



# MODERN MATERIALS HANDLING®

mmh.com

June 2015

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Medline team from left: Daniel Schwartz, Will Ingalls, Brian Bevers, Bill Abington, and Paul Ancona

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**DEMATIC**

# KION Group acquires division of Egemin Group

THE KION GROUP has signed an agreement with the Belgian automation specialist Egemin Group to purchase its Handling Automation division for approximately \$80 million.

Egemin's Handling Automation division offers automated warehouse systems, automatic guided vehicles and in-floor chain conveyor solutions. In fiscal year 2014, the division generated approximately \$86 million in revenue with more than 300 employees.

The KION Group is one of the world's two largest suppliers of forklift trucks, warehouse

technology and associated services and increases the number of brands in its portfolio to seven with this acquisition.

"By acquiring Egemin's handling automation activities, the KION Group is strengthening its expertise and capabilities in the design and management of complex logistics automation projects for the future," said Gordon Riske, CEO of the KION Group. "Automated material handling solutions will play a crucial role in Industry 4.0 as they facilitate the vision of the smart warehouse and factory."



## Teradyne acquires Universal Robots

TERADYNE AND THE shareholders of Universal Robots (UR) announced an agreement under which Teradyne will acquire privately held Universal Robots, the Danish supplier of collaborative robots, for \$285 million, plus \$65 million if certain performance targets are met extending through 2018.



Universal Robots is a leading supplier of collaborative robots that work side by side with production workers. According to a company release, collaborative robotics is a \$100 million segment of the industrial robotics market, growing at more than 50% per year.

"Universal Robots is the technology and sales leader in the fast growing collaborative robot market, and we are excited to have them join Teradyne," said Mark Jagiela, president and CEO of Teradyne.

Universal Robots achieved record revenue growth in 2014. Company revenue increased 70% from 2013 reaching more than \$38 million, with profit more than doubling from the prior period.

## Accenture to buy Javelin Group

ACCENTURE HAS ENTERED into an agreement to acquire Javelin Group, a London-based retail strategy consulting and digital transformation services provider.

Javelin Group employs more than 160 people, generating approximately half its revenues outside the UK. It offers a range of strategy services including omni-channel retail planning, retail analytics and supply chain fulfillment and operations.

"Accenture anticipates continued strong demand for strategy services in the retail market as new technologies raise consumer expectations and transform the fulfillment of products and services across multiple channels," said Chris Donnelly, retail industry strategy lead for Accenture Strategy. "Javelin Group's unique set of integrated strategy, consulting and implementation capabilities will help us support clients through their entire digital transformation journey."



## HighJump takes Nexternal

HIGHJUMP, A GLOBAL provider of supply chain management solutions, announced that it has acquired Nexternal, a leading cloud-based e-commerce platform provider based in California.

Nexternal provides an omni-channel commerce platform that serves manufacturers, distributors and retailers. Nexternal's platform includes an order management system that captures business-to-business and

business-to-consumer orders, using standard and mobile Web browsers. The system acts as the single hub for all pricing, promotions, status and customer care related to the order management lifecycle.

"Through its TrueCommerce division, HighJump is facilitating B2B transactions with EDI," said



Alex Gile, founder and president of Nexternal. "For those customers, we can provide a second option: capturing B2B transactions from the Web.

Currently there is not a single provider of a unified e-commerce platform and warehouse management system. We look forward to changing that."



## A FAN THAT COOLS OFF AND PAYS OFF.

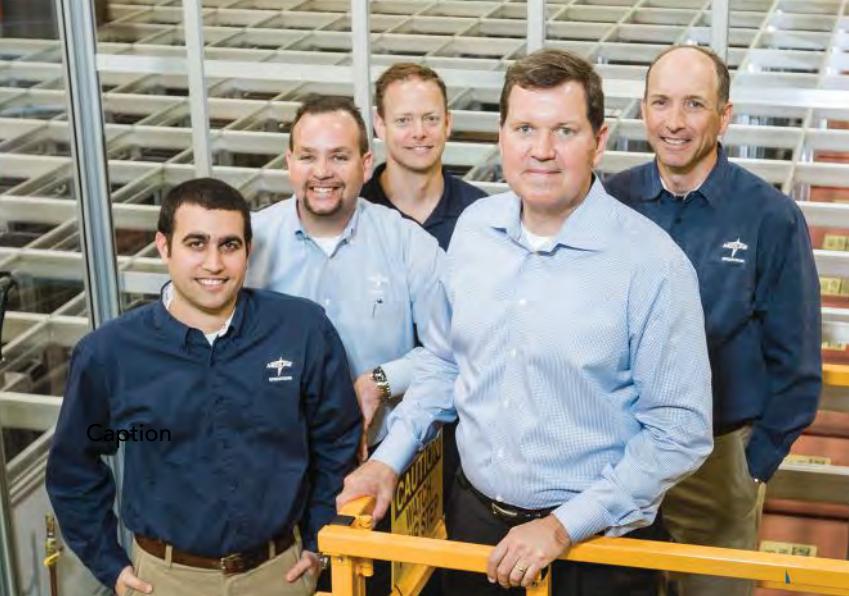
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Caption

Peter Wynn Thompson/Getty Images

## COVER STORY

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At the healthcare distributor's Libertyville, Ill., distribution center, mobile robots are handling totes, filling orders and enabling growth.

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60 seconds with...  
David Butwid

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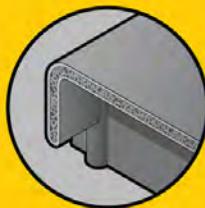
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**MICHAEL LEVANS**  
GROUP EDITORIAL  
DIRECTOR



## Big Picture: Moving from theory to practice

Several years ago, executive editor Bob Trebilcock proposed a series of feature stories called The Big Picture—pieces that would break out of our traditional equipment-centric and best practices coverage and focus on the broader role materials handling plays in driving larger company initiatives.

The premise rested on the idea that materials handling has “come out of the shadows” and is now directly tied to business operations; and thus, can build a competitive advantage that creates a measurable impact on the bottom line.

By stepping back for this broader view, these stories have given *Modern* readers a more comprehensive look at how warehouse/DC operations are not only tied to success, but in many cases have become the foundation of the business strategy.

In recent Big Pictures, Trebilcock examined the growing need for skilled technicians who can keep our more complex distribution systems and, in turn, our businesses running; he revealed how automation vendors are focusing on MRO not only to help maintain operations, but differentiate themselves in a more commoditized market: and, he put the concept of Big Data into context and examined how it can be applied to maintain equipment, deliver services and manage processes.

This month in *Modern*, we offer the latest installment of The Big Picture, one that illustrates how one of the savviest organizations in the world is taking a much-discussed theory and putting it into practice.

Starting on page 24, Trebilcock offers a Big Picture take on the potential implications of the Internet of Things (IoT)—or as Cisco defines it, the Internet of Everything (IoE). Think of all machines, equipment, gadgets,

appliances and the things we use in our daily lives all tied to the Internet. “Now, think of the effect this will have on supply chain operations,” says Trebilcock. “That’s where Cisco’s Jack Allen is heading now.”

As the senior director of logistics and manufacturing solutions for the company that connects us to the Internet, Allen is in the process of remaking Cisco’s supply chain processes to embrace the IoE, calling it “Cisco’s connected supply chain and logistics of the future.”

“What I found most intriguing is that when Allen and his colleagues talk about a much more automated warehouse, they’re not necessarily talking about materials handling automation,” says Trebilcock. “Rather, Cisco is thinking about ways to automate decision-making and mundane processes that are currently done by people.”

Allen contends that it’s about more than just software, it’s the convergence of sensors, data collection, analytics and smart machines that can quickly communicate information from every node of the supply chain. “When you piece all of this together you end up with a supply chain that can automatically take actions up and down the chain to respond to events as they occur,” says Trebilcock.

But the best part of the Cisco story is that this isn’t a pie-in-the-sky conference session pitch. Instead, Allen and crew are putting these concepts to work and making their “warehouse of the future” a reality.

“The industry has been talking about this level event management for years, and the tools to do it are already on the shelf,” adds Trebilcock. “What’s new is the way Allen is integrating the tools to create new and innovative processes and putting theory into practice. We can all learn something from this.”

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# NEWS & TRENDS

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ANALYSIS

## Gartner's supply chain conference focuses on value of data

ONE THEME TIED TOGETHER ALL OF THE PRESENTATIONS, REGARDLESS OF THE TOPIC: THE IMPORTANCE OF DATA.

BY **BOB TREBILCOCK**, EXECUTIVE EDITOR

"Data is the oil of the 21st century," said Gartner's senior vice president of research Peter Sondergaard during his keynote at Gartner's supply chain conference. Going through the notes of my conversations and the sessions I attended at the event in Phoenix, it's an apt analogy. The value of data—and the consequences of not having the right data—was a theme that tied them together.

In fact, data is more like the shale oil of the 21st century: We're discovering that there's more of it than we ever imagined; its key to making the digital economy hum; and yet, like shale oil, we're going to need a whole new set of tools, technologies and processes to extract it from our systems and use it to optimize our supply chains.

Here are a few final thoughts from the conference:

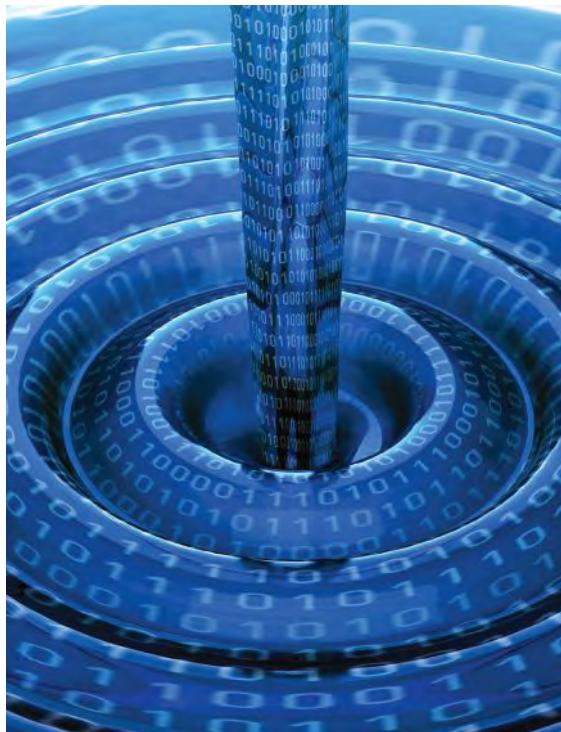
**No one knows the true cost of e-commerce fulfillment.** As pointed out by Auburn University's Brian Gibson, e-commerce represents about 7% of the sales of traditional retailers, but it's driving the majority of their sup-

ply chain investments. More importantly, most traditional retailers aren't making money on e-commerce and most would be happy just to stop the bleeding. What's the solution? For many retailers, it's to push the problem down to their manufacturing partners

by having them drop ship e-commerce orders for their products, according to Burt White, vice president of industry supply chains for Chainalytics. The problem, White told me, is "getting to the true cost of filling an e-commerce order. No one really has brought together the data to get a true cost of inventory, fulfillment, transportation and returns processes." Like Gibson, White says retailers and manufacturers were more concerned about getting an online presence than making money from e-commerce when it was 7% of their sales. But now they look forward and see that it's going to be 30% to 50% of their sales in five years and realize "it's not a sustainable model."

### **It's all about the network:**

That point was driven home in a presentation on a collaboration initiative at Brown Shoes presented by vice president Jeff Kuhn. The initiative was launched five years ago as a call to action as Brown Shoes realized that it was working with old systems with limited visibility into data; it was slow to market; and there was "no new China," meaning no new emerging market to improve



efficiencies. “We discovered that 50% of our factory delays are tied to some kind of problem with raw materials,” Kuhn said. The collaboration platform enables a connected network of tanneries that provide the leather that goes into shoes, suppliers of key components, the contract factories manufacturing the shoes, logistics providers, quality inspectors and corporate. The goal, a seamless process with visibility into data from design to delivery.

### Intelligent fulfillment is coming:

The supply chain management software industry has been talking about the convergence of planning and execution for about 10 years, since Manhattan Associates acquired Evant back in 2005. However, planning and execution still largely took place in silos. That may be starting to change. JDA’s Prashant Bhatia talked to me about distributed order management (DOM) and the concept of “most profitable to fulfill.” That is the ability of the DOM system to analyze the most profitable way to fill an order given all of the potential distribution points and transportation options. “This is in its infancy, but we are taking steps to get there,” Bhatia said. A similar theme was echoed by Satish Kumar and Dinesh Dongre from Softeon, who talked about the convergence of planning and execution. Like JDA and Manhattan, Softeon is also pursuing the “most profitable to fulfill” concept.

**The elephant in the room:** Digital business may be the future of supply chain management, but the question of how we get there remains.

“The elephant in the room is data,” said Michael Schmitt, chief marketing officer for e2open. The challenge, he added, is that most companies today have four or five ERP systems that don’t talk to each other, let alone the disparate systems from their suppliers and customers. “You need normalized data to do the things that are so exciting in our industry,” Schmitt said. “Meanwhile, the average supply chain is fire fighting and struggling to get out orders.”

### PICKING

## German university wins inaugural Amazon Picking Challenge

The Robotics and Biology Laboratory (RBO) at the Technische Universität Berlin won the first Amazon Picking Challenge, marking a milestone in the development of commercially viable automated piece picking in unstructured environments.

The centerpiece of the record-attendance IEEE Conference on Robotics & Automation in Seattle, the challenge was created to help develop a robotic system that autonomously grasps several objects from a shelf. The scenario recreates the process that occurs in an Amazon warehouse when a client buys one or more products. Currently these tasks are supported by robotic shelves, which move around autonomously within the warehouse.

Entries included robotic arms from ABB, Fanuc, Rethink Robotics, Universal Robots, Willow Garage, and Yaskawa-Motoman, using a variety of grippers, hands, suction and scoops. The RBO team used Barrett Technology’s WAM arm to finish in first place with 148 points. The Massachusetts



**Spectators gather to watch the winning team from The Robotics and Biology Laboratory (RBO) at the Technische Universität Berlin.**

Institute of Technology, using an ABB arm and a gripper with creative finger geometries, finished in second place with 88 points. The third-place finisher came in at 35 points. Among the other participants were top universities like UC Berkeley and Georgia Tech, as well as many robotics companies.

“This has been a fantastic team effort,” said professor Oliver Brock of TU-Berlin. “Every single member of our team contributed with enthusiasm and ingenuity, enabling us to produce a compelling showcase for mobile manipulation as a winning approach to industrial manipulation.”

### AUTOMATION

## ABB to manufacture robots in U.S.

ABB, a global leader in power and automation technologies, announced it will start production of robots in the United States.

According to a release, it is the first global industrial robotics company to fully commit to and invest in a North American robotics manufacturing footprint.



The company made the announcement at the opening of a new robotics plant at an existing facility in Auburn Hills, Mich., where it already has about 500 employees.

Production will begin immediately. The new plant is ABB’s third robotics production facility,

alongside Shanghai, China, and Västerås, Sweden, and will manufacture ABB robots and related equipment for the North American market. The United States is ABB's largest market with \$7.5 billion in sales. The company has invested more than \$10 billion in local R&D, capital expenditure and acquisitions since 2010, taking local employment from 11,500 to 26,300.

"Today, we are marking and celebrating the next stage of our commitment and growth in North America with the start of local robot

manufacturing in Auburn Hills," said ABB CEO Ulrich Spiesshofer. "ABB is the first global automation company to open a robot manufacturing facility in the United States. Robotics is a fundamental enabler of the next level of North American industrial growth in an increasingly competitive world."

The portfolio of products manufactured at the new facility will expand in phases, with the goal that most ABB robots and robot controllers delivered in the United States, Canada and Mexico will be manufactured in Auburn Hills.

## ROBOTICS

### Industrial robotics market to reach \$44.48 billion by 2020

Transparency Market Research (TMR), a market intelligence firm, has released a report forecasting the global industrial robotics market will reach a market value of \$44.48 billion by 2020, growing from \$29 billion in 2013.

TMR estimates the market will grow at a CAGR of 6.2% between 2014 and 2020, in a report titled "Industrial Robotics Market – Global Industry Analysis, Size, Share, Growth, Trends and Forecast, 2014 - 2020."

According to the report, factors such as the widespread adoption of robotics in small- and medium-sized enterprises and rising labor costs drive the global industrial robotics market. Greater use of robotics in manufacturing and strategic business expansion initiatives will create several growth opportunities in the global industrial robotics market in the forecast period.

In 2013, the materials handling segment held the largest share in the global market.

In terms of revenue, the global industrial robotics market was led by Asia Pacific in 2013. In North America, Mexico is expected to be a promising market for industrial robotics. □



Materials handling applications now hold the largest share of the global robotics market.

## PACKAGING

### Complexity of e-commerce supply chain raises the stakes for manufacturers

With 131,447 U.S. businesses selling products online, revenues near \$298 billion and an annual growth rate close to 6%, the e-commerce supply chain's growing volume is complemented by increased complexity.

These are among the findings of the "E-Commerce Market Assessment" published this year by PMMI, The Association for Packaging and Processing Technologies, the owner and producer of the Pack Expo portfolio of trade shows.

With jumps in volume and complexity, however, come challenges manufacturers must address.

**Keep the product safe:** Replacing a destroyed item can cost up to 17 times as much as shipping, and overcoming negative online reviews stemming from such an incident can take months. Manufacturers must ensure packaging remains undamaged throughout the delivery process, regardless of the shipping scenario.

