LOCUS

Multi-bot Fulfillment:
The Path to Optimal Productivity

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Executive Summary

Prior to the COVID-19 pandemic, the adoption of automated warehouse fulfillment solutions to drive efficiency had been steadily - but slowly - gaining credence among innovative operators looking to sustainably manage performance, especially during peak periods.Then came the pandemic and it all changed.

While there are many lessons to come out of the pandemic, there is little doubt that early adopters of automation were better positioned to deal with the unprecedented volumes and new operations and management challenges.

As the stresses of lockdown intensified, those slow to adopt automation struggled to react quickly enough to shifting demand, heightened customer delivery expectations, and as the need to optimize throughput increased.

In addition, labor became increasingly difficult to find and existing workforces were shrinking due to illness and social distancing demands, creating additional operational challenges.

The pandemic has been a major driver for change, creating a new paradigm where flexible automated solutions can consistently deliver improvements in performance demanded by a post-pandemic world. But, with many options, one type of solution is rapidly proving to be an ideal solution to many of these new challenges.

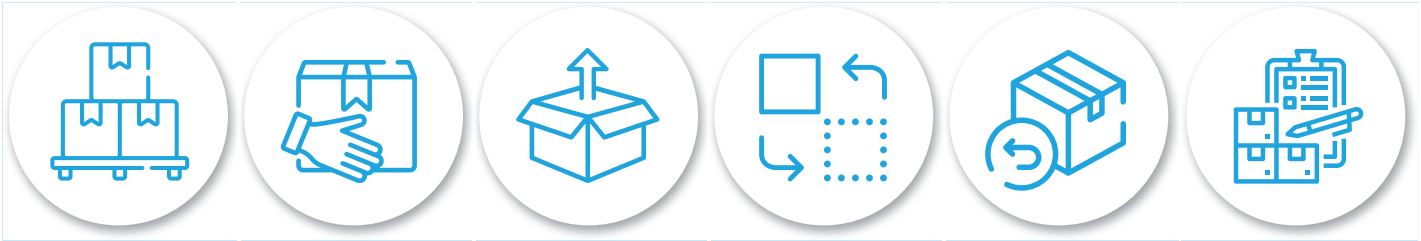
Autonomous Mobile Robots (AMRs) are able to generate significant productivity gains, quickly and cost-effectively. Coupled with fast deployment, it has rapidly become the e-commerce fulfillment solution of choice for many leading logistics businesses.

In addition, the ability of AMRs to work in a wide range of industries is another reason why the collaborative solution is not confined to warehousing. It is also being adopted in other industries including, healthcare, pharmaceuticals, manufacturing and defense. The versatility of collaborative robots adds value to an operation not only in terms of economy, optimized productivity, and worker safety. It helps position companies for future challenges and growth.

A New Paradigm for Warehouse Automation

The need for a seismic shift in warehouse automation developed when it swiftly became evident that improving current workflows was not always the best path to optimal productivity.

OPTIMIZED PRODUCTIVITY AND TRUE TASK INTERLEAVING



Batch Picking | **Discrete Picking** | **Putaway** | **Replenishment** | **Returns** | **Inventory Control**

The traditional approach of adding vast armies of temporary labor to increase productivity in an already inefficient environment actually had the opposite effect. With more people working in the same spaces where previously the workforce was only the third of the size, actually reduced throughput, overall operational efficiency and increased costs.

