RFID update

Seven years after the Wal-Mart RFID mandate, RFID is alive and growing in the supply chain.

By Bob Trebilcock, Executive Editor

"Wal-Mart Radio Tags To Track Clothing."

That was the headline of a story in *The Wall Street Journal* this past July. For many in the materials handling business, it was a déjà vu moment. After all, seven years earlier Wal-Mart announced what came to be known as "the mandate," the goal to have all suppliers tagging cases and pallets with RFID smart tags by the end of 2006.

Anyone who ships to Wal-Mart knows how that worked out. But, let's give the retailer credit where credit is due: Without that mandate, we might not be talking about RFID today. And make no mistake about it, when it comes to tackling problems in the supply chain, leading companies of all sizes are talking about RFID.

"The euphoria around Wal-Mart spurred a lot of innovation by the RFID industry," says Kerry Krause, vice president of marketing for Impinj (www.impinj.com), a provider of RFID readers and silicon chips. "You saw investments in reader technology, chip technology and software that arguably accelerated the progress of the technology."

Those innovations led to pilot projects that are now rolling out across the organizations of the early adopters in a big way. The result is that the market for RFID technology is projected to grow at a compound annual growth rate of 19.5% through 2014, according to VDC Research Group (for more, see *Modern's* special report on the Top 20 Automatic Data Capture Suppliers in the October issue, www.mmh.com/article/top20suppliers).

Where then is RFID today and how does it look compared to what we expected back in 2003? To find out, *Modern* talked to analysts, hardware and tag manufacturers and solution providers. We learned that while most companies are not attempting to track cases and pallets through an open supply chain, which was the idea back in 2003, a new vision for RFID is taking hold and driving real value for early adopters.

Behind the growth

So what's behind the growth? For starters, the technology had to overcome three important hurdles involving perception, functionality and price.

First, there was a hype cycle. RFID's evangelists promised to replace bar codes and deliver real-time, end-to-end visibility across the supply chain for pennies. That was unrealistic. "At the top of the hype cycle, you would've thought RFID could solve world peace," says Chris Schaefer, director of global market development for RFID at Motorla (www.motorola.com). "There was a set expectations that were impossible to deliver."

For another, it didn't work so well. Radio waves are finicky. RFID, for instance, did not work well around metal or liquids. Given the prevalence of steel racks, lift trucks and metal truck trailers, that described most manufacturing and distribution environments. "The technology was in its infancy, and there were high failure rates," says Carolyn Ricci, senior product manager of RFID for Zebra Technologies' specialty printing group (www.zebra.com). "That made it a difficult sell to the business side of the house."

Last, but certainly not least, it was expensive. The goal back then was the 5-cent RFID tag. But when a bar code cost a fraction of a penny, those nickels would add up across the billions of cartons and pallets that are shipped every year in the retail supply chain.

What happened? In a nutshell: The technology now works. "On the tag side, we've got better silicon that can be read more accurately, at increased ranges and requiring less power to excite the tag," says Phyllis Turner-Brim, director of RFID strategy and licensing for Intermec (www.intermec.com). "On the reader side, there has been a real

Retailers are still adopting RFID, but now the emphasis is on item-level tagging in the store. That information can be used to drive replenishment from the DC.

focus on eliminating spurious reads and making sure that you're only reading the tags that you've selected to read." They've even come up with solutions to reading in environments with lots of liquids and metals.

The price of the technology has also come down. Part of that is the result of Moore's Law (a prediction by Gordon Moore, who co-founded Intel, that the number of transistors on a microprocessor would double periodically). But part is also the result of the role of standards, says Helge Hornis, manager of the intelligent systems group for Pepperl + Fuchs (www.pepperl-fuchs.us), a provider of RFID solutions to manufacturers. "In the past, we'd have a chip manufacturer develop a chip that would work for our solutions, which resulted in an expensive RFID tag," says Hornis. "Today, we can develop solutions utilizing one of the

open standards available on the market. That is a significant advantage to our customers."

