

RFID JOURNAL

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JANUARY/FEBRUARY 2015

- **PERSPECTIVE**
More Apparel Retailers Want To Jump Into The RFID Game PAGE 10
- **VERTICAL FOCUS: STEEL**
Manufacturers And Suppliers Get An ROI From Internal And Supply-Chain Applications PAGE 24
- **PRODUCT DEVELOPMENTS**
ATEX RFID Tags For Potentially Explosive Environments PAGE 32

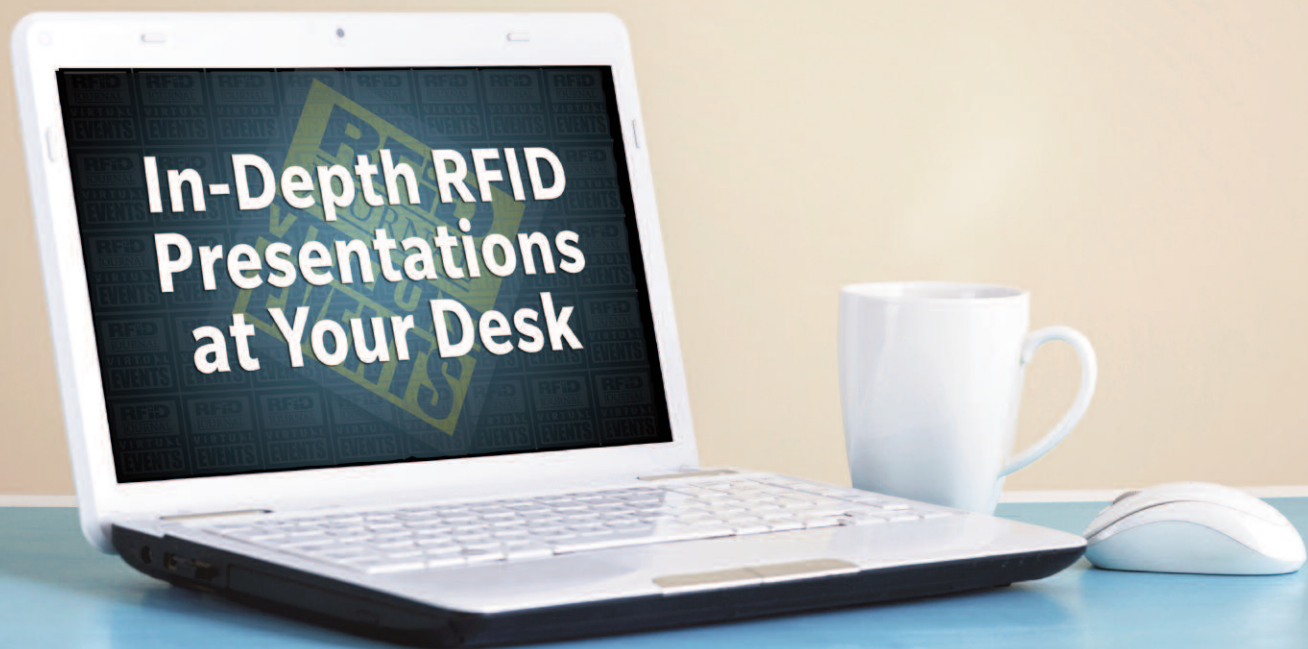
BUSINESS



COLLABORATION

What Each Side Needs To Bring To The RFID Table

PAGE 16



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FOR SPONSORSHIP INFORMATION, PLEASE CONTACT

Alan McIntosh: Senior Director of Sales, amcintosh@rfidjournal.com | (212) 584-9400 ext. 4

Matthew Singer: Senior Director of Sales msinger@rfidjournal.com | (212) 584-9400 ext. 6



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EDITORIAL

Mark Roberti, Editor
mroberti@rfidjournal.com

Andrea Linne, Executive Editor/Magazine
alinne@rfidjournal.com

Paul Prince, Executive Editor/News
pprince@rfidjournal.com

John Hull, Creative Director
jhull@rfidjournal.com

Rich Handley, Managing Editor
rhandley@rfidjournal.com

Beth Bacheldor, Senior Editor
bbacheldor@rfidjournal.com

Claire Swedberg, Senior Editor
cswedberg@rfidjournal.com

Edson Perin, Brasil Editor
eperin@rfidjournal.com

Sam Greengard, Contributing Writer
sam@greengard.com

Bob Violino, Contributing Writer
bviolino@optonline.net

Rhea Wessel, Contributing Writer/Europe
rwessel@rfidjournal.com

Jennifer Zaino, Contributing Writer
jennyzaino@optonline.net

INTERNET OF THINGS JOURNAL

Mary Catherine O'Connor, Editor
mc@iotjournal.com

RFID JOURNAL EVENTS

Kimberly A. Ray, VP of Events
kray@rfidjournal.com

Cheryl Johnson
Senior Director of Events Management
cjohnson@rfidjournal.com

Debbie Hughes
Senior Editorial Director of Events
dhughes@rfidjournal.com

Deborah Lambert
Editorial Coordinator of Events
dlambert@rfidjournal.com

SALES

Alan McIntosh, Senior Director of Sales
amcintosh@rfidjournal.com

Matt Singer, Senior Director of Sales
msinger@rfidjournal.com

SUBSCRIPTIONS

subscriptions@rfidjournal.com

ARTICLE REPRINTS

customerservice@rfidjournal.com

RFID JOURNAL LLC

Editorial office:
PO Box 5874
Hauppauge, NY 11788

Mark Roberti, Chief Executive
mroberti@rfidjournal.com

Kathleen Knocker, Director of Finance
kknocker@rfidjournal.com

Sonja Valenta, VP of Marketing
svalenta@rfidjournal.com

Kathy Roach, Marketing Coordinator
kroach@rfidjournal.com

Lydia Sum, Administrative Assistant
lsum@rfidjournal.com

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features

COVER STORY

16 The Business-IT Connection

The success of any RFID project in any industry requires close collaboration between the operations and technology teams.
By Samuel Greengard

VERTICAL FOCUS

24 Nerves of Steel

Manufacturers and suppliers that deploy RFID to track and manage steel slabs, pipes and other assets say the benefits are well worth the work.
By Jennifer Zaino

PRODUCT DEVELOPMENTS

32 ATEX RFID Tags

Vendors are certifying their tags so companies that operate in potentially explosive environments can track and manage assets and items.
By Bob Violino

departments

5 Editor's Note

Working together to turn information into business value.

6 Out in Front

RFID could track oil spills under ice; RFID may ease one aspect of breast cancer surgery; hidden dangers.

10 Perspective

Making RFID easier for retailers; more apparel retailers want to jump into the RFID game; calculating the benefits of RFID.

columns

40 Tuned In

Consumers rule!
By Bill Hardgrave

43 Health Beat

Hospitals embrace passive applications.
By Ygal Bendavid and Harold Boeck

45 Software Savvy

Teamwork overcomes challenges.
By Ken Traub

tune in online

Find New Business Opportunities

RFID providers now have a source where they can find companies worldwide that are actively seeking to deploy the technology. [RFID Requests for Proposals](#) is updated regularly, with new RFPs from companies in diverse industries. Each RFP includes detailed information, contacts and submission deadlines.

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[RFID in Harsh Environments](#), May 20

[RFID for Asset Tracking in Asia](#), June 17

[RFID in Manufacturing](#), July 15

[RFID for Warehouse & Inventory Management](#), Sept. 23



Find products that can help you deploy RFID successfully, such as Convergence Systems Ltd.'s [CS8300 Temperature Sensing Tag](#). The EPC Gen 2 battery-assisted tag provides a long read

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- [Linen Loss Drops By 90% at Los Angeles Luxury Hotel](#)
- [Bluetooth Beacons Bring Services, Info to SeaWorld, LA Zoo Visitors](#)
- [SK-Electronics Unveils Ant-Size RFID Tag](#)
- [Tyco Retail Solutions Acquires Creativesystems](#)

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- 2 RTLS
- 3 Supply chain
- 4 Airbus
- 5 Retail
- 6 NFC
- 7 Jewelry
- 8 Beacon
- 9 Construction
- 10 Security



The Inside Scoop

What are end users saying behind the scenes? Why should the RFID community be optimistic about the industry? Who's spreading misinformation? Get insight and perspective at the [RFID JOURNAL Blog](#).



Ideas Exchange

RFID JOURNAL maintains an [Ask the Experts](#) forum, where you can submit questions about RFID technology and its applications. Your questions will be answered by RFID JOURNAL editors or outside experts. Recent questions include:

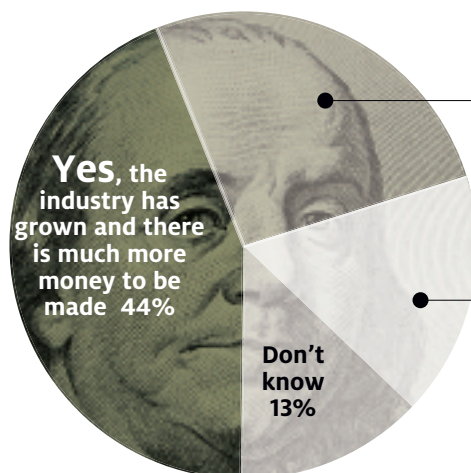
- What is the usual RFID label-printing process?
- What is the cost of an RFID transponder?
- What software supports RFID?
- How is RFID being applied in mines?
- How is RFID used in shipping containers?
- From what range can RFID tags be interrogated?

POLL RESULTS

Is this the right time for venture capitalists to begin investing in RFID again?

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Perhaps,
though they
should be
cautious when
re-entering the
market 26%

No, history
would likely
repeat itself and
VCs would lose
money again
17%

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RFID Journal holds several face-to-face conferences every year, as well as a number of online virtual events and webinars. These events feature end users speaking objectively about the business reasons that they deployed an RFID system, the technical hurdles they overcame in doing so and the benefits they now achieve as a result, as well as presentations by academics, vendors and other experts. Many of the sessions were recorded, and we have compiled these recordings into seven DVDs that are available for purchase for only \$99 or free with a one-year premium membership to *RFID Journal*.

