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# Are You Realizing the Full Benefits of RFID?

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## Introduction

Radio Frequency Identification (RFID) is an Automatic Identification and Data Capture (AIDC) technology that was developed during World War II, refined in the 1970s, and has been widely used in mainstream applications in the past decade. The technology uses a reader to communicate with a tag or label containing an Integrated Circuit (IC) to obtain an identification or exchange data. There are many technologies used for RFID, including different frequencies, active and passive tags, different protocols, and more, that provide flexibility to address a wide range of application, but add complexity to the understanding of the capabilities of RFID and how it can be used.

An understanding of the technology itself has been accompanied by a tremendous shift in customer attitudes, with RFID now viewed by many enterprises as a strategic imperative rather than a technical curiosity. Backed by strong value propositions, business benefits, and proven ROI, organizations that have deployed RFID consider it to be a competitive differentiator. This is a significant change from the past, when RFID was viewed as a complex, challenging, and costly technology with uncertain benefits. This progression shows customers' growing appreciation of the capabilities of RFID and provides context for the successful applications that are shaping the current market, including asset tracking, supply chain management, and item-level tagging.

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Put simply, enterprise end users are no longer asking whether the technology works or is cost effective. Instead, they are thinking creatively about the many ways in which RFID can solve real-world business problems. Today, customers' questions are about identifying and quantifying the business benefits and value propositions associated with RFID. Organizations want and need to know how RFID can enhance visibility, security, or condition monitoring for select business processes, especially those that cannot be addressed with alternative technologies such as barcode.

This paper offers insight into the meaningful, positive impact RFID can have on operations, business processes, and the bottom line to assist those considering an RFID implementation.

## Real-World RFID Applications Creating Real-World Business Opportunity

As citizens, consumers, and corporations, many people have unwittingly been exposed to applications of RFID without realizing it. For example, many companies have adopted RFID for access control and employee ID badge applications. In addition, contactless smartcards have been widely deployed to speed payment, transit ticketing, and identify people (such as national ID and healthcare cards) across the world. Other familiar applications include electronic toll collection, pet tracking, and passports—all supported by RFID.

RFID is solving real-world business and operational challenges within industrial, retail, government, health care, and enterprise environments, on a widespread basis. From manufacturing shop floors to supply chains to healthcare facilities, a growing list of users representing an extensive range of applications are being supported by RFID solutions. Inventory control, asset tracking, supply chain management, and Work-In-Process (WIP) are fueling the application growth and positioning RFID as a game-changing automation technology across industries.

RFID solutions are now deployed in countless countries across many unique applications. And while it is impossible to enumerate every user and each specific application, there is no better way to communicate how RFID is tackling real-world business problems than by offering a few examples. Specific business challenges or opportunities are identified below along with the RFID-based technology that was used to address them. Our focus is on the application of passive UHF technology, which is experiencing rapid adoption due to its standardized communication protocols, strong technical capabilities and rapidly falling price points.

### *Business Opportunity No. 1: Optimize Asset Tracking, Management, and Utilization*

Assets, items, animals, people, documents, or other physical objects get lost, misplaced, mislabeled, stolen, or overlooked within the four walls of a manufacturing facility, in the yard or field, in transit, or elsewhere within the supply chain. When there are a large number of assets located in diverse locations at variable times and for varying purposes, any part of the process that requires human intervention introduces the possibility for error in either data collection or entry, resulting in unreliable information and operational problems. Every organization has physical assets of some kind, and in the absence of RFID, most lack a good way to manage and monitor them.

RFID can deliver excellent business value and a high Return on Investment (ROI) by providing truly automatic identification of each specific asset. In addition, software systems can be tailored to enable a broad range of exception handling, notifications, or alerts, depending on the business rules, processes, and best practices. The resulting visibility, when combined with appropriate Business Intelligence (BI) strategies, can provide dramatic improvements in the profitability and accounting accuracy of a business. In the regulatory environment many companies face today, both of these results are extremely valuable.

One of the biggest warehouse operational issues facing Mission Foods, a large tortilla manufacturer, was the need to better manage and maximize the utilization of mission-critical assets, specifically its returnable, reusable plastic containers used to deliver its product to customers. Each day approximately 20,000 containers leave warehouses in Texas headed to independent distributors, which would return them to different locations, at different times and, in some cases, not at all. Low asset utilization and asset loss coupled with limited inventory control and visibility led Mission Foods to seek a solution.