The result of these technological developments is that perceptions have also changed. "There are still nuances in an operating environment because RFID is tied to physics," says Michael Liard, practice director for RFID at ABI Research (www.abiresearch.com). "But it's now part of the solution tool kit. RFID is real. It's here and people are using it. That's the most important change."

Rethinking retail

Perhaps the biggest example of the change in perception is in the retail supply chain, where the hoopla began.

The starting point in 2003 was to tag cases and pallets at the point of manufacture with inexpensive passive RFID tags to track cases and pallets flowing through retail distribution centers and

transportation networks. That would allow retailers to know just what inventory they had and where they had it. The retail supply chain, however, is an open loop. There are any number of participants that are out of the retailer's control and are only going to handle the merchandise once, including manufacturers, distributors, third-party logistics providers and transportation providers. Unless every one of those players agreed to read and share data, there were still dark holes along the way.

Today, the starting point is the individual items on the retail shelf, especially apparel. That's because the retailer's store is a closed loop that begins at the retailer's distribution center, with stops at the back room of the store, the shelf and the point of sale. The retailer controls each of those stops and can ensure compliance. What's more, it's not just Wal-Mart following this script.

"We are seeing department stores and we are seeing closed loop brands—apparel makers that own their own stores—doing item-level tagging in their stores," says Prasad Putta, general manager of merchandise visibility for Checkpoint Systems (www.checkpointsystems.com). "Their value proposition is the reduction of out-of-stocks to increase sales."

Without RFID, a retailer may know what inventory it has in the store, but it doesn't know whether the size, style and color it needs to make a sale is on the shelf or in the back room. "Retailers we talk to will tell you that their inventory in the store is only about 60% accurate," says Zebra's Ricci. "The labor it takes to go out and count all the merchandise in a store is expensive."

With a handheld reader, an associate can quickly take inventory or identify product needed to fill an order.

By tagging the merchandise and then reading it in the stock room, when it leaves the stock room and through daily or weekly audits at the shelf, a retailer can fill in that gap. "Many of the retailers we work with are putting an RFID read point at the door between the back room and the sales floor," says Putta. "When the product leaves the back room, they can automatically update their inven-

RFID technology boosts asset control

Thanks to an asset management solution, Mission Foods saves big on returnable containers.

As one of the world's leading tortilla producers, Texas-based Mission Foods is an industry innovator in manufacturing quality tortillas, chips, salsa, taco shells and more for consumers throughout the country and around the world.

Operations in three Texas warehouses require accuracy and proficiency as they process and prepare nearly 20,000 containers of product on a daily basis for a vast network of independent distributors.

As part of the distribution process, Mission Foods places all of its packaged products in returnable plastic containers (RPCs), which independent distributors then load onto trucks. The independent distributors then are supposed to return these RPCs after sales are complete. However, Mission Foods found that after the RPCs left the warehouse for deliveries, they were likely never seen again.

With a paper-based tracking process that wasn't streamlined across the various warehouses and distribution centers, Mission Foods workers had no

way to track if RPCs were returned to a different facility or if they were ever returned at all. Because of this, Mission Foods lacked basic asset tracking, and

RFID technology is used to track nearly 20,000 returnable containers a day at Mission Foods.

the results were staggering. Nearly 100% of its RPCs were being replaced each year at an annual cost of nearly $3.5 million.

The solution was an RFID-based

asset management and tracking system (Intermec, www.intermec.com). In the new process, the packaged products are picked and loaded onto the RPCs, which are tagged with RFID labels. The RPCs are then loaded onto pallets and the RFID label is encoded by a smart printer before it's applied to the pallet wrap. An RFID reader records these pallets and associated RPCs as a forklift drives though an outbound portal prior to the loading dock. When the delivery trucks return, the RPCs are again processed through an inbound portal, offering an easy, immediate reconcile of inventory. Even if the containers are returned in batches or to a different warehouse, they are still scanned in as "returned," allowing Mission Foods to see in real-time where they are all located.