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- RFID in Defense and Security
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Working Together to Turn Information Into Business Value

IT'S ALWAYS DRIVEN ME a little crazy that many people who work at RFID companies think RFID Journal is a publication for techies. The vast majority of our readers come from end-user companies, and they have titles such as director of logistics operations, store operations manager, director of inventory control and vice president of logistics.



The people who read RFID Journal are seeking to solve business problems or improve the way they do business. But they can't do it alone, and as RFID has become more widely adopted, we have seen an increase in readers with titles such as director of IT, senior systems analyst and CIO. That's a good thing.

The truth is, business and IT must collaborate to make an RFID deployment successful. For more than a decade, we've been advocating companies create a crossfunctional team. The business manager of the unit in which the application will be deployed is as critical to the process as IT. Without the former, team members won't understand the business issues or the value of the solution, and without IT, it will be impossible to turn data from the RFID system into useful information employees can act on.

Our cover story examines how business and IT teams should come together to deploy successful RFID solutions (page 16). Disney, for example, makes it a policy to embed an IT expert within individual business teams. This helps bridge the gap in critical expertise between

domains and improves the odds that systems and processes will remain in synch over time.

One industry in which the business side and IT are beginning to work together is steel production. It was once believed RFID wouldn't work on metal products, but as this issue's Vertical Focus shows, manufacturers and suppliers are finding that not only can passive RFID tags work on steel surfaces, they can help workers quickly identify slabs or rolls of different quality and gauges (page 24).

ThyssenKrupp turns steel slabs into products, such as coils for the automotive industry. The company developed its own solution to track steel across a multinational supply chain. Now, the firm can quickly identify steel being offloaded from ships in chaotic ports, which saves time and money. ThyssenKrupp also uses RFID to improve internal operations at its factories and warehouses.

Elsewhere in this issue, we describe ATEX-certified tags designed for use in industries in which there is danger of sparks causing an explosion (see Product Developments, page 32). We also explore advances that make RFID retail solutions easier to deploy and more intuitive, which increases the likelihood they'll be used by untrained staff (see Perspective, page 10).

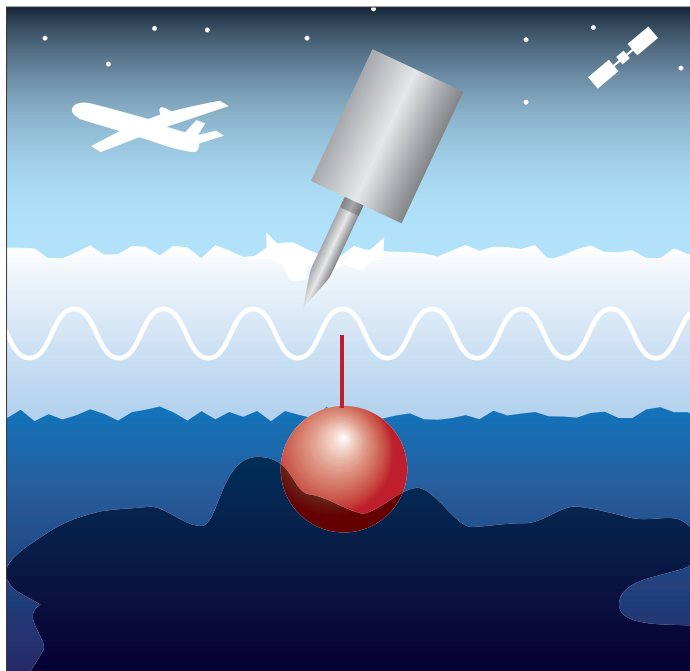
Regardless of what industry you're in, or what side of the business you're on, I encourage you to work collaboratively toward achieving a successful deployment within your company.

Mark Roberti, Founder and Editor

ENVIRONMENT

RFID Could Track Oil Spills Under the Ice

A solution that combines acoustic technology and satellite tags could help cleanup crews locate spills trapped under moving ice floes.



The RFID satellite tag looks like a “lawn dart” with a soda can on top.

THE DEEPWATER HORIZON DISASTER, which released an estimated 210 million gallons of oil into the Gulf of Mexico, focused the attention of oil companies, environmentalists and government agencies on the need to respond more effectively to spills. With increased drilling and shipping in the Arctic, questions have been raised about how the world can respond to a spill that could occur under several feet of ice. The answer might be a combination of acoustic devices and satellite RFID tags.

Last September, the Bureau of Safety and Environmental Enforcement (BSEE), part of the U.S. Department of the Interior, issued a contract worth nearly \$900,000 to URS—a leading provider of engineering, construction and technical services for public agencies and private-sector companies worldwide—for the development of a system to track spills below ice floes.

The problem with tracking under-ice spills is that ice floes move with water currents, so even if a spill is detected and its GPS coordinates are noted, the spill could be miles away before the cleanup equipment reaches the spot. The

solution must be able to mark the location of the spill and track it as it moves.

URS, which was recently acquired by AECOM, a large infrastructure and support firm, hired Midstream Technology, an RFID solutions development firm, as a subcontractor. Midstream’s director, Sam McClintock, has been working with researchers at the College of William & Mary and Envigia Systems, an active RFID and mesh networking technology company, to develop a system that leverages both acoustic technology and RFID to track spills in the Arctic.

When a submersible, manned or unmanned, locates an under-ice spill, it will release an acoustic device in a buoyant carrier slightly larger than a softball. The ball will lodge in the ice floe and emit a low-frequency sound wave that will travel horizontally through the ice (radio waves don’t travel well through ice).

After the acoustic device has been deployed, cleanup crews can return to the approximate location of the spill by plane and drop RFID satellite tags on the surface. The tags will pick up the acoustic waves traveling through the floe and compute the relative location of the device. The satellite tags on the surface, which McClintock describes as “lawn darts with something the size of a Coke can on top to house the satellite transmitter,” will broadcast their location, enabling the cleanup crews to find the spill, drill a hole in the ice and vacuum up the oil.

William & Mary and Midstream are developing the acoustic device. Envigia is developing the satellite tag, and URS is managing the project.

“The challenge right now is to see how far we can get the sound wave to propagate within the ice,” McClintock says. “But we think we will be able to have the tags pick up the sound waves from about a kilometer away, because they’ll have some computing power that lets them sift through background noise. Another challenge is developing a tag that sheds water, ice and snow so it can communicate properly with a satellite.”

The project is due to be completed by September, but McClintock is hoping for an extension. “We’d like to go up to the Arctic and test the solution under real-world conditions,” he says. “Of course, the spill will be simulated.”

—Mark Roberti

HEALTH

RFID May Ease One Aspect of Breast Cancer Surgery

BREAST CANCER IS THE most common form of cancer among women. Many opt for surgery to remove the tumor, and survival rates are high. But before surgery, women must undergo a procedure to help pinpoint the location of the tumor within the breast. It involves the insertion of a thin "localization wire" into the breast tissue, usually with the aid of mammography

wondered if it could be used to pinpoint the location of a tumor within a breast. He and a team of researchers conducted some experiments with low-frequency tags, which can be inserted under the skin with a needle, but found the orientation dependence of the reader-tag interaction too limiting for efficient and ergonomic use in the operating room.



Daniel van der Weide says the team is preparing the solution for FDA approval.

or ultrasound. The procedure is painful and provides only a two-dimensional view of where the tumor is.

Fred T. Lee Jr., MD, vice chair of radiology at University of Wisconsin Hospitals and Clinics, observed the discomfort and the scheduling difficulties inherent in the procedure and began looking for an alternative. He turned to a frequent collaborator, Daniel van der Weide, a professor in the department of electrical and computer engineering at the University of Wisconsin-Madison.

Van der Weide had participated in RFID research and written about the technology and

procedures the patient must undergo and maximizing the efficacy of location in the OR."

Van der Weide, Lee and several other doctors and researchers from the university have formed a company called Elucent Medical to bring the technology to market. Other companies are working on a similar approach, but van der Weide is confident Elucent's solution will be successful. "We have a talented and experienced team," he says, "and we're working on all aspects—engineering, medical, regulatory and business—to optimize this system for patient comfort and physician confidence." —M.R.

The research team developed a tag, in the form of a tiny pellet, that could be inserted into the tumor during a biopsy. In the OR, a doctor could use a reader, also developed by the team, to determine the distance of the tag—10 cm or 6 cm—from the reader antenna. This approach would eliminate the need for insertion of the localization wire and save upward of \$2,500 per patient.

"We have promising prototypes, which we are now refining in preparation for FDA approval," van der Weide says. "Our focus is on minimizing the number of

Oil Under Ice: Hidden Dangers

Barrels of oil spilled in Russia's Komi Republic every 18 months:
4 million

Gallons of oil leaked into Montana's Yellowstone River in 2015:
50,000

Gallons of oil-drilling waste spilled from North Dakota pipeline in 2015:
3 million

Gallons of oil spilled onto Alaska's North Slope in 2009:
46,000

Barrels of oil leaked into Norway's North Sea in 1977:
202,400

Gallons of oil spilled into the Mississippi and Minnesota Rivers in 1962:
3.5 million

—Rich Handley

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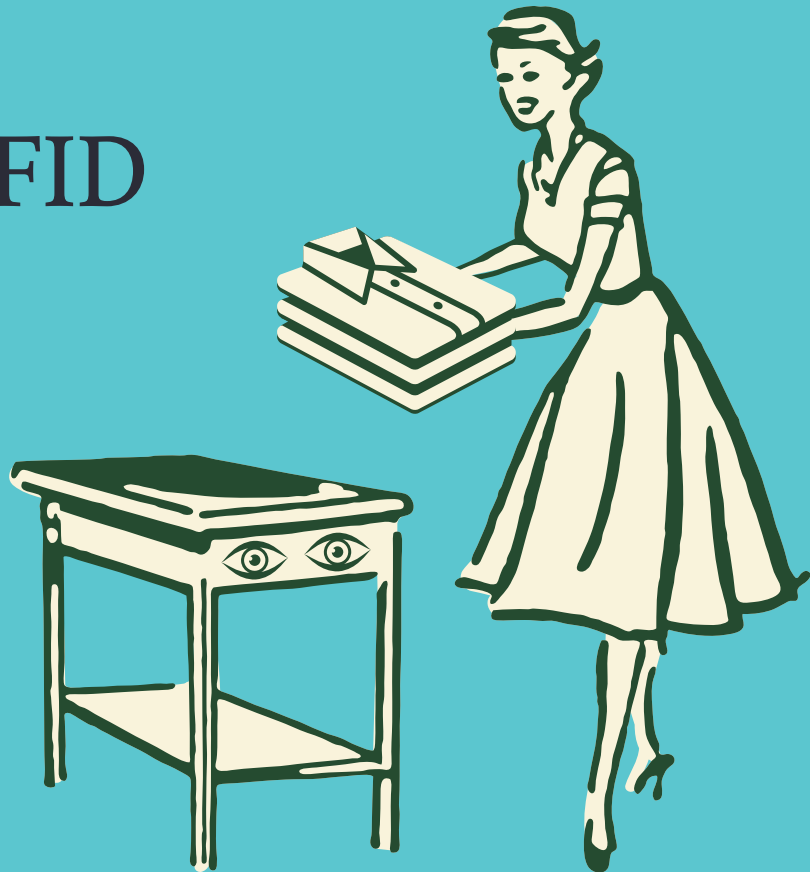
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ADOPTION

Making RFID Easier for Retailers



Solution providers are addressing employee issues that have arisen as retailers deploy the technology in more stores.