**Constant communications count:** Strong communication with third-party retailers is another critical factor for manufacturers. Frequent communication can bridge disconnects that lead to consumer dissatisfaction. For example, when brand owners plan significant changes to



Report says packaging must be more than functional and can serve as a valuable marketing tool.

primary packaging, they should work with their third-party retailers to take current inventory and marketing into account so the consumer experience is in sync with the marketing.

**Secondary packaging is prime marketing space:** Product marketing on packages presents another challenge: distinct differences of opinion. Marketers want packaging to reflect their brand and even advertise products. Operations and engineering question the value of branded packaging post-purchase, and logistics professionals face looming concerns of theft. These disagreements can present significant hurdles, but compromises can be found through tactics such as discreet branding and product advertisements on secondary packaging.

## Fleet management earns a promotion

*Rapid improvement suggests the lift truck could be among the most important things in the Internet of Things.*

By **Josh Bond**, Associate Editor

Let's have a round of applause for fleet management. In a relatively short time, solutions from impact sensors to telematics have advanced the industry to the point that about 25% of the market uses telematics integrated through mounted or mobile computers. Along the way, growth in the use of warehouse control systems (WCS) and a push for real-time responsiveness elevated the role of on-board computers. While the "sophisticated" work took place there, fleet management was initially a much simpler art with plenty of room for improvement.

Now, however, the fleet management "layer" has climbed the ladder and enjoys equal footing and full integration with wider software and optimization solutions. In fact, an argument could be made that fleet management is toward the top of the pack in terms of its potential to improve safety, cut costs, boost productivity, and enable flexibility and nimbleness. The Internet of Things (IoT) is, at its most basic, the ability to connect things, and lift trucks are pretty important in that network.

"Lift trucks were just a dirty part of the business, and a guy could stand on one if he was successful at other menial jobs in the building," says Mike Maris, senior director of North American transport and logistics for Zebra Technologies. "Now with IoT, we're seeing a real meaningful change in what is happening with lift truck usage."

Borrowing from the successes of over-the-road fleet management, lift truck systems gather telematics about the driver's performance and the condition of the engine so little problems don't get bigger. "Inside the four walls," Maris says, "the questions include: 'What's my battery life? Will it last a full shift or part? Am I driving hard, lifting more, and how fast?'"

Unlike a tractor trailer driver, however, a lift truck operator is likely to exit the vehicle frequently to per-



form other tasks. "Understanding what is going on in the building, including real-time location systems (RTLS), ties into not just the warehouse management system, but the WCS," Maris says. "If you see all of a sudden you have a bunch of putaways in one area, and there's a traffic jam, the WCS can redirect an operator to avoid congestion."

In the old paradigm, lift truck staff dynamics are like a Battle of the Bands, where training issues and seasonal peaks and valleys hit hard. The new paradigm is instead very much like an orchestra, where a lift truck operator can interact with nearby equipment and systems or automatically trigger an action by proximity.

"Before, the conveyor systems might have been in sync with inbound and outbound flow, but the lift trucks and pickers were variables," Maris says. "Now, we can program what the day will be like based on standardization, or we can quickly adjust to keep pace with volume. This market will evolve very quickly."

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*Josh Bond is Modern's associate editor and can be reached at [jbond@peerlessmedia.com](mailto:jbond@peerlessmedia.com)*

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## Track and reduce your stretch wrap use

*Using a wireless monitoring system of stretch film weight can reduce your operation's downtime and costs.*

**By Sara Pearson Specter,**  
Editor at Large

**W**ith high-volume, automatic stretch wrappers unitizing up to 100 loads an hour, rare is the manager who isn't interested in controlling stretch film costs.

To help users keep tabs on how much stretch film is applied to a load, as well as to track usage (and expense) over time, Orion Packaging Systems offers the Sentinel stretch film monitoring option for use on their automatic stretch wrap machines.

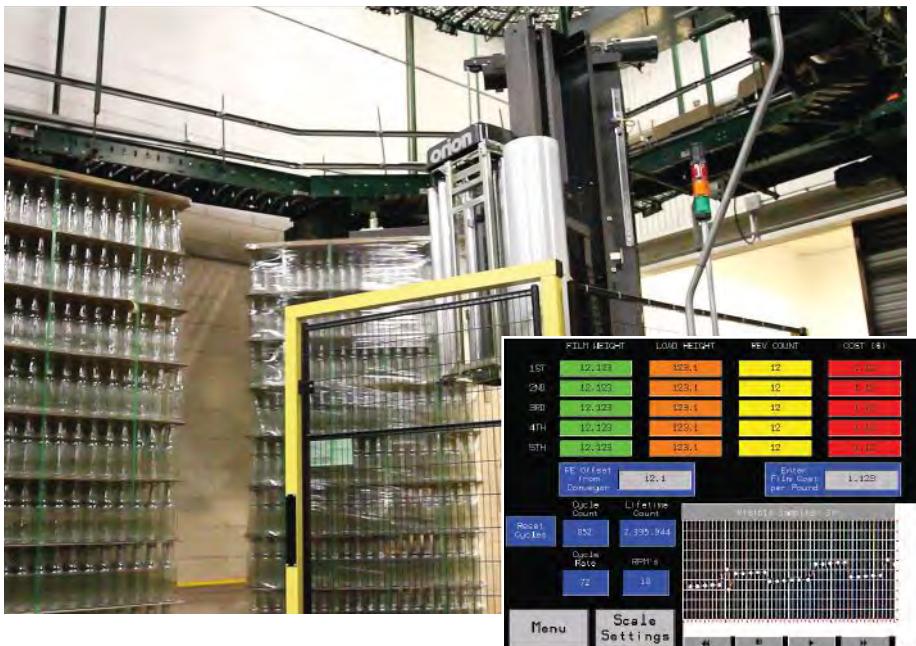
"We're not the first manufacturer to offer remote monitoring of film use, but our Sentinel system is the only one that physically weighs the film roll before and after the wrap cycle instead of calculating approximate usage based on revolutions," says Peter Vilardi, director of marketing at Orion Packaging Systems. "Weighing the film most accurately determines how much was used in unitizing each load."

The system includes a high-definition load cell mounted to the film carriage to weigh the roll and a wireless Bluetooth connection that securely transmits captured data to the machine's controller. The computer does the math and records the sum weight of film used.

At the machine, the display shows film use either by weight or cost. By monitoring each and every load wrapped, and verifying that the wrap pattern is consistent, it's possible for customers to reduce film gauge and reduce their overall wrapping costs.

"With a typical load using a half-pound of stretch film, and costing \$0.50 to \$0.75 to unitize, saving a few cents per load adds up quickly," Vilardi explains.

Further, the system sends e-mail or text messages to supervisors or maintenance personnel based on a



variety of triggers, including low film, film empty or emergency stop.

"These machines tend to be in unmanned areas, so if there's a film break it may take 15 minutes or longer to be noticed," he adds. "Alternately, if an operator sees the film is low, the roll might be changed prematurely for convenience—which wastes film. The monitoring system minimizes both downtime and waste."

In addition to collecting data locally, current and historic information from multiple machines in different locations can be tracked remotely, says Vilardi. "This helps users see trends or spot trouble, possibly caused by a change in machine settings or film type used," he adds. "The system lets a company gain a complete understanding of its unitizing costs."

*Sara Pearson Specter is an editor at large with Modern and can be reached at [sara@saraspecter.com](mailto:sara@saraspecter.com).*

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# Medline Industries embraces goods-

At the healthcare distributor's Libertyville, Ill., distribution center, mobile robots are handling totes, filling orders and enabling growth.

By Bob Trebilcock,  
Executive Editor

Up on the mezzanine level of Medline Industries' 600,000-square-foot distribution center in Libertyville, Ill., 47 mobile robots are in constant motion. The red bots travel back and forth across a grid, moving 27,570 plastic storage totes in and out of 37,750 storage locations.

Once a pick wave is released, totes are delivered to goods-to-person workstations, where order selectors pick items to order totes. In all, the system is managing 11,000 unique SKUs—primarily items that will require some kind of value-added service before they are packed for shipment.

This is the first North American implementation of the AutoStore technology (Swisslog, [swisslog.com](http://swisslog.com)), an automated goods-to-person technology first used in Europe to manage service parts distribution. Medline chose it for Libertyville—one of 42 distribution centers the distributor of medical and surgical supplies operates in North America—because it best met the unique order characteristics and volumes required at that location, which services customers in select zip codes of Illinois, Wisconsin, Iowa, Michigan and Indiana.

"We evaluated a variety of goods-to-person technologies," says Bill Abington,

president of global operations for Medline. "In our view, the sweet spot for this technology was 8,000 to 12,000 less-than-case lines per day, and at the time, we needed to do about 8,000 less-than-case lines per day."

Since going live two years ago, volume in the AutoStore has increased by 25%, peaking to as much as 12,500 less-than-case lines per day on some days. Yet, Medline has been able to accommodate the growth in volume without adding to its head count at the facility. And, the system displays images and a detailed description of the unit level to be picked, which led to an improvement in the number of defects per 10,000 picks (DPTT) in that area, adds Daniel Schwartz, Medline's director of engineering, operations. "Our extremely high accuracy rate improved as a byproduct of installing the system," Schwartz says.

More importantly, the system illustrates how new goods-to-person technologies, including mobile robotics, are meeting the evolving needs of distributors who are grappling with more piece picking, shorter windows to fill orders and a tight labor market. "As some places in the country experience a tight job mar-



# to-person picking



From left: Brian Bevers, vice president of operations; Will Ingalls, director of operations; Bill Abington, president of global operations; Paul Ancona, vice president of engineering; and Daniel Schwartz, director of engineering, operations.



Peter Wynn Thompson/Getty Images



**Mobile robots deliver totes to workstations, where associates are directed by lights and a photo of the item to be picked into a shipping container.**

ket and customers demand later cut off times, less-than-case volumes increase, then you have to look into automation,” says Abington.

### Moving goods-to-person

Of course, the goods-to-person concept is not new. Horizontal carousels and VLMs have been doing that for years. But the justification for those technologies was typically space savings.

Over the last five or so years, new technologies have come to market that take a different approach to the goods-to-person problem, including shuttles and mobile robots. The challenge has been convincing end users that the solutions are reliable, viable and can

deliver an ROI beyond the cool factor.

Enter Medline Industries Inc. Founded in 1966 with headquarters in Mundelein, Ill., Medline is the largest privately held manufacturer and distributor of healthcare supplies across the continuum of care in the United States. With more than \$7 billion in annual sales, Medline was ranked No. 62 on the *Forbes* 2014 list of largest privately held companies in America. The company's roots date back to 1910, when A.L. Mills, the great-grandfather of the current leadership, started sewing butcher's aprons in Chicago. The current CEO, COO and president represent the fourth generation of the Mills family to manage the company.

The Medline network features more than 40 DCs in North America and a total of 50 throughout the world, serving customers in more than 90 countries. It also counts 17 manufacturing facilities worldwide and a dedicated truck fleet with 400 MedTrans vehicles traveling more than 17 million miles each year.

Distribution centers like Libertyville serve as regional hubs that can provide next-day service to a vast customer base that covers the continuum of the health care industry, from hospitals, surgical

In June of 2009, *Modern* ran its first article on an emerging picking methodology that used a mini-load automated storage and retrieval system (AS/RS) to deliver a tote from storage to a workstation where an associate picked items into a shipping container.

Since then, goods-to-person picking has gone mainstream, and a variety of high-density storage technologies besides mini-loads are delivering those goods to a workstation.

*Modern* has been reporting on

the trend in several recent issues. In March, we described how e-tailer BHFO is using a mobile robotic solution from OPEX to pick apparel; April featured the Dematic multi-shuttle solution in use at AcuSport's Ohio DC; and in May, we detailed how Southern Wine & Spirits is using a unit-load AS/RS from Westfalia to deliver full pallets of wine and spirits to case pick modules.

This month, we round out the series with a look how Medline

Industries is using the AutoStore mobile robotic solution, provided by Swisslog, to distribute healthcare supplies from an Illinois DC.

While the industries and products are different, each company needs to pick a large volume of pieces or cases with a high degree of accuracy while meeting intense customer service level agreements and minimizing associate walk time. Goods-to-person technologies are delivering on all three.

centers and long-term care facilities to physicians' offices, big box retailers and retail pharmacies and labs. However, every DC in the network, including Libertyville, serves as a potential backup for another DC.

Medline's distribution and order fulfillment requirements are evolving. Hospitals used to receive large bulk case orders. Now they require small deliveries to hundreds of internal addresses. "As hospitals acquire physicians' offices and expand their services, we are becoming their central store room, shipping to both internal and external physical addresses for them," says Abington. While Medline's own fleet delivers the majority of orders, Medline still ships to tens of thousands of small customers who receive parcel or LTL orders daily. "Hitting order cut-off times for parcel and LTL shipments is critical because everything we do is next day," Abington says.

Those aren't the only changes in a complex order fulfillment environment. Today, a majority of orders are received within a two-hour window during the day—a challenge with those aggressive order cutoff times. There



**Totes are conveyed from the goods-to-person picking area to packing where they are prepared for delivery to a customer.**

can be a wide variation in demand: A nursing home with a new patient may order something that hadn't been required for months; or an outbreak of the flu may create a sudden spike in

demand for a vaccine. Some products must be temperature controlled. And, all of those changes have been exacerbated by an increase in "each" piece level orders. "Nine years ago, split case picking accounted for less than 20% of our line volume," Abington says. "Now,



**In the replenishment area, associates unpack incoming products and pack them into totes that will be stored in the mobile robotic area.**

### Slotting at Medline

Automation is not the only way Medline drives efficiency. The distributor is also a firm believer in slotting, according to Daniel Schwartz, director of engineering, operations.

The fastest moving items are slotted in a forward pick zone. Once a month, to increase picking efficiency, Schwartz's team runs slotting algorithms developed in-house to move pallets based on how often order selectors are visiting a slot.

"The big win is that it drastically reduces the travel time for our team members," Schwartz says. "Travel time per line is tracked closely and the engineering team is held accountable to improving this metric annually."

it represents more than 60% of the business lines.”

### Bring in the robots

The Libertyville facility came online in 2008 with best-of-breed warehouse management system (WMS) and RF picking capabilities. However, processes began to change to meet these new requirements, according to Schwartz.

A labor management system (LMS) and a robust employee incentive program were implemented, followed by voice-enabled activities including batch picking to cart. Soon, even that was maxed out; not only was Medline adding more SKUs, but associates were walking 4 miles to 7 miles a day in the split case modules. “We wanted to handle more orders, more SKUs and increase efficiencies without increasing our footprint in that area,” Schwartz says.

Goods-to-person appeared to be the best solution to meet both of those criteria. However, Medline would not automate just for the sake of automation. “We’re not a field of dreams,” Abington says. “We won’t put in automation and hope that the need follows.” The key, he adds, was matching the right solution to the volume and customer needs for the ideal automation.

To that end, the Medline team



evaluated a variety of goods-to-person technologies, including mobile robotics, shuttles and mini-loads, from more than 10 suppliers before choosing AutoStore as the best match for

**Faster moving items are palletized, stored and picked from a reserve storage area. An aggressive slotting program ensures that the fastest moving items are stored at the floor level to be easily accessible.**

Libertyville’s specific application, volume and ROI. Shuttles, for instance, were capable of handling higher order volumes and more picks per hour and Medline is even in the process of implementing shuttle technology at a couple other DCs. But the higher cost of the system couldn’t be justified based on Libertyville’s specific volume.

The solution offered at least two other benefits: The system can be enclosed and temperature controlled, both of which are important to Medline, and it’s easy to maintain compared to other technologies evaluated.

There were some challenges since not only was this the first implementation in North America, but the technology needed to be adapted to meet the unique requirements of the healthcare industry. For one, Medline worked with the system integrator to design and develop the workstations to allow one order selector to simultaneously pick from two donor totes into three customer totes to reduce latency between picks.

“The main focus in Europe, where we viewed the technology, seemed to be more on cube utilization than picking efficiencies,” Abington says. “A typical speed we saw was 120 picks per hour. By redesigning the workstation, we can pick between 220 and 320 picks per hour. Additionally, the cubic footprint of our picking grid uses almost a fifth of the cubic feet required in a split case pick module.”

Slotting also became an important issue—figuring out how many items can be in a tote and how many SKUs should be in one of the 37,500 storage locations to reduce the number of moves required of the robots for replenishment. The software had to integrate with Medline’s enterprise resource

### Communicate, communicate, communicate

Medline laid the ground work for launching the mobile robotic solutions months before going live, according to Will Ingalls, director of operations at the Libertyville facility. The key, he says, was to over-communicate. “The No. 1 question I got from team members was about their job security,” Ingalls says. “We assured them that any downsizing would occur over time and that we’d do it through attrition and not through layoffs.”

In fact, Ingalls adds, the status of the project became a standing talking point in his DC meetings. “We shared our plans for the system, how we were progressing and the go-live date,” he says. “We made

good on our word about layoffs and that gained credibility with the employees.”

Communication is a two-way street at Medline. At a computer kiosk in the break room, employees can send an anonymous e-mail with praise—or criticism—to any member of the senior management team without worrying about reprisal. Management also offers cash rewards for innovative ideas and creates advancement opportunities for hourly employees. “Sixty percent of all salaried jobs were filled by hourly employees,” Abington says. “That’s part of our culture: We want our employees to feel as if they are part of something different.”

planning (ERP) system and WMS, and it had to be tweaked with each redesign of a process. “One of the benefits of being a first implementation is that we had the ear of the system integrator,” Schwartz says. “They are helping us grow with the system.”

The system went live two years ago. To get it up and running, Medline took a slow and methodical approach to the implementation, moving in one busi-

ness unit at a time, adjusting as needed and then moving in the next business unit. “Every time we added a business unit and increased the volume, we would learn where the latencies were and we could improve the system and our processes,” Abington says.

