

From inventory tracking solutions to mobile robots, today's warehouse technology and automation systems provide more potential for efficiency improvements than ever.

*Inbound Logistics* assembled a team of executives at leading materials handling companies and asked for their perspectives on the important logistics challenges and opportunities affecting your business processes.

# MATERIALS HANDLING

## THOUGHT

# LEADERS

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CEO and Founder, Kiva Systems

**3** **PETER HARTMAN**  
President, Retrotech Inc.

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## Mobile Robots Expand Warehouse Automation Options

**Q:** Warehouse managers are tasked with making investment decisions about systems that must scale for growth, often leading to unnecessary spending based on faulty five- and 10-year plans. Are there equipment options that can help mitigate this risk for warehouse management?

**MOUNTZ:** Mobile-robotic solutions offer a whole new approach to warehouse automation. Using features such as robotic drive units, mobile shelves, workstations, and sophisticated control software to automate the pick, pack, and ship processes provides warehouse managers

**Q:** In the e-commerce fulfillment center (FC), managers are pressured to keep costs down, offer same-day or overnight shipping options, and adapt quickly to changing product assortment. Order accuracy is paramount and any disruptions to the workflow are costly. How can an FC warehouse keep up with the complexities of demand without sacrificing speed, efficiency, and accuracy?

**MOUNTZ:** Today's savvy Internet retailer has abandoned the old practices that required operators to walk miles each day pushing carts to pick orders. Instead, they're leaving the heavy lifting and travel to warehouse robots.

This form of picking is operator-friendly; empowers two to four times more productivity than other pick, pack, and ship automation approaches; and boasts a 99.99-percent order accuracy rate. And, because today's trend could be tomorrow's clearance item, when product accessibility needs change drastically overnight, mobile shelves ensure that items are always placed in the most efficient location.

**Q:** How can an investment in warehouse automation begin to reflect ROI even in the short term?

**MOUNTZ:** Mobile-robotic systems are easy to design and install, with overall lower installation and operational costs than traditional warehouse automation systems. This flexibility drastically reduces the installation time for a new distribution center from months to weeks.



MICK

MOUNTZ

CEO and Founder  
Kiva Systems

unmatched flexibility to implement the solution they need to handle their current volumes, then add additional capacity quickly and easily if they need it later.

Unlike conveyor, carousel, and traditional automated storage and retrieval systems (AS/RS), this type of portable solution adapts to changes in product types and velocities, order prioritization, and other operational realities.

Work injury reduction also yields cost savings. These solutions reduce worker fatigue and injury, because they limit walking through the warehouse, and bending and stretching at pick stations. Companies can also save on overhead costs by using zone heating and lighting in the limited areas where human stations are located.

Ultimately, a mobile-robotic warehouse is quick and low-cost to set up, inexpensive to operate, and easy to change.

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## Upgrading Order Fulfillment Systems Boosts Warehouse Efficiency

**Q: Is it possible to speed product flow in response to customer demands and cut inventory processing costs at the same time?**

**HARTMAN:** Many automated systems installed several years ago were not designed to handle escalating customer requirements, such as higher accuracy, more complex traceable orders with multiple SKUs, and more on-time deliveries. Nor did these designs anticipate the growing need to safeguard workers and consume less energy. And the food industry must now deal with escalating requirements resulting from the Food and Drug Administration's new Food Safety Modernization Act.

Minor equipment and/or operating software additions and upgrades can help firms with an automated storage and retrieval system achieve measurable improvements in many areas, including throughput speed and costs.

**Q: SMBs and mid-size 3PLs are dealing with increasingly stringent demands from their vendors, and many don't have the internal capabilities to keep up. Are there solutions that act as force equalizers, giving smaller companies world-class product throughput capabilities?**

**HARTMAN:** Companies have achieved stunning results from projects that converted manual warehouse operations into automated order fulfillment centers. These firms deliver attributes of customer value that yield higher product quality, revenues, and margins, with lower costs.

What if you could access any case at any time to build a customized pallet at the dock ready for shipment? What if the cost of handling every case in your warehouse could be reduced 90 percent? What if enough space were freed up to eliminate the need for outside warehouses? Some firms will not be competitive without automating their warehousing and distribution operations.