RADIO FREQUENCY IDENTIFICATION has been hailed as a way for retailers to improve store performance by boosting inventory visibility. Store associates, for example, can use handheld readers to take cycle counts weekly, or even daily, so retailers can see what items are missing from shelves and replenish them. This prevents retailers from losing a potential sale because a customer can't find the desired item.

But some retailers are finding that as they roll out the technology across hundreds of stores, it's difficult to manage individual deployments. Store associates don't always use the RFID system as intended, and store managers don't necessarily stay on top of them to do so. Associates might not do regular cycle counts and replenish items that are out of stock. Or they might not use a handheld to locate items that are out of place and return them to their proper spots.

RFID solution providers involved in large retail rollouts have begun to address these issues. Checkpoint Systems, for example, recently introduced a smart table that can be used at a distribution center to immediately check whether an apparel supplier has shipped the correct items. The RFID hardware and software are integrated into the table and linked to a retailer's enterprise software. As an employee runs tagged items over the table's surface, inventory data is updated and items ordered but not received are flagged. This enables staff members to receive items without having to remember to read tags with a handheld reader.

Checkpoint has also developed a smart table designed for the back of stores. As an employee folds clothing items received from the distribution center on the table, a reader captures the unique serial number in each tag and confirms

the item was supposed to be shipped. The system flags any items shipped in error. If an item is needed on the sales floor, the system alerts the employee to bring it out immediately.

The same system can be used to facilitate omnichannel shopping. The table can confirm that an order arriving at the back of the store—or picked from the store's inventory—was purchased online, so the item will be available when the customer comes to get it. The aim of these integrated stations is to simplify routine tasks for store and distribution center associates, so systems can be rolled out quickly—and employees, even temporary workers, will use them.

Impinj began this trend in 2013 when it unveiled its xArray system, which combines its Speedway Revolution R420 reader with a beam-steerable antenna and software. The xArray, now available for broad distribution, is designed for installation in retail store ceilings. Conventional RFID antennas capture data from tags in a narrow read field, but beam-steerable antennas can determine the location and movement of tagged objects in a larger read field. The xArray creates a 40-foot-diameter read zone and can show where a tagged item is within that zone. Impinj worked with one of its partners to create a touch-screen solution that shows items for sale. A store associate or customer can click on the item and see where it is located in the store, even if it has been misplaced.

Overhead readers obviate the need for store associates to use handhelds to conduct cycle counts. Inventory is continually being counted. Several other companies have adopted this approach.

Tyco Retail Solutions recently launched a beam-steerable RFID antenna—the Sensormatic IDA-3100 RFID—that comes in a slim, low-profile case so it can be installed unobtrusively on store ceilings and walls. The IDA-3100 can create read zones in fitting rooms, at transition areas and in stock rooms. This makes it possible,

for example, to send alerts when an item has been left in a fitting room or an out-of-stock item isn't replenished within a certain period of time.

Tyco Retail Solutions has also ported its TrueVue retail software to Apple iOS, so it can run on an iPhone attached to an RFID handheld sled created by Technology Solutions (UK). By having the software run on the iPhone, which is familiar to most store associates, the solution becomes simpler to roll out and more likely to be used.

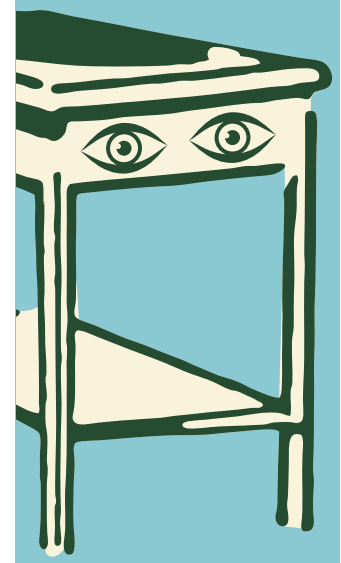
Intel has developed a prototype of a low-cost ultrahigh-frequency reader with power-over-Ethernet and an intelligent networking device that can control multiple readers. The unit creates read zones like beam-steerable antennas, but is not as sophisticated as some of the beam-steerable readers on the market. That's because Intel wanted to create a reader system for retailers and companies in other industries that is inexpensive and simple to deploy.

The system eliminates the need to hire an electrician to run power to readers, and to network the readers so data from multiple readers can be combined, filtered and sent to applications easily and cost-effectively. Intel developed the intellectual property and expects to license it to third parties that will build the readers and networking devices. It promises to reduce the cost and complexity of deployments, which should speed up adoption and reduce the need for employees to do regular cycle counts.

It is likely these products are the first wave of new RFID solutions that are easier to deploy and more intuitive to use. Solutions that scale are critical in retail, because many retailers have 100 locations or more. Ease-of-use product features and scalability strategies that prove successful in retail will be extended to products designed for warehouse and factory locations. That's good news for end users in other industries that will likely benefit from the advances being made for large retail deployments. —Mark Roberti



The table can confirm that an order arriving at the back of the store—or picked from the store's inventory—was purchased online.





EDUCATION

More Apparel Retailers Want to Jump Into the RFID Game

To help companies get up to speed quickly, RFID Journal LIVE! will provide retail workshops and tracks, featuring practical information and real-world case studies.

EVERY MONTH, IT BECOMES CLEARER that adoption of radio frequency identification is ramping up in the apparel retail sector. As I pointed out in the Nov./Dec. 2014 issue of this magazine, 2014 stood out as a year in which many retailers worldwide announced plans to introduce or expand item-level initiatives to improve inventory accuracy (see [Apparel Edges Toward the Tipping Point](#)). Already this year, Marc O'Polo, a German casual apparel company, announced that it had adopted an RFID solution to track its products across the entire supply chain, from its distribution center to 86 of its stores throughout Europe. And the buzz at the National Retail Federation conference, which took place in January in New York City, was about RFID and omnichannel shopping (see Tuned In on page 40).

Meanwhile, some retailers that have deployed RFID to improve inventory accuracy are now using the technology to gain a competitive advantage (see [Building on Retail's RFID Foundation](#) and [Second to None](#)). Apparel retailers that have been watching these developments from the sidelines are now showing more interest in deploying the technology. In fact, many now realize they are behind the curve and have to get up to speed quickly.

To meet this growing interest, RFID Journal is expanding its coverage of the retail sector at its annual [RFID Journal LIVE!](#) conference and exhibition, which will be held on Apr. 15 to 17 in San Diego, Calif. There will be a strong focus on education, and retailers that have deployed RFID will discuss the benefits they're achieving and why they're rolling

out the technology to additional stores.

One session in the [Item-Level Retail and Apparel Workshop](#) will provide an introduction to the fundamentals of the technology. Another session will explain the tagging guidelines, developed by the GS1 US Item-Level RFID Workgroup, for passive UHF RFID based on the Electronic Product Code standards. The guidelines for where to place tags, what types of tags are suitable for certain products and other critical issues are designed to smooth RFID adoption for retailers.

Rupert Thorpe, senior manager for selling support development at John Lewis, a leading U.K. department store, will explain how the retailer integrated RFID and its legacy systems, enabling it to track and manage 25,000 SKUs across selected fashion assortments. Thorpe will also discuss how John Lewis plans to roll out item-level RFID to more stores in 2015.

In addition, a panel of retailers—including Richard Jenkins, head of RFID strategic development at Marks & Spencer, and Joseph Granato, director of global initiatives at Lululemon Athletica—will discuss how and where they are benefiting from using RFID technology today and which applications will deliver additional benefits once all items are tagged.

In the [Retail/Apparel](#) track, Jenkins will go into more depth about Marks & Spencer's use of passive UHF RFID to track and manage apparel and all general merchandise. The British retailer expanded its rollout from 2012 to 2014 to cover 380 of its largest U.K. stores and more than 95 percent of its apparel and home goods. The firm has been investigating and conducting trials of new uses of the technology across the entire scope of its operations. Jenkins will explain why M&S expects the technology's future benefits to provide even greater merchandise visibility and accuracy, from supplier through distribution centers and into stores, to support its omnichannel efforts.

Hans Petter Hübert, supply-chain manager for Scandinavian clothing company Moods of Norway (MoN), will explain how the retailer is using RFID technology to better manage inventory in its 13 stores. The system not only provides 98 to 99 percent inventory accuracy but also reduces the amount of time employees spend performing manual inventory checks, thereby enabling more frequent checks. During a six-month pilot, RFID boosted sales of men's shirts and suits by double digits.

Other featured speakers will include Simon Tam, CTO of Ritani Jewelry, which is using RFID to enable retailers that sell its jewelry to automatically display information about merchandise customers asked to see, and to allow those shoppers to share the items' images with friends after making a purchase. And Antonio Almeida, superintendent of Brascol, a leading wholesaler and distributor of babies' and children's clothing in Brazil, will explain why his company is using RFID to optimize inventory control, increase operational savings and improve the service experience for customers.

Education opportunities also will come from networking with retailers from the United States and other countries. The Auburn University's RFID Research Center will host an invitation-only lunch for retailers and suppliers, to discuss barriers to deployment and how to break through them. The exhibit hall will also feature a wide array of RFID products aimed at retailers, including overhead readers (see "Making RFID Easier for Retailers" on page 10), handheld readers, smart displays and software applications.