After two years and one expansion, Abington says the solution is meeting Medline’s needs in Libertyville. “It has allowed us to continue to increase

our cutoff times, expand our product offering in a temperature-controlled environment and cover our expanding customer base,” he says. “And it’s allowing us to challenge the norm and continue to drive a world-class supply chain that benefits our customers and differentiates our business. As a result, Medline is continuing to install AutoStore technology in two additional sites.” □

## Embracing robotics and streamlining fulfillment

Goods-to-person picking is just one of the processes that allows Medline to meet its customers’ stringent requirements.

By Bob Trebilcock, Executive Editor

### Medline Industries Inc. Libertyville, Ill.

**SIZE:** 600,000 square feet

**PRODUCTS:** Medical surgical supplies

**THROUGHPUT:** 20,000 lines per day

**SKUs:** 32,000 SKUs on-hand

**SHIFTS PER DAY/DAYS PER WEEK:** 3 shifts per day/  
5 days per week

**EMPLOYEES:** 144 employees

At its 600,000-square-foot distribution center north of Chicago, Medline has installed a high-density mobile robotic storage and picking solution for goods-to-person picking and value-added services. Other areas of the facility use conventional processes, such as case picking to pallet and voice-enabled pick to cart.

**Receiving process:** Pallets are unloaded at the receiving dock (1) and staged (2) for a piece count. Once verified, the new inventory is scanned into the warehouse management system (WMS). The WMS creates license plate bar code labels, which are applied to the pallets. They are ready for storage.

**Putaway process:** The WMS directs the putaway process into pallet rack in the reserve storage and case picking area (3). Storage is located above the case picking levels in the pallet rack. Typically, this is done on a first-in/first-out basis. When the license plate bar code is scanned, the system directs the

lift truck operator to a storage location. Putaway is confirmed by scanning the location bar code label. The inventory is now available in the WMS.

**Replenishment:** Medline uses a replenishment tool to replenish an estimated 400 items per day in the AutoStore robotic picking system (4). The WMS prints out bar code labels for the replenishment. Team members pick the cases to a pallet that is delivered to an induction area. There, an experienced team member scans the case bar code label and decants the items into the storage and picking tote. Those totes are then inducted for putaway into the mobile robotic system.

**Slotting:** To ensure efficiency, Medline also uses reslotting to evaluate the velocity at which specific SKUs are moving through the facility in the reserve storage area and in a two-level, split case picking module (7). The fastest-moving items are placed into the most accessible pick locations. Slotting

is done monthly for case items and weekly for split case items.

**Picking:** There are a variety of picking methodologies, based on the characteristics of the order.

**Mixed or full pallet case picking:** LTL orders are shipped as full or mixed pallets. Order selectors are directed by voice to the right location in the reserve storage and case picking area (3), where cases are picked to a pallet. Once the order is complete, the pallet is delivered to shipping (5). There, a “follow the leader” module supports the marrying up with SKUs that have been picked in another zone. Once all items are on the pallet, it is stretch-wrapped and any required shipping documentation is printed out for the order.

**Parcel case picking:** During the parcel picking process, associates are directed by voice and pick cases (3) to two pallets at a time. Once the pallets are as full as possible, they are delivered to shipping (5). Some cases will be

labeled for shipment; to optimize parcel shipping rates, some cases will be conveyed to parcel shipment processing (6) for post-picking services required for distribution.

**Split case picking mezzanine:** Some split case orders are picked in a two-level, split case picking mezzanine (7). Order selectors are directed by voice to a pick location. After reading back a check digit, they are told how many items to pick to one of 16 orders on the cart. Once the orders are complete, the cart is delivered to a packing station (8). Some items will be conveyed to a print-and-apply station, where they are labeled and ready for shipment. Others are delivered to a pack station, where they are put in the right sized shipping box and any required dunnage is added before labels are applied.

**AutoStore pick:** The WMS drops orders to the AutoStore (4) software system about half an hour before picking begins. With that information, the mobile robots pull totes required for that wave,

and deliver them to a conveyor. Once an order selector logs into a workstation, totes are presented to the order selector. A light shows the bin location in the tote that contains the item required and the number to be picked is displayed on an LED.

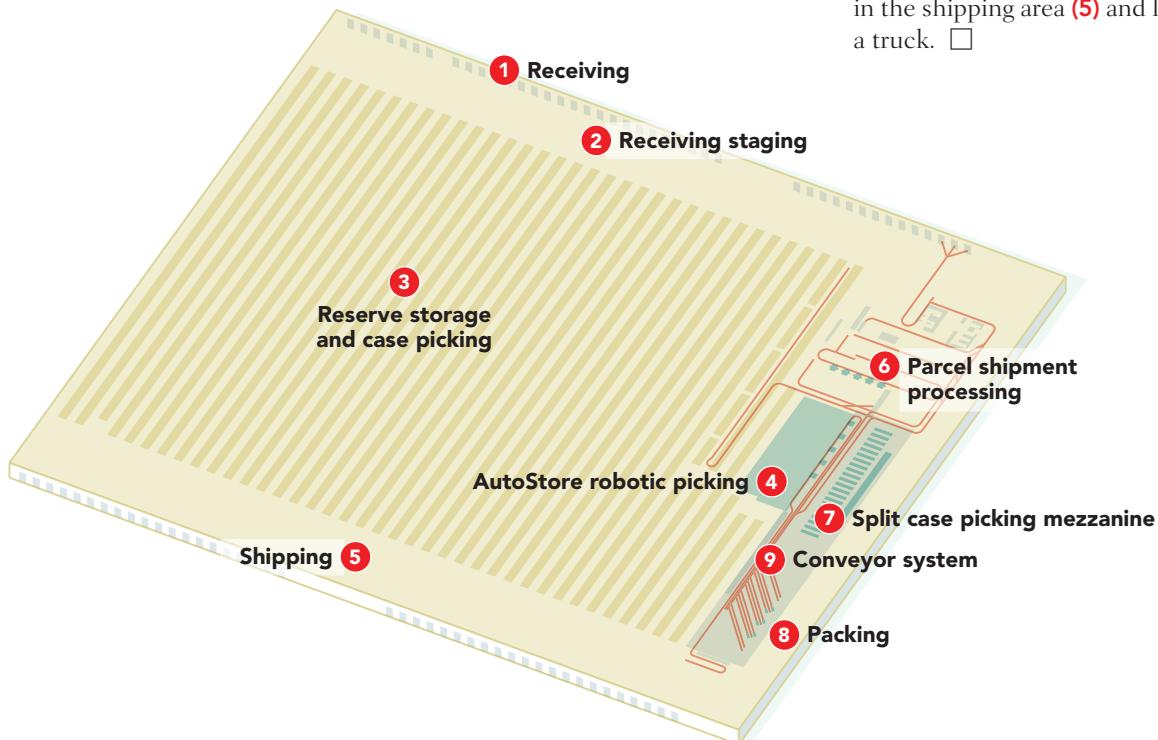
The order selector may also perform value-added services, such as placing loose items in a plastic bag, capturing a serial number or placing protective liners in a tote destined for an operating room. Once the items are picked, the order selector presses a button to confirm the pick. The donor is automatically conveyed (9) back to the storage area, where a robot puts it away. Once all the items in an order tote have been picked, it automatically exits the workstation and is conveyed (9) to one of six pack stations (8). Any order that will be shipped in that

tote goes to a print-and-apply station. Otherwise, the contents are placed in a shipping container and sent to the right shipping location. For instance, it may be married up with an LTL order, sent to the banding station in parcel shipment processing (6), or delivered directly to shipping (5).

**Shipping:** Once orders are picked and packed, they are sorted or delivered by lift truck to the right dock door in the shipping area (5) and loaded onto a truck. □

## System Suppliers

- MOBILE ROBOTIC ORDER FULFILLMENT:** Swisslog
- WMS:** Catalyst by Aptean
- LABOR MANAGEMENT SYSTEM:** Tom Zosel & Associates (TZA)
- CONVEYOR:** Intelligated
- MOBILE COMPUTING AND RING SCANNING:** Motorola Solutions
- VOICE RECOGNITION:** Lucas Systems
- LIFT TRUCKS:** Raymond and Associated Material Handling
- BATTERIES:** EnerSys
- MEZZANINES:** Wildeck
- RACKING:** Unarco
- WIRE DECKING:** Worldwide Material Handling
- POWERED TRAILER LOADER:** Caljan Rite-Hite



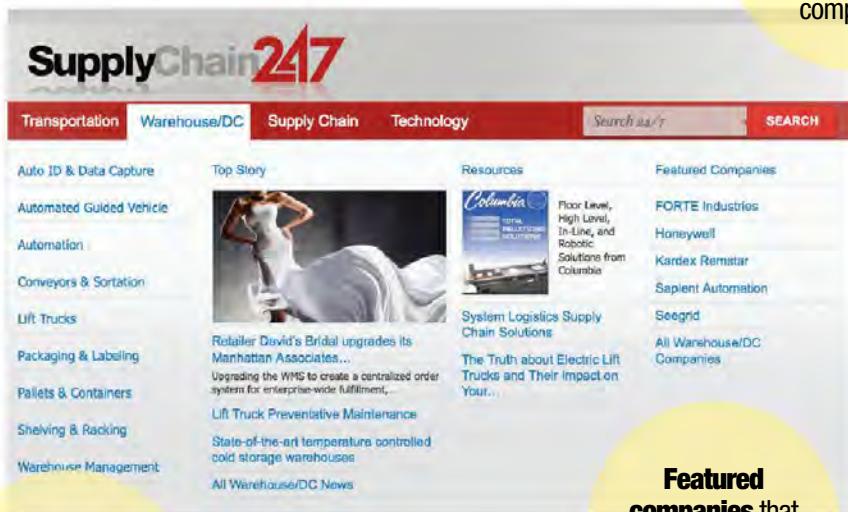
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# Cisco's warehouse of the future

**Cisco says the warehouse of the future will focus on automation and integration across the supply chain. That doesn't necessarily mean automated materials handling.**

By Bob Trebilcock, Executive Editor

**A**t ProMat this year, I spoke to a major retailer who made a provocative statement: Forget all the cool automation on the show floor. He viewed that as a commodity. What he wanted was intelligent software that could give him more real-time information about more aspects of his operations than he was getting now. "I think suppliers need to stop thinking of themselves as hardware shops and start thinking of themselves as software shops," he said.

That sentiment strikes a chord with Jack Allen, senior director of logistics and manufacturing solutions for Cisco. "I walk through a lot of warehouses where people are enamored with the mechanical technology," Allen says. "But, in our view, it's not about mechanical automation: It's about software."

As one of the companies that provide the

hardware, software and systems that connect to the Internet, it should come as no surprise that Cisco is focused on the Internet of Everything, or IoE. This is the idea that all of the machines, equipment, gadgets, appliances and things we use in business and our daily lives will be connected to the Internet. IoE is more than just connecting things, it's about connecting things, people, processes and data in a way that's usable and useful.

The idea has supply chain implications—if trucks, conveyors, lift trucks, packages, pallets, people, suppliers and customers can all communicate, there's an opportunity to rethink the way we do things. For that reason, Cisco is in the process of remaking its own supply chain processes for the Internet of Everything, and they call it Cisco's connected supply chain and logis-



tics of the future.

Included are plans for the warehouse of the future. But when Allen and his colleagues talk about a much more automated warehouse, they're not necessarily talking about materials handling automation. Rather, Cisco is thinking about ways to automate decision-making and mundane processes that are currently done by people.

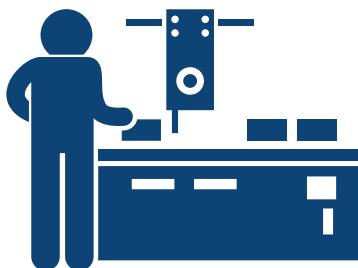
And, it's more than just software. The warehouse of the future will also use sensors, data collection technologies, analytics as well as smart, connected machines that can communicate more information from more nodes in the supply chain. Put them all together, and you end up with a supply chain that can automatically take actions up and down the supply chain—including inside the four walls of the warehouse—to respond when events occur.

"The value is in the integration of the pieces of the supply chain, what we call the value at the seams," Allen says. "It's having access to the information between areas like manufacturing and distribution, shipping and the customer or this silo and that silo."

Allen uses the example of the Japanese tsunami to illustrate how that might work. "When the tsunami hit, you had a lot of people going through spreadsheets to find out that the material to build the components to build the subassemblies to build the thing that they needed were actually coming from only two suppliers—and they were both in Japan inside the affected

zone," Allen says. "They had to get on the phone and scramble to find supply."

In a connected supply chain, the system might analyze unstructured data from external information, such as Twitter, and conclude that the tsunami was going to disrupt supply. It would then automatically migrate orders to factories outside the impacted area or send orders to warehouses that have



inventory. "You're going to speed up trucks already in route to avoid a problem; you're going to stop trucks that haven't moved yet; you're going to issue POs to your secondary source of supply; and you're going to expedite those orders by putting them on planes," he says.

The most important aspect of that scenario: It will all happen automatically. People will only get involved to handle the exceptions that cannot be addressed by the system.

To do that, Allen adds, you have to have sensing technologies to know where your trucks, inventory and orders are located; and you have to have the methodology to speed up or slow down your order fulfillment processes. "Ninety percent of that is information and not the mechanical movement," Allen says. "That's why we believe the future will be as much about the movement of data as it is about the physical movement of goods."

He adds, "In the big picture, that's where we want to go."

### It's not new

In many respects, the industry has been talking about global visibility, col-

laboration and event management for years. Moreover, the tools of Cisco's trade, such as sensors, RFID, RF, data collection technologies and supply chain software are already on the shelf. What's new, according to Allen, is the integration of these tools to create new and innovative processes. "If you think about it," he says, "the touchscreens and the user interface in the first iPhone weren't new either. The secret sauce was in how Apple put it all together," he says. "That's what we want to do in the supply chain."

It takes a layered technology model to make all of this happen. The first layer consists of edge-sensing devices that gather structured and unstructured information from across the supply chain. Structured data would include information generated by a system such as a purchase order, confirmation of the receipt of a shipment or a wave of orders created in a warehouse management system (WMS). Unstructured data might include weather or news reports, social media and trend analytics about events that could disrupt operations. That could be everything from the Japanese tsunami to the bankruptcy filing of a critical vendor.

The second layer analyzes that information and makes decisions about what needs to happen next based on rules and protocols. That way, only the exceptions that fall outside the rules have to be handled by people.

The third layer includes the execution systems, like warehouse and transportation management, that put plans in motion and route orders to where they need to go. This is facilitated by workflow, decision support and intelligent agents in a machine-to-machine, management-by-exception environment.

One of the critical components in this model could be the lowly pallet. It's already a platform for the physical movement of goods. Cisco is also viewing the pallet as a platform to collect, carry and communicate information about the movement of goods. In



this scenario, every pallet would be equipped with some kind of a sensing device that can be populated with information about the shipment and automatically updated and read as the pallet moves through a manufacturing plant, distribution center or transportation hub. Something similar could be applied to assets like forklifts in a facility or trucks on the road that would allow them to be tracked. Allen says Cisco is still trying to determine whether that technology should be some kind of a bar code, RFID tag or other sensing device.

### Warehouse of the future in action

The point, however, isn't just to track the location of a pallet, a container or a lift truck. Instead, it is to use these technologies to connect warehouse and logistics processes in innovative ways.

Some of this is already happening at organizations other than Cisco. In Frankfurt, Germany, for instance, Lufthansa Technik Logistik Services, or LTLS, has built a highly automated distribution center to expedite the delivery of spare parts and components to repair an aircraft that has been grounded for repair. The facility includes a mini-load automated storage and retrieval system (AS/RS) that stores 30,000 parts and components and automatically delivers them to a packing station. When LTLS has a required part in stock, it can have an online order ready to ship within 15 minutes of commitment to the customer.

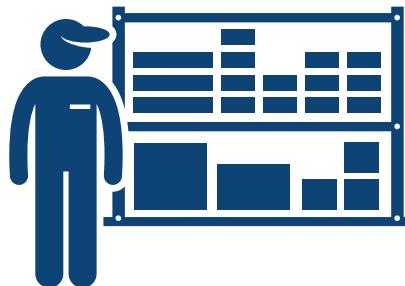
The backbone of the facility, however, is a unique set of software solutions that includes enterprise resource planning (ERP), transportation planning and a collaboration portal for customers and logistics providers. The system automates the time-consuming process of validating whether LTLS can meet a customer's service level requirements. In the past, when a customer called with an expedited order, specialists had to get on the phone to confirm that the part was in stock, determine when was the next available flight to



Jack Allen, senior director of logistics and manufacturing solutions for Cisco

the airport where the repair would take place and check on the availability of couriers to pick up and deliver the part. In all, it could take 48 hours from the first phone call to get a part in the hands of a repair technician.

Today, those steps are automated. Customer orders are received electronically. The system then checks to see if the part is in stock and evaluates all



of the available transportation options to meet a service level requirement. If the order is a go, it then automatically creates a transportation plan based on the cheapest option to meet a customer service requirement, schedules the delivery and sends an electronic order

to the warehouse, which initiates the order fulfillment process in the mini-load AS/RS. Along the way, the system communicates with the airline ordering the part and monitors the logistics process for any exceptions that would delay delivery.

As a result, LTLS can now reach any airport in Europe within 12 hours of receipt of an order and reduce transportation costs.

### Cisco's warehouse of the future

Cisco is similarly using automatic data collection technologies and the cloud to change the way it manufactures and distributes set top boxes to cable customers. Each box is uniquely tied to a key that allows a customer to unlock the box when it's installed in a consumer's home. "If you don't have the key, the box is a brick that can't be unlocked," says Allen.

