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In cooperation with  **CSCMP** Council of Supply Chain Management Professionals

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Regardless of whether they hold toilet paper, field rations, or ammunition, every cargo container the military sends to the Iraq conflict zone has a radio tag on it to track its location as it travels from factory to warehouse to battlefield. Called RFID, these radio-frequency identification tags are smart labels

that not only make sure troops get their supplies, but also streamline civilian shipping by simplifying even the longest supply chain.

By one estimate, the U.S. military wasted as much as \$10 billion in the first Gulf War by not knowing what supplies it had and where they were going. Shrouded by the fog of war, thousands of containers were sent to the wrong place, leaving some soldiers without vital equipment and supplies. Having learned its lesson, the military is on the front lines in using radio tags and operates the world's largest RFID tracking network, with 2,000 locations in 46 countries. "It has changed the face of war," observes Peter Harrop, chairman of IDTechEx, a market research firm based in Cambridge, England. "RFID gives the military a big advantage. It's very simplistic, but if Napoleon had RFID technology, he might have taken Moscow in 1812, instead of running out of supplies."

### Smart Labels

While the military has been spearheading the RFID effort, companies like Wal-Mart and Metro Group have been pushing the technology to streamline their supply chains and cut the cost of doing business globally. The update to the venerable bar code, RFID tags are attractive because they can be automatically read via wireless technology. As tagged boxes, crates,

and containers pass by an RFID reader at a port, warehouse, or loading dock, a radio the size of a fingernail in the label sends out a small identifying packet of data. The reader receives the data and passes it along to the company's supply-chain system.

"The data is available instantly," observes Doris Hall, chief information officer at BAX Global, a worldwide logistics and transportation firm based in Irvine, Calif. "One of the most important things for our customers is knowing where their goods are on a timely basis. RFID will be part of supply chains in the foreseeable future." The problem for Hall is that the technology needs to mature with global standards and increased reliability before BAX Global starts using it at all 500 of its facilities in 133 countries.

In the meantime, the company has set up an RFID-equipped warehouse in Singapore, where radio ID tag readers check shipments as they enter or leave the complex. "This was previously done manually with bar code scanners, and the company has seen tremendous productivity and accuracy gains," adds Hall. Each movement of goods is recorded on BAX Global's Warehouse Management System's computers, forwarded to the owner's supply-chain-management network and any unauthorized move results in a text message

## Decoding RFID

*Making sense of the terminology is key to understanding RFID.*

### Antenna

Usually made of silver ink or etched metal, the antenna broadcasts the RFID chip's data.

### Gen 2

The second generation of tag design, these chips are just coming to market.

### Inlay

An RFID chip and antenna packaged together in a plastic case to protect the sensitive circuits.

### Label

The final tag that includes the radio, antenna, and a printable paper wrapper.

### RFID

The replacement for bar codes, Radio-Frequency Identification technology, wirelessly transfers a small bit of data from a tag to a reader.

### Radio Chip

The basic element of a tag, the chip has a tiny radio and a small amount of memory to transmit its information to an RFID reader.

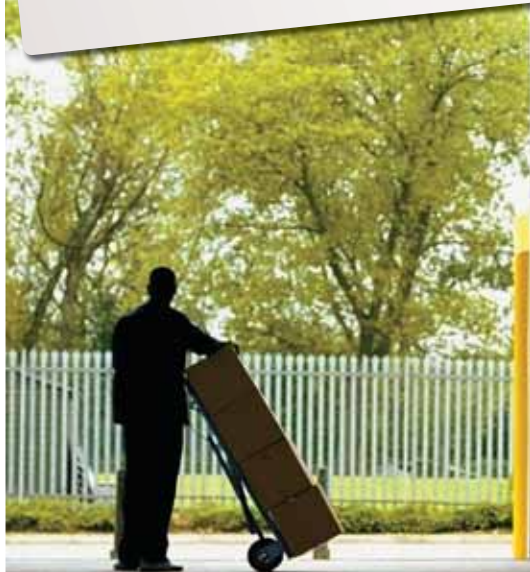
### Reader

A device that interrogates the RFID tag, receives its data, and sends it along to the company's supply chain software.