Those new to RFID Journal LIVE! can create a personal event planner by selecting sessions on the agenda to attend and by researching exhibitors on [RFID Connect](#). Attendees can also get personalized advice on which sessions to attend and which exhibitors to see by taking advantage of our [Concierge Service](#) prior to the event or visiting the Ask the Experts booth on site. —M.R.



The exhibit hall will feature a wide array of RFID products aimed at retailers, including overhead readers.



ADOPTION

Calculating the Benefits of RFID

Apparel retailers have a tool to determine the potential return on investment.

WHILE A GROWING NUMBER OF RETAILERS understand that RFID can improve inventory accuracy, there are still many misconceptions about deploying the technology. RFID Journal's Apparel Retail ROI Calculator can help address them. The calculator is a tool that enables a retailer to get an estimate of how much RFID might cost, and how much return a company might achieve on that investment.

Many retailers, for example, believe tag costs are too high, but the calculator tells a different story. We've used a tag cost of 12 U.S. cents. We created a fictional company, XYZ Apparel, which operates 400 stores, each containing 10,000 items on the floor and 5,000 in the back room. The average selling price of the items is \$30, with a margin of 52 percent. Each store does five inventory turns annually. Revenue is \$2.25 million per store and \$900 million for the chain.

The net benefit for XYZ Apparel, after factoring in the one-time cost of the RFID system and the recurring cost of tags and maintenance, is \$30,000 in additional profit in year one, \$58,000 in year two and \$63,000 in year three. The

chainwide benefit in year three is roughly \$25 million. If you plug in a tag cost of 24 cents (for adding an RFID inlay to an existing label or hang tag), profit per store drops to \$23,500 in year one, \$51,000 in year two and \$55,000 in year three. The chainwide benefit in year three is \$22 million. So doubling the tag costs reduces the very significant contribution to the bottom line by just 11 percent in year three.

Another misconception is that RFID is merely a tool to help store managers ensure that when an item is sold, it is quickly restocked. Since some retailers sell fashion items and do not restock them, they think RFID is of no use. The truth is that RFID is about selling more goods at or near full price, because every item is in the right place at the time the customer wants to buy it. The calculator attributes just a 1 percent increase in revenue from incremental sales due to better replenishment.

The calculator also addresses labor costs and internal shrinkage. Retailers can download the Apparel Retail ROI Calculator for free [here](#). Then, they can plug in their own numbers to estimate the potential benefit RFID will deliver. —M.R.

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cover story



The Business-IT Connection

By Samuel Greengard

The success of any RFID project in any industry requires close collaboration between the operations and technology teams.

“Love and marriage, love and marriage, go together like a horse and carriage. This I tell you brother, you can’t have one without the other.”

Anyone planning a radio frequency identification project should keep these song lyrics, popularized by Frank Sinatra, top of mind. That’s because the success of any company’s RFID project—big or small, regardless of industry or application—depends on input from people in both the business and IT departments.

Each side brings key issues and knowledge to the table. The business team knows what problems need to be solved and where inefficiencies occur in the company’s processes. It has identified opportunities for using RFID to achieve productivity gains, bottom-line financial benefits and a competitive advantage. The IT team understands the technical issues that must be addressed to meet the business objective.

“Deploying the technology throughout an organization is an ongoing challenge,” says Vinny Pagliuca, director of creative costuming at Walt Disney Company, which is using RFID to track and manage costumes at its resorts and on its cruise ships. “There is a need for the IT and business sides of the organization to collaborate effectively.”

But effective collaboration is not always easy to achieve. Each team may approach an RFID project without a clear understanding of what the other group requires, egos can emerge, and entrenched silos and turf battles can impede the free flow of information. For optimal results, everyone must begin with a willingness to cooperate and learn what the other team can contribute.

“Organizations that support a more open and connected business and IT environment unlock greater value and better

results,” says Josh Girvin, senior VP of product management at Atlas RFID Solutions, who has worked with Bechtel and other construction companies on major RFID deployments. “You really want to build a framework that drives adoption of the technology, provides the necessary input and spans three crucial factors: people, processes and technology.”

COME TOGETHER

“RFID reaches across silos in an organization,” says Sue Flake, director of RFID business development at Zebra Technologies. An established best practice when planning an RFID project is to form a crossfunctional team, with representatives from all areas of the com-

pany that will be affected by the deployment. This, of course, includes the business and IT departments.

It’s critical to build an enterprise framework for RFID and bring together key business and IT managers, Flake says. Business and IT staff members must feel as though they are on equal footing, she says, though the business side will ultimately drive the project forward. “Their goals must begin to mirror each other,” she adds.

Any RFID project requires a formalized communications structure with regular meetings to make sure everyone’s on the same page, Flake says. “There’s a need for everyone to ask questions, participate and exchange ideas, concerns and whatever seems relevant,” she says. “There must be an understanding that there are no bad questions.”

An IT representative, for example, must take time to explain how or why something will work—or why it won’t work, Flake says. But, she adds, there’s no need to drill down to issues on a “bit and byte” basis.

Disney makes it a policy to embed an IT expert within individual business teams and groups, including the costuming department, Pagliuca says. “There is a basic framework for sharing information across the business-IT boundary,” he says. This has helped bridge the gap in critical expertise between domains, he explains, and it improves the odds that systems and processes will remain in synch over time.

“We have some extremely knowledgeable technology people working in our department,”



“We take the position that operations leads and IT is a valuable member of the team.”

—ANITA WEISSMAN, ESSINTIAL ENTERPRISE SOLUTIONS

Pagliuca says. “We could develop a technology solution on our own—and even do some of our own integration and programming. But this probably wouldn’t result in the best possible solution. We understand the need to leverage IT expertise. They bring a great deal of value to a project.”

Embedding an IT person or staff on business teams is a wise approach, Girvin concurs. “You really need people who can help navigate a team past technical and practical hurdles,” he says.

Anita Weissman, project executive at Essintial Enterprise Solutions, which provides IT services and support for U.S. companies, says clearly defining roles and responsibilities was one of the biggest challenges the company faced when it decided to adopt RFID to improve inventory management at its Lewisberry, Pa., warehouse. “We always seem to have some back and forth in our company about who should run projects,” she says. “IT often believes it should control them because they are IT initiatives. But in order to deliver value, the focus must be on the

functional and operations side.”

To ensure all requirements for its RFID project would be met, Essintial formed a cross-functional team, which included representatives from almost every department in the company, as well as someone from its RFID solutions provider, Iris Software. The team began with the premise that operations would drive the project forward with support from IT and IS.

“IT and IS aren’t close enough to the processes, and they don’t fully understand what users need,” Weissman says.

“So we take the position that operations leads and IT is a valuable member of the team.” IT and IS were charged with determining how enterprise systems and hardware would support the RFID initiative and ensuring all data captured in the RFID system would flow into the company’s enterprise resource planning system, she says. At the same time, the company relied on in-house business analysts to oversee

the project, as it does with all major projects. “They have basic IT-IS knowledge,” she says. “They are critical because they have the hybrid expertise to bridge the gap” between practical and technical issues.

The RFID team held weekly, sometimes daily, meetings, Weissman says. “We reviewed everyone’s tasks and status to determine exactly where we were at and what they needed to do,” she says. “In addition, the vendor supplied a lot of critical information because of its past knowledge and experience with implementations.”

As with any project, Essintial experienced a few hitches during its RFID implementation. At the onset, for example, the system delivered read rates in the high 70 percent range, which rendered it largely ineffective. “We didn’t want to get into finger-pointing,” Weissman says. “We just wanted to solve the problems.” Iris Software worked with both the IT and business groups to resolve the issues, and within a month, Essintial boosted the read rates to an acceptable 99 percent-plus.

FOCUS ON THE BUSINESS CASE

RFID is a business tool that requires considerable IT support—that’s another fact everyone involved in an RFID project must remember. It’s not uncommon for RFID projects to get lost in features, specs and technical capabilities, experts say. When this happens, the technology can easily frame and hamper business processes rather than introducing fundamentally new and better ways to conduct business.

A strong business case with projected return-on-investment data is a good starting point. “You can’t begin to select the right solution and put the right technology in place without knowing exactly how it solves a real-world problem,” Girvin says. Yet it’s not uncommon for multiple stakeholders to introduce conflicting ideas and goals. Atlas often uses a “workshop approach” that focuses on identifying objectives early on, he says. Once they are clearly and accurately defined, Atlas works with business and IT leaders to ensure they are working in lockstep.

A solid business case incorporates several key issues, says Francisco Melo, VP of global RFID at Avery Dennison Retail Branding and Information Solutions. These include: identifying the underlying problem or opportunity, gauging the benefits and ROI, pinpointing the key stakeholders, defining how IT needs to be involved, identifying the resources required to put the initiative into motion and training employees to use the system correctly. IT can provide input about how the technology will work within an existing IT framework, he says, but that cannot define the entire scope of a project. It might be necessary to upgrade systems and build a more modern data conduit, for instance.

Taking a “holistic view” is essential, Flake agrees. Business and IT leaders must sit down together to address key issues, she says, including: the gap between existing systems and

infrastructure and what’s needed to support the project; what tools and technologies are needed onsite; how the deployment will affect business partners; what outside assistance is required and what training is necessary.

During this process, the RFID team must determine whether to deploy RFID as a point solution to solve one problem or as an enterprise solution that could support additional applications and could be rolled out to other locations. This decision requires close collaboration between the business and IT teams, says Ken Traub, president of Ken Traub Consulting. The IT department will be responsible for managing any data generated by the RFID system. But data management becomes more critical when the deployment moves from a point solution, in which the data is self-contained and limited in scope, to an enterprise solution, in which it will need to be integrated into various enterprise applications and

Determining whether to deploy RFID as a point solution or as an enterprise solution requires close collaboration between the business and IT teams.

—KEN TRAUB, KEN TRAUB CONSULTING



available for access by numerous business divisions at different locations.

If the RFID team decides to adopt an enterprise approach, the IT people will need to make sure the RFID data flowing to the enterprise level is designed to be leveraged for future projects, Traub says. But, he adds, this could cause tension between competing goals—catering specifically to the needs of the first project versus planning for future applications. The former approach might seem easier, but the latter lays the groundwork for

growth, even when it's not clear exactly what might be needed down the road. (For tips on how to overcome these challenges, see Software Savvy on page 45.)

