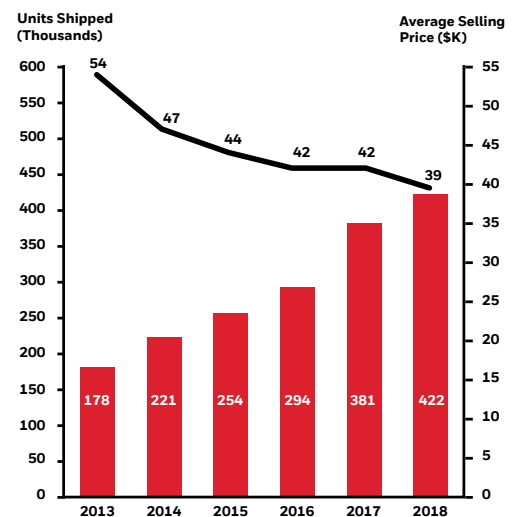
As a result, one-click comparison shopping has practically commoditized the entire retail industry. Customers now expect superior service at little or no cost, including fast (and free) shipping and returns.

ROBOTS TO THE RESCUE

In the past, high costs or complexity had made automation impractical in DCs. Today, however, two encouraging developments are changing the game.

First, costs are coming down. According to the International Robotics Federation, the average price of industrial robots fell by a compound annual growth rate of 6 percent between 2013–2018.

Second, DC automation is finally coming of age, thanks to significant advances in simulation, sensors, vision, mobility, computing power, machine learning, artificial intelligence (AI) and connectivity.



2013–2018

- Unit Shipments Increased by CAGR +19%
- ASP Decreased by CAGR -6%

2019–2022

- Unit Shipments Forecasted to Increase by CAGR +6%

SAMPLE USE CASES

Here are several real-world examples that demonstrate how [autonomous mobile robots \(AMRs\)](#) are already transforming leading DC operations:

Heavy Load or Pallet Transport

Whether you're managing cross-docking operations or transporting the discharge from a palletizer or wrapper, heavy loads are typically moved with forklifts. Labor scarcity makes this an inefficient use of workers, whose unique human advantages can be better applied toward more advanced needs.

Pallet conveyance AMRs offer a better solution. When a pallet is ready to be moved, fleet management software assigns the appropriate AMR to pick up the pallet load and orchestrates the routing of the pallet to the appropriate destination. The selected robot picks up the pallet, transporting it by autonomously navigating through the facility, and avoiding obstacles along the way. When the robot arrives at the designated location, it drops off the pallet load at the destination location station. The drop-off is reported to the manufacturing execution system (MES), [warehouse execution software \(WES\)](#) or an operator, and the robot receives its next assignment or instructions to return to a "home" position.

Processing Returns

Returned or refurbished items must be sorted and transported to various locations throughout a typical facility. Traditional fixed automation solutions like conveyors don't work well for these tasks, which involve extensive travel, complex routing and the inherent variability of reverse logistics. Refurbishment and recycling processes add further challenges because they require secondary and tertiary routing among multiple workstations.

With a [robotic solution](#), returned or refurbished items can be received and manually sorted into bins on AMR carts. Loaded carts are placed in a pick-up location for a workstation, where the operator scans a placard to signal the AMR fleet. A mobile robot delivers the cart

to the appropriate workstation, where the bins are manually removed for processing. Once the cart is empty, the operator positions it in an empty pick-up location and scans a return placard, informing the fleet management system that the cart is ready for re-use.

In more complex operations, a touch-screen interface enables the operator to select from a list of destinations for the cart as required by the returns process workflow.

Assisted Picking

Order pickers can spend half or more of their time manually transporting items between picking racks and pack-out stations. It's not unusual for workers to walk more than five miles a day.

Productivity can be streamlined dramatically by deploying AMRs in the same aisles as picking operators. Based on the orders that need to be fulfilled, AMRs are directed to the locations of the item(s) to be picked. An AMR's display indicates the item to pick and its location. Once the operator picks and scans the item, the AMR automatically drives to the next pick location while the operator moves on to the next robot.

Once a given AMR has all its picks, it is routed to a pack-out or a value-added service (VAS) cell for packing and shipping. There it is unloaded, and the pack-out operator indicates that the unit is ready to be redeployed. The fleet management software then generates a new picking order and sends the unit back to the picking aisles.

ROBOTS MEAN BUSINESS

Many [e-commerce trends](#) have been accelerated by events of 2020.

These changes are here to stay and are highlighting the entire industry's need to consider an expanded use of robotics. The key concern is not

to replace human workers, but to remain competitive in response to unprecedented market changes.

Recent events have demonstrated that automation is already becoming critical to achieving this goal and operations willing to embrace it are more likely to thrive. The examples detailed here illustrate just a few of the ways today's advanced automation solutions enable you to take advantage of the latest innovations in DC automation with minimal cost and technical risk. <





**TAKE YOUR
SYSTEM FROM
DC NOW TO
DC NEXT.**

What's your "next"? Smart robotics, end-to-end control, labor productivity? You can't know the future, but you can plan for it. **What's your next?**

THE FUTURE IS WHAT WE MAKE IT |

Honeywell
Intelligrated®

DC SIMULATION DELIVERS REAL-WORLD RESULTS.