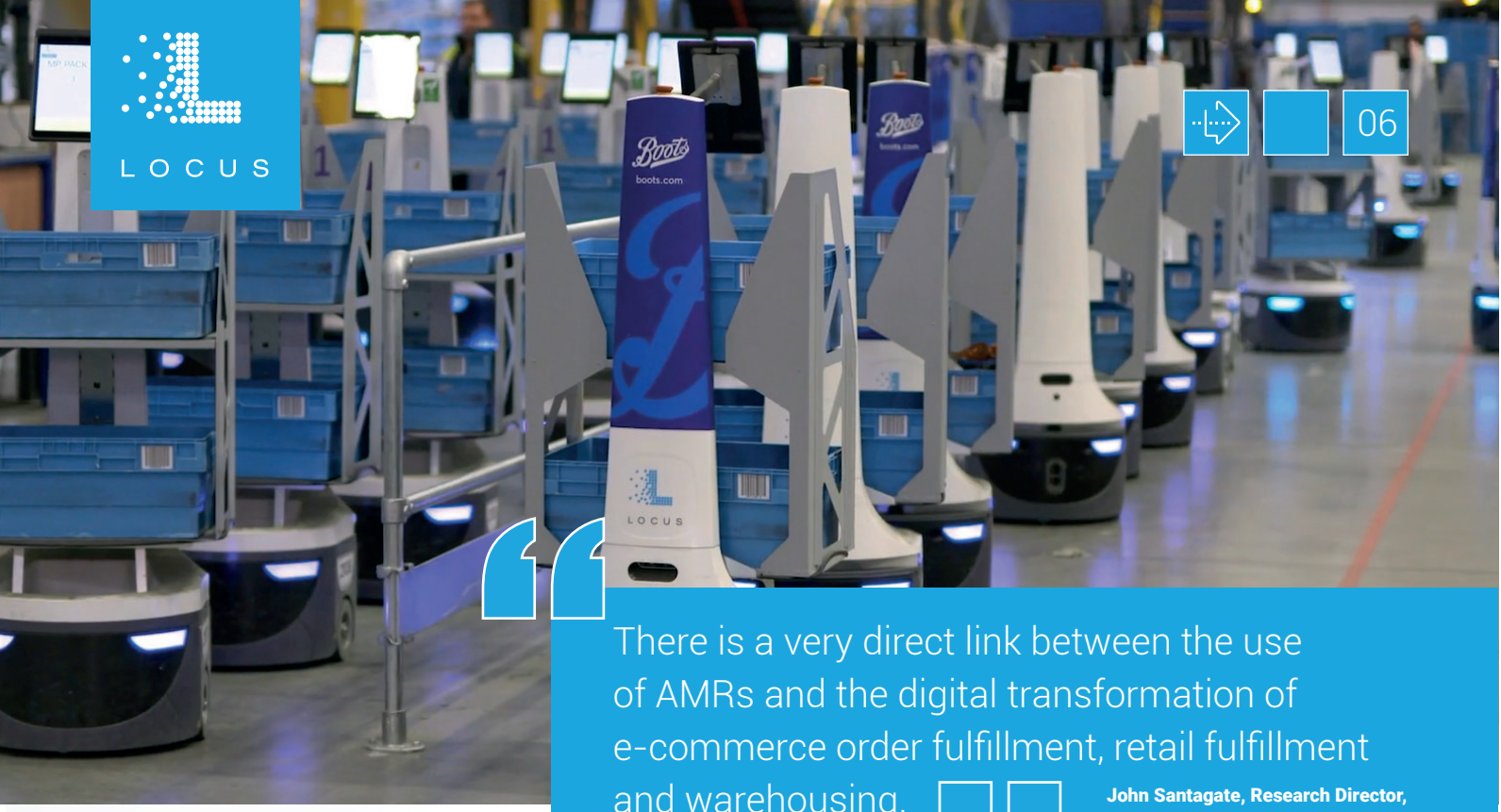
Initially, automation offered many benefits to productivity, but these solutions often lacked flexibility, adaptability and scalability to meet the fluctuations in demand.

New robotic solutions, such as automated carts or follow-bots, offered only a nominal improvement over traditional methods of cart-based picking. Associates are still tethered to the slow pace of the follow-bot. The technology has more impact on reducing the physical burden of pushing a heavy cart than it does on actually improving productivity.

Autonomous Mobile Robot (AMR) solutions like Locus Robotics provide a far more effective means of delivering lasting productivity improvements.

With Locus, each associate is freed from list-based order picking or following pre-planned routes.

Instead, the LocusBots handle the travelling, leaving the worker free to collaborate with muliple robots (and more orders), dramatically reducing their unproductive walking time. This increased productivity and shorter cycle times allows workers to handle more work with less effort.



> There is a very direct link between the use of AMRs and the digital transformation of e-commerce order fulfillment, retail fulfillment and warehousing.
>
> **John Santagate, Research Director, Commercial Service Robotics, IDC**

How the Multi-bot Solution Works

What makes the multi-bot solution so effective, is the synergy created between robot and associate.

Freed from having to haul a heavy cart or trudge behind a slow "follow-bot" or automated cart, each associate instead interacts with multiple cobots, dramatically improving productivity and order cycle times. Workers can pick more orders faster, thanks to the bots' intuitive onboard display unit, while an efficient order clustering engine directs bots and people to build pick density.

Each associate can clearly see from the display unit what product needs picking. The item is selected, scanned and placed in the bot's tote. The LocusBot then navigates its way to the next pick, via the most efficient route.