After trying ineffective solutions such as paper-based forms and realizing that more than $3.5 million was being spent each year on replacing the returnable plastic containers, Mission Foods looked to trial RFID and its real-time automated data capture capabilities in a few of its most problematic facilities. Deploying a passive UHF system leveraging on-demand label printing, Mission Foods began tagging its containers. After saving $700,000 in packaging costs, a sub-5% loss rate (it was 100% in some warehouses), and a tripling in the average number of turns per container, Mission Foods quickly decided to deploy the solution to all 25 warehouses and plants. The increased asset visibility, improved inventory control, and enhanced reporting processes have also provided Mission Foods with the information it needs to consider charging for lost containers.

While the Mission Foods' RFID implementation is one of countless deployments across global industry, the takeaway is not unique to this example; the value proposition and business process benefits enabled by RFID technology are real. Correlations and parallels can be drawn to assets of any kind in any industry.

Today RFID transponders are attached to corporate IT assets, capital equipment, containers, returnable transport items, documents, medical equipment, rental items, and more. These applications utilize RFID to monitor the movement of assets within a building, yard, warehouse, office, or elsewhere in order to tighten control and visibility of the assets and keep accurate inventories. The variety of assets being tracked is virtually limitless, ranging from low to high value, and includes the following:

- High-value assets, including equipment, tools, and capital assets
- Reusable assets such as containers, bins, totes, and roll cages
- Returnable Transport Items (RTIs) such as pallets, bins, cages, and racks
- IT assets, such as servers, blades, laptops, tapes, and hard drives
- Medical equipment and devices
- Yard (trailer) management
- Vehicle inventory management, an automotive manufacturing-specific application

## *Business Opportunity No. 2: Improve Traceability*

Traceability—generally defined as the ability to capture and trace information about an item's flow through a process or supply chain—is a fast growing need in many industries. While this definition is unquestionably broad, it often means data collected to support the chain of custody of certain assets, individual items, shipping containers, and other objects. Supplemental business requirements are also tied to the concept of traceability, including electronic pedigrees, enhanced safety, and increased anti-counterfeiting and brand protection within a number of segments such as manufacturing, oil and gas, and transportation and logistics.

> For the full benefits of RFID and true end-to-end supply chain visibility to be realized, item-level tagging must begin at the source or point of manufacture.

RFID supports traceability for compliance and verification processes as well. The technology can be leveraged to verify that critical assets, such as process, fleet and life safety equipment are properly maintained.

As an example, G.H. MUMM, a premium champagne producer, is focused on ensuring the highest quality throughout each stage of its production process, making traceability a key issue. MUMM sought to improve end-to-end batch traceability by placing RFID tags on the wire crates that hold champagne bottles throughout the stages of production. Challenges with batch number changes during intermediate stages (which would require barcodes to be removed and replaced to update the data), longer aging cycles (which would require labels to be updated), and the need for overall stock management improvements led MUMM to evaluate RFID. Initial interference and performance concerns resulting from the presence of metal (wire cages) and moisture and humidity (during select stages) were addressed through the use of encapsulated rugged passive UHF tags that are especially well suited to the unique environment of champagne production.

In addition to total visibility and enhanced batch security through routing error detection, G.H. MUMM's RFID implementation makes it easier to pinpoint defective batches which can then be removed from the production chain. As a result, 100% of defective batches are now detected. Furthermore, RFID helps optimize batch number management through improved real-time data during preparation of customer orders. Significant labor savings were also realized, including a 12.5% reduction in time spent on administrative tasks related to tracing product through the production process.

## *Business Opportunity No. 3: Enhance Supply Chain and Inventory Visibility*

Retailers today need a high level of real-time inventory visibility. In fact, this need has become more pronounced with the advent of omni-channel or multi-channel retailing. Item-level RFID tagging can provide a glass-pipe view into the retail supply chain or store floor, affording retailers and brand owners incredibly detailed information about what is in and out of stock, as well as other specific inventory metrics. This level of visibility is particularly useful

for high-value goods since there is a greater risk of theft and diversion. RFID can also provide enhanced visibility at the shelf itself. The need for shelf level visibility is particularly acute in large retailers that often display thousands of SKUs in a given store. With RFID, these retailers are able to ensure that the store is always well merchandised, and that product is in stock, displayed appropriately, and priced right, with minimal human intervention.