How Simulation Reduces Risk and Commissioning Time While Optimizing Performance

Automation, robotics, control software, [warehouse execution systems \(WES\)](#), [labor management software \(LMS\)](#) and other innovations are becoming increasingly important – even essential – to addressing the growing demands of service level agreements (SLAs).

While many solutions are available, their sheer number and complexity make it difficult to determine the most efficient and cost-effective choices for every operation. And since new facilities or upgrades often have to be planned 12–18 months or more in advance, anticipating possible market shifts is critical.

In this environment, DC simulation and emulation are emerging as highly effective tools for minimizing risk, optimizing performance, and identifying growth opportunities. These technologies significantly reduce uncertainty by allowing multiple solutions to be tested, refined and validated before you buy and implement them. Real-world performance can be predicted with high accuracy, enabling you to determine which solution will best achieve your chosen benchmarks, how effectively your system will respond to disruptive changes, and how quickly you'll see return on investment (ROI). They can also enhance your operation over time by identifying potential process enhancements, validating alternative upgrades, and enabling you to make better-informed decisions.



VIRTUAL SOLUTIONS CREATE PROFITABLE REALITY.

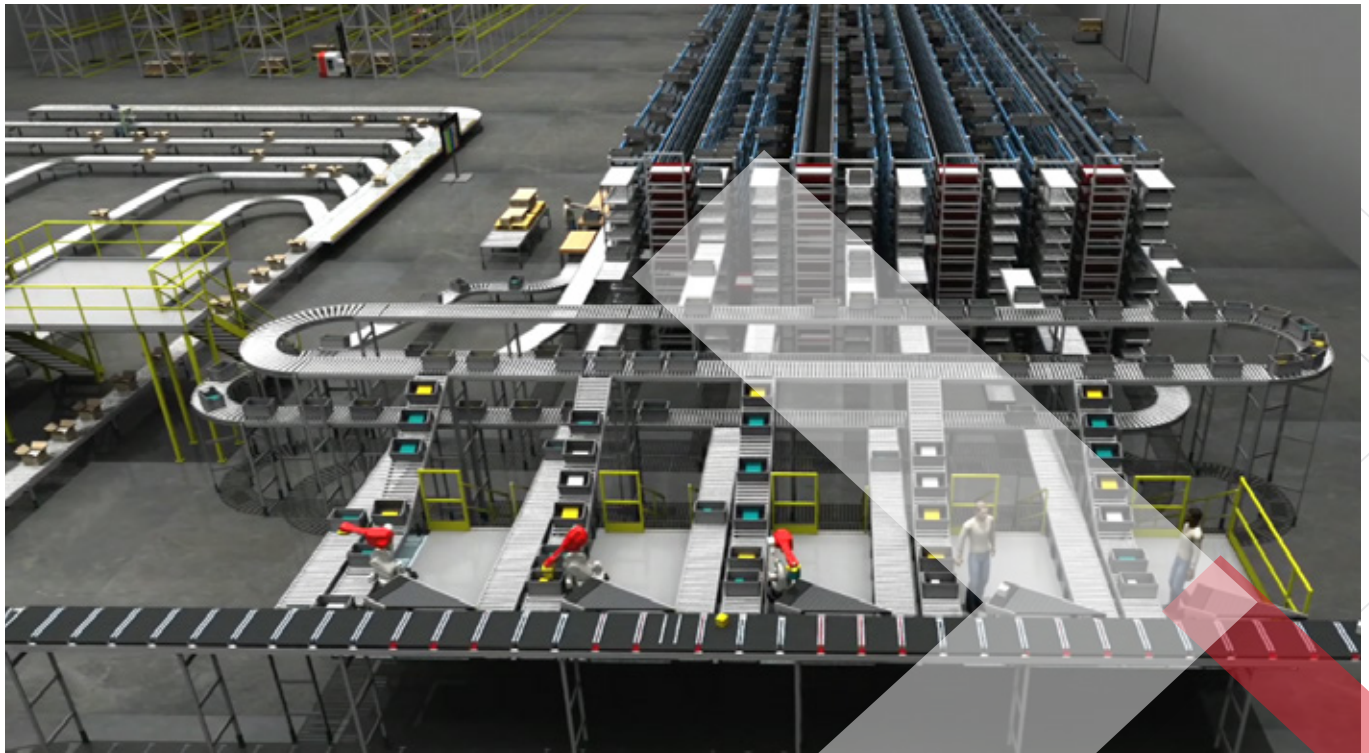
While [simulation](#) and [emulation](#) are related, these two terms refer to two different aspects of virtual performance optimization:

- **Simulation** approximates system behaviors and performance using a set of mathematical, logical, and physics-based inputs and assumptions, and then calculates the system's response. This allows dozens or even hundreds of possible scenarios to be tested in a very short amount of time. For example, the processing of millions of products passing through one or more DC areas could be simulated in one or two hours. In this way, the most efficient designs and processes for a specific site's needs can be identified before any physical equipment is ordered. Simulation can also be used to predict the growth potential of a new or existing DC.
- **Emulation**, a physics-based approximation, uses the actual machine control code or other software that will ultimately control conveying equipment. By precisely duplicating the responses of physical equipment, emulation enables software code to be validated much earlier in the lifecycle of a project, before on-site work begins. This can significantly streamline installation and commissioning. Emulation can also be used to test integration with intermediate WES software, ensuring that the entire design functions reliably when the system is switched over to real-world equipment.