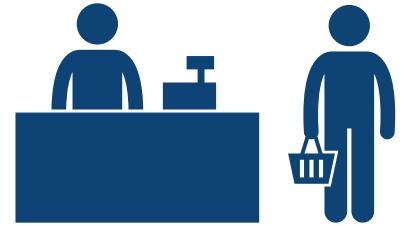
In the past, information about the set top box was collected and managed manually in a time-consuming method. Now, the process is done automatically. The original manufac-

# THE BIG PICTURE

Where Business Meets Materials Handling

turer sends identifying information about each box to Cisco's manufacturing execution system (MES) and automated test system. That data is then fed to secure sites in the cloud where key information is stored.

When the boxes arrive at a Cisco location, the serial numbers don't need to be scanned—they were scanned once at the manufacturer. All that needs to be scanned are the pallet IDs (license plates), which are scanned into the



system and sent to the cloud where they are married with the keys for all of the serial numbers on that pallet. Later, when Cisco builds an order for a customer, the license plate bar code on a pallet provides a link to the information in the cloud for all the set top boxes in that order.

"When we send it to a customer, and they scan the license plate bar code, all of the key information they need for the boxes on that order is pulled down from the cloud and goes into their billing system," says Allen. In the past at Cisco, he says, every box had to be manually scanned, multiple times, by Cisco and its customers. "The physical process isn't new," he says. "People have been scanning license plate bar codes for years. What's a model for the future is the process to use the data."

In the warehouse of the future, Allen envisions using data coming from pallets in other innovative ways. For instance, a warehouse could receive information from a carrier about the delivery of a pallet needed for a hot order. The warehouse could then pull together and stage the other items needed for the order in locations equipped with lights with an IP address.

When the hot pallet is scanned at the receiving dock, a lift truck driver would get a signal to go to the dock to get the pallet. The driver could then go to the lit storage locations to assemble the rest of the order. Meanwhile, the system could automatically schedule the outbound transportation for that order and notify the customer that it's on its way. "Bar code scanning isn't new," Allen says. "But the process is new."

"I believe we're at a major cusp of another wave of disruption, another wave of productivity in the warehouse," he adds. "In a connected world, we're going to be much more intelligent about how we do things and use things." □

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# A peek into Goodyear's ergonomic sandbox

An inside view of the ergonomic strides that one international manufacturer is making in its plants and warehouses.

By Bridget McCrea, Contributing Editor

**A**s the vision of a fully ergonomic warehouse or DC comes into clearer view, an increasing number of companies are putting time, money and effort into decreasing the number of musculoskeletal injuries that impact their workers' backs, knees and upper extremities. In many cases, such accidents are caused when individuals handle materials, apply force, adopt unusual postures, and/or endure long work hours with few or no breaks.

Defined as the science of fitting jobs to the individuals who work in those positions, workplace ergonomics help reduce the level of physical stress that's placed on workers' bodies and the negative impacts of those stressors (i.e., tendonitis, carpal tunnel syndrome, and so forth). By focusing specifically

on the work environment plus the various components that comprise it (workstations, controls, tools and lighting, to name just a few), ergonomics ensure that the surroundings truly do match the individual employee and his or her physical traits, capabilities and even limitations.

At Goodyear Tire & Rubber Company of Akron, Ohio, workplace ergonomics and safety go hand in hand. With 51 plants operating in 22 countries, Goodyear stands as one of the world's largest tire companies, with operations in most regions of the world. Together with its subsidiaries and joint ventures, Goodyear develops, markets and sells tires for most applications. Two years ago, the company rolled out a new ergonomics program at its Fayetteville, N.C.,

plant, where a "push, pull, lift" campaign was put into place.

Glenn Washington, ergonomics coordinator; Mike Welsh, plant health and safety manager; Frank Murray, on-site physical therapist; and Eldon Fink, director of health, safety and environment, talked to *Modern* about the initiative and the strides that Goodyear is making in its effort to develop and run ergonomic workplaces.

**Modern:** What was the "before" picture at Goodyear's Fayetteville plant that prompted the company to implement an ergonomic initiative in its warehouse/DC?

**Goodyear:** In the fourth quarter of 2013, the safety team at Goodyear's Fayetteville plant, led by Washington





Illustration by Daniel Hertzberg

and Welsh, was instituting a “push, pull, lift” campaign. Geared toward educating hourly associates on how to use best ergonomic practices to perform pushing, pulling and lifting motions while on the job, this campaign had several unique components.

First, the natural working environment (e.g. the plant floor) was used for demonstrations on how to best execute tasks while implementing the proper ergonomic techniques. A second unique component is the demonstrator. Volunteers from the hourly workforce stepped forward to act as safety coaches—individuals who spent dedicated time with Washington and Murray, each of whom showed each volunteer how to use ergonomic best practices while on the job. The team

took pictures of proper and improper techniques, and safety coaches were empowered to make “in the moment” corrections of colleagues using push, pull and lift motions.

**Modern: What were the results of the campaign?**

**Goodyear:** The campaign was considered a great success as teams stayed engaged and involved in the process throughout the three months that it ran. The result was an 80% improvement in ergonomic form, which we attribute to colleagues’ ownership of the program and leadership empowering the change. Associates recognized the contributions that this type of training made to their wellbeing, and the need for a hands-on training area became apparent. Thus,

the concept of the ergonomics sandbox was born.

The ergonomics sandbox in Fayetteville now features several hands-on training modules, which were developed at little to no cost to the plant. For example, a lever with a 45-pound spool of fabric attached to the opposite end is used to show how keeping weight close to the body when lifting is a less strenuous, ergonomically beneficial way to lift heavy loads. Similar exercises involving mock pieces of machinery are also available for associates to use in hands-on training.

**Modern: What else can you tell us about how the initiative was rolled out and the various tools or strategies that were incorporated?**

**Goodyear:** The ergonomics sand-

box started as space on the manufacturing floor that was sectioned off for hands-on training. At first, the space was sanctioned for use by the tire assembly associates. (Tire assembly is one of five business centers within the manufacturing facility where various tire components come together to make the tire. Once assembled, the tire is sent to a curing press where the rubber is molded with a tread pattern, and the rubber is cured.) After three weeks of training, other business centers were asking for the opportunity to include training for their associates within the ergonomics sandbox.

**Modern:** Has the initiative expanded or grown since inception?

**Goodyear:** As demand grew, the need to keep the sandbox relevant grew as well. Since its inception, other hands-on training modules have been placed in the sandbox for the purpose of replicating ergonomic movements that are conducted when working on a machine. The increased visibility of this type of training also heightened associate demand, leading to the addition of ergonomics training for all new hires. Currently, the plant is working to provide ergonomics sandbox training across its approximately 2,000-person workforce.

**Modern:** How did workers respond to this initiative?

**Goodyear:** The concept of hands-on training that provided knowledge easily transferrable to daily tasks created a groundswell of attention. Associate engagement in the process was bolstered by the presence of safety coaches—associates who volunteered their time to participate in in-depth training, which they then used to help train others. These individuals used their credibility with colleagues to drive change and wellness on the plant floor. To date, there are more than 90 safety

coaches—a team comprised of associates from all four shifts.

**Modern:** Can you talk about your on-site physical therapist and his role in the project?

**Goodyear:** Assisting the safety coaches was Murray, a physical therapist who also owns his own company, Industrial Motions Inc. He and a physical therapist's assistant are available throughout the week, both day and evening, to provide training to any associate who may be interested. Murray has taken training a step further, by conducting one-on-one sessions with

associates at their machines, analyzing their movements and providing real-time feedback on how to improve.

As we continue to identify ways to improve associates' safety and physical health while on the job, it became apparent that visible, hands-on training would be key to

associate engagement in the sandbox. Metrics were put in place to measure the effectiveness of this strategy, which resulted in overwhelmingly positive feedback.

**Modern:** Were Goodyear's goals met?

**Goodyear:** In the recent past, Goodyear implemented a plant optimization initiative that focuses on holistically improving a plant's performance through focus on several key areas, one of which is people and environmental care (PEC). The PEC team now holds meetings with Washington and Welsh during which they study certain tasks conducted on equipment and then conduct specialized training for hourly associates. Plant optimization is a process owned and instituted by Goodyear as a corporate initiative, however, plant associates have

taken ownership of the process through their work in the ergonomics sandbox; in turn their involvement drives the plant optimization process within the plant. Lastly, associates continue to drive the process through their submission of new ideas or desired training requests to suggestion boxes located on the plant floor. Washington (who arrives at 5:30 a.m. every day to accommodate night shift workers) takes these ideas to the PEC team, and works with engineers to involve them in the generation of new ways to solve problems that are submitted.

**Modern:** What role has the sandbox played in helping lower ergonomic risk?

**Goodyear:** The sandbox was fully developed by March 2014, with additions being made based on associate suggestions on a regular basis. Vendors and visitors to the plant were the source of encouragement for the plant to enter the project for recognition by external parties. This training center helps by acting as a visible reminder to Fayetteville associates on how to best conduct certain tasks or perform certain motions. Safety coaches, and Murray's on-site support also provide opportunities for associates to seek out assistance in real time and to have

ergonomic issues addressed quickly. When an associate heals from an injury, for example, and comes back to work at the plant, he or she is required to walk back through the sandbox before re-entering work. This helps to strengthen muscles that are used during their workday, and helps

the individual to remember proper ergonomic techniques.

**Modern:** What are the challenging aspects of this initiative? Was there anything you had to work through?

**Goodyear:** Bandwidth. As the training grew in popularity, the demand



from each business center to have associates walk through the sandbox also grew. With speed being the name of the game, Murray and his team were challenged to conduct effective hands-on training, while still keeping group size small enough to keep all participants engaged in the process. The newest opportunity will be to have the roughly 2,000-associate workforce go through the training, as well as new hires. Additionally, the plant has extended the opportunity to contractors in the recent past.

**Modern: What benefits has Goodyear received from this initiative?**

**Goodyear:** Through learning proper ergonomics techniques and controlling movements, plant associates have been able



to reduce incidents, while seeing a simultaneous reduction in the severity of incidents that do occur. Other benefits attributed to the sandbox hands-on training include increased participation in ergonomics training, engagement in the training and associate ownership in transferring the knowledge they gain into their daily activities, and sharing of this knowledge with their colleagues. Associates have started to stop by on their own time, including coming in before shifts or staying after to participate in the training, or walk through a movement with the physical therapy staff. As skill has increased, enthusiasm has become apparent, and suggestions continue to roll in for expansion of the sandbox.

**Modern: What advice would you offer another company that wants to roll out this type of initiative in its own facility?**

**Goodyear:** Seeing is believing, so engage people in a visible hands-on process, says Fink. When people had the opportunity to experience training in a tactical way, they were more likely to take ownership of the process, and advocate for it with their colleagues. Keep training classes small so all participants have the opportunity to understand, learn and remember. Capitalizing on that sentiment, Washington emphasized using associates as advocates. Target jobs that involve significant ergonomic strain and provide guided training to associates on those jobs. This will result in immediate return on investment, and you can see the improvement almost equally as fast. □



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# Replenishment: The next big target

As the pull of consumer demand replaces the push of the traditional supply chain, the replenishment function is being pulled in more than one direction. Following successes in pick optimization, the industry is turning its attention to reaping the benefits of refined replenishment.

By Josh Bond,  
Associate Editor

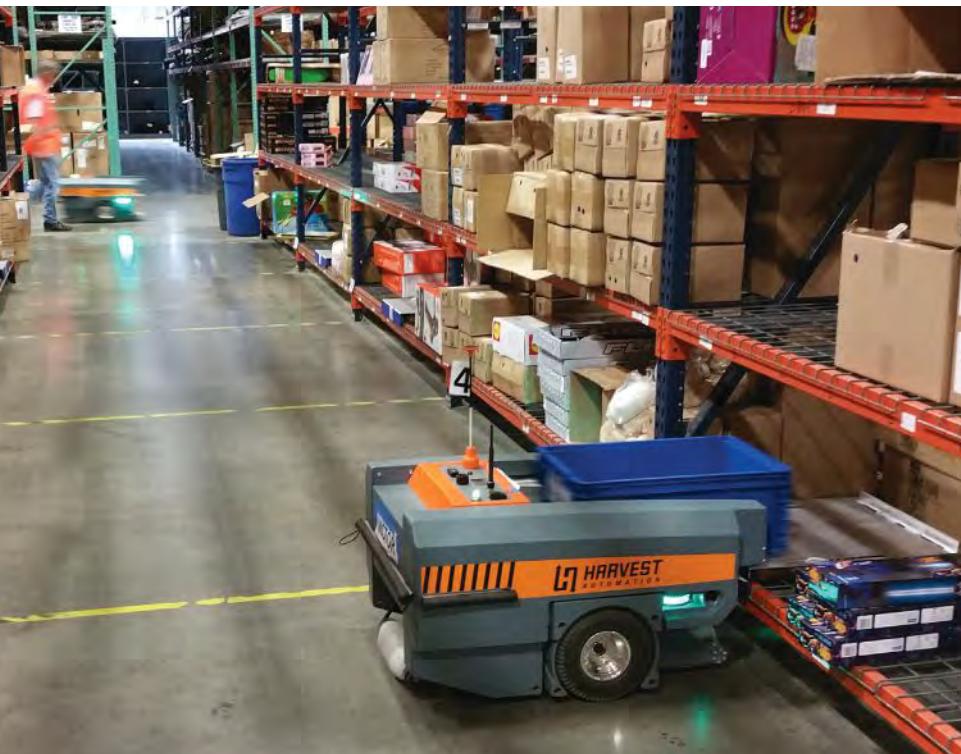
Once seen as merely a cost of doing business, warehousing and distribution are rich with potential competitive advantages. For a time, replenishment from reserve to forward pick faces was the

new necessary evil as attention to picking productivity intensified. Now, companies are adjusting to e-commerce and a broader need to fill more precise orders on a more frequent basis. Each product movement and touch now faces tremendous scrutiny, and their impacts can inform processes within the facility as well as the wider supply chain.

According to Richard Rodgers, director of solution development for Dematic, “Historical best practices were economically driven, with each level in the supply chain asking, ‘What’s easiest for me? What can I get away with, and what will my customer put up with?’ Everyone managed to evade as much cost, labor and effort as possible.”

Suppliers used to control what they manufactured and when they shipped it, with an eye toward economies of scale. “Whether retailers or consumers, downstream customers are now driving the bus, not the manufacturer,

**Automation can support replenishment and pick productivity by increasing SKU accessibility throughout a facility.**





and it has completely inverted the supply chain of command,” Rodgers says. “Before everyone got smart about carrying all the costs related to inventory, suppliers would load up a buffer and send single-SKU truckloads of goods. The warehouse just needed to figure out how to store it.”

There’s a lot more to figure out these days, but the experts *Modern* spoke with for this article agree the replenishment function is a good place to start. After all, the small transactions

between reserve storage and forward pick areas often mirror the larger relationship between nodes throughout the supply chain. The traditional, linear flow of product from manufacturer down to store shelf has been disrupted by consumer demand to “buy anywhere, ship anywhere.” Inside the four walls, a case might move from receiving directly to a pick face, to another truck, to a value-added service or packing station, or any combination of those. It might even make sense for the manu-

**Having updated their picking processes, many operations are now looking behind the pick face to improve replenishment.**

facturer to skip the DC altogether and ship direct to the consumer.

“Replenishment gets less attention than order picking,” Rodgers says. “Everyone is laser-focused on pick productivity, and replenishment tends to be a less high-profile or less automated area. But, it is the next target.”



**Real-time capabilities prevent replenishment tasks from becoming outdated in a lengthy queue.**

### **New key performance indicators**

Those who have spent some time tightening their picking processes won't have to go far to find that target. Although it occurs right behind the pick face, replenishment is often painfully divorced from picking processes. Luther Webb, director of operations and solutions consulting at Intelligrated, offers an example.

Say a carton flow rack location can hold 15 units, but there is now demand for 16. The system might quickly re-profile the location to show 16 units available for picking, but the stocker will put the extra item on the floor behind the location, or maybe in a secondary reserve area. Either way, Webb says, at some point the picker will wonder where 16 is, and someone has to

manually find it. Even with timely and efficient replenishment, a single unit has now wasted lots of time and effort. The effect is almost the same as if the 16th unit had never been brought forward. Webb suggests such stock-outs or "hot replenishments" should never be higher than 3% to 5%. More than 30% can mean trouble.

"Traditional techniques were manageable until the SKUs got out of hand," says Eric Lamphier, senior director at Manhattan Associates. "There were all these established KPIs like the ratio of reserve to pick, and the presumed synchronization of processes has been the default way it was done. For years it seemed like some kind of art form to issue a replenishment closely with a pick task, but with e-commerce our

customers now want batch algorithms that support single-item slotting in batches of one in real time."

Without even basic software to manage replenishment functions, DC operators of the past would try to keep as much stock as possible up front and only reserve if they had to. "Today people still make pick locations big so they don't have to replenish often—because they can't do it well," says Michael Howes, vice president of software engineering and service for Forte. "Previously, when you created a task, it sat in the queue for hours. The quantity never changed but picking continued. If the need changes from 100 units to 130 at the last second, you've created and delayed the next replenishment task."

With next-generation replenishment software, the ideal quantity is retrieved at the last possible second, goes to the best location in the best quantity, just in time. "You literally couldn't have done any better," Howes says. "Ballpark, with that kind of system, you will see half the travel time for replenishment pickers as compared to what we would expect to be normal travel with modern systems."

Customers are also looking to evaluate replenishment labor as a percent of total labor and identify its cost per case moved. Managers might like to stay below a certain number of SKUs or stock-outs as a percent of units shipped. "That's fine, but say you have a large percentage of stock-outs, but it's for inexpensive items with small margins," Webb says. "This is the idea of scoring tasks, and it can go beyond the value of merchandise. If you run out of a promotional product, the cost of that item is one thing, but the value of your promise to customers is another."