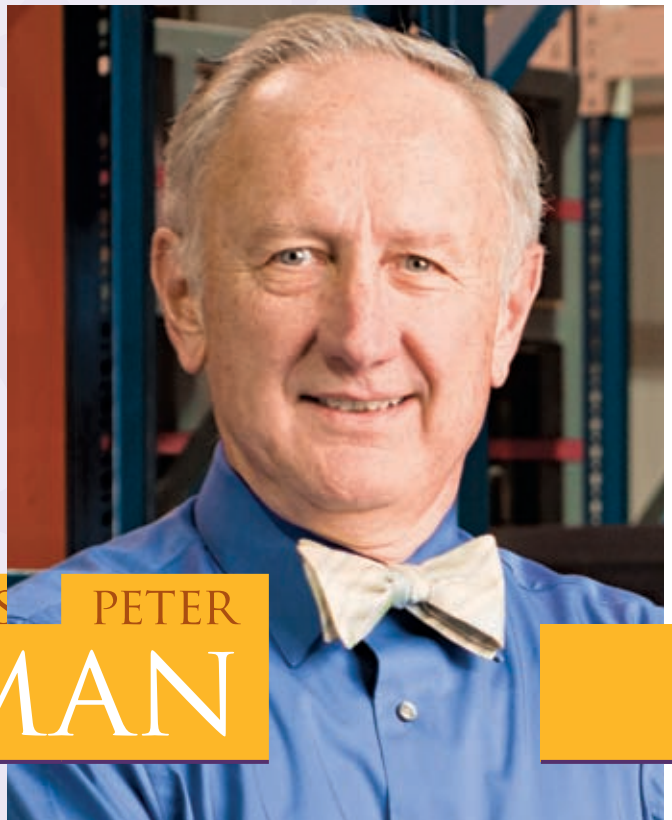
If your competitors have an automated order

fulfillment system, we recommend vigilant competitive benchmarking. Manufacturing firms must question if their future is based on continued aggressive bidding of three-year contracts or, perhaps, a more thoughtful long-term relationship with 3PLs centered on well-considered infrastructure investments.

**Q: Today's demands stretch many legacy warehouse automation systems beyond their capabilities. Despite the need, some companies are reluctant to undertake a new warehouse automation project because of downtime caused by design complexity and long lead and project completion times required. What options are available to address these concerns?**

**HARTMAN:** Existing systems made by defunct firms can be brought back to useful life. Through a procedure called "Live Retrofit," a bypass can be developed to enable ongoing order fulfillment as hardware or software components are repaired, replaced, or upgraded.

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FIRST PETER

HARTMAN

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Retrotech Inc.



## Tracking Warehouse Inventory on the Move

**Q: Despite technology advances in end-to-end supply chain visibility, the warehouse is still a “blind spot” for many companies. What can be done to improve visibility within the four walls to bring the same level of excellence achieved in other areas of the supply chain?**

**VAN WORMER:** Over-the-road transportation fleets have gained tremendous productivity through real-time GPS tracking of their trucks, drivers, and in-route inventory. As in transportation, visibility in a warehouse operation means knowing the real-time location of your materials

and historical data analysis. For example, optical tracking technology from Sky-Trax provides second-to-second, inch-accurate tracking of vehicles, drivers, and inventory, with a full package of reporting and data visualization tools that allow managers to view the inside of their facility in ways they've never been able to before.

**Q: What are the benefits of this kind of visibility?**

**VAN WORMER:** Having real-time visibility of your warehouse operations provides immediate improvements in accountability, safety, and elimination of unproductive activity. Managers can also track and analyze fleet utilization and driver productivity to determine opportunities for reducing fleet and shift sizes, and improving labor standards. Additionally, tracking inventory movement from receiving to put-away, picking, and shipping provides insight into optimizing routes, rack slots, zones, and throughputs. Accurate inventory and vehicle location data can be fed real-time into warehouse management systems (WMS) to create optimized tasks, enable interleaving opportunities, and reduce the need for cycle counting resources.

Sky-Trax technology can also eliminate the need for hand-scanning pallet and location IDs, allowing drivers to move more pallets per hour. This historical data can be captured in a database to support Six Sigma, lean manufacturing, or other continuous improvement initiatives. Warehouse operators who have invested in these visibility tools have typically realized productivity improvements of 10 to 40 percent.



PHIL

VAN WORMER

Executive  
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Sky-Trax Inc.

handling vehicles, drivers, and inventory so operations can be optimized for maximum productivity.