With the new system, Mission Foods now budgets a 20% replacement rate for damaged or unreturned boxes, instead of the 100% replacement rate it once experienced. In reality, the company now has closer to an impressive 4% replacement rate as a result of the RFID technology.

—Bob Trebilcock, executive editor

tory levels." Likewise, they may audit the shelves with a handheld reader to see what needs to be replenished, or use information from a point-of-sale system to drive replenishment.

In these cases, the RFID tag isn't just a replacement for a bar code; it can also provide information that isn't contained on a bar code. "With apparel, you have all the different permutations of style, size and color that can't be captured by a bar code," says Impinj's Krause. "You know you've sold a pair of jeans, but you don't know if you need to replenish the 32-inch by 32-inch jeans, or the 32-inch by 30-inch jeans. With RFID, you can grab a hand-held reader, walk up to a wall of jeans, and know what you've sold through."

The next step is to integrate those in-store systems with the back-end systems in the warehouse to automate the replenishment system. "We're clearly at an early adopter phase," says Krause, "but the growth is explosive."

RFID gets active

The retail supply chain uses passive RFID tags. Some of the most exciting applications and solutions today use more expensive active RFID technology. These are tags that incorporate a battery in the tag as a power source. This allows them to broadcast information at scheduled times.

Most of these solutions are in closed loop applications that are controlled by an organization, especially manufacturers. "Once people began thinking about RFID, they began to look at other ways to get involved with the technology," says Motorola's Schaefer. "The starting point was inside the four walls of their plants, their distribution centers or in the transportation nodes that they control."

Manufacturers, for instance, are applying RFID technology to keep track of the manufacturing process. "The No. 1 application is fault and process step tracking," says Hornis of Pepperl + Fuchs. "You may have 100 small but different steps in a process, and you want to be sure that it passed each step. That information can be written to a tag." Likewise, Hornis

The Department of Defense was an early adopter of RFID technology, including active tags that are used to track assets and equipment in the field.

adds, a manufacturer may use the tag as a mobile database that is read when a product like an automobile assembly, reaches a workstation. The tag tells the equipment, or an operator, what work needs to be performed or what component needs to be added to that particular vehicle.

Generically, the industry groups these solutions under the asset management umbrella. They want to know what assets they have, where they are and whether they can get them to the place they're needed at the right time. The pay off is better utilization of the asset.

And while RFID is part of the conversation around asset management, it's not the sole conversation, says David Shannon, senior vice president of strategy and corporate development for Savi Technology (www.savi.com). Increasingly, technologists are combining RFID technology with other data collection technologies and application systems for a richer experience. "RFID now touches bar codes, it touches sensors, it touches WiFi and it touches GPS," says Shannon. "It may be associated with data collected directly by a sensor or it may be connected to data that's found in a database."

What Shannon is getting at is called convergence. The idea is that many automatic data capture technologies work

best when they're used in conjunction with other complementary technologies. The Department of Defense, for instance, is not only interested in the location of an asset, but also in the condition of the products or their readiness for use. "The solutions we're developing now can monitor the location of an asset in the supply depot," says Shannon. "But we can also track the progress of a repair during the maintenance processes and then track the asset as it flows into the theater of operations."

While Savi is focused on military applications, the private sector is applying similar solutions to critical assets. Aircraft maintenance organizations, for instance, are using RFID to track the location of critical tools required for repair operations and to associate that information about whether the tool has been inspected or calibrated and is ready for use. Other organizations are using active RFID as a resource management tool to keep track of people working in hazardous environments to make sure they're safe.

"There are so many interesting things going on," says Liard at ABI Research. "They're far reaching. They're broad. And, they're real." Seven years after the Wal-Mart mandate that may be the most important message of all. □