These two approaches can be used to test everything from new mechanical systems to changes in operational conditions (such as staffing) to verify the effectiveness of proposed changes before implementation.

The advantages of these tools include, but are by no means limited to, the following:

- **Risk reduction and better-informed decisions** — You'll have a clear understanding of how systems will work, what quantifiable improvements they'll deliver, and when you'll achieve ROI.
- **Reduced commissioning time** — Possible bottlenecks or other challenges can be identified and proactively corrected ahead of time. Solution models can also show the impact each alternative will have on other processes. These results can establish a clear road map for the real-world version of the system, which speeds implementation and troubleshooting while reducing costs.
- **Digital visualization** — High-end graphic visualization shows exactly what the system will look like while operating, which can be a valuable asset when seeking stakeholder support.
- **Future-proofing and contingency planning** — Solution models can prepare your system for challenges before they occur, modeling the impact of peak seasons, changes in consumer buying patterns, equipment breakdowns, chance



events and other disruptions. You can also determine how much additional capacity your system can handle with a high degree of accuracy.

Simulation and emulation enable new DCs to be planned with maximum efficiency, predicting throughput rates, operational constraints and system sensitivities. Existing operations can use the same tools to evaluate changes to operational conditions or new mechanical systems.

SYSTEM-LEVEL SIMULATION

Using software and custom analytic tools, sophisticated development teams can simulate the functions and performance of an entire DC system. As part of this process, the design can be visualized in an animated virtual environment that models everything from automated equipment to human labor. In addition to providing a valuable tool for managing the complexities of overall system design, this virtual DC can be tested to see how it will respond to very specific challenges.

It is possible to model, for example, how the system would respond if one of its lines breaks down for an hour, or if a forklift runs out of battery power in a location that could disrupt throughput. Any significant challenges encountered by the simulation can be identified, enabling them to be corrected before implementation.

UNIT-LEVEL EMULATION

Unit-level emulations focus on a sub-system or single piece of equipment. While these calculations have more intensive requirements, they also deliver significantly higher levels of accuracy. This makes it possible to target specific benchmarks or challenges, or validate the throughput of new equipment.

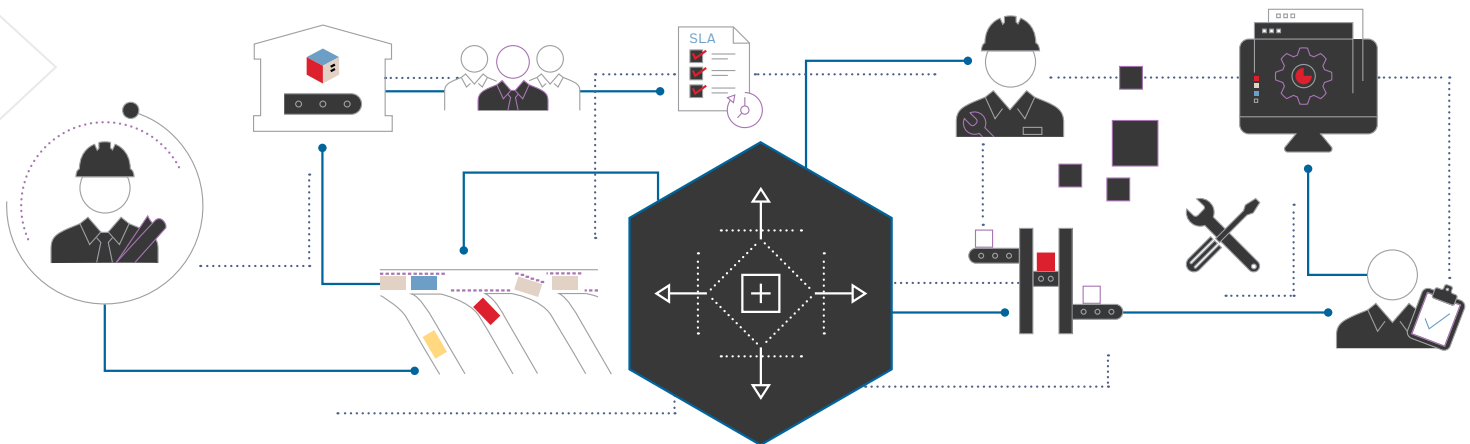
The most reliable unit-level emulations rely on complex physics-based engines, with the same software and controls logic used to drive real-world equipment. Such models leverage performance metrics from the