Once the LocusBot has completed its mission, it then navigates to the packing station, again via the optimal route.

This means that an associate can remain in a zone throughout their shift, fulfilling more orders and even interleaving other tasks such as putaway and counting by collaborating with the robots.

This has immediate impact on productivity. In addition to eliminating unproductive walking time, it improves pick per hour rates and drastically reduces cycle times.

For the operation, improved productivity leads to increased throughput, while a more efficient operation helps reduce costs and wastage. The greater the savings, the faster the return on investment.

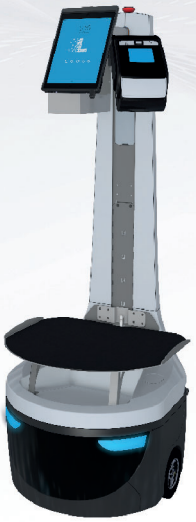
The Locus system collects and tracks critical operational data, delivering insights to improve operational performance that is accessible at any time, from any location around the world – in real time. Using this information, operational parameters can be changed to ensure optimal performance is maintained.

For example, associates can be relocated within the pick operation to where they will be most effective, given current operational requirements.

Operational performance can also be displayed on screens throughout the fulfillment facility, enabling associates to monitor their own work rate, and instilling a sense of friendly competition.

While human benefits are more difficult to quantify, operators typically report workers are less tired at the end of a shift due to not having to haul a heavy cart around and having to walk less. Additionally, associates are said to be happier in their work, with absenteeism and accidents much reduced because people are more alert, and they no longer have to push heavy carts to complete their work.

Benefits of Multi-bot vs the Follow-bot



VS

Higher Productivity

- The decoupling of workers from robots and reduction of time between picks or tasks enables consistent 2-3X improvements in productivity.

  Where a picker may have been picking 30 units per hour (UPH) manually pushing a cart and tethered to an order or set of orders, with a multi-bot solution, this picker can potentially pick 90-100 UPH.

  This approach enables associates to spend more time on highly productive tasks as opposed to non-productive walking.

Higher Throughput

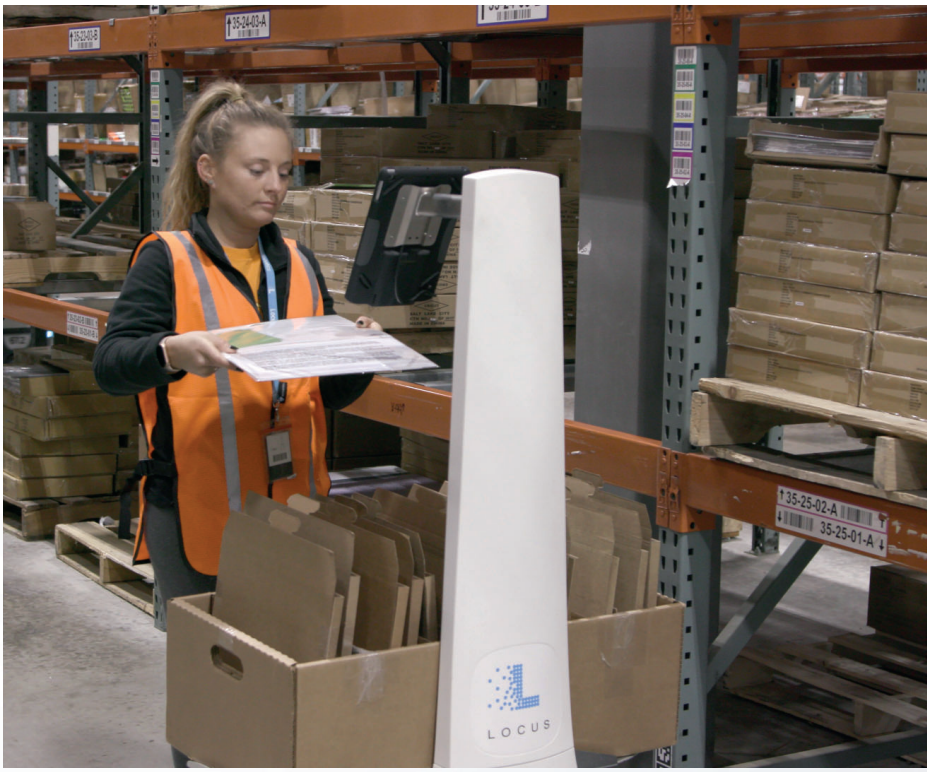
- By design, a collaborative, multi-bot solution focuses on optimizing each autonomous mission for optimum velocity, density, and throughput, helping you get orders out the door, faster.