Replenishment might be a non-value-added step, but optimizing it can prevent value loss. "You can look at how to get 'free' replenishment through inventory analysis and task interleaving, since it doesn't cost anything to complete a task while I'm there," says Jim Barnes, CEO of enVista. "Or you could



**Instead of discrete tasks and roles, cross-training could soon become the norm.**

tend to think of replenishment as an inbound operation. Take in and put there,” explains Dibyendu Ghosh, vice president of product development for Softeon. “There’s much more to it. Software can bring demand-driven replenishment, dynamic replenishment, cross-docking or direct-to-pick during putaway. The dynamic nature keeps increasing, and it no longer makes sense to hold a pile of inventory, but many keep doing just that.”

The key to replenishment is constant monitoring, Ghosh says. “Am I doing the right thing right now? Has product velocity changed?

Have product dimensions changed? Is it slotted in the right place? Is it a seasonal product? The logic behind these systems should be flexible enough to accommodate seemingly simple changes that can clog up a process.”

“It’s very simple to bring a case forward from reserve, but say you need to present it to the picker with the box top cut off, or empty the product into a tote,” says Brian Lindenmeyer, principal solutions consultant for IBS (International Business Systems). “Some systems can skip zones, but what if it makes sense to bring a full pallet directly to pack-out?”

For example, if 100 orders of the same teddy bear are bound for 100 different customers, whether the pick face is carton flow or a pallet location, it is not ideal to send 100 pickers to that location. Instead, Lindenmeyer says, a full pallet can be processed at the packing location.

design and slot a facility with the goal of eliminating replenishment altogether.”

Barnes offers the example of a customer that used to move net 26 full cases per man-hour. “They could have replicated their previous facility, a \$7.5 million project with lots of conveyor, three pick modules, a shipping sorter, a routing sorter,” Barnes says. “In the new facility, they now touch each case only once, and with the no-replenishment approach they’re now well north of 135 cases per man-hour.”

**New paths to productivity**

To accomplish that sort of velocity, many companies rely on an array of picking technologies—from automation to voice to light-directed to wearable scanners—to establish a baseline of accuracy. This also means associates can pick and replenish simultaneously, work with dynamic SKU locations, and generally touch and move items with minimal fear of introducing errors.

In addition to cross-training, you need a strong software foundation to efficiently coordinate all these tasks, whether that be a warehouse management system, warehouse execution system or other slotting module. “Some

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“The concept of direct-to-active has been supported in various flavors for some time,” Lamphier says, “but e-commerce makes operations get more aggressive about finding those opportunities.”

There is another side to that coin. Although it often makes sense to move as much product as you can while you are there, more is not always better. If you are expecting 20 orders for car seats in a given shift, it is not ideal to move all 20 forward in the morning and force the picker to work around them all day. Bringing only five at a time might sound counterintuitive since the number of replenishment tasks has now quadrupled, but because tasks can be blended across orders and associates, the overall effort can be optimized.

### Reacting to need

Companies don't necessarily need robust software to manage all this,

Howes says. Even simple spreadsheets and basic tools to slot intelligently can make a big difference. “I might carry three to seven days of stock in each location. More than that will expand the footprint a lot,” he says. “That sort of discipline is not about how you replenish, but the timing of when you need to.”

According to Bill Ostermeyer, vice president of sales for viastore systems, those simple software improvements are the first step toward locating where more sophisticated or automated replenishment might make sense.

“In the traditional setup, you receive to reserve and there's an inventory buffer in the picking media,” Ostermeyer explains. “The replenishment function occurs continuously throughout the shift. The nice thing about the old way: It's very flexible, lending itself to discrete or batch picking and the ability to ‘throw bodies at it’ to keep up.”

A new model of automated case pick-

**New solutions help ensure accuracy, enabling the same associate to pick, replenish and consolidate.**

ing means everything is in reserve and is retrieved on a per-order basis. Well, not exactly everything. “Some companies look for an automated solution for the entire SKU range, but that's not realistic,” Ostermeyer says. “Some fast movers might be better handled manually.”

Customers are surprised when Ostermeyer suggests the top 5% of SKUs should not enter an automated storage and retrieval system (AS/RS) and that a more conventional pallet flow approach is better—even for piece-picking applications.

Similar to the concept of scoring tasks, locations in a given pick module can be given preferred status. “Storage systems and their usage have changed, and are morphing into case-ready storage accessed by persons not equipment,” says Art Eldred, client executive for systems sales for Vargo. “I think of it more as ‘preferred versus not preferred’ instead of ‘reserve and forward.’”

Preferred status can—and should—change from moment to moment, Eldred says. For example, baseballs and gloves might be slotted close together because they're being sold as a bundle. But, it may turn out that gloves and hats are selling together more often, and that the hat has to be retrieved or conveyed long distances to get the order's SKUs together.

“Retail has always been built on plans,” Eldred says. “When you mix with e-commerce it's water and oil. The industry is having a tough time releasing control of these systems, and that has hurt us over the years. The name of the game now is versatility and flexibility.”

Even if fast movers could be accurately predicted, condensing them in a single area can lead to congestion. “For some e-commerce customers with a long tail of slow-movers, that approach is no longer your friend,” Eldred says. “The idea is to keep SKU locations as random and flexible as possible to spread the wealth.”



Matt Aprea, director of product management for Harvest Automation, agrees. He describes a system of mobile autonomous robots working alongside pickers in a traditional warehouse pick module, with an 8-foot pick area and bulk storage above. Instead of conveyors, carts or lift trucks, a picker uses totes on the shelf as pick sources, order containers or replenishment destinations.

"In the traditional mode, picking and replenishment are seen as discrete operations with separately trained associates," Aprea says. "They might inhabit the same place, but they're not doing the same things. That will change, and it will decouple the picker from a certain limited set of orders. Each person will be responsible for as many orders as the building can handle."

In Aprea's scenario, consider a tote with 10 items. The same associate can take five, put them into an empty tote, and complete an order that a robot will later bring to pack-out. The other five items can be placed in a tote for an order that will need one more item

**Responsiveness in picking processes depends on equal precision in reserve storage and replenishment.**

from the other side of the facility. The robot will later ferry that tote, but the empty donor tote has immediately switched from a storage location to an order container.

The whole idea behind touches is that some amount of time elapses, some task is completed, or some person or piece of equipment was in motion consuming time and energy. If replenishment, picking and order consolidation can all happen on the same shelf, in the same locations and by the same person, the time and effort between each task is virtually eliminated.

Webb expects to see more automated storage, goods-to-person, mini-loads and shuttles, and robotic solutions play a powerful role in replenishment. "When we talk about replenishment historically, the first thing that came to mind was that it would need to be conveyorized," he says. "Now with e-commerce, SKU proliferation, flash sales, short SKU lives, labor costs and service levels, you can't afford to have something stocked out, much less replenish something you need to ship same day. We're now way beyond conveyorized replenishment." □

### Companies mentioned in this article

- Dematic
- enVista Corporation
- Forte Industries
- Harvest Automation
- IBS (International Business Systems)
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# Cubing and weighing: Besting the dim rate dilemma

After major parcel carriers introduced new rate structures, the industry is still scrambling to identify and eliminate every cubic inch of waste.

By Josh Bond,  
Associate Editor

It's been five months since FedEx and UPS enacted their new dimensional (dim) rates, a move that has compelled distributors of all sizes to reassess their approaches to packaging and shipping.

Driven largely by e-commerce growth and "buy anywhere, ship anywhere" omni-channel capabilities, the transition follows increased strain on parcel carriers tasked with ferrying huge amounts of small packages. That strain is now squarely on the shoulders of distributors, who have also seen no shortage of dramatic transformations in the way they do business. Still, the dim challenge seems to be particularly disruptive.

"Last year we were telling companies they needed to get ready for dim, and article after article emphasized the potential impact," says Dan Hanrahan, president of the Numina Group. "Now people are coming to us with 30%

increases in shipping costs, floored and seemingly surprised. A lot of companies were still caught off guard."

Before the update, carriers priced items smaller than 3 cubic feet based on weight and larger items based on size. This meant light items in large boxes could be shipped for roughly the same price as smaller, heavier boxes. Not anymore.

Hardest hit are small- and mid-sized operations shipping large boxes with low density, but dim rates create penalties for shipping empty space that affect businesses of all sizes. Whether handling pallets, cases or eases, item-specific data is essential to maximizing efficiency. Effective on-demand corrugate box systems, cartonization software, shipping processes, labor optimization and more are all dependent on collecting and maintaining detailed data, which is easier said than done.





It takes time and effort to maintain accurate dimensional data, but those costs are more than offset by storage and shipping efficiencies.

“The other shoe hasn’t dropped on the shippers yet since some of the carriers have been issuing waivers and exclusions to those who have not yet adapted,” says Bob Fischer, CEO of shipping software provider ADSI. “When I ask customers how dim impacts them, a lot who should know say ‘that’s a good question.’ But less-than-truckload companies will follow UPS and FedEx, and it will happen soon. The storm is here, the tornado is 5 miles down the road, and it’s going to catch them by surprise.”

### Getting the details squared away

Whatever an organization uses as a system of record, it will need to support dim data including size, weight, height, width, length and category, such as grocery or electronics. “If your system does not support that specificity, that’s where you will run into a roadblock,”

according to Chase Sowden, supply chain architect for Barcoding Inc. “But even if you have the details of each item, you also need information about the shipping carton, since choosing the right packaging is huge if you want to control dim costs.”

Hanrahan says some have had to rethink what they consider lean practices. “Many looked at corrugate and inventory costs and asked, ‘Why are we using 20 boxes? Let’s get volume purchasing to reduce costs and standardize around four box sizes.’ That was great up until this year,” he says. “Now they’ve gone back to having more boxes available, especially for split case pick, pack and ship applications.”

Sowden says cartonization software can help, but it’s not necessarily a must-have. In fact, many software solutions are also struggling to come to grips with the dim challenge. When

cubing an order, most software literally seeks to represent everything as a cube.

“But that item might also have usable space,” suggests Randy Neilson, director of sales and marketing for CubiScan. “The challenge some customers might have—and it’s a challenge for suppliers, too—is how to measure void space in, say, a baseball helmet. When it goes through cartonization, does the system understand that a baseball could fit in the helmet?”

In these cases, it might be necessary to actually put the baseball in the helmet before dimensioning, instead of relying on a master data file. Gary Moe, director of product development for Packsize, says cubing is not a straightforward concept. When you add details like fragility, nesting or volumetric dimensions, complexity quickly increases. Software might suggest the most efficient way to package two skis

is end-to-end, or three nestable trash cans will require three boxes or one huge one with space for all three.

“The market is still a bit on the adolescent side of maturity in terms of efficiency, and it is becoming more important to find ways to solve these problems,” Moe says, emphasizing that it all begins with detailed data. “I’ve been to a lot of really big customers, ones you’d think would have their act together, and they don’t have good dim data. They often have plenty of scanning technology, but the problem is getting new data into the system on an ongoing basis.”

Neilson also sees plenty of companies with fairly sophisticated software in place that relies on dim data, but the master files are rarely accurate. “There is a significant percentage of error in data files with regard to cube and dim data,” he says. “The majority of people who think they have 90% to 95% accuracy are surprised to find it’s often more like 50%.”

### Thinking inside the box

For many operations, the most accurate data is collected after the order has been packed and is ready to ship. “Measuring at the end is great to tell you what shipping will cost,” Hanrahan says, “but I believe you have to do car-



**A dimensioning device is great at capturing data, but it must be supported by disciplined training and processes.**

tonization up front. If you’re not looking at how to pick and pack to a right-sized carton, it doesn’t help manage efficien-

cies throughout the operation.”

Data should be collected as early as possible in the warehousing and distribution process, ideally on receipt. Dimensions for master packs, inners and eaches can inform shipping and storing, including the design of shelves, racks, conveyors and other equipment.

“There are best-of-breed shipping systems, and we will soon see best-of-breed receiving solutions as well,” Fischer says. “Right now, some scan two boxes from a pallet and assume the rest are the same. But the same SKU could be packaged differently, in different configurations, or with a different amount of packaging. There are still a lot of customers who only measure on the back



**Optimum cartoning and packaging decisions are only possible with detailed dimensional data.**

end, with a yardstick sometimes.”

The “tape measure and clipboard” approach to inbound data collection is not just time-consuming, it presents opportunities for inaccuracy that can snowball into larger costs and problems downstream. “A half-inch deviation can create a bigger problem than you might think,” Neilson says. “Larger items are less impacted by those variations, but a tenth of an inch for a small nut or bolt can be a huge error.”

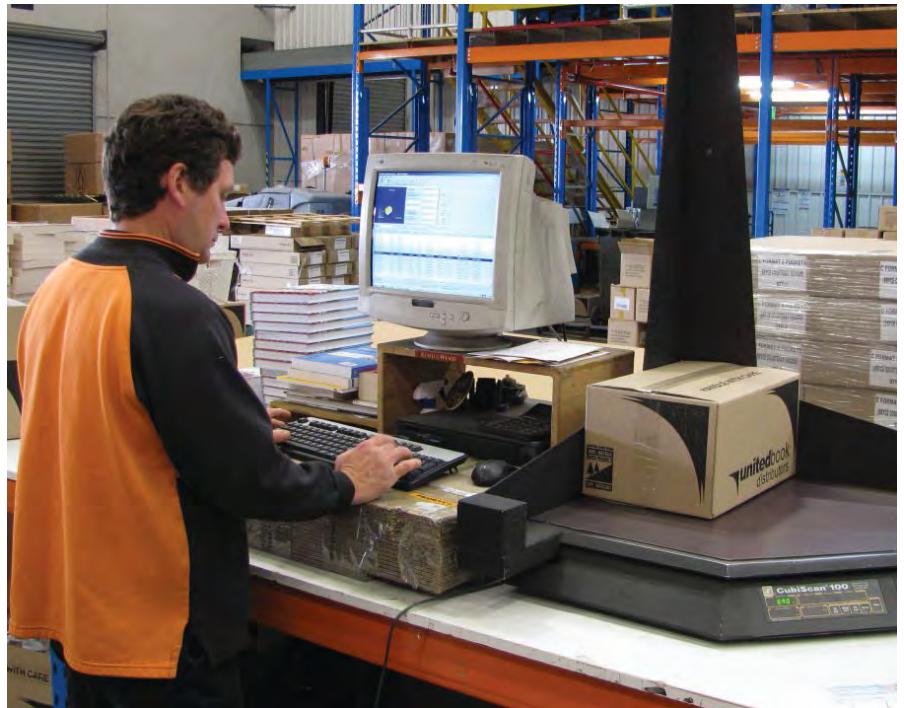
For example, take a single shirt in a poly bag. If the air hasn’t been squeezed out, the master file might allocate only 10 units to a carton that could hold 20. Manually performing that accurate measurement consumes time, but the added value for storage and shipping efficiency more than offsets any labor costs.

“Even if you have a dimensioning device, you still need disciplined measuring processes,” Neilson says. “If a collar makes the shirt thicker at one end you might stagger the shirts to account for that. A device takes dimensions, but it’s incredibly important to establish best practices and training based on how you pack and ship.”

**The light at the end of the dim tunnel**

Those at the top of their game have recognized that dim data can inform processes well beyond the pack station. Hanrahan offers the example of a customer whose conveyor system was built around its smallest carton size, a 10 x 7 inch box, which resulted in massive waste when shipping items like thumb drives. They identified the potential to save several hundred thousand dollars if they could convert just half of those items to padded bags, which were not compatible with the existing roller conveyors.

The customer introduced totes to help convey bags, but the improvements didn’t stop there. With detailed dim data, the customer now prints packing slips and shipping labels first and then applies them to the empty bags. Voice-enabled pickers then fill and seal each



**The industry might soon see best-of-breed receiving solutions to help ensure accurate dimensional data throughout a facility.**

bag, and the entire tote skips pack-out and is diverted to shipping.

“We’re finding people want to use dim data beyond the warehouse control system or warehouse management system and all the way to enterprise resource planning,” Moe says. “They are wondering how they can use the packaging system to improve everything. The concept of ‘forest to fill’ accounts for how packaging impacts how many trees are cut down all the way to how much packaging ends up in a landfill.”

Although dim charges might seem like a burden to many operations, Fischer suggests it will soon become a boon. “Right now, dim is used to increase the cost of freight,” he says. “We will soon see it used to decrease costs.”

Pallet dimensions and characteristics will become more detailed than just class and weight, Fischer suggests, and might include discounts for stackable pallets, repeat deliveries and other factors. “Then it will make sense for everyone to use dim, not just those with big, light boxes,” Fischer says. “At the manufacturing level, might denser but

smaller packaging make more sense? The impact of dim will move upstream and impact the whole scope of the supply chain.”

In the meantime, Hanrahan offers some simple tips to move in the right direction. “If you don’t have a cubing solution, knockdown boxes with a crease every 2 inches can help,” he says. “Or you might put colored tape inside a tote to act as an indicator for operators to match the tote’s fullness with the appropriate carton. It’s a poor man’s cubing operation, and it’s not perfect, but it helps. Once you’ve have applied a Band-Aid, you can start to build a case for broader process improvements. Now that freight costs are even more important, every opportunity to get efficient counts.” □

**Companies mentioned in this article**

- ADSI
- Barcoding Inc.
- CubiScan
- Numina Group
- Packsize

By **Josh Bond**,  
Associate Editor

# VLMs help warehouse keep up **with** **precision** **machining** **job shop**



*New system provides 92% floor space savings and 30% additional inventory capacity.*

**A** modern, state-of-the-art job shop, Gurecky Manufacturing Service produces precision machined parts in a range of materials for the oil and gas industry. As the job shop grew, warehousing the finished goods prior to distribution was quickly becoming a bottleneck. A new vertical lift module (VLM) improved inventory management, accuracy and productivity.