### Supply Chain

A series of manufacturing and shipping links that together efficiently bring goods from one part of the world to another.

If your supply chain were  
this simple, any RFID tag  
would do.



**We understand your world. That's why we provide real-world RFID solutions.** With more than 70 years' experience in related

industries, Avery Dennison is uniquely qualified to turn the promise of RFID into reality. Our expertise in pressure-sensitive adhesives, roll-to-roll manufacturing, electronic tags and multi-layered label construction has helped us to create an expanding portfolio of highly reliable, competitively priced Gen 2 products. In fact, our RFID Division Atlanta Technical Development Center simulates a wide variety of challenging real-world conditions to ensure that our RFID products will deliver consistently across your supply chain.

For solutions to your real-world RFID needs, call 866-903-RFID or visit [www.rfid.averydennison.com](http://www.rfid.averydennison.com).



## Tracking News

*RFID tags are doing everything from identifying people to paying for gas. Here are some novel ways the technology is being used in the U.S. and abroad.*

### Gas 'n Go

Six million Americans use Mobil's SpeedPass to buy gas by waving an RFID key fob at the pump; the purchases show up on their monthly credit-card statement.

### Verifying Viagra

Pharmaceutical giant Pfizer tags every bottle of Viagra so that pharmacists can verify authenticity.

### Tobacco ID

In Japan 600,000 cigarette machines will soon have RFID readers in them and only sell smokes to those with chip-equipped ID cards.

### Instant Cash

By next year, an estimated 700,000 RFID cards in Asia will be used to pay for everything from train rides to snacks while waiting.

### Ports of Call

Many American ports are being equipped to use RFID tags to make sure that sealed shipping containers don't hold bombs or smuggled aliens.

### Convenience Stores

Buying tagged goods at FamilyMart convenience stores in Japan can cut checkout time to ten seconds, and the company is rolling out automated stores.

sent to the port's operations manager's cellphone, alerting him or her to check into it.

### Brave New World

"There's so much potential for a vibrant industry," explains IDTechEX's Harrop. He forecasts that the RFID business will grow from this year's estimate of \$2.7 billion to \$26 billion by 2016. At that point, he thinks that nearly 600 billion tags could be produced, up from 1.3 billion tags this year.

While specialty tags that record temperature or exact location can cost \$50 and are the size of a credit card, the typical basic tag is postage-stamp sized and goes for between 15 and 30 cents. Most agree that the simplest tags need to come down to about a penny a piece before they become widespread. "It's a classic Catch-22

Monza chips are designed to perform well—even in less than ideal RFID environments such as large and very busy distribution centers. "Imagine a Wal-Mart or Target distribution center with hundreds of RFID readers blasting out signals," says William Collier, the company's CEO. "Monza tags cut through the interference to hear the signal and successfully transmit data." RFID tags that are powered by Impinj's Monza chips also work well on historically difficult-to-tag items such as liquids and metals.

### Chipping In

Turning the chips into final RFID tags starts with attaching the chip to an antenna to form what engineers call an inlay, which is then mounted on a self-stick label that's ready for printing. Because it

**There is so much potential for the RFID industry. By 2016 the vibrant market is projected to soar to \$26 billion, up from \$2.7 billion this year.**

situation," relates Rick Blasgen, CEO of the Council of Supply Chain Management Professionals (CSCMP). "We need a lot of demand to drive tag costs down, but the price has to go down before we'll get high volume. It will happen, but it will take years." With 10,000 members worldwide, the CSCMP has its headquarters in Oak Brook, Ill., and specializes in logistics.