Business Intelligence

- The highly visible real-time data supplied by the LocusBot solution aids strategic thinking by allowing businesses to increase operational capacity and accurately plan needed labor and other resources.

Faster Cycle Times

- Since LocusBots are not tied to human pickers, they are able to optimize their travel paths to each pick location and workers can pick faster since they do not spend unproductive time walking.

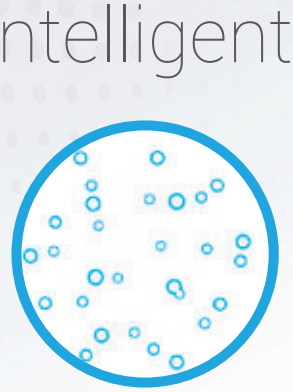


- **Payload per picker**

  The equivalent number of lines that fit on all active robots, divided by the number of pickers.

  The amount of available work per picker is similar to a follow-bot, but much more flexible, which adds valuable momentum to the picking operation.

Intelligent Warehouse Execution

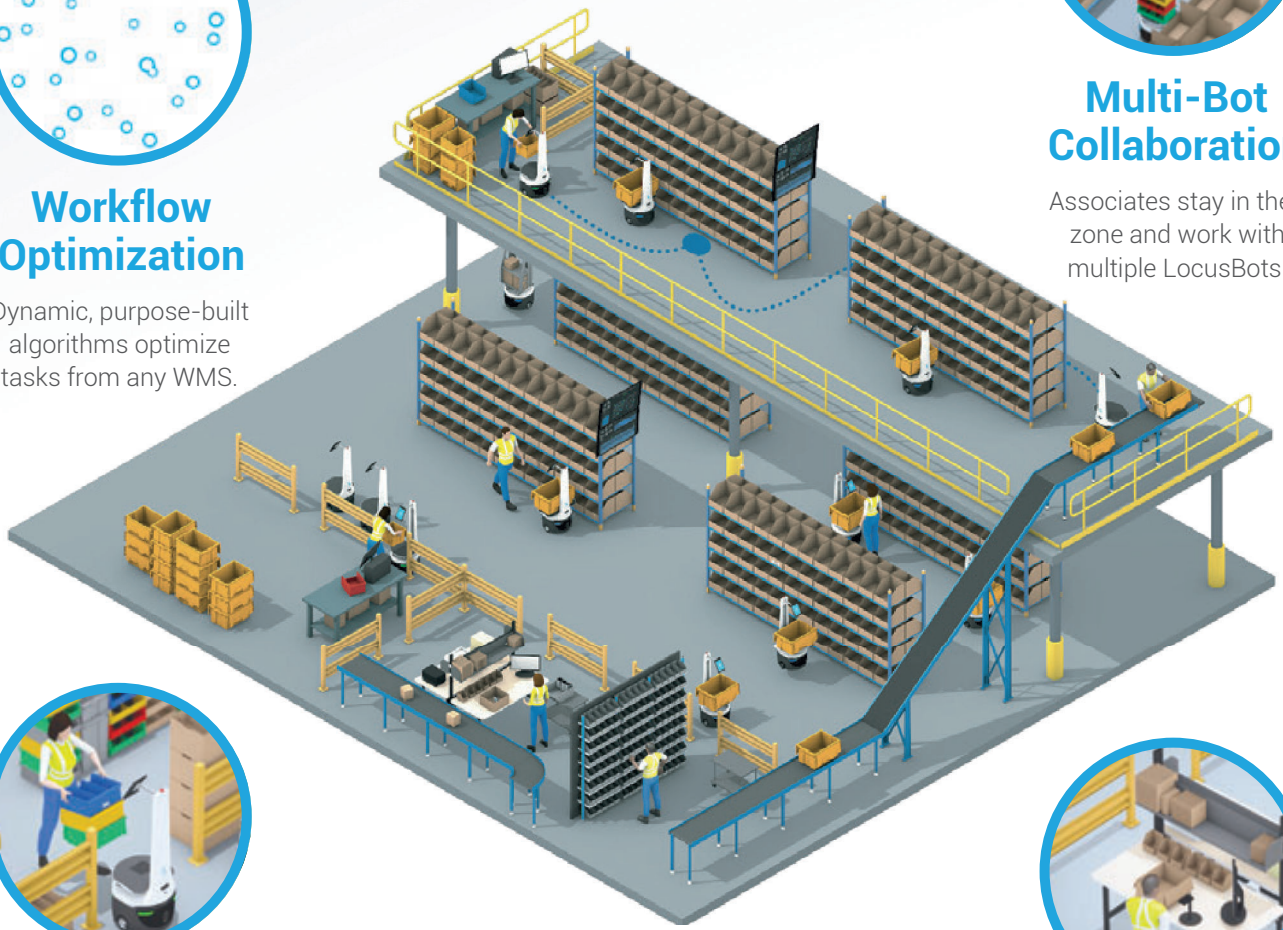


Workflow Optimization

Dynamic, purpose-built algorithms optimize tasks from any WMS.

Multi-Bot Collaboration

Associates stay in their zone and work with multiple LocusBots.

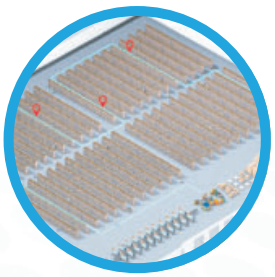


Directed Induction

Locus directs optimal induction of containers on the bot.

Seamless Hand-off

Locus integrates with connected systems for sorting and packing.



Autonomous Missions

LocusBots optimize their path from one task to the next, collaborating with different associates.

Intelligent Warehouse Execution (continued)

Deployment of the Locus AMR solution aids the power of intelligent warehouse execution in several ways.

Workforce Optimization

- The dynamic, purpose-built algorithms optimize tasks from any Warehouse Management System, improving fleet management and labor allocation.

Multi-bot Collaboration

- Associates remain in their picking zone and work collaboratively with the LocusBots.

Directed Induction