The facility in Rosenberg, Texas, produces parts to customer specification and keeps these parts in inventory until the customer requires them. In the past, workers would use paper pick tickets and ladders to access parts stored on shelving.

“Distribution was a slow, tedious and tiring task that didn’t work well with the cutting edge, automated job shop we were supporting,” says John Dorman, president and CEO. “We purchased the VLMs with a built-in growth plan, and there is still space to add inventory and continue to grow business.”

The two new 13-foot-tall shuttle VLMs (Kardex Remstar, [kardexremstar.com](http://kardexremstar.com)) include inventory management software and pick-to-light technology. Occupying 320 square feet, the two units replaced 4,000 square feet of shelving. The new VLMs hold 10,000 SKUs of inventory compared to the 7,000 SKUs in the previous shelving.

Each storage location contains one part number with multiple lot numbers. Previously, the worker would locate the part and then have to look through multiple parts at that location for the correct lot number. Now, the VLM presents the operator with the exact part to pick, increasing pick accuracy to more than 99%.

The VLMs have provided a 92% floor space savings, 30% additional inventory capacity, a 42% increase in productivity and cut mispicks in half. Gurecky has gone from picking 10,000 parts a month to 17,000 parts a month and only had to increase staff by one part-time employee. □

By **Josh Bond**,  
Associate Editor

# High-density storage system keeps pace with SKU growth



*Apparel distributor adds 17,000 locations to increase storage capacity 86%.*

**O**verton's/Gander Direct (Gander Mountain) is the nation's largest retail network of outdoor specialty stores for shooting sports, hunting, fishing, camping, marine, apparel and footwear. A major concern was a massive influx of SKUs. Before it ran out of space, the company installed a high-density fabric cell storage solution to improve cube utilization, reduce wear and tear on existing bin boxes, and improve ergonomics for employees.

Previously, employees would often have to dig through pallets and totes on the ground or on shelves, while using step ladders to reach product stored overhead. As the apparel product category saw rapid SKU growth, the company found it didn't have enough right-sized locations and couldn't change pick slots dynamically.

The existing horizontal carousel system was not

scalable enough to accommodate the growth, and Overton's didn't want to spread product over multiple locations. The company also avoided the additional cost of adding a pick module, as it would lead to more warehouse management system costs as well as automation and conveyance challenges.

The new storage cells (SpeedCell, speedcell.net) were tested in four bays during peak season before 88 more bays were installed in the 267,000-square-foot facility. The installation added 219 locations in each bay or 4,380 locations to each aisle for a total of more than 17,000 additional locations within the existing footprint. The project increased storage capacity by 86% per bay and reduced travel time for pickers.

A net result of this installation has been that Overton's employees have increased picking and stocking efficiency by 25%. □

By **Josh Bond**,  
Associate Editor

# Cabinets improve storage and retrieval of special service tools

*With room to grow, the new system  
is more efficient and secure.*



**T**oyota Motor Sales USA in Torrance, Calif., requires all of its 1,400 Toyota and Lexus dealerships to own special service tools (SST). Dealers are instructed to store these tools in a central location so service technicians can quickly find them when needed. The reality was that, in many dealerships, technicians spent too much time hunting for SST. Using a new standardized three-cabinet system to organize tools by category, the company improved technician productivity and reduced costs.

Previously, the average technician spent a minimum of 6 minutes per day and as much as an hour hunting for tools. The average dealer employed 14 technicians, and was spending \$1,500 per year replacing tools that had been lost or stolen.

“Technicians were spending too much time locating specific SST that they needed to ensure a quality repair,” says Jim Sapunarich, Toyota’s advanced vehicles and equipment manager. He says

the company saw a need for a central, secure storage system that would benefit all dealers.

The new cabinets (Stanley Vidmar, stanleyvidmar.com) replaced an old tool board and racking system that held only 40% of the dealership’s total SST. Based on a complete set of tools, the new storage system was designed to house each tool and included room for 25% growth.

The three-cabinet system organizes tools by category, labels on the drawer pulls identify the tools stored within, and partitions inside the drawers create compartments sized for particular tools. The service or parts manager controls access to the system and keeps track of who is using what.

“The system has made technicians more productive,” Sapunarich says. “They’re working on cars rather than searching for tools. Our service managers tell us it’s one of the most helpful things we have ever done in tools and equipment.” □

By **Josh Bond**,  
Associate Editor

# Rugged mobile computers support traceability in cold environments

*Meat distribution company improves quality control in refrigerated storage facilities.*



**M**eat distributor Fridosa, based in Santa Cruz de la Sierra, is Bolivia's largest meat-product exporter. Employing more than 400 people, the company sources cattle from 300 suppliers and holds accounts with large companies such as McDonald's and Burger King. Using new mobile computers, the company was able to improve monitoring and minimize climatic impact on its products.

Fridosa employees used to track inventory and quality control data by hand. Then, they introduced a computer-based inventory management system. This system saved time by eliminating paperwork and manual calculations, but it also introduced some significant problems of its own. Although cuts of meat withstand extremely cold, humid environments, most computers do not.

New rugged, pocket-sized field computers and imagers (Handheld Group, [handheldgroup.com](http://handheldgroup.com)) enable inventory staff to track and record the weight of meat products along the supply chain. This is an effective way to identify a compromised

storage environment, because meat shrinks when it is exposed to fluctuating temperatures and humid-ity conditions.

The company maintains its storage conditions at 90% to 95% humidity, with temperatures between 32°F and 37°F for refrigerated products and as low as -4°F for frozen products. Entering and exiting can cause harmful electrical shorts inside computer equipment, and extreme cold dramatically shortens the life of conventional computer batteries.

"We tried to implement automated controls with conventional computer equipment, but it did not resist the extreme environmental conditions at the facility, and it deteriorated very quickly," says Oscar Aguilera, Fridosa's systems manager, who adds that the technology works seamlessly within the existing IT environment. "We have now created a better inventory control system, and we have experienced significant savings with better shrinkage control for our products." □

# Under the gun on traceability

Chain of custody initiatives in health care supply chains face new FDA mandates, and compliance isn't simple. Here's a look at some of the considerations and systems involved.

**H**ealth care supply chains are at an inflection point, readying for new traceability regulations from the U.S. Food & Drug Administration (FDA). However, these latest challenges may best be seen as part of longer-standing movement toward improving “chain of custody” information from manufacturing to point of use.

You can't get much more safety critical than “point of use” in health care, since it means a patient's mouth for pills or inside the body for implantables like artificial joints. That's why tracing the pedigree of these items is seen as necessary by the FDA, as well as beneficial to manufacturers who don't want counterfeits slipping into the market.

For prescription drugs, the new traceability requirement comes from the FDA's Drug Supply Chain Security Act (DSCSA), which was signed into law in November 2013. The act's lot-level tracing requirements for manufacturers, wholesalers and “repackagers” began in January 2015. There are other DSCSA requirements to be phased in, culminating in item-level traceability using a “product identifier” format that can be supported with 2D data matrix bar codes. Manufacturers of regulated drugs must have product identifiers on items by late November 2017.

According to the FDA, the three key goals of the act are to:

- enable verification and legitimacy of drugs down to the item/package level,

By Roberto Michel,  
Editor at Large





**Automated order verification stations use singulating belts and fixed position scan technology to efficiently check and document outgoing shipments.**

- enhance detection of illegitimate products in supply chains,
- and support efficient recalls.

Attaining these goals involves supply chain execution (SCE) software such as warehouse management system (WMS) solutions, and will rely on use of appropriate automatic identification and data capture (AIDC) technology. Other systems may be involved, such as inventory control and patient record systems at hospitals, and solutions from vendors that specialize in cloud-based management of traceability data. What's more, traceability ultimately involves the whole supply chain, not just the manufacturer or distributor.

"The idea is to have effective,

detailed traceability so you know that you got an item from a trusted partner upstream in the supply chain, who got it from somebody trusted in the supply chain," says Robert Colosino, vice president of marketing and business development with TECSYS. "There needs to be complete confidence in that pill being dispensed."

#### **WMS capabilities**

While the act starts with lot-level traceability, and most WMS solutions are capable of tracking lots, says Colosino, the rule progresses to item-level tracking, so distribution centers need to be ready to accomplish this as accurately and efficiently as possible. To facilitate item-level tracking,

FDA collaborated with industry organizations including GS1 to establish the needed data elements, such as serial number, expiry date and unit of measure. Manufacturers can use a 2D bar code to comply with DSCSA, making use of GS1's Global Trade Item Number (GTIN) format and appropriate GTIN guidelines for the DSCSA.

Actually attaining supply chain wide traceability, however, is more complex than slapping a 2D bar code on every pill box. One challenge, notes Colosino, is being able to accurately identify each item in a shipment being received without having to hand-scan items. To avoid that, says Colosino, WMS solutions should

be able to “infer” serialized item data by accepting a single scan on inbound goods and cross-referencing the scan with advanced ship notice (ASN) messages and serialized item data from the manufacturer.

The WMS should also be able to manage and store items according to expiration date and other criteria, such as whether it needs to be refrigerated, adds Colosino. For distributors, the WMS also needs to account for, verify and communicate what is sent to downstream customers, down to the item level. “It’s a matter of being a

trusted partner so that when the next entity in the chain receives a shipment, they can receive it efficiently,” says Colosino.

WMS solutions for pharmaceutical distributors need to support serialized track and trace that spans every movement of goods, from receiving, through the warehouse, and even for reverse logistics, says Michael Armanious, vice president of sales and marketing for Datex. Reverse logistics comes into play with expired prescription drugs that return to a DC for destruction.

For certain drugs, such as prescrip-

tion narcotics, pharmacies will send back sealed bags of expired products, with a signed statement saying how many pills are being returned, says Armanious. At some DCs, this reverse count for painkillers is done under camera surveillance, and if there is a discrepancy between the actual count and what is on the bag, the WMS needs to alert managers and reroute the bag for investigation.

Tweaking WMS or other database-driven systems used in the pharmaceuticals industry is a rigorous process because they might be FDA-validated

## Role seen for RFID in medical device tracking

New traceability regulations on medical devices and prescription drugs from the U.S. Food & Drug Administration (FDA) call for serialized, item-level tracking of goods, but don’t specify the exact automatic identification and data capture (AIDC) technology to use.

Since radio frequency identification (RFID) has the advantage of not requiring line-of-sight scanning, you might think RFID is an ideal technology to use for tracking items to help comply with the new FDA rules, but yet RFID is not seen as the method of choice for many tracking scenarios.

Why is RFID not seen as a “cure all” for traceability needs in health care? There are two main reasons, say vendors: the cost of the tagging and RFID infrastructure relative to the value of certain goods, and the accuracy of conventional, long-range RFID systems for closely stacked, small items common to order picking.

For example, when picking individual small boxes of prescription drugs or vials, the tags would be closely stacked, and the proximity of the tags to each other and presence of liquids and foil blister packaging can throw off the accuracy of conventional RFID systems. For these reasons, most vendors anticipate the bulk of traceability for the FDA’s Drug Supply Chain Security Act (DSCSA) will be tackled using 2D data matrix codes.

However, RFID has a place in health care traceability, and some newer, unique forms of RFID promise 100% read rates, even for closely stacked items.

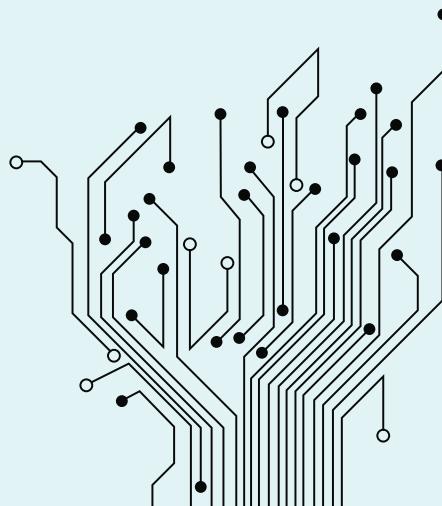
Conventional RFID is tuned for long-range reading, which can cause misreads of closely stacked small items due to tags coupling with each other rather than coupling with the reader, says Graham Murdoch, chief

engineer for SATO Vicinity, and the co-inventor of a type of RFID called Phase Jitter Modulation (PJM). SATO’s PJM is a whole system of readers, tags, chips and a frequency optimized for accurate reads on small, stacked items, says Murdoch. “From the ground up, we were designing [PJM] to meet the requirements of bulk reading of small items at high speed, in any orientation,” he says.

Developed in Australia, PJM has been used successfully for tracking medical devices as well as diamonds. According to Murdoch, more than 80% of the orthopedic loan kit market in Australia uses SATO’s PJM RFID system for traceability on the items that go out to hospital surgery rooms for operations such as knee replacements. Surgeons only use a small percentage of the parts in each kit, so the kits are returned to a distribution center to check and replenish them for the next use.

The loan kit business requires 100% accuracy on the parts in the kits, because the last thing the surgery team wants is to be scrambling for a part due to an incomplete kit. Before PJM, the reset of the kits, which typically hold 150 to 200 parts each, required handling and line-of-sight hand scanning of bar codes on each packaged item in a kit. Now, there is still a visual check of the kit and a reset process, but the actual reading of the tags only takes a couple of seconds, says Murdoch. At one DC, this has allowed the facility to reduce the number of staff for handling loan kits from 35 full time staff down to five staff working part time.

Now SATO, under its Sato Global Solutions business, is taking PJM into the North American health care market. Besides its solution for loan kits, SATO also offers a PJM RFID smart cabinet for managing and accounting for the use of small items stored in cabinets.





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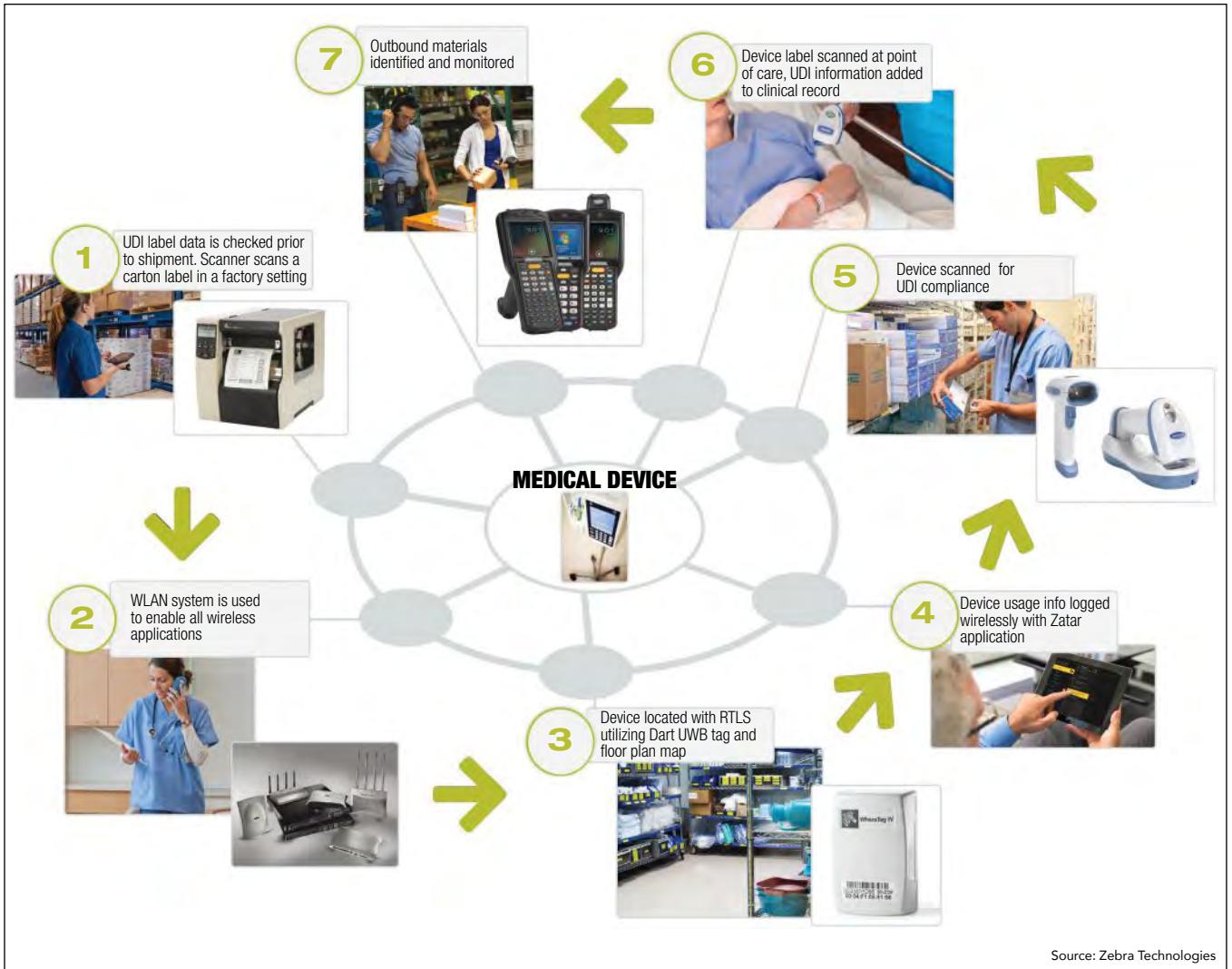
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**The FDA's Unique Device Identifier (UDI) tracking rule centers on the use of 2D bar codes for item-level tracking, but may involve other infrastructure considerations for wireless networking and managing AIDC devices.**

systems. With FDA-validated systems, says Armanious, changes related to product attributes, such as changing the dimension of an item, should have audit control over changes, including a database record of who made the change and when. Some WMS vendors may not have this type of change control built into the database structure, he adds.