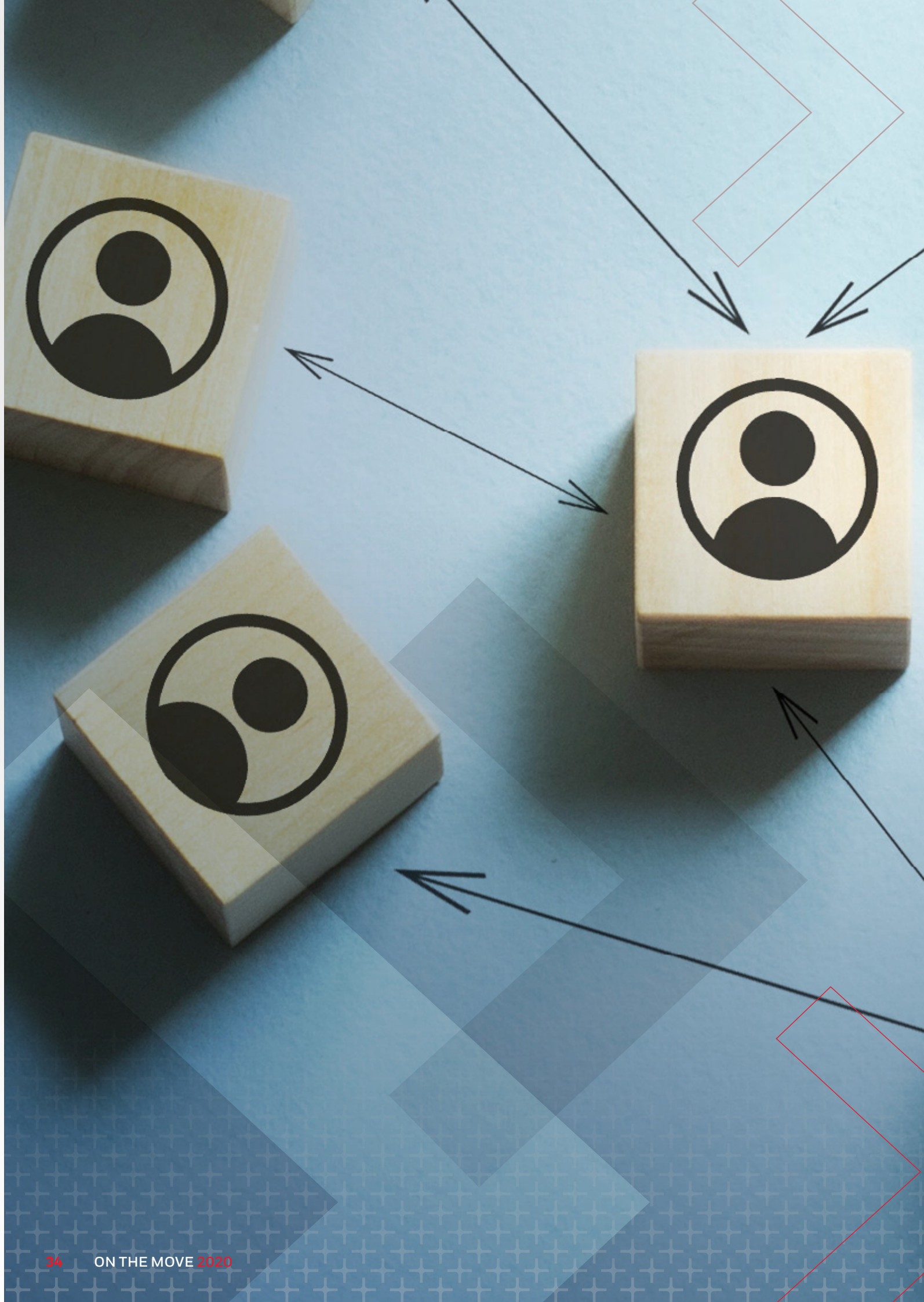
equipment they replicate, such as acceleration and deceleration rates, to simulate the most realistic behaviors.

In addition, unit-level emulations can be incorporated seamlessly into system-level designs, enhancing the entire solution model.

Simulation and emulation provide powerful tools for minimizing risk. Their exceptional reliability and predictability enable you to test and optimize before you build.

Moreover, the best simulations don't just rely on software tools. Virtual DCs from [Honeywell Robotics](#) incorporate decades of material handling experience plus millions of hours of real-world equipment performance data, testing and validation to ensure that each simulation accurately reflects the reality that will follow. <





HONEYWELL HELPS DISTRIBUTION CENTERS MEET **NEW SOCIAL DISTANCING AND COMMUNICATIONS CHALLENGES.**

During the current health crisis, distribution centers (DCs) and warehouses are keeping the supply chain vibrant and moving for retailers, manufacturers and end users. DCs are experiencing challenges that are requiring them to innovate, adapt and improve operations. Among the many challenges DCs face include¹:

- **Increased e-commerce traffic.** DCs are working near or exceeding peak capacity levels of e-commerce orders. They are focused on how to process more packages with the same size (or smaller) workforce.
- **Rethinking the DC floor and operations.** DCs will be modifying workflows and workstations to make sure they align with new safety protocols and enhance employee safety. They need to keep in mind how to make these changes yet still maintain operational focuses on accuracy, speed and productivity. There is a restructuring of how employees move in the DC to adhere to social distancing norms such as reduced seating in break areas/cafeterias and pattern flows into a building's common areas. Social distancing protocols are being enforced in traditional warehouse workflows such as inventory counting, order picking and cold storage environments.
- **Fewer workers per shift.** Because of the new focus on safety protocols, DCs have transitioned to staggered or split shifts. Work team sizes have been reduced to comply with social distancing. With fewer staff on-site, team members need to be cross-trained in DC workflows.
- **Improved cleaning procedures.** To comply with safety protocols and governmental guidance, DCs are implementing new procedures that call for cleaning during and between shifts with increased focuses on workstations, handrails, desks, equipment, lifts and anything that is frequently touched by workers. Special attention is given to make areas safer and contact-less, such as break rooms, restrooms and anywhere where workers gather. Some DCs are implementing single-use assignment of mobile devices and lift equipment to specific users per shift or per day to minimize the spread of infection.