MAP A STRATEGY FOR CHANGE

Any RFID project will impact how a company conducts business and employees do their jobs. To ensure a project will be successful and the solution will be used as intended, the business and IT teams must sit down together and map out a strategy for dealing with change. This includes analyzing operations and technical processes to understand up front where change will occur—and how to alter job responsibilities, workflows, physical environments and other issues.

Change is inevitable, but it doesn't have to be overwhelming, says Avery Dennison's Melo. The key is being prepared by providing employee education and training. It's also important to communicate wins to workers who are using the new system or to the entire organization. "When people see a benefit and

technology," Pagliuca says. "They view it as a success story rather than a vague proposition."

Pagliuca and Melo both acknowledge it's unlikely you'll be able to sell the project to everyone. "There will always be a few people who question the technology," Pagliuca says. At Disney, he adds, more than 45,000 cast members use the technology, and he's aware of only about 100 negative comments or complaints.

CREATE A JOINT KNOWLEDGE REPOSITORY

Once an organization achieves positive results with RFID, it's smart to design an enterprise architecture detailing how the solution was deployed, Traub says. This is essentially a blueprint of business practices and processes, data formats, hardware and software selections—everything other business and IT divisions, regardless of location, would need to replicate or adapt the solution to their needs. This enables a company to deploy RFID faster, cheaper and better the second and third time, he adds.

Since an enterprise architecture includes information about operations and technology, Traub suggests creating a separate team, with people from both the business and IT sides, to develop and maintain it. In addition, he says, a knowledge repository should provide social business tools that enable people to communicate and collaborate. These could include messaging applications, videoconferencing systems and shared workspaces.

At Disney, the goal is to avoid reinventing the wheel, Pagliuca says. Embedding an IT person on business teams is one way the company facilitates knowledge sharing.

In addition, Disney develops road shows and other events to demonstrate and seed the technology in other parts of the organization. "A road show allows us to show other lines of business what is possible," he says. "We are willing to share the technology because, in the end, there's an understanding that it's for



At Disney, the goal is to avoid reinventing the wheel. Embedding an IT person on business teams is one way the company facilitates knowledge sharing.

—VINNY PAGLIUCA, WALT DISNEY COMPANY

see how it makes their jobs easier or better," he says, "there's typically buy in."

At Disney, business and IT teams work together to create measures and benchmarks that identify paramount performance issues and other critical factors. "When people see numbers, they are a lot less inclined to question the

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the company and not any particular unit or department.”

Exposing internal business groups to RFID technology is critical, Melo says. A presentation team should include both business and IT representatives—or at least individuals who have the knowledge to bridge the business-IT chasm. “When people understand what the technology can do and how it works, they are generally a lot more receptive about using it,” he points out. “They also think up new use

lent internal communication and a dedication to keeping everyone aligned and on track,” he says. “Once an organization develops positive momentum, it’s a lot easier to build RFID into the framework of the business.”

To see how business-IT collaboration works in the real world, consider Lifespan, a group of five hospitals in Providence, Rhode Island. The business team wanted to automate the time-consuming, paper-based process of recording temperature and humidity levels of

refrigerators, freezers and rooms in which pharmaceuticals and blood were stored. Regulatory compliance organizations, such as The Joint Commission and the American Association of Blood Banks, require that hospitals conduct these readings on a daily basis.

Elaine Palm, Lifespan’s director of IS infrastructure, suggested adding RFID to the hospitals’ existing wireless network infrastructure, because it would be a cost-effective and easily implemented and supported solution.

Then, to help develop the business case, Lifespan’s IS infrastructure engineering team conducted a proof-of-concept to determine how much time it could save by replacing the manual system with an automated solution.

Palm determined that employees would save more than 35,000 hours per year, which could be spent on more value-added patient-care activities. With clearly defined benefits, ROI and a path to implementation in place, the business team secured management approval and companywide acceptance.

Lifespan deployed a Wi-Fi-based temperature- and humidity-monitoring solution from AeroScout (now Stanley Healthcare) at one of its hospitals in July 2011, and three more of the facilities were RFID-enabled in September. The solution was deployed at the fifth hospital in 2012. Hospital managers also worked with Palm’s team to develop and implement a solution for tracking and managing high-value mobile assets. “Relationships and trust,” Palm says, “go a long way toward achieving results.” ■



Business and IT worked together to develop a plan and define the ROI, securing management approval and companywide acceptance.

—ELAINE PALM, LIFESPAN

cases and see potential benefits that may not have been previously identified. You want people to be excited about the possibilities and receptive to the technology. This greatly increases the odds of success.”

WHEN TEAMS COME TOGETHER

Companies that adopt a strategic framework—giving both business and IT leaders a clear voice—dramatically increase the odds of success, Zebra’s Flake observes. “Organizations that have a clear vision, a good project-management framework and teamwork with strong collaboration succeed,” she says.

Atlas’ Girvin also believes a culture of cooperation and mutual respect, with clearly defined roles and responsibilities, is vital. “Organizations that achieve a high level of success with RFID projects tend to have strong executive sponsorship, well-defined steering committees and crossfunctional teams, excel-

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NERVES OF Steel



Manufacturers and suppliers that deploy RFID to track and manage steel slabs, pipes and other assets say the benefits are well worth the work.

BY JENNIFER ZAINO

Steel manufacturers have been slow to embrace radio frequency identification technology. In addition to the usual barriers, including cost and a resistance to change, there has been concern that RFID doesn't work on or near metal or in harsh environments. But like other manufacturers, steel producers are plagued by the inefficiencies that affect inventory, logistics and supply-chain management. So ThyssenKrupp Steel Europe, one of the world's largest steel producers, ignored all the usual arguments for not deploying a new



RFID vendors have developed a variety of tags that work well on steel surfaces and embedded in steel products.

PHOTO: THYSSENKRUPP STEEL EUROPE

“That’s what makes steel today so hard and so much of an effort. People are not necessarily willing to invest time and money to develop the solution.”

—LOÏC FEINBIER,
THYSSENKRUPP

ThyssenKrupp relies on RFID to track and trace steel across a multinational supply chain.

technology and, in 2007, announced it was using ultrahigh-frequency RFID tags to track 30-ton steel slabs from Brazil to its German processing factories.

This proved to be a solid investment and the beginning of the company’s engagement with the technology. Today, RFID forms the core of ThyssenKrupp’s centralized services solutions for tracking and tracing steel across a multinational supply chain composed of its own

the tag right is just part of the job. The rest is building a process around the technology. “That’s what makes steel today so hard and so much of an effort,” he says. “People are not necessarily willing to invest time and money to develop the solution.”

RFID also plays a role in improving operations at ThyssenKrupp’s factories, where steel slabs are turned into products, such as coils for the automotive industry. Other steel companies involved in manufacturing or finishing work are piloting RFID for inventory and supply-chain management. In addition, steel producers



and third-party facilities in five locations: its plants in Duisburg, Germany, and Sepetiba, Brazil; a receiving factory in Alabama that ThyssenKrupp owned at the time; and cross-shipping seaports in Mobile, Alabama, and Rotterdam.

Since that initial deployment, vendors have developed a variety of RFID tags that work well on steel surfaces and embedded in steel products, says Loïc Feinbier, head of business process outsourcing management at ThyssenKrupp’s Global Shared Services group, who spearheaded the company’s first foray into RFID. But, he adds, rarely will the same tag suit every application and, in any case, getting

are improving customer service by tracking pipes and other structural steel products shipped to construction and oil and gas sites (see “The Competitive Advantage” on page 29).

LINKING THE STEEL CHAINS

It took nearly three years from ThyssenKrupp’s initial pilot to develop a total solution, which addressed both technology and business issues. The company determined which RFID tags and readers to use, and how to affix them to objects to ensure identification accuracy. Each RFID tag is programmed with a unique identification number, based on GS1’s Serialized Global Trade Item Number (SGTIN) stan-

dard. Additional information, including steel grade and slab dimensions, is printed on the label. The work also required building applications, creating logic rules to drive down misreadings, and enabling IT systems integration capabilities that span its own and its partners' systems, Feinbier says.

Developing a global solution presented several challenges, says Heiner Niehues, one of Feinbier's first hires and now ThyssenKrupp head of supply-chain visibility/RFID. Each port through which steel shipments pass uses a different crane type, so reader-mounting installations had to be customized for each location, and ultrahigh frequencies and power emissions had to be optimized for use in different countries.

When large slabs of steel are being cross-shipped, "identification has to be real fast or a ship would lie longer in the port," Niehues says. The longer it takes to unload a ship, the more costs add up. RFID offered real value over using bar codes or manual approaches to understanding inventory movements at ports.

Implementing RFID was a challenge, because it had to deliver speed and accuracy in a complex environment, with "assets coming out of chaotically organized storage in the vessel," Feinbier says. "This took a massive amount of effort to figure out on our own because there was no leader or software in the market to do it."

But today, all that effort has paid off: "We can see on a screen of a world map the second a slab is loaded or unloaded into or from a vessel—which crane reads the slab, which slab it is, and what is that slab's history as it moves across the planet," Feinbier says. With that information in hand, business rules in the software the company developed guide crane operators in moving the correct slab to the specified spot, for quick placement onto the designated railcar or barge. What ThyssenKrupp has done, he says, "really has worked out versus a lot of steel-environment apps that other companies have tried but which have disappeared because they couldn't get them to work right or were too expensive."

FORGING INTERNAL OPERATIONS

In 2014, ThyssenKrupp deployed an RFID system at two rolling mill factories, where steel rolls are turned into coils. It's designed to ensure the rolls used for thinning pieces of metal—which are exchanged daily for maintenance—are replaced by the correct ones. The wrong combination could break the roll or damage the steel slab materials. "It's about making 100 percent sure you don't mix rolls up as surfaces and diameters matter to getting the right roll to the right production process," Feinbier says.

To ensure the match is accurate, a high-frequency RFID tag from Deister Electronics is embedded in each steel roll and identified by a Deister RFID reader installed on the rolling mill. "Most important in these apps is the resistance of the tags, because those rolls are turning very fast and are under heavy pressure because they're pressing metal from two sides," Feinbier says. "They also are exposed to heat because you create heat when you roll with massive pressure. The tags also are exposed to chemicals, oils and liquid—it's a really harsh environment."