- Locus recommends the optimal tote for the order to optimize payload for the mission.

Autonomous Missions

- The path from one task to the next is optimized for the LocusBot, enabling it to autonomously interact with many different associates in the quickest possible time. Task priority and product density are improved.

Seamless Hand-Off

- The LocusBots seamlessly integrate with connected systems for optimal sorting and packing.

Real-Time Dashboards & Actionable Insights

- Mission control dashboards and data reporting provide full visibility of current operational performance.
- Labor Planning – associates are instantly directed to where they will have optimal impact on the picking operation, aiding efficiency.
- Real-time workflow optimization from any location, on any device.

REAL-TIME DASHBOARDS & ACTIONABLE INSIGHTS

Mission control dashboards and reporting provide full visibility of operational performance, facilitate forecasting, labor planning, and real-time workflow optimization – anywhere, on any device.

Conclusion

Automation technology is proven to help fulfillment warehouses improve their operational efficiency. The swift adoption of such technology proved the decisive factor in enabling many supply chain operations to effectively manage demand during the pandemic and will continue to do so in the future.

Consumer trends suggest the switch to online shopping witnessed during a succession of lockdowns will remain, continuing to place pressure on ecommerce order fulfillment operations globally.

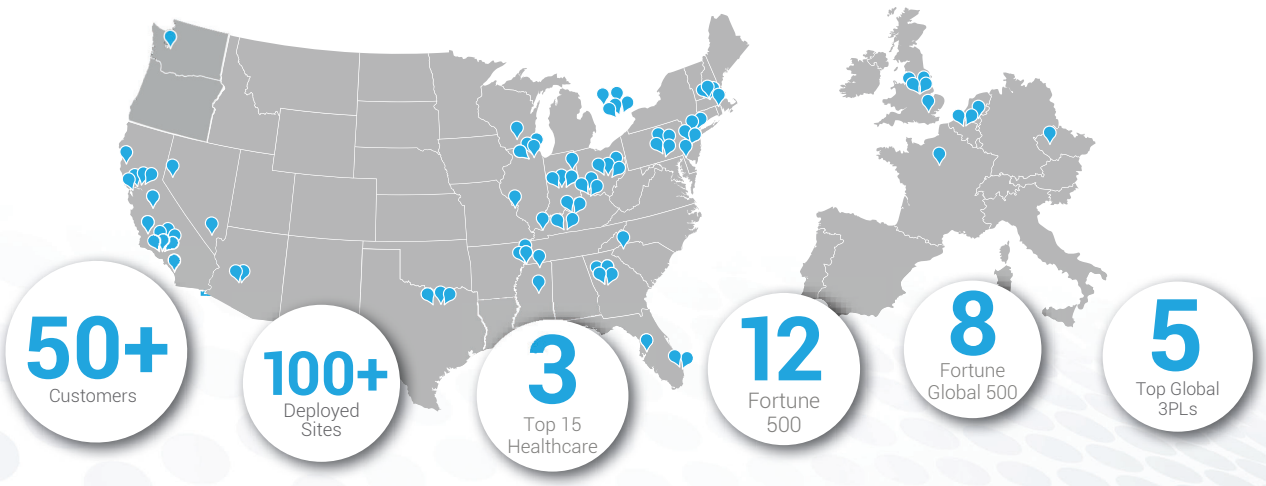
The ability of automated solutions to improve efficiency and maintain – even exceed - customer delivery expectations will continue to be critical as demand continues to accelerate and finding labor becomes even more challenging..