These changes are opportunities for DCs to re-evaluate internal processes and procedures and develop steps that will enable them to sustain growth and create safer and healthier workplaces. They will require very specific solutions that address cleaning procedures and device chain of custody to maintain their operations and increase productivity.

HONEYWELL DISTRIBUTION CENTER SOLUTIONS

Honeywell understands the shifts occurring due to DC operational demands. In response, we have launched a comprehensive effort to quickly develop solutions that address our customers' needs with device and software innovation, applying technological advances in new ways and leveraging our global partner network.

Honeywell has been working closely with our customers around the globe to understand their specific needs for:

- Adhering to new safety and health protocols
- Protecting workers when performing workflow responsibilities
- Bridging technological gaps needed for safer work environments

WATCH AND LISTEN



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Subscribe to the Honeywell Intelligrated YouTube channel and access 150+ videos covering the most relevant topics in the material handling industry!

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On The Move Videos

Tune in to Honeywell Intelligrated's video series featuring subject matter experts providing answers and insights on the opportunities and issues facing the material handling industry.



On The Move Webinars

Hear from experts in the field as they discuss issues that impact the industry and learn how Honeywell Intelligrated is finding solutions to customer challenges.



On The Move Podcasts

Listen to interactive discussions covering new technologies and the latest trends in the material handling industry.



These efforts represent more than half a billion workers in industries such as retail, health care, warehouse/DCs, and transportation and logistics.

Honeywell is committed to helping people return to their traditional work environments by delivering solutions that address their most current challenges. These solutions will help to address social distancing and new cleaning procedures, while maintaining a focus on employees' productivity—without compromising accuracy and speed. Our commitment is to work with you and your DC to help you operate within the 'new normal'. These solutions include:

Software to Address Worker Health and Safety.

Honeywell has expanded the feature set of our Operational Intelligence technology to include the ability to support the needs of a mobile workforce.

[Operational Intelligence](#) software is a remote asset management platform that helps DCs keep their mobile-equipped employees productive, while helping them respond to local site health and safety compliance requirements. New health crisis response features give employees control to act quickly, increasing productivity and decreasing device downtime, while reducing the frequency of contacts or touches. Its features include the following:

- **Social Distancing Proximity Detection** allows organizations to prioritize and monitor social distancing practices. The feature monitors the proximity between Honeywell devices and logs alerts, allowing frontline workers to promote social distancing and adhere to safety guidelines.
- **Check-out/in** assigns unique devices or assets to a specific user, creating a chain of custody that provides managers device tracing data. This will give real-time visibility to each device's location throughout the DC, thereby eliminating the additional costs and hassles of 'devices that go missing'.
- **Device Cleaning Management** gives you the ability to set up configurable cleaning protocols for each asset. Configurations can be per employee on an hourly, daily or in-between shift basis. Each cleaning event will be logged with the user, time and date for reporting. In addition, the feature can send alerts instructing workers to clean other assets and areas of the worksite.



- **Remote Control and Remote Wipe** give IT administrators the ability to quickly take control of a device in any location to investigate and fix issues remotely and digitally wipe devices to original factory settings, allowing them to maintain social distances.



Honeywell Smart Talk for DC Communications.

[Honeywell Smart Talk](#) is a true voice-enabled unified workforce communications application for the DC environment that addresses the problem of fragmented communications. You receive enterprise-grade security for voice calling, text and media messaging, and user presence. Smart Talk can be added to Honeywell CT40, CT60 or CK65 mobile computers or to many types of mobile devices which workers already carry. Device-enabled employees are always connected, eliminating the need for team or huddle meetings, thus helping to adhere to social distancing guidelines.

With Smart Talk, operators can enable smarter communications for their entire team from just a single mobile device. ◀

FOOTNOTE

1. Steffen, Todd. Knowledge Leader. Top 10 Operational Impacts to Distribution Centers During COVID-19. April 2020. (Accessed Sept. 28, 2020.)



CONNECT TO MORE PREDICTABLE MAINTENANCE OPERATIONS.

Adapting Lifecycle Management Strategies to New Operational Constraints

When it comes to integrating industrial internet of things (IIoT) technologies into maintenance operations, the distribution and fulfillment (D&F) sector has experienced somewhat of a disconnect. While many retailers have tested the waters with [exploratory IIoT initiatives](#), few have been successful in leveraging the power of data to drive sustained, measurable operational improvements.

On paper, the business case for utilizing data-driven insights seems undeniable. By monitoring IIoT-connected assets via sensors and control system data, operations can:

- Increase equipment reliability
- Limit unplanned downtime
- Enhance operational performance
- Transition to a more predictive, automated maintenance and operations (M&O) model

Despite recognizing the obvious potential of IIoT, the D&F sector's progress along this digital transformation continuum has been relatively slow. For most retailers, pre-2020 market conditions did not create an overwhelming imperative to accelerate this transition.

Events of 2020 may have changed all that.