While the focus is on shipping, RFID has other uses—everything from automatic payment cards to inventory control. The biggest project is a \$6 billion effort in China to issue 1.3 billion RFID-equipped cards to its citizens. All the Chinese ID cards will use the latest second-generation, or Gen 2, chips, which offer better performance, security, and reliability. "The move to Gen 2 hardware is key to increasing volume and decreasing prices," explains IDTechEX's Harrop. "It will push this technology to new heights."

Seattle-based Impinj's Monza Gen 2 radio chip leads the way with more than 100-million chips shipped since its introduction late last year and production continuing to increase. Based on the Impinj's patented Self-Adaptive Silicon technology,

makes every part of the final tag except the radio chip, label-maker Avery Dennison Corp. is well placed to take advantage of the expected growth in RFID tags. According to Robert Malchione, senior vice president for corporate strategy and technology at Avery Dennison, "Speed is of the essence. We need to be thinking in terms of billions of tags."

To accomplish this, the company has spent millions to develop its unique strap attach tag-making process that's capable of pumping out 150,000 finished inlays an hour. "It's ten times faster than competitors," observes Malchione. The method involves marrying together a roll of flexible webbing that has the chips held in place by a matrix of tiny straps. "To succeed, it has to work with the six or so major RFID chip designs on the market," he adds. "We're chip agnostic. We work with everybody."

While RFID is instrumental in lowering shipping costs and streamlining shopping, ultimately its real worth is the opportunities it presents to business. By knowing exactly where a shipment is,

this technology allows moment-by-moment decisions. For instance, if the company's Stockton, Calif., warehouse is overloaded, or a strike has shut down the San Francisco port, the goods can be diverted to Oakland, avoiding a bottleneck. The bottom line: This successor to

the bar code is sparking a paradigm shift in supply-chain management and revolutionizing business. —Brian Nadel

*To advertise in our RFID sections, please contact Linda Lydon, FORTUNE / Money Group Custom Projects, at 617-954-9420.*

## Resource Guide

### APICS

Is your organization using RFID to achieve real results in supply chain operations? Visit APICS The Association for Operations Management at [www.apics.org/resources/magazine](http://www.apics.org/resources/magazine) for your copy of "RFID Insights," and learn more about RFID applications at the upcoming APICS Conference in Orlando at [www.apics.org/conference](http://www.apics.org/conference).

### DC Expo D/C EXPO 2006

The Largest Exhibit of RFID, Supply Chain, Warehouse Management, Transportation

Management, Logistics, and Distribution Systems for over 23 years. May 23–25, Navy Pier, Chicago. [www.logistar.com](http://www.logistar.com)

### Integrated Solutions Magazine

Want to read about RFID in action? Integrated Solutions magazine details RFID deployments and the latest technological advancements. Our coverage of RFID ranges from active tag asset tracking to the latest EPCglobal initiatives. [www.IntegratedSolutionsMag.com](http://www.IntegratedSolutionsMag.com)

### Technology Evaluation Centers (TEC)

Guided by leading analyst research and

decision support software, TEC is the source for impartial technology evaluation. Users compare RFID software online, and interactively, to identify the best solutions for their business needs.

[www.technologyevaluation.com/RFID](http://www.technologyevaluation.com/RFID)

### Vertmarkets

RFID Solutions Online, the premier sourcing site for the RFID industry, showcases more than 30 vendors and offers more than 18,000 pages of free downloadable content and research.

[www.rfidsolutionsonline.com/content/homepage/](http://www.rfidsolutionsonline.com/content/homepage/)

# IF THE BEST RFID TECHNOLOGY IS IN YOUR SUPPLY CHAIN, SO ARE WE.

Around the globe – on over 100,000,000 pallets, boxes, and individual products – chips from Impinj are making supply chains run faster and smarter than ever. We didn't just help create the Gen 2 standard, we made it real by delivering an RFID solution unmatched by any other. And moving forward, more Impinj breakthroughs – such as our RFID Reader – will make supply chains run even stronger. We're always innovating. It's what leaders do.