In addition, employees equipped with RFID handheld readers can locate the tagged rolls in warehouses, which speeds up getting the correct materials moved to the rolling mill when they are needed, to avoid holding up projects. The handheld readers have built-in location positioning systems (LPS) for tying the XY coordinates of where a roll is stored to the RFID object identification information. (The warehouses are relatively small facilities, with at most a couple of hundred rolls in each.) Niehues expects this solution to be implemented at ThyssenKrupp's other production locations.

Silent Partner Technologies (SPT) is piloting a project with one of the largest pipe manufacturers in the

"Corinth might have only about 10,000 pieces of pipe at any given time on its site, and having less inventory to deal with leads to a significant reduction in RFID investment costs."

—TED KOSTIS,
SILENT PARTNER TECHNOLOGIES

TimkenSteel is adding RFID applications: The company is tracking steel haulers to manage scrap, steel transport carriers to improve safety and internal vehicles to facilitate fueling.

world, Corinth Pipeworks S.A., headquartered in Athens. Corinth, whose business includes supplying steel pipe to the oil and gas industry, brings in and processes steel on a customer order basis, says SPT president Ted Kostis. Corinth is using UHF magnetic tags that attach to the inside of a pipe to manage inventory in the yard and improve shipping accuracy. At the end of processing, a worker uses a handheld reader to val-

implement a system to verify steel tubing shipments at its plant in Canton, Ohio. TimkenSteel produces hundreds of grades of steel, and some 200 trucks leave the plant each day. The goal was to take human error out of its client shipments. "The project wasn't focused on costs—it's focused on quality," says Dave Haslar, TimkenSteel's unit manager of shipping services. "We are just adding another layer to our protocols to ensure accurate shipping."

Each bundle of steel tubing had a bar-code tag with a serial number assigned to a bill of



TimkenSteel RFID-tags steel tubing to verify shipments before they leave the plant.

idate the right pipes are being sent to the customer, and then removes the tags for reuse on the next project—unless the customer wants to keep the tags to continue tracking on its own end, in which case it pays a fee to Corinth.

Each tag costs roughly \$7, Kostis says, but "it is not a yard with a million pieces of pipe to store and track. Corinth might have only about 10,000 pieces of pipe at any given time on its site, and having less inventory to deal with leads to a significant reduction in RFID investment costs."

TimkenSteel, a leading U.S. manufacturer of tailored alloy steel bars and seamless mechanical tubing, is employing UHF RFID technology to manage several internal processes. In 2009, the company worked with Lowry Solutions to

loading, and TimkenSteel added an RFID chip to the tag. The tags are read when a driver exits the site through an RFID portal. Custom software matches the tag data to the bar-code serial number and associated bill of lading. If the process discovers an incorrect bundle, a light flashes on top of the building housing the RFID portal and an alarm alerts the driver to check the load.

Last year, the company began using RFID to manage shipments of its steel bars. It was easier to RFID-tag the steel tubing, because the tags hang off the bundles, but the bar-code tags are glued to the ends of the steel bar pieces. "It took awhile to find an RFID tag that worked attached to the bars," Haslar says. "If any part of the tag with the antenna touches steel, it

THE COMPETITIVE ADVANTAGE

RFID is helping steel companies win contracts and improve customer service.

SINCE 2009, Gammon Construction's Gammon Steel, a Hong Kong provider of structural steelwork services, has been using RFID to track components and products in its factory and en route to construction sites. Gammon Steel attaches a Xerafy Bric rugged tag, specifically designed to be embedded in concrete, to metal support rods by cable ties. The tag is ideal for tracking modular construction assets such as prefabricated building pieces and for supporting regulatory checks and maintenance, says Xerafy CEO Dennis Khoo. That's increasingly important for construction companies, especially in Asia, sourcing steel from China, he says.

"It's not so obvious from the start that you have shoddy quality," Khoo says, "but it starts to show after awhile." RFID provides a record of where materials came from so the quality issues can be monitored and addressed. The Hong Kong Housing Authority, for example, has instituted a value-added component to public construction project tenders that award extra points to companies that plan to use RFID for facility management, even though that typically raises the bid price.

"RFID lets the government automate quality control, materials management and communication," Khoo says. "RFID also facilitates supplier check audit and an easier ability to control project delays and cost overruns. In the past, they would have to rely on paperwork and humans to record and track and trace. RFID simplifies the whole process and allows them to be able to trace things back to the supplier if there is a quality issue."

Bechtel, the engineering and construction giant, is building three liquefied natural gas processing and export facilities on Curtis Island, off the coast of Gladstone, Australia. It's been RFID-tagging materials at its laydown (storage) sites on the mainland, to ensure the correct items are sent to each construction site. Last spring, when RFID Journal published a story about the deployment, Bechtel said it was working hard to increase partner involvement, and that some fabricators were tagging items before shipping (see [RFID Helps Bechtel Manage a Megaproject](#)).

"Efficiency gains were achieved by having tags fixed at pipe shop fabricators prior to shipping," says Matthew Saunders, procurement operations manager, Curtis Island projects. "This allowed for an expedited receipt upon arrival and enabled the material to be placed quickly in laydowns unobstructed. There was no latency in processing, as the tags would be read by the vehicle-mounted reader to capture inventory location. There is a definite benefit to having the tags fixed upstream in the supply chain so products arrive ready for use." —J.Z.



"Efficiency gains were achieved by having tags fixed at pipe shop fabricators prior to shipping," says Matthew Saunders, procurement operations manager, Curtis Island projects.

The Electronic Product Code Information Services (EPCIS) standard provides a universal business language that has helped ThyssenKrupp expand its RFID initiative.



OCTG Tubular Finishing tracks the steel pipes it inspects and finishes, before shipping to oil-drilling sites.

grounds it out and it's not readable."

As of today, three TimkenSteel plants in the Canton area are using RFID to track shipments of both steel tubing and steel bars. The tags remain on the steel bundles, but customers are not yet taking advantage of the RFID possibilities, Haslar says. "We have had some inquiries, though," he says, "and some customers may be looking to utilize RFID since it's available now."

inventory and accounting standpoint, he says.

Recently, TimkenSteel also began using RFID to track each of its 325 internal vehicles—forklifts, straddle carriers, pickup trucks and semis—for fueling purposes. Readers at each fueling station read the tag on each truck to identify what type of truck it is and ensure that it is at the right fuel pump or area, Bond says.

Age Steel, a United Arab Emirates company that operates multiple steel yards, deployed an innovative RFID solution to improve inventory management. The company mounted an RFID



After deploying RFID to manage steel tubing shipments, TimkenSteel installed RFID tags on its steel transport carriers to add an extra layer of safety. The system alerts employees that the trucks, which carry tubing, bars or supplies, are entering work areas, says Gregg Bond, TimkenSteel's principal analyst for steel transportation.

Next, it installed RFID tags on steel haulers to identify the vehicles as they enter the scrap yard. Each hauler is weighed, and then software subtracts the actual vehicle weight from the total to determine how much scrap steel it is bringing in. "We get a fairly accurate reading of how much scrap comes into a yard, and that is important to keep track of how much internal scrap we generate and reprocess, from an

reader on a drone as part of its Steel Yard Autonomous Tracking solution to quickly and accurately track the locations of pipes, plates and other metal products stored in the steel yards it operates in Dubai.

STANDARDIZATION—TRUE AS STEEL

Early on, ThyssenKrupp recognized the need for technology standards in the steel industry. Speaking at RFID Journal LIVE! Europe in 2008, Feinbier said, "Standardization is crucial," explaining it would lead to low-cost solutions, and provide flexibility to integrate with new customers and suppliers.

Among the decisions ThyssenKrupp made was for all its software applications to be based

on the Electronic Product Code Information Services (EPCIS) standard. EPCIS provides a universal business language that has helped the company expand its RFID initiative, whether it's collecting data to provide visibility at a seaport or a rolling mill warehouse.

Recently, for example, ThyssenKrupp introduced a mobile application that allows third-party slab suppliers anywhere in the world to identify their slabs with RFID labels. All they need, Niehues says, is a computer and printer; after downloading the app, they can print UHF RFID labels locally.

The application benefits the Alabama factory, originally owned by ThyssenKrupp, which was configured to receive materials using RFID for the greatest efficiency. The facility now sources slabs from other suppliers as well as ThyssenKrupp, and it can use RFID to receive all materials. "That's really important, because the whole internal logistics of that factory with respect to slabs now depends on RFID technology," Niehues says.

STEELING THE INDUSTRY FOR THE FUTURE

OCTG Tubular Finishing is employing UHF RFID technology to track the steel pipes, also known as tubes, it inspects and finishes at a facility near Houston, Texas, before they are shipped to oil-drilling sites. The company worked with SPT, its RFID solutions provider, to track the pipes from OCTG's yard to the time they entered a drill hole. The goal was to provide supply-chain visibility for inventory management at the finishing facility and at drill sites, and to trace an inoperable pipe to determine where and how the problem occurred.

OCTG and SPT formed a joint venture called Oil Country Asset Management (OCAM), to sell the pipe-tracking solution to supply-chain partners—oil-field operations companies and steel mill customers, as well as other steel finishers. Many steel yards and finishers have hundreds of thousands of pipes on site, all of them still owned by the steel mills.


For now, though, the OCAM venture is on hold. Blame it on the cost of the magnetic tag,

Kostis says. "When it's a raw steel pipe with no end cap on it, and the pipe hasn't been treated or inspected yet, going through sandblasting, painting, ultrasonic testing and other processes, you'd have to use the embedded magnetic version," he says.

The tags can be removed before a pipe enters a drill hole for reuse, but, Kostis says, the cost is too high for steel mills to eat, even considering the potential return on investment of more efficient inventory management. OCTG receives daily calls from steel mills requesting inventory counts. Another option, he says, is to use a 30-cent, nonreusable tag that can be attached to a pipe's end cap once the finishing processes are concluded. It could be used for supply-chain tracking, but the finisher wouldn't get the benefits of automated on-site counting of the pipes from the moment they enter its yard.

Collaboration between manufacturers and finishers could make the cost more digestible, Kostis says. In addition, each supply-chain partner could use RFID to improve other inefficiencies. OCTG, for example, is using RFID for access control and to enable managers to see exactly how many employees are available to accomplish a specific task. The company is also tracking the location of tools to avoid production delays.