PANDEMIC COMPOUNDS LIFECYCLE MANAGEMENT CHALLENGES

Pandemic-driven disruptions only worsened pre-existing M&O technician challenges and highlighted other weaknesses that posed threats to operational continuity. To keep pace with demand, many retailers found themselves operating their distribution centers (DCs) at nearly continuous peak productivity levels — placing added strain on material handling equipment (MHE) while raising the stakes of incurring unplanned downtime.

The challenges associated with replacing veteran technicians or upskilling new team members were only made worse by the pandemic. Many DCs implemented new safety precautions that hampered their abilities to bring in outside technicians for equipment expertise and assistance with issue resolution. In addition, mobility constraints due to social distancing precautions introduced other barriers to M&O crew efficiency. As a result, the emergence of any MHE issues now presents a much greater threat to overall DC performance and its ability to meet elevated throughput targets.

In this environment, the opportunity cost of not embracing connected technologies in lifecycle management programs has grown exponentially. Key equipment and assets have become more

important and essential. Not only have the costs associated with downtime risen significantly, they also begin accruing within minutes, rather than hours — which also makes recovery from downtime much more difficult. And as downtime leads to missed service level agreements (SLAs), a company's brand reputation and well-earned customer loyalty are also in jeopardy.

As a result of these challenges, the fundamental structure of lifecycle management programs is evolving to a more connected services model that helps companies mitigate market uncertainties. These programs are designed to address existing and emerging M&O and business challenges through:

- Connecting equipment/asset infrastructures and software to enable remote, continuous monitoring and analyses of system health

THE CONSEQUENCES OF DOWNTIME

Up to 80 percent of businesses are unable to accurately estimate their downtime rates. Many underestimate downtime costs by 200–300 percent. The following far-reaching consequences must be considered when calculating the costs of downtime:

- Lost production
- Recovery costs
- Wasted labor/productivity
- Missed customer SLAs
- Depleted inventories
- Mechanical equipment/system stress
- Disruption to innovation
- Loss of brand loyalty/customer trust

To offset these repercussions, DC operations need connected, data-driven strategies and tools that enable:

- Remote visibility into DC operations
- Fast identification of productivity bottlenecks
- Shorter equipment maintenance windows
- Smaller spare parts inventories
- Data capture and knowledge transfer
- Reduced reliance on skilled labor
- Predictability of outcomes

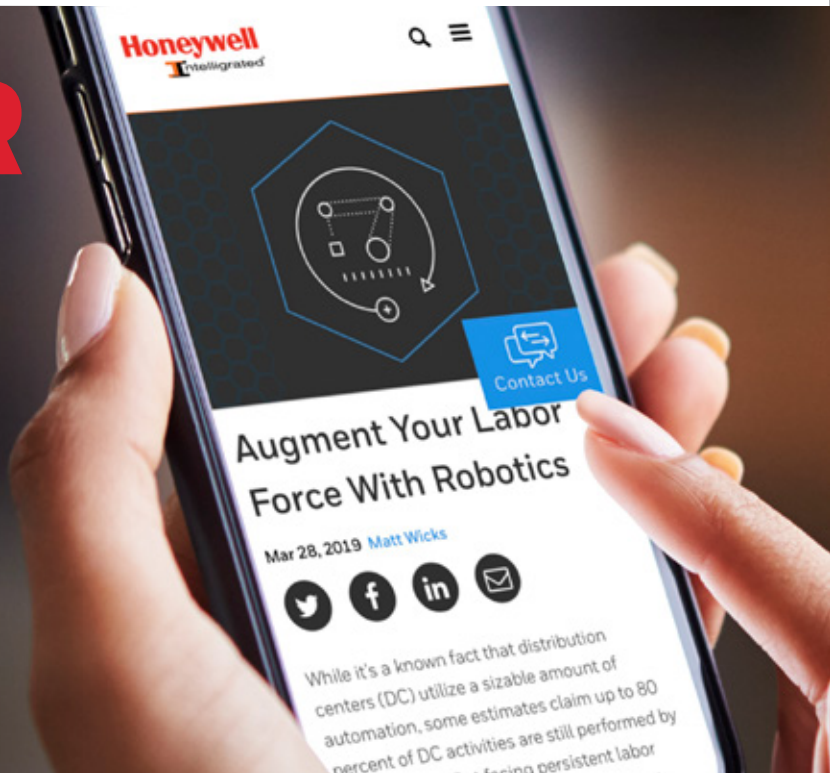
- Supporting M&O services with programs designed to augment gaps in technician staffing, automate work orders, upskill existing resources, and enable remote technician support
- Providing outcome-based commercial agreements with financial models that flex with seasonal order volumes and business profits

CONNECTING ASSETS WITHIN AN M&O SERVICE MODEL

Prior to the pandemic, retailers faced the ongoing collective challenge of finding, training and retaining the ideal mix of skilled labor and technician resources. But with the introduction of current operational demands and safety protocols, these labor pressures have only intensified.

To meet spikes in online demand, many companies have been running their DC operations at near-peak productivity levels

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PROVING THE VALUE OF PREDICTIVE PROGRAMS

The prospect of converting operational data into business value was validated in a study by the Department of Energy (DOE) more than a decade ago. This report demonstrated how the use of data in functional predictive maintenance programs delivered the following benefits, including:

- **10X** return on investment
- **25–30 percent** reduction in maintenance costs
- **70–75 percent** elimination of equipment breakdowns
- **35–40 percent** decrease in downtime needed to perform maintenance
- **20–25 percent** increase in production

for extended periods of time. This unexpected scenario has placed continuous, additional strain on MHE systems at a time when fewer maintenance personnel are available to keep these systems operational.