GPS does not work indoors, but different types of visibility solutions and tools provide indoor tracking and productivity gain. RFID, laser, and optical solutions are the most common technologies deployed today. These solutions typically include visualization tools such as real-time location maps, daily performance reports,

These visibility technologies also support next-generation warehouse automation opportunities, such as tracking and controlling automated guided vehicles. The ability to track both manned and unmanned vehicles' real-time location, direction, and speed allows managers to remotely control mixed fleets, ensuring safety while optimizing vehicle and labor utilization, and inventory flow.

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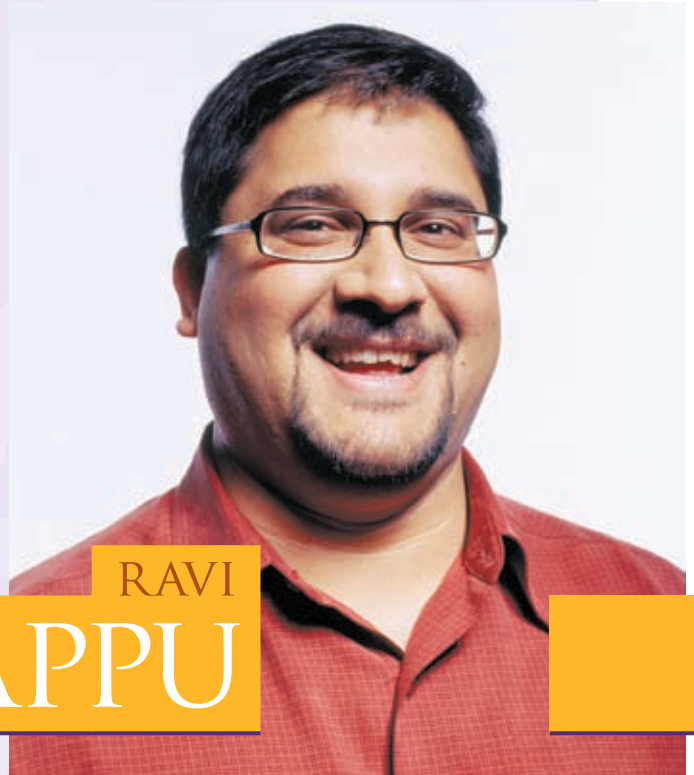
## RFID Delivers the Power to Transform Markets

**Q: The business cases for achieving improved visibility throughout the supply chain have been identified. What technologies should logistics providers consider to get there?**

**PAPPU:** Physical objects are becoming coupled with a myriad of radio technologies to drive a communications revolution. For instance, location information from GPS satellites 16 miles above the earth is being used to track vehicle fleets delivering goods between locations. Various radio frequency identification (RFID) technologies are being used to locate and identify objects during manufacturing and shipping processes at distances from inches to hundreds of feet. And the sensing capabilities of some RFID-enabled devices can remotely determine a shipment's temperature, determine its direction of travel and velocity, and even turn on and off devices connected to the RFID tag. These technologies allow computers, objects, and individuals to interact in many new ways, supplying logistics providers and materials handlers with predictable and actionable data to enhance their service offerings and operations.

commercial, and industrial environments where high performance in a wide range of operating conditions is required.

More interesting than any standalone technology is the integration of multiple identification and sensing technologies into a



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**Q: What are some of the trends and advancements logistics providers should be aware of when considering GPS and RFID technologies?**

**PAPPU:** Ultra-High Frequency (UHF) Passive RFID performance is advancing phenomenally. The read range of passive UHF RFID tags has quadrupled in the past three years, read rates have increased from 200 to 1,200 tags per second, and read accuracy is nearly 100 percent. The cost of Passive RFID tags has also decreased by a factor of five over the same period.

Further, as the market evolves from one-size-fits-all RFID readers toward highly integrated solutions, diverse RFID reader form factors become more important. Today, small UHF RFID modules are being embedded into mobile devices for inventory management applications, and a variety of stationary RFID readers are available for enterprise,

single device or solution. Combining RFID, GPS, GPRS, Wi-Fi, and other technologies will allow everyday objects to deliver valuable data that can be used for a variety of applications.

**Q: Where do you expect new market growth to come from?**

**PAPPU:** Many markets are adopting RFID technology. Any organization focused on decreasing delivery times of its products, reducing product theft, or improving customer service can benefit from implementing auto-identification and sensing technologies. The important thing to understand is that the technology itself is no longer a barrier to entry.

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