Operators will therefore continue to seek out the most effective solutions that meet their primary goals of high productivity and low cost.

The advantage of the Locus Multi-Bot model means operators will benefit from a robotic system that is easy to deploy and is proven effective and capable of overcoming the challenges of changing demand and depleted labor resources.

This is what makes the Locus solution the number one choice of fulfillment solution for leading global logistics providers.

#1 CHOICE OF GLOBAL BRANDS



DHL GEODIS CEVA Boots

> The flexibility of the Locus system to scale as demand grows has been key to our success. The autonomous nature of the LocusBots has also been instrumental in worker health and safety, enforcing social distancing through such a busy period while also delivering significant productivity improvement.
>
> **Ken Hall, Supply Chain Development Manager, Boots**

Case Study

Boots & Locus Robotics

Boots is one of the UK's leading pharmacy-led health and beauty retailers. It is part of the Retail Pharmacy International division of Walgreens Boots Alliance (Nasdaq: WBA), which is a global leader in retail and wholesale pharmacy, touching millions of lives every day through dispensing and distributing medicines, and through its convenient retail locations, digital platforms and health and beauty products.

Boots UK partnered with Locus Robotics early in 2019, deploying 135 autonomous, mobile, and collaborative LocusBots in their Burton-upon-Trent, UK warehouse facility to support anticipated holiday season volume growth.

The deployment was an immediate success, with LocusBots utilization driving a 200% increase in productivity and picking over 3 million items on behalf of Boots throughout the Black Friday season (November 21 through December 2). The Locus solution also improved workplace culture, with a 77% reduction in worker accidents and a significant reduction in worker absences and attrition, with cross-generational acceptance of the Locus technology.

Boots scaled up its Locus solution deployment in January 2020 to include over 200 robots in its UK facility. The retailer's timely decision to expand its robotic fleet benefited it greatly during the unanticipated COVID-19 pandemic when shopping moved from in-store to online.

The effectiveness of the LocusBot solution enabled the retailer to successfully manage a 172.4% increase in online orders – easily outstripping that seen during the 2019 peak – whilst maintaining customer delivery expectations.

Prior to Locus, Boots had been an early adopter of fixed infrastructure automation to improve its warehouse operations. However, it realized that its systems were already reaching capacity limits and they were forecasting an escalating demand ahead of the 2019 peak. The Locus solution gave it a flexible and effective solution, enabling Boots to overcome labor challenges and ensure a seamless customer experience. When the COVID-19 pandemic surfaced, the Locus solution allowed them to seamlessly scale up to meet the explosion of online ordering due to lockdowns, without compromising productivity.

The Locus AMR solution proved so effective that it was named the winner of the 2020 UK Supply Chain Excellence Award for "Best Use of Robotics".

About Locus Robotics

Locus Robotics is the market leader in Autonomous Mobile Robots (AMR) for fulfilment warehouses. The company has quickly become the leading warehouse robotics solution provider for retailers and third-party logistics (3PL) operators, industrial/automotive, and healthcare companies worldwide that are looking to meet the shifting demands of the booming e-commerce and fulfilment market.

Locus's collaborative robots work safely with human employees, driving productivity to ensure that retailers and 3PL providers can match higher order volumes with increasing consumer demand, despite the widespread scarcity of warehouse labor.

Typically, Locus customers see a Return on Investment of an average 129% in less than six months and the deployment can be completed in as little as four weeks, keeping disruption to a minimum.

For more information visit
www.locusrobotics.com

2-3x productivity gains

4-6 weeks to go-live

6-8 months to ROI

50% faster cycle times

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