Generally, most companies operate their DCs without objective baseline data about the current health of their essential MHE, such as critical sortation systems. Understanding the intricacies of these systems typically falls within the purview of veteran technician staff members, who evaluate system condition by “feel” and whose insights are mostly undocumented or considered tribal knowledge.

A connected services approach provides an answer to this all-too-common conundrum. By continuously gathering and analyzing data on a sortation system — such as motor temperature, vibration and electrical current draw — a connected solution could detect a potential system failure before it occurs, and even automate a workflow for work order creation and issue resolution, as follows:

1. Issue is detected that poses a significant threat to uptime.
2. Work order is created in a computerized maintenance management system (CMMS).
3. Resolution instructions are sent to a technician via a hands-free, voice-directed system.
4. If needed, a live video chat is initiated with a remote support technician using augmented reality smart glasses or another video-enabled solution.

The benefits of such a connected services approach include:

- Remotely accelerate issue resolution.
- Upskill or train the technician in the process.
- Improve the hiring search by reducing the skill level needed by candidates.
- Reduce the number of labor hours to maintain systems.
- Limit the frequency and duration of unplanned downtime.
- Provide the ability to schedule/plan downtime during off-peak periods.
- Lower the amount of spare parts needed on-site.

PARTNER WITH AN EXPERT TO ENSURE RESULTS

Along the journey toward connected lifecycle strategies, most companies quickly discover that they are simply not equipped to manage IIoT initiatives on their own. Another common barrier to adoption is that many companies view maintenance initiatives as distractions and would rather concentrate more on their throughput goals and business objectives. Many companies also face organizational resistance when trying to change the cultural mindset to a data-driven paradigm.

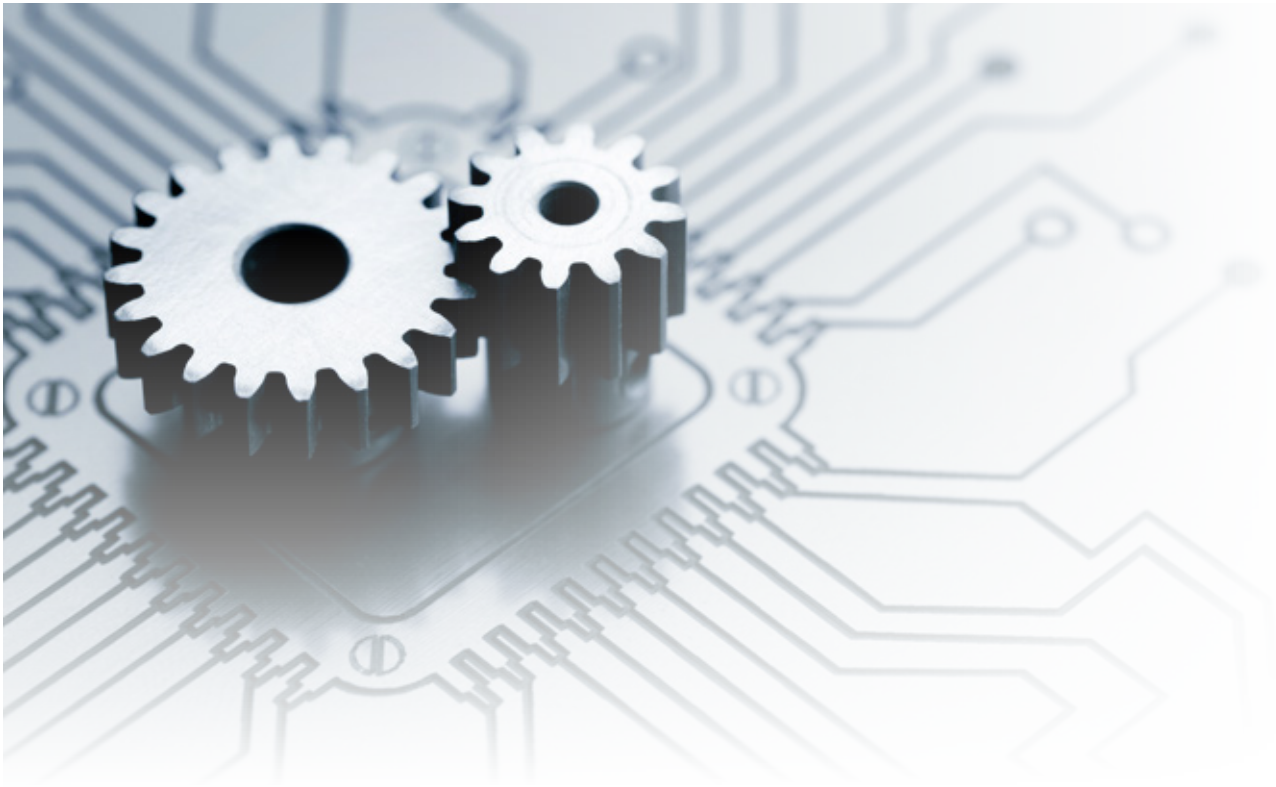
Partnering with an experienced lifecycle management service provider is essential to overcoming these common pitfalls. When equipped with industry experience, IIoT expertise and a consultative approach to customer engagement, a partner can help you to:

- Define the scope and desired outcomes of your initiatives
- Extract the benefits of a connected M&O strategy
- Interpret data into actionable insights
- Provide coaching on IIoT adoption
- Hold internal stakeholders accountable for action items

Considering the diversity of D&F operations and profit models, a one-size-fits all approach to lifecycle management is simply not feasible. Instead, a consultative engagement provides a framework for offering flexible commercial lifecycle management agreements that closely align with a company’s financial preferences and operational (or personnel) constraints.