Clearly, ThyssenKrupp and other steel manufacturers and suppliers are seeing an ROI from the time and money they've invested in developing RFID solutions. But they'd like RFID providers to do a better job developing and marketing solutions specifically for the steel industry, to promote adoption and drive down costs. "In any kind of steel production, there are so many apps that you can think of," Feinbier says. "The key thing around steel is that for any single app that you can think of, you have to start from scratch. There barely are any solutions out there." ■



Manufacturers and suppliers would like RFID providers to do a better job developing and marketing solutions specifically for the steel industry, to promote adoption and drive down costs.



ATEX RFID TAGS

BY BOB VIOLINO

Vendors are certifying their tags so companies that operate in potentially explosive environments can track and manage assets and items.



There are many rugged RFID tags on the market designed to withstand extreme temperatures, harsh chemicals, pounding pressure, dust, rain, shock and other challenging conditions (see [Rough Riders: RFID Tags Get Rugged](#)). But in some hazardous environments, companies are required to use tags that meet the ATEX (ATmospheres EXplosives) Directive, which took effect in Europe in 2003. It mandates that all electrical and mechanical equipment used near explosives or explosive fuels or gases needs to be certified as safe.

Products must be tested to ensure they can't produce a spark that could ignite an explosion or fire.

The directive covers a range of equipment. It does not specifically mention RFID tags, but since active tags contain a battery, they would fall under the mandate. There are different opinions in the field regarding whether passive tags need to be certified, says HID Global's Richard Aufreiter, director of product management for identification technologies.

BP was able to deploy an RFID solution to streamline maintenance operations at its oil refinery, in Gelsenkirchen, Germany, because it used ATEX tags from Tectus Transponder Technology (see [BP Refines Maintenance Operations](#)). Elpiji, a Malaysian liquid propane gas supplier, also used Tectus ATEX tags to automate the process of filling gas cylinders at its Penang plant (see [Malaysian Propane Supplier Fills Up on RFID](#)).

In addition to Tectus, Confidex and HID Global are among the handful of vendors providing ATEX-compliant tags. The companies that have achieved ATEX certification say it's important because it enables them to serve particular needs and markets, such as challenging industrial applications and the oil and gas industry.

ATEX is accepted in many countries outside Europe, but ATEX is not required in the United States and other countries. Rather, these countries have signed on to the IECEx (International Electrotechnical Commission System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres) scheme, the goal of which is to establish worldwide standards. IECEx and ATEX are nearly identical except for some minor specification differences.

The U.S. Department of Defense uses the HERO (Hazards of Electromagnetic Radiation to Ordnance) certification, which states that military munitions containing electrically initiated devices (exploding foil initiators, laser initiators, burn wires, fusible links, hot bridge wires, carbon bridges and conductive compositions, for example), shall be designed or protected such that electromagnetic radiation does not cause an inadvertent initiation, degradation or disablement.

WHAT IS ATEX?

There are two ATEX directives: one for the manufacturer and one for the user of the equipment. The ATEX 95 equipment directive (94/9/EC) is aimed at equipment and protective systems intended for use in potentially explosive atmospheres; the ATEX 137 workplace directive (99/92/EC) has minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres.

Employers in the European Union are required to classify into zones areas where hazardous explosive atmospheres might occur. The classification given to a particular zone, and its size and location, depends on the likelihood of an explosive atmosphere occurring and its persistence if it does. Areas classified into zones (0, 1, 2 for gas, mists or vapors, and 20, 21, 22 for dust) must be protected from effective sources of ignition. Any equipment and protective systems intended for use in zoned areas must meet the requirements of the directive.

Zone 0 for potentially hazardous gases, for example, is an area in which an explosive mixture is present either

Cofidex's Ironside product family are all RFID global frequency on-metal tags.



“In the oil and gas industry, ATEX-certified tags can be used for maintenance, repair and operation purposes.”

JARI OVASKAINEN, CONFIDEX



continuously or for long periods. Zone 1 is an area in which an explosive mixture is likely to occur in normal operation, and Zone 2 is an area in which an explosive mixture is not likely to occur in normal operation and, if it occurs, will exist only for a short time.

For dust, Zone 20 is an area in which an explosive mixture is continuously present or present for long periods. Zone 21 is an area in which an explosive mixture is likely to occur in normal operation, and Zone 22 is an area in which an explosive mixture is not likely to occur in normal operation and, if it occurs, will exist only for a short time.

Explosion groups include I for methane gas, IIA for propane, IIB for ethylene and IIC for hydrogen, the most dangerous group, Aufreiter says. Temperature classes T1 through T6 correspond with maximum permitted housing or component temperature of the operating devices, ranging from 450 degrees Celsius down to 85 degrees Celsius, he says.

ATEX-certified items need to be marked with an ATEX logo and certification string “so that onsite it is always obvious that this is certified equipment,” Aufreiter says. “While every ATEX-certified RFID tag is, by definition, safe for some potentially explosive environment, some are better suited to certain situations

than others,” he says. “It is critical to understand the distinctions between the various ATEX certifications, which are presented in long character strings to represent various safety-related features.”

CONFIDEX

Getting ATEX certification for the Ironside product family was an obvious choice, says Jari Ovaskainen, Confidex’s marketing director for tags and labels. “There seemed to be demand in the oil and gas industry for such a tag family, which has durable structure, offers different form factors and allows versatile attachment methods,” he says.

Confidex Ironside passive ultrahigh-frequency Gen 2 RFID tags “have received the most stringent level of protection certification, meaning they are suitable for use in areas categorized as Zone 0, where an explosive gas mixture is present continuously or for long periods,” Ovaskainen says. “This means that Confidex tags are proven to be intrinsically safe and compliant for both surface industries and mining.”

The company received the ATEX certification in 2013, and the Ironside tags—which had already been used in a variety of RFID applications, such as tracking rail wagons and moni-

toring bulk containers—were approved for use in the petrochemical, offshore and mining industries and other sectors in which RFID systems are continuously or occasionally exposed to potentially explosive atmospheres.

The Ironside, Ironside Slim and Ironside Micro tags are all global frequency on-metal tags. They are made of materials designed to withstand harsh requirements from various environments, Ovaskainen says. Smaller items can be tracked with the Ironside Micro, he adds, and when a longer read range is required, Ironside Slim can be used.

The tags can be mounted on any metallic surfaces, either mechanically with screws or pop rivets or with industrial adhesive. For a superior grip, Confidex offers a welding bracket for the Ironside tag.

“In the oil and gas industry, ATEX-certified tags can be used for maintenance, repair and operation purposes,” Ovaskainen says. “With the help of RFID, field operators can easily identify and locate assets and equipment that require attention.”

There are also logistics applications, such as gas cylinders that require ATEX-certified components. RFID enables greater supply-chain visibility and supplier collaboration, Ovaskainen says.

HID GLOBAL

In November 2013, an IECEx specification clearly stated, for the first time, that passive RFID tags are, by definition, intrinsically safe, Aufreiter says, and therefore don’t need a certification. “Still, certain customers ask for a

Some Leading Providers of RFID ATEX Tags

COMPANY	PRODUCTS	TECHNOLOGY	ZONES	INDUSTRIES
Confidex www.confidex.com	Ironside product family	UHF	All ATEX zones; tags for different areas and applications	Automotive, construction, logistics, manufacturing, mining, oil and gas, rail transport
HID Global www.hidglobal.com	IN Tag product family	LF, HF, UHF	All ATEX zones; tags for different areas and applications	Flour mills and other process industries, mining, oil and gas, petrochemical
Tectus Transponder Technology www.tec-tus.de	A variety of tags, in different sizes and form factors	LF, HF, UHF and NFC	All ATEX zones; tags for different areas and applications	Flour mills and other process industries, logistics, mining, oil and gas, petrochemical

HID Global's IN Tag portfolio of industrial RFID tags include water-, chemical- and shock-resistant disc tags.



“Customers typically come from the mining industry, certain productions like mills that operate in explosive dust, or from the oil and gas area.”

RICHARD AUFREITER
HID GLOBAL



certified tag, possibly just to be on the safe side,” he says. “HID typically certifies tag families as a service to customers.”

In 2012, HID Global achieved ATEX certification for its IN Tag portfolio of industrial RFID tags that include water-, chemical- and shock-resistant disc tags. They are available in low-frequency, high-frequency and ultrahigh-frequency versions. The company's HF IN Tag 200 OM and 500 OM 13.56 MHz transponders are designed for metal assets.

The company's Glass Tag and LogiTag lines of industrial transponders are also ATEX certified. All HID Global's ATEX-certified tags can be used in environments such as offshore drilling platforms, petrochemical plants, mines, flour mills and other process industries. They can be used in zones 0 and 20, and at temperatures of up to 135 degrees Celsius. The Glass Tags and IN Tags can be used in zones 1 and 21.

“Customers typically come from the mining industry, certain productions like mills that operate in explosive dust, or from the oil and gas area,” Aufreiter says. “RFID tags are typically mounted on containers or boxes for transport of goods inside the explosive environment or directly on equipment like tools to track usage or on walls [or] equipment for proof of presence. In general, the use cases of

tags in explosive environments do not differ from other uses in the production industry.”

The ATEX tags are manufactured in ISO 9001-2008-certified facilities using patented processes, Aufreiter says. In addition to submitting its products for external certifications, HID puts its rugged tags through extensive testing in its own labs, using a company-designed methodology and equipment, including impact tests, ovens, freezers and drop stations.

The company plans to get ATEX certification for its Iron Tag, IN Line Ultra family (including Keg Tag UHF and LF) and SlimFlex tag. Future products, beginning with the LogiTag family, will be certified to both ATEX and IECEx, Aufreiter says.

TECTUS TRANSPONDER TECHNOLOGY

“Our customers in industries such as oil and gas asked us to provide ATEX-certified tags,” says Udo Doege, Tectus' managing director of sales.