Making changes to FDA-validated systems, which might be needed to support item-level traceability, is a genuine concern because of the effort

involved in being able to document changes and test them, says Sheila Dooley, a business analyst with Bastian Solutions. "It's not a rapid process when making changes to validated systems," she says.

With some older WMS solutions that don't support processes such as matching scanned information from inbound shipments to ASNs and records of valid serial numbers, the system may need to be modified so that it has the proper routing steps to either accept goods or put them

on hold, says Dooley. Some materials handling systems and scanning equipment may also need modification or upgrades, she adds, such as making sure that bar code readers can read 2D codes.

With DSCSA's item-level tracking requirement on the horizon, it's also possible that some picking systems such as pick-to-light may need to be modified to let pickers know that a scan needs to be performed on an item to capture the serialized item data, rather than the pick-to-light simply

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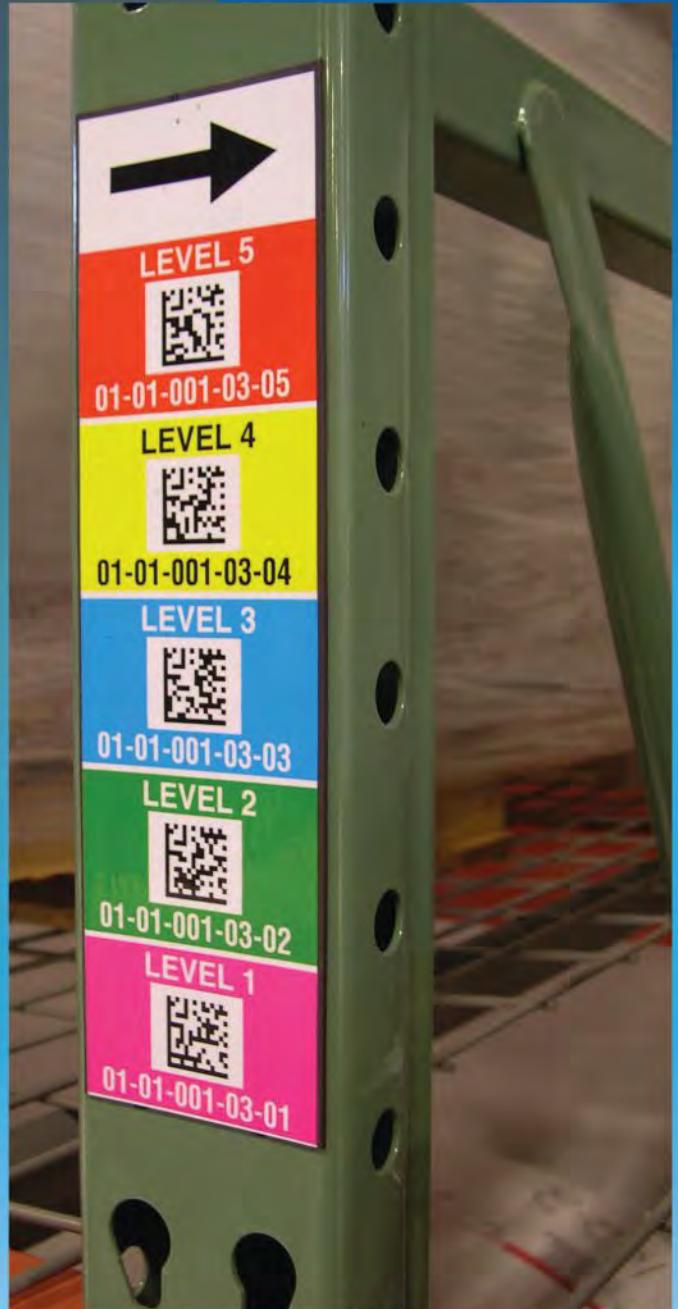
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indicating the number of an item to pick. An extra color code might be all that's needed, but that change would need to be tested, says Dooley.

"The best advice is to start sooner rather than later," Dooley says. "It's best to sit down now and figure out the changes that need to be made, then get those pieces in and fully tested, so that you can rule them out as problem issues when the deadline sets in."

### Verifying each shipment

Distributors, of course, aren't just shipping out full pallets of one stock-keeping unit (SKU). One shipment in a tote might contain 100 different items. This makes it necessary for distributors to not only be able to pick items accurately and send a data file or an ASN to customers on what to expect, but to verify exactly what is in each shipment before it goes out the door.

For outbound order processing, hand scanning each GTIN code on each item as it is picked is time consuming, says Ross Halket, executive director of automation sales with Schaefer Systems International. For higher-volume scenarios, an efficient approach is to "decouple" the picking from the serialized bar code verification step, says Halket, by sending picked items to an order verification lane with a fixed-position scan tunnel.

The "order verifier" solution that Schaefer offers consists of narrow V-belts that move at different speeds to shift items or "singulate" them into a single line so they can be scanned with complete accuracy. The belts can singulate on their own with boxed

**One way that RFID is being used in health care supply chains is to support tracking of orthopedic "loan kits" for surgeries. The tunnel shown here is outfitted with a type of RFID called "Phase Jitter Modulation," which is designed to read small, closely stacked items in any orientation.**

**"The best advice is to start sooner rather than later. It's best to sit down now and figure out the changes that need to be made, then get those pieces in and fully tested, so that you can rule them out as problem issues when the deadline sets in."**

— Sheila Dooley, business analyst with Bastian Solutions

items, but with vials or round items, it is recommended that a person manually singulate items. "We believe that by decoupling the outbound verification process, you can still have efficient, high-speed picking combined with an efficient, high-speed scanning and confirmation step," says Halket.

Health care organizations and suppliers of medical devices also face a chain of custody challenge under the FDA's Unique Device Identifier (UDI) rule. The rule, finalized in 2013 and being phased in over several years dependent upon the class of device, establishes an identification format and reporting system that goes

down to the item level so that devices can be tracked through distribution and use. As part of the UDI, medical device manufacturers and others who label the devices are required to submit information to an FDA-administered data repository called the Global Unique Device Identification Database (GUDID).

The FDA has worked with organizations including GS1 and the Health Industry Business Communications Council (HIBCC) to establish standard data elements for UDI labeling, bar codes or radio frequency identification (RFID) tags. The FDA doesn't specify what type of AIDC to use, but sets forth the data elements to be represented, including a mandatory "device identifier" portion, and a "production identifier" portion that holds information such as lot number, serial number, date of manufacture and expiration date, if applicable.

The UDI rule has health care organizations and medical device suppliers looking at the most accurate ways of generating UDI-compliant labels, scanning them and getting the data into the necessary supply chain and electronic health record (EHR) systems, as well as the GUDID, according to David Coons, vice president of advanced markets and technology for Zebra Technologies. The data collection isn't as simple as acquiring some bar code printers and readers, Coons contends, because there are AIDC devices to manage, and a reliable network infrastructure is needed to sup-



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port data gathering. Some organizations may even want to employ RFID and real-time locating system (RTLS) solutions as part of tracking some critical items under UDI.

Zebra offers a bundled approach for UDI compliance, Coons explains, which spans bar code printers, readers, label design software, printer device management and RFID/RTLS solutions. Zebra's "Zatar" Internet of Things platform might also be used for organizations wanting to manage infrastructure centrally in the cloud, while some hospitals may want to upgrade their wireless LAN infrastructure. "We are bundling all of these components as needed by the client to provide an industry solution, rather than having the health care organization go out and acquire components from different vendors and piece together a reliable solution," he says.

In health care, UDI traceability at



**RFID-enabled "smart cabinets" allow for secure access and traceability of small items in health care settings without placing a data collection burden on clinicians.**

on specific patients. As a result, it's important that AIDC vendors work closely with EHR vendors so that bar code labeling and scanned data works flawlessly with EHR systems. "The aspect of working closely with these independent software vendors is critical," says Coons.

**Supply chain thinking**

The biggest factor working in favor of better traceability in health care supply chains might just be the attitude of health care organizations. Not too many years ago, most health care organizations treated supply chain management as overhead or at best a side-

the patient level means that data collected at the point of use should integrate with EHR systems to create an audit trail of which devices were used

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line to their real mission of providing health care. But steadily over the last decade, more health care companies have come to realize that supply chain excellence is crucial to their profitability and effectiveness as providers of care, says Colosino.

Hospitals have undertaken supply chain initiatives such as pooling their buying power by starting group purchasing organizations. More recently, hospitals have streamlined distribution by establishing consolidated service centers (CSCs) rather than having individual hospitals work with distributors to procure supplies. They've even brought in distribution professionals to run these CSCs and are using WMS and other SCE solutions to better manage operations. "They've really transformed the way they are operating by becoming supply chain companies," says Colosino.

Hospitals also have begun using

better inventory control solutions and data capture technology to manage the point of use without interfering with the work of clinicians, says Colosino. While bar code scanning is the backbone of inventory tracking at most hospitals, in some areas, RFID is used so that clinicians can just grab and use high-value items without having to stop and scan them.

For example, says Colosino, in some operating rooms, RFID-enabled case carts are used to track high-value items consumed during an operation. A supply chain staff person loads up each cart with RFID-tagged items. During the operation, after each item is used, it is placed in a receptacle outfitted with a reader, which records each item consumed. RFID can be a good solution for scenarios where the goods are high value, and you don't want to distract highly paid clinicians with data collection tasks, Colosino says. "You need to

build clinician friendly solutions for traceability," he says.

The new attitude at hospitals toward supply chain management bodes well for improved traceability, says Colosino, even if many hospitals still have a long way to go. As Colosino sums up, "The majority of hospitals aren't there yet in achieving supply chain excellence, but the majority recognize they need to get there and have active initiatives to try to get them there." □

### Companies mentioned in this article

- Bastian Solutions
- Datex
- SATO
- Schaefer Systems International
- TECSYS
- Zebra Technologies

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## Scanners engineered for retailers

The new suite of Voyager scanners support Windows embedded 8.1 and Android 5.0 operating systems. The devices are optimized for back-of-store and point-of-sale (POS) use by retailers. For flexibility, the series includes a battery-free wireless laser scanner that reads bar codes without a long recharge time, maintenance, or environmental



disposal issues associated with traditional batteries; a compact 2D Bluetooth scanner with area-imaging technology to complement tablet-based retail POS systems; and upgradable tethered and wireless units capable of scanning linear bar codes, PDFs and 2D bar codes displayed on smartphone screens. **Honeywell Scanning & Mobility**, 800-782-4263, [www.honeywellaidc.com](http://www.honeywellaidc.com).

## Sled enhances mobile devices with RFID and bar code scanning

The new RFD8500 multi-operating system RFID sled has been configured to easily add high-performance RFID and 1D/2D bar code scanning to existing Android and iOS mobile devices. It can



also transform the supplier's TC55 and MC40 mobile devices into handheld RFID readers for expanded data collection capabilities. Lightweight and ergonomic, the sled provides full-shift battery life, making it ideal for inventory and asset management, product search and replenishment applications. Its reader communicates with a variety of host devices to read and write to EPC Class 1 Gen2 UHF tags and capture 1D and 2D bar codes over Bluetooth. **Zebra Technologies**, 847-634-6700, [www.zebra.com](http://www.zebra.com).

## Windows-based 1D and 2D handheld bar code terminals

The new BHT-1300-CE wireless and batch 1D and 2D handheld bar code terminals are compact, lightweight and rugged. The devices run the embedded Windows compact 7 operating system and are backed by a three-year warranty. For faster scanning than comparable laser-based models, the devices use area-imaging technology. The 2D models can read codes from any angle within 360 degrees, reducing working time by up to 30%. Pre-installed software includes a keyboard interface application, wireless setting tool, application launcher and backup tool. For fast, secure data transmission, the terminal is equipped with Wi-Fi and the latest network encryption protocols. Other connectivity functions include direct-connect USB cables and device cradles that enable Ethernet, USB or RS-232 communication. **Denso**, 888-693-3676, [www.denso-adc.com](http://www.denso-adc.com).



## Fixed industrial bar code reader for medium-range sortation

Offered as an out-of-the-box identification solution, the XRF410N bar code reader is engineered for medium-range sortation in e-commerce order fulfillment, parcel sortation and reusable tote reading applications. It incorporates two Matrix 410N imagers to create an extended reading field through 2D imaging technology. The device reads codes on medium-sized objects moving at speeds up to 433 feet per minute and in scanning depths to 15.7 inches. Powered by DL.CODE software, the unit is simple to install and setup. It is ideal for top reading of flyers, letters and parcels, as well as for scanning inside totes for simultaneous reads of several items with different dimensions. **Datalogic ADC**, 800-929-3221, [www.datalogic.com](http://www.datalogic.com).

## Voice-directed picking system keeps cables enclosed in vest

The Lydia VoiceWear vest is engineered for voice-directed picking applications where loose-hanging connecting cables could cause distraction and Bluetooth wireless solutions are beyond the budget. Worn by voice-directed pickers, the portable, wearable system features integrated loudspeakers and microphone enclosed within the material. The components connect directly to a pouch in the back where the battery pack and computerized system are housed. Ergonomic and lightweight, the vest maximizes picker mobility. The vest may be specified in gray, safety yellow or safety orange for enhanced visibility. **topVOX**, 847-842-0900, [www.top-vox.com](http://www.top-vox.com).

## Rugged, compact vehicle terminal with quick-mount feature

For use in demanding environments such as yard, logistics, freezer storage and more, the VERSO+ 10 rugged vehicle terminals are equipped with an Intel Core i5 processor. Compact for installations in tight cabins or other small areas, the computers include a quick mount for easy vehicle attachment/detachment for service, movement between vehicles or to prevent theft by removal at the end of the working day. The devices have a 10-inch, sunlight-readable XGA display and a scratch-resistant, multi-point touchscreen. Built-in features include a 9-36 VDC power supply, a backup battery to ensure uninterrupted operation during power drops, WLAN communication with built-in, highly sensitive antennas for reliable Wi-Fi connectivity in poor coverage environments, and Bluetooth antennas for reliable communication with low-power, hand-carried peripherals. The device can be ordered with Windows 7 Pro or Windows embedded standard 7, Windows 8.1 and Windows embedded 8 standard operating systems. JLT Mobile Computers, 480-705-4200, [www.jltmobile.com](http://www.jltmobile.com).



## Keep track of mobile assets

Incorporating an easy-to-use interface with a customizable dashboard, MobileAsset v7 is compatible with iOS and Android devices—including smart phones and tablets—for easy tracking and locating of assets. It is offered in three editions: standard, professional and enterprise. Ideal for IT departments, the system syncs data and devices anywhere in real time through wired and wireless connections on the network to keep information up to date and readily available. Other functions include mobile devices image and signature capture, active directory integration and proactive e-mail alerts. Wasp Barcode Technologies, 866-574-9277, [www.waspbarcode.com](http://www.waspbarcode.com).



## RFID-enabled key management solution with open-architecture platform

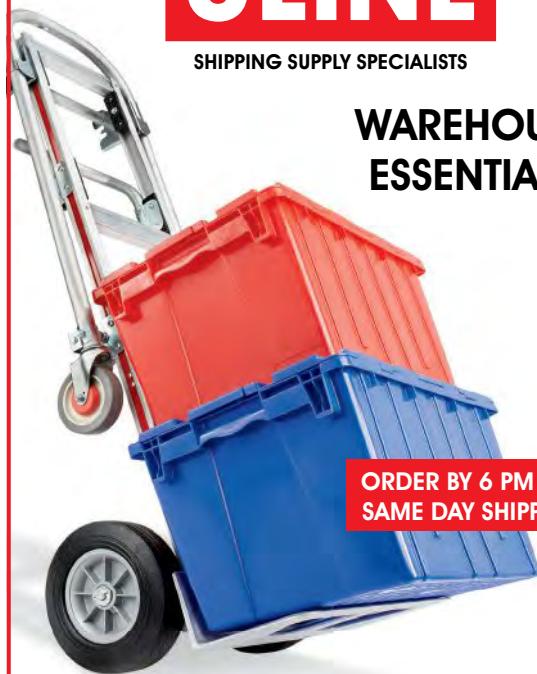
For greater flexibility and customization options, the Capture Tech RFID-enabled key management solution now features an open-architecture system. The solution supports better organization, accountability and security in an operation's key management processes. Compatible with any standard reader, the solution combines Gen2-compliant RFID with seals to hold the keys and does not require a physical connection to the seal or an electronic cabinet. This allows tracking of keys in and out of buildings (instead of in and out of cabinets). **Barcoding**, 888-412-7226, [www.barcoding.com](http://www.barcoding.com).



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## Rugged, compact mobile computer

Ideal for challenging worksites, the rugged Nautiz X4 handheld mobile computer is equipped with a high-brightness resistive touchscreen and weighs 11.6 ounces. The unit comes with a choice of high-performance laser scanner or 2D imager for fast and accurate scanning and bar coding. It also features a 5-megapixel camera with auto focus and LED flash; integrated GPS receiver for built-in navigation; and multiple connectivity options such as 3G and Wi-Fi.