Rather than incurring large intermittent expenses — typically from resolving major downtime issues — a partner can offer more predictable financial arrangements that may even flex with seasonal demand fluctuations and profit margins.

What’s more, an experienced lifecycle management partner can help you to evaluate your strengths and weaknesses and develop programs tailored to your preferences and



business goals. Depending on your capabilities, these outcome-based lifecycle management agreements can provide options to outsource the full or partial ownership of maintenance functions.

COUNTER UNCERTAINTY WITH PREDICTABILITY

The sheer unpredictability of 2020 has prompted many companies to kick-start their connected initiatives to help drive out operational inefficiencies and begin the transition to more predictable M&O and lifecycle management strategies.

[Connected Services](#) from Honeywell Intelligrated's [Lifecycle Support Services](#) provides flexible commercial, technical and financial agreements designed to complement our customers' current capabilities and help them achieve their defined business outcomes. We leverage consultative engagements to help companies at every step of their journey

toward predictability – with the goals of maximizing IIoT investments and extracting optimal value and insights from operational data.

Our lifecycle management engagement model is designed to help your organization understand:

- Where you sit on the continuum of digital transformation
- What resources you need to augment your M&O operations
- How you prefer to align lifecycle management agreements with your financial business models

Partnering with an experienced lifecycle management service provider is essential to overcoming these common pitfalls.

By helping you transition to a more predictive lifecycle management program, we're committed to lowering your labor costs, increasing system reliability and uptime, and maximizing the utilization of your operations to meet current and future demands. ◀

ACCELERATE ISSUE RESOLUTION WITH VIDEO ENABLEMENT.



TechSight provides the benefits of real-time remote video collaboration with our 24/7/365 team of support experts. **Learn more about video-enabled issue resolution.**

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About Honeywell Intelligrated

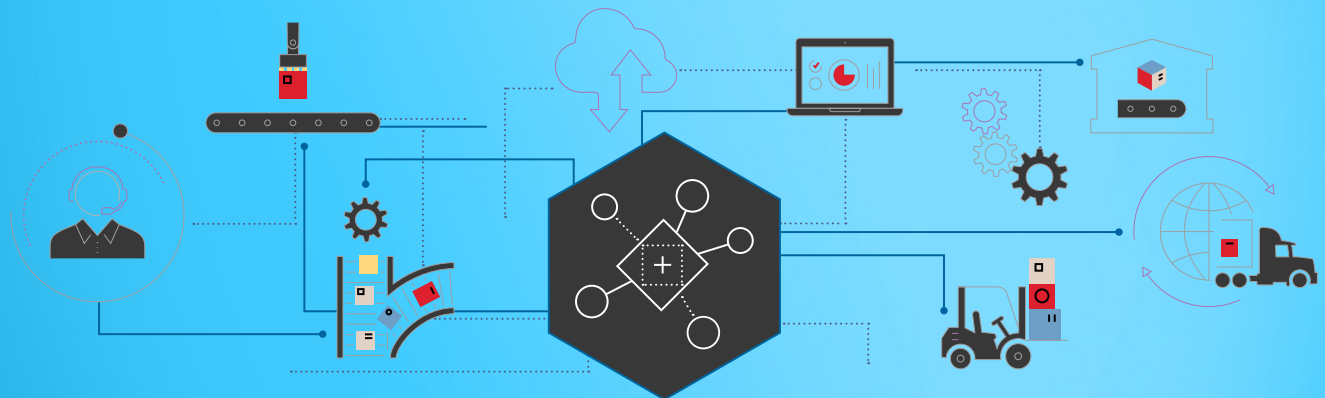
Honeywell Intelligrated is a leading North American-based, single-source provider of automated material handling solutions and intelligent software that drive fulfillment productivity for retailers, manufacturers and logistics providers around the world. Through a broad portfolio of automation equipment, warehouse execution system software, services and support, our solutions give businesses a competitive edge in increasingly complex commerce and fulfillment environments.

The Connected Distribution Center

The pace of change in modern commerce is putting tremendous pressure on fulfillment operations. To stay competitive and protect profits, companies need solutions that help them achieve maximum throughput, day-to-day flexibility, future-proof scalability and intelligence to make informed decisions.

The Connected Distribution Center helps companies make the digital transformation necessary to increase reliability, improve utilization and maximize productivity through:

- Intelligent, data-driven, high-speed execution
- Automated, adaptable processes for machines and workers
- Optimized utilization with the ability to seamlessly adapt and expand
- Insights and predictive analytics, from sensors to the cloud



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Find us in the "Automation" section under "Products," "Services" and "Software".