Tectus has ATEX-certified a wide range of RFID tags in different form factors, sizes, materials and frequencies—including LF, HF, UHF and Near-Field Communication. The company has tags for ATEX zones 1, 2, 21 and 22, Doege says. The tags are produced and



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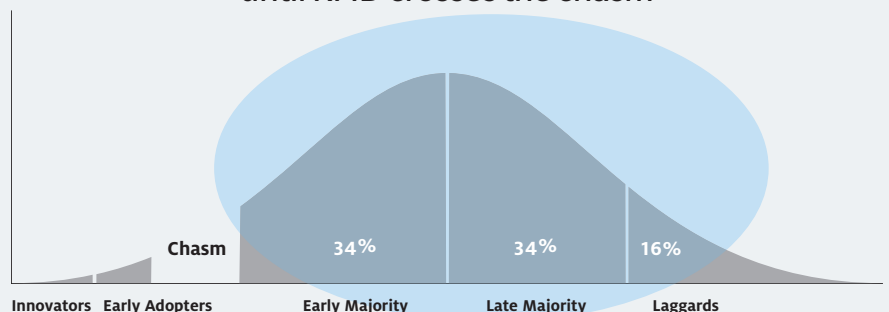


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Tectus tags come in a wide variety of sizes, form factors, materials and frequencies.



tested according to the ATEX and IECEx rules and regulations, he adds.

The company's ATEX tags are designed for use in a variety of hazardous areas where certified equipment is required, in industries such as food processing, mining, oil and gas and petrochemical. Some of the tags are designed to work in extreme temperature conditions. In addition, Tectus' ATEX-certified RFID tags can be used during dangerous goods transportation, and in areas where dust or dust-air mixtures or gas occur temporarily, occasionally or during normal operation. This can include environments where there are grains, flour, sawdust, resin or other particles.

Form factors in the Tectus tag portfolio of metal and glass tags include cable tie, card, cylinder, key fob and on-metal, for identifying devices, equipment, machines and number plates. Wristbands are also available for access control and time attendance.

The tags range in size from 2.5 x 2.5 x 0.4 mm—which Doege says is one of the smallest ATEX-certified UHF RFID tags on the market and can be used to identify small items such as metallic tools and surgical instruments—to 150 x 20 x 8 mm, which is used to identify metal containers, pallets and equipment, with a read range of up to 10 meters.

Customers are using the tags to track and manage assets and items, including drill pipes, serial number plates, valves and hoses at on-shore and offshore oil and gas drilling rigs; valves, pipes, pumps, tools, cables and engines at refineries; and pumps, valves, cables, hoses and lightning protection at chemical plants; as well as for maintenance and tracking of gas cylinders, Doege says. Tectus will customize tags for use in harsh conditions, such as a tag to track metal drill pipes for oil and gas exploration, he adds.

SERVING A GROWING NICHE MARKET

ATEX-certified tags and readers are a "big" part of Tectus' business, Doege notes.

ATEX certification is an "occasional request" HID gets from customers, Aufreiter says. "The majority of tags is sold to [non-ATEX] environments," he says. "We do see a growth of RFID use in general, but growth in ATEX environments does not differ from similar industries in non-ATEX environments."

But Doege says the market for ATEX-certified tags will likely grow because more companies are relying on these types of RFID solutions and they deliver potential benefits such as improvement of processes, cost savings and better safety. ■

Tectus' ATEX-certified RFID tags can be used during dangerous goods transportation, and in areas where dust or dust-air mixtures or gas occur.

Consumers Rule!

Shopping habits revealed during the 2014 holiday season will likely propel many retailers to adopt RFID.

By Bill Hardgrave



I ALWAYS find the National Retail Federation (NRF) annual conference fascinating. In early January, more than 30,000 people descend on New York City to talk, listen and learn about the latest developments in retail. This year, the pre-NRF buzz seemed to be about RFID and omnichannel, most often mentioned in the same sentence. I was determined to find out what was truly on retailers' minds.

The first day of the show, I served on a panel with Pam Sweeney, Macy's senior VP of logistics systems, and Joe Granato, Lululemon Athletica's director of operations and global initiatives, moderated by RFID Journal's Mark Roberti. Sweeney said Macy's plans to expand its RFID initiative in 2015 to more categories to provide visibility to the "single" unit and execute its omnichannel promise to consumers. Granato said Lululemon wants to improve inventory accuracy to enhance the customer experience. (Many thanks to both Macy's and Lululemon for discussing their deployments and communicating the RFID message.)

The next day, I spoke with a group of retailers and suppliers at a breakfast meeting. Throughout the rest of the conference, I met with groups of retailers and brand owners, as well as with individual retailers.

Indeed, everyone was talking about RFID and omnichannel, and for good reason. It seems many retailers were unprepared this past holiday season for the shift in consumer buying behavior. Black Friday sales were down, but online sales and overall sales were up. The omnichannel consumer had arrived and was demanding the freedom to shop anytime, anywhere—in a store, on a mobile device, on a home computer or by phone. But

most retailers were unable to provide a uniform experience across all delivery channels—such as buy online pickup in store (BOPIS)—because they had poor visibility into their inventory at the store level.

As I've discussed in recent columns, retailers understand RFID can provide real-time, accurate inventory data efficiently and cost-effectively. They knew customer buying behaviors were shifting and omnichannel was on the horizon, but many didn't believe it would be here this quickly. So the buzz among retailers not yet using RFID was how to get up to speed quickly. And the buzz among retailers using RFID on some items was what merchandise they should tag next. Several retailers that have been tagging replenishable items are expanding to fashion (nonreplenishable) items

It is a matter of when—not if—RFID in apparel will reach the tipping point and most items will be tagged. Then, and only then, will retailers be able to deliver on their omnichannel promise. Retailers, if you think consumers demanded control on when, where and how they shopped this year, just wait until the 2015 holiday season. ■

Bill Hardgrave is the dean of Auburn University's Harbert College of Business and the founder of the RFID Research Center. He will address other RFID adoption and business case issues in this column. Send your questions to hardgrave@auburn.edu. Follow him on twitter at @bhardgrave.



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Hospitals Embrace Passive Applications

Health-care managers pave their own path to RFID adoption.

By Harold Boeck and Ygal Bendavid



FOR SOME 10 YEARS, we've been speaking about RFID at health-care seminars and workshops. To a steadily growing group of attendees, we've explained how RFID could help hospitals cut costs and improve services. We've provided examples of early adopters that deployed various solutions, particularly real-time location systems (RTLS) to manage high-value mobile assets, achieving noteworthy benefits.

Until recently, our presentations were met with great interest overall, but also a fair amount of skepticism. When we asked attendees if they were considering an RFID project, most said they were taking a wait-and-see approach. They believed RFID was expensive and involved too much risk.

During the past few months, however, we've seen a major shift in attitude. Early adopters have proven the business case, and attendees now "get" RFID and believe the technology can help them meet some of the challenges their hospitals face. They no longer ask general questions about the technology's potential, but want to learn how other hospitals are using RFID and how they can leverage that knowledge for their own initiatives.

We're also seeing a shift in focus. Deploying an active RTLS is still the main solution most hospitals are considering, but now we're fielding frequent questions about passive applications, including automatic replenish-

ment for low-value medical supplies, consignment product management, and tracking medical instruments and even laundry.

It seems there's no single path to RFID adoption. It was generally believed that hospitals would first deploy an RTLS to track assets and then add other applications, such as staff and patient workflow management. But many hospital managers are concerned that choosing an RTLS is complicated, given the competing technologies and providers, and deploying a system can be challenging and costly.

Hospital managers are leaning toward passive solutions, because they're easier to deploy and less expensive. They also have a good track record, because they were developed for other industries—managing inventory in retail stores, or tracking tools for aerospace firms or linens for hotels, for example—and RFID providers adapted them for the health-care sector. The return on investment has been documented by deployments in other industries and holds true for hospitals.

Hospitals that choose the passive path should not forget that there are no shortcuts to deploying RFID. It's still essential to develop a business case, analyze the many robust solutions on the market and research various providers. It's a time-consuming process, but it will facilitate a successful project. ■

Harold Boeck and Ygal Bendavid are professors in the school of management at the Université du Québec à Montréal, and members of RFID Academia's research board.





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Teamwork Overcomes Challenges

Operations and IT departments must work together to develop a detailed blueprint for deploying RFID.

By Ken Traub



RFID projects are uniquely challenging for most companies, because they require close collaboration between personnel in two very different departments: Operations—in factories, warehouses, stores or other environments—and IT. For

an RFID deployment to succeed, operations and IT must take joint ownership of the project, and that may be an unfamiliar style of collaboration for both of them. The best approach is to get these teams working together at the beginning of a project, with a focus on a common deliverable: a detailed specification of the data that will flow between the tag and reader infrastructure and the IT systems.

Creation of a data specification is a two-phased process. In the first phase, all the operational processes that will involve RFID must be mapped out step by step. Tracking finished products, for example, includes shipping, receiving, warehousing and in-store operations. The processes for monitoring equipment, tools and other assets might include procurement, inventory, inspection, maintenance and repair.

At this stage, it's mostly the operations staff talking and the IT folks listening. Operations should describe all the relevant processes in which tagged objects are handled. But IT should ask probing questions, such as: Does it always happen that way? What can go wrong? What happens if that step fails? This ensures both the "happy path," when things work as expected, and exceptions are covered. This stage can be tedious, but it's necessary for the context of the RFID data to be fully understood. It can also be illuminating for both sides—a good outcome is, "I didn't know that's how we really do shipping and receiving."

At the end of this stage, the team should have many detailed flowcharts showing all the relevant process steps, including exceptions. Now the team moves to the second phase. Here, the IT people do most of the talking. Their first task is to identify which of the many process steps must be visible to IT systems to achieve the overall business objectives. Then, they need to determine exactly what data will flow from the RFID readers and middleware in each step to provide that visibility.

For each step, IT people must identify the "what," "when," "where" and "why" facets of data the IT system needs. The GS1 Electronic Product Code Information Services (EPCIS) standard provides an excellent framework for designing the data in this phase. IT must work with operations to ensure the data design is implementable, given the capabilities of the RFID infrastructure.

When finished, the operations team and the IT team will have a concrete blueprint from which to work as they proceed to the detailed design and implementation of their respective parts of the system. More important, they will be working together with a shared understanding of what happens on the other side. ■

Ken Traub is the founder of Ken Traub Consulting, a Mass.-based firm providing services to companies that rely on advanced software technology to run their businesses. Send your software questions to swsavvy@kentraub.com.