The device runs Android 4.2 or embedded Windows 6.5 operating system. Built to withstand rough use, drops and tumbles, the IP65-rated unit resists extreme temperatures, dust and water. **HandHeld USA, 541-752-0313, www.handheldgroup.com.**

## High-resolution, high-speed code reading with image-based device

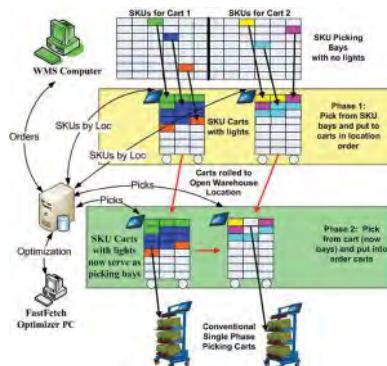
The high-resolution LECTOR650 image-based code reader decodes 1D and 2D marks in automation and manufacturing applications. With a large field of view and an optional dynamic focus function, the device easily identifies different code positions, object heights and transport speeds. Omni-directional, the code reader modularly integrates multiple



devices for reading printed and direct part marked codes. Two variations—Flex and Dynamic Focus—are offered with resolutions of 2 or 4 megapixels. The Dynamic Focus model includes a wide-angle lens and frame capture rate of 40 hertz to identify objects at fast conveyor speeds up to 13 feet per second. Features include easy-to-use function buttons, integrated LED illumination, an aiming laser for simple setup and installation without a PC, and a MicroSD memory card for storing images and parameter settings. It is compatible with TCP/IP, EtherNet/IP, EtherCAT, PROFINET, PROFIBUS, serial and CAN network fieldbuses. **SICK, 952-829-4728, www.sickusa.com.**

## Slot and pick simultaneously

Coupling light-directed picking modules mounted on carts and in bays with tablet PCs, a new system allows for picking and dynamic slotting to be completed



at the same time. The system eliminates a centralized computer system to control the lights on bays and carts, allowing slotting of products for each wave without relocating inventory. It is ideal for picking a batch of orders with a reasonable degree of SKU commonality, such as applications that pick from open cases in large bulk storage areas. By slotting products perfectly for each wave, the system enables batch picking of multiple orders while reducing picking time and labor. **FastFetch, 678-570-5178, www.fastfetchna.com.**

## Rugged mini tablet is lightweight, powerful

The XT1 rugged mini tablet supports the Android 4.2 operating system and is equipped with an integrated 2D bar code scanner. Compact and lightweight, the tablet features 4G-ready UMTS/HSDPA/HSUPA/GSM wireless wide area network communication and 802.11a/b/g/n dual-band WLAN. For durability in challenging environments, the IP54-sealed device has been constructed to withstand repeated 3-foot drops to concrete. Its 5.9-inch capacitive touchscreen is easy to read, while its lithium ion battery recharges quickly for maximum uptime and productivity. **Janam Technologies, 516-677-9500, www.janam.com.**



## Simulation-based training system hones forklift operator skills

Awarded MHI's Best New Innovation at ProMat, the Forklift Simulator training system teaches new employees how to operate a forklift, and refines the skills of experienced workers, without exposing them to hazardous situations. The system increases safety and improves productivity by creating authentic training conditions through customizable scenarios and environments. Features include simulator technology, 360-degree virtual reality headgear and realistic driver's seats to allow workers to hone their skills without using expensive real-world equipment. **Forklift Simulator, 32-15-33-1946, [www.forklift-simulator.com](http://www.forklift-simulator.com).**



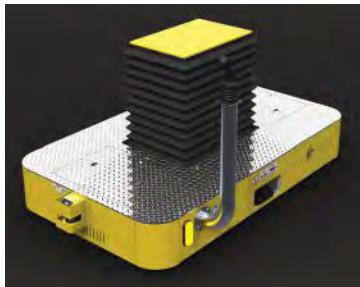
## Maximize energy savings with mostly mechanical crossbelt sorters

A line of robust cross-belt sorters operates on a mostly mechanical basis, keeping electronic components to a minimum. The sorters feature rotating drives that work at up to 90% efficiency for 50% more energy savings than other systems. The sorters' simple, modular construction makes installation, relocation or reconfiguration easy, with minimal downtime and labor requirements. Engineered to be versatile, the system can safely handle a range of items—from eggs or wine glasses to 55-pound sacks of dog food. Depending on throughput rates, performance targets and the amount of available space, the sorters can be configured horizontally in a circular structure, or vertically in a linear structure. **Interroll, 800-830-9028, [www.interroll.us](http://www.interroll.us).**



## Manually guided cart convertible to automatic guided vehicle

Adaptable to accommodate production growth, the MGV/AGV is a manually guided vehicle that can be transformed into an automatic guided vehicle without significant infrastructure change or investment. The heavy-duty, self-propelled MGV cart incorporates a hydraulically powered scissor lift that is mounted in the center of the frame. With a fully customizable deck size and lifting capacities up to 3,000 pounds, the cart securely lifts, holds, turns (with added tooling) and transports unfinished goods safely, quickly and ergonomically. Conversion to an AGV assembly line can be accomplished without overhead or under floor power, towline systems, conveyor belts or lines. The modular, DC-powered carts feature a drive motor with integral brake, and controller-directed acceleration and deceleration for smoother starting and stopping. **Handling Specialty Manufacturing, 800-559-8366, [www.handling.com](http://www.handling.com).**



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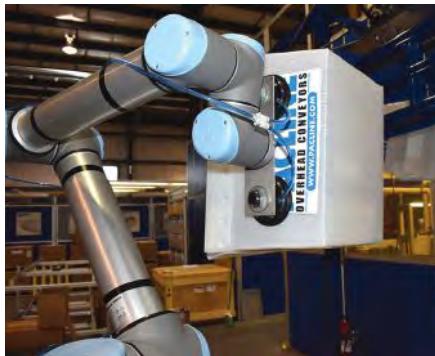
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## Handle empty cartons with overhead conveyor system

The PAC-LINE empty carton handling system uses an enclosed track overhead chain conveyor in combination with a UR10 universal robot. Configured with motion-tracking software, the robot automatically loads and unloads cartons to and from the carriers on the moving conveyor. Ideal for split case or less-than-carton picking operations, the system permits centralized carton building with subsequent delivery direct to workers throughout the picking areas. Features include modular construction for fast installation and easy modification, and tight radius curves to accommodate existing equipment and building features. **Pacline Overhead Conveyors, 800-955-8860, [www.pacline.com](http://www.pacline.com).**



## Industrial warehouse management system

A new industrial wireless-mobile WMS replaces paper forms and manual keyboard data entry to give a real-time view of inventory. Offered at a purchase price of \$3,000, or a subscription cost of \$200 per month, the software works with wireless mobile

computers equipped with scanners to read pre-printed, license-plate tracking bar codes. With an optional module, it can print bar code labels in a customer-specified format. The software installs on a Windows server in a user's facility or at a remote data center, and employs a Web-browser interface. Capable of running stand alone, the system can be interfaced with accounting and enterprise resource planning systems, e-commerce Web sites, and supply chain systems that generate advanced shipping notices, packing slips and bills of lading. **BellHawk Systems, 508-865-8070, [www.bellhawk.com](http://www.bellhawk.com).**

## Place objects precisely with articulating jib crane

With a load capacity up to 660 pounds, the Easy Arm 660 gives workers full control when picking, placing, positioning and loading large, heavy objects. The unit incorporates the supplier's G-force intelligent lifting technology with an ergonomic articulating jib crane. Flexible, responsive and freestanding, the device places objects precisely within a span of 14 feet. It can reach lifting speeds up to 45 feet per minute in high production environments. Electrical servo-powered and fully programmable, the device can be outfitted with specific tooling to match the size and structure of the load. Other features include capacity overload, power loss protection, and a built-in float mode for exact placement. **Gorbel, 800-821-0086, [www.gorbel.com](http://www.gorbel.com).**

## Articulating conveyor extension eliminates lowering, lifting

Fitting the supplier's telescopic conveyors with the DroopSnoot articulating extension allows them to reach the top a trailer or shipping container so loose-loaded parcels at heights of more than 6 feet can be loaded or unloaded with minimal effort. (Alternately, parcels at floor level can easily be drawn onto the



belt and conveyed into the facility.) The 59-inch articulating section mounts at the front of the conveyor. Its operation is guided with an intuitive smartpad, allowing an operator to elevate or lower the unit in any vehicle. Features include a custom-made, high-grip belt to prevent parcel slipping; a two-way anti-collision bumper that forces the conveyor to retract slightly if an obstacle is encountered; guards that prevent access to moving parts; and rollers at the front of the unit that pop-out if anything is caught between them, eliminating pinch risk. **Caljan Rite-Hite, 800-338-1751, [www.caljan.com](http://www.caljan.com).**

## Lift and transport system moves items with custom end effectors

Three new versions of the ErgoTranz lift/transporter—featuring custom end effectors—have been released, making the unit more versatile to accommodate a variety of applications. The first model incorporates a multi-functional sliding boom and hook end effector to pick up material from boxes on floor level and transport loads up to 600 pounds. Easy to install and use, the device replaces manual lifting or the use of bulky cranes. For applications that require pouring of wet or dry substances, the grip/turn/tip end effector allows operators to lift, transport and pour loads with precision and without strain. It supports loads up to 200 pounds. The third version grips and rotates rolls of material from within the core. Its 90-degree pivot allows users to move rolls from a vertical to a horizontal position, and back, while its optional electric motorized push-off mechanizes the full operation. **Ergotech, 203-790-4100, [www.ergotechinc.com](http://www.ergotechinc.com).**

# PRODUCT Showcase

## Add spring-actuated level loader to powered walkie or rider pallet trucks

Adding the PalletPal mobile leveler attachment to an existing powered walkie or rider pallet truck makes loading pallets safer and faster. The automatic, spring-actuated level loader's fork channels allow the vehicle to be driven into it (flared ends on the fork channels enable simple fork alignment). After positioning an empty pallet on the slip resistant platform, the worker travels through a facility and loads the pallet. The attachment keeps the platform at a comfortable height with an integrated spring that responds to the load, compressing to lower the platform while keeping the top level. The device requires no electrical power and accommodates all types of pallets and skids. To allow workers to get closer to the load, the platform features recesses and narrow base pads. **Southworth Products, 800-743-1000, [www.southworthproducts.com](http://www.southworthproducts.com).**



## Prevent product, pallet and rack damage with forklift attachment

Weighing 13 and 18 pounds respectively, the low-cost Pallet Shield and Pallet Shield PRO attach to any Class 2 forklift carriage and act as a bumper to protect products against impact damage. Constructed of solid steel, the devices are engineered to connect with the center block or stringer below the lead board, preventing wood chips, damaged pallets and product. The PRO version works with both reach and sit down vehicles that interact with racking systems. It features a patented lift up mechanism flips up when it comes into contact with racking systems or dock plates. **Product Protector, 877-768-3287, [www.productprotector.com](http://www.productprotector.com).**



## Battery-powered pail lifter for ergonomic handling of 5-gallon buckets

The Pail Lifter provides a fast, safe and easy way to handle 5-gallon buckets of liquids, such as paint. Similar to a two-wheel hand truck in operation, the unit includes a powered component that eliminates manual handling. A yoke and integrated retainer hold the pails securely in place while lifting and transporting. The device accommodates up to three pails at a time and lifts them to an under-clearance height of 35 inches. It also includes a flip-down shelf to transport case packed goods, including quart or 1-gallon containers. Powered by a 24-volt, 7.2-amp hour battery for full shift use, 110-volt battery charger is included with each lifter. **Lift'n Buddy, 701-499-5290, [www.liftnbuddy.com](http://www.liftnbuddy.com).**

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## Rugged keyboard enhances touchscreen computer

For industrial applications and environments where on-screen keyboards are not ideal, the supplier now offers the iKey DU-5K-FSR completely sealed industrial keyboard. Fully resistant to dirt, water, oil and dust, the peripheral device features an integrated force sensing resistor and no breakable moving parts. Together, the S9000 computer and keyboard can be implemented as a fixed or mobile mount pair that work as one cohesive unit to maximize productivity in harsh environments. **Glacier Computer, 866-724-6257, [www.glaciercomputer.com](http://www.glaciercomputer.com).**



## High-pressure protective packaging films address longer shipping, storage cycles

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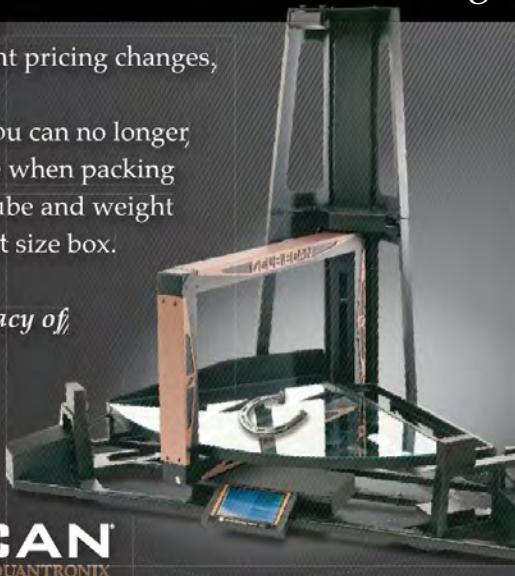
cycles, two new high-performance inflatable cushioning films have been introduced. The HC Performance hybrid cushioning films feature multiple square air chambers instead of a single large cell, allowing air to transfer between the individual chambers. Two versions are offered: one engineered for high air retention properties to protect heavy items; and a second, lighter-duty version for packaging lighter weight products. The films work with the supplier's AirSpeed HC Versa unit that automatically inflates the rows of material on-demand. **Pregis, 877-692-6163, [www.pregis.com](http://www.pregis.com).**

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## Maintenance-free casters, wheels

The Swivel-EAZ Pro precision wheel and caster are engineered to be maintenance free and support limitless motion with ergonomic ease of movement. Offered in widths of 2 inches and diameters from 3 to 8 inches, both handle load capacities up to 1,500 per unit. The casters employ a three-axis system for easy pushing and pulling motions in any direction while the wheel reduces floor contact pressure. **Aubin Industries, 800-324-0051, [www.aubinindustries.com](http://www.aubinindustries.com).**

# PRODUCT Showcase



## Meet GHS regulation with durable labels

The CILS-8100GHS range of computer printable durable labels has been developed to meet the Globally Harmonized System (GHS) regulation deadline of June 2015. Engineered specifically for the classification and labeling of chemical drums, the labels resist solvents, chemicals, abrasion, weathering and extreme temperatures ranging from -320.8°F to 730.4°F. They feature a pre-printed, solvent-resistant coating that allows the addition and/or printing of variable data directly from a standard, in-house laser or thermal transfer printer. CILS International, 877-512-8763, [www.cils-international.com/usa](http://www.cils-international.com/usa).

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**David Butwid**

**TITLE:** Vice president of sales and marketing, Gorbel; Vice chair of EASE, the Ergonomic Assist Systems & Equipment industry group at MHI

**LOCATION:** Fishers, N.Y.

**EXPERIENCE:** 35 years at Gorbel

**PRIMARY FOCUS:** Responsible for sales, marketing and customer service at Gorbel. The EASE industry group provides a forum for current ergonomic, safety and health issues and trends affecting the performance and safety of human work.



currently working with the College Industry Council on Material Handling Education (CICMHE) to develop a university curriculum for teaching ergonomics. This will complement the courses universities have always taught about the concept of ergonomics by providing appropriate content for specific applications, like pick-and-place applications. That's something we hope to have finalized in the next year and ready for the classroom in the fall of 2016.

**Modern:** David, you've been in the industry for 35 years. If you think of how the industry has evolved, what would you say is the state of ergonomics today?

**Butwid:** When you're talking about ergonomics, what you're really talking about is the creation of user-friendly systems or processes that consider the interaction between the human and the machine, while increasing safety and productivity. On the industrial side of the industry, we are focused on improving safety and productivity. If I look back at when I joined Gorbel, we have been talking about ergonomics since the mid-1980s, but it didn't come to the fore until the mid-1990s. Today, just about every major company we talk to—and I'm sure this is true for other members of EASE—has an ergonomist on staff. That is something we didn't see even in the 1990s.

**Modern:** What is the role of the ergonomist in the organization?

**Butwid:** The ergonomists primary role is to help engineers designing systems and the workers performing a task pick out the right equipment for the job. To be frank, there's a lot of equipment on the market that may be ergonomic, but hasn't been applied properly by

engineers or isn't used by workers. And, let's face it: If a worker isn't willing to use it, ultimately it's a bad solution. So, the role of the ergonomist is to interact with engineers and workers to develop a process or system that is safe, productive and, most importantly, will be used. That's a big and important shift.

**Modern:** We have often heard that there is more of an emphasis on ergonomics in Europe than in the United States. Is that the case, and if so, how does it differ?

**Butwid:** The difference is that in Europe, there are standards that companies have to meet. In the United States, there are no standards. States like North Carolina and California have guidelines, and we are seeing a trend among some large companies to develop their own guidelines for their engineers and workers. But, you don't have to comply with a guideline. The lack of a standard is a barrier to raising ergonomic awareness.

**Modern:** That's a good segue to talk about what you're doing at EASE.

**Butwid:** Raising ergonomic awareness is one of the most important things we do at EASE. For instance, we're

**Modern:** How about building awareness within industry?

**Butwid:** We are working with the Ergonomics Center of North Carolina to develop a two-hour training package that will help EASE members, manufacturers of ergonomics equipment and dealers to train their sales forces to be better ergonomics consultants with customers. For instance, ergonomics and lean manufacturing should go hand in hand. You want to perform a task as efficiently and safely as possible in lean. So, we'll be training them to go into a work cell and identify ways to make it as efficient and ergonomic as possible.

**Modern:** Companies understand that ergonomics is important. Now, it's getting them to apply the concepts in their operations?

**Butwid:** You're right. In the 1990s, companies were just beginning to understand the importance of ergonomics. Now, they're hiring ergonomists. That's a lot of progress in 20 years. The next step is to work on the proper application of the equipment. That's what we're developing with CICMHE and with training materials for people in the field. □



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