The retail apparel sector in particular has embraced RFID technology at the item level to address operational challenges, protect their brands, and elevate customer loyalty, service, and the overall in-store experience. Major retailers including big-box stores such as Walmart, Macy's, Marks & Spencer, and Kohl's as well as smaller footprint stores such as American Apparel, Trasluz, and many others are deploying RFID and working with their supply partners (brand owners) to improve accuracy in shipping, receiving, and inventory control with passive UHF RFID. Additional benefits include labor cost savings, staff reallocation and efficiency, faster inventory cycle counts, better replenishment processes, out-of-stock reductions, reduction in shrink and uplift in sales.

While in-store applications have been the core focus of most retailer installations to date, there are clear signs that RFID is moving further back in the supply chain as retailers and consumer goods manufacturers come to appreciate the many benefits item-level tagging can bring to their businesses.

The power of inventory accuracy is the driving force behind the anticipated widespread adoption of item-level tagging across the retail supply chain and in stores. Inventory accuracy drives all of the most important decisions in retailing, directly impacting the ability of shoppers to find the item they're looking for from the channel they prefer (such as in-store, kiosks, online) at the price they are prepared to pay. For retailers that have deployed item-level RFID tagging, it has demonstrated its value, proven its use case, and is now viewed as a powerful tool to manage the selling environment, customer experience, and everything that goes with it in retailing.

With the business case validated and billions of passive UHF tags being shipped each year to support retail item-level tagging implementations across the world, it is becoming clear that RFID has found one of its killer applications. In fact, several retailers are extending RFID tagging beyond the apparel category and increasingly using RFID for such needs as Electronic Article Surveillance (EAS), anti-counterfeiting and brand protection (in addition to inventory control and visibility) to help reduce theft, shrink, and damage to brands.

Item-level tagging is not restricted to the retail sector. Pharmaceutical companies, consumer electronics manufacturers and alcohol distillers are evaluating and deploying it as well. For example, passive UHF RFID is now mandated in the Korean pharmaceutical supply chain. Participants in the Korean whiskey and Chinese wine industries are also using RFID to support chain-of-custody documentation and anti-counterfeiting. Given the current levels of activity and interest, it is safe to assume that stronger adoption of RFID at the item-level lies ahead.

## *Business Opportunity No. 4: Improve Manufacturing Throughput and WIP Tracking*

RFID has proven its ability to improve critical manufacturing processes. Many manufacturers, including those in the automotive and Aerospace and Defense (A&D) sectors put RFID tags and labels on parts and assemblies as they move through their manufacturing process, increasing factory automation and throughput. Regulatory requirements and 24-by-7 production demands focused attention on just-in-time sourcing, parts replenishment, product delay avoidance, and component-level traceability. Often times, manufacturing settings present harsh environmental conditions such as high heat, abrasion, the presence of fluids, challenging tagging surfaces, durability requirements, and other factors that traditional barcode labels are poorly suited to address.

To enable RFID's broad range of benefits such as track-and-trace, asset management, and WIP tracking within the manufacturing environment, the RFID vendor community has responded with a range of creative solutions. Today a wide assortment of specialized tags and labels are available to meet the needs of specific applications such as paint masking, flame retardation, on-metal tagging, parts and tools tracking, and high-strength reusable labels for totes and bins tracking. There is truly an RFID solution for every application.

Perhaps the most compelling feature of RFID technology is that a single solution can support more than one application, deliver multiple value propositions, and yield an enormous range of business benefits.

## *Business Opportunity No. 5: Enable Multi-Application Support with a Single Tag*

Perhaps the most compelling feature of RFID technology is that a single solution can support more than one application, deliver multiple value propositions, and yield an enormous range of business benefits.

An emerging example is Automatic Vehicle Identification (AVI). AVI encompasses electronic toll collection, automated parking payment, electronic vehicle registration, border crossing and access control, all delivered through a single tag. Passive UHF-based AVI solutions have been deployed by the governments of Mexico and Brazil with each supporting multiple applications. Mexico has rolled out a combined electronic vehicle registration and toll collection applications while Brazil is deploying a system that supports toll collection and automated payment for parking, both using a single passive UHF windshield tag capable of being read at long ranges and at high speeds.

The ability to integrate multiple applications, value propositions, and process improvements in a single tag has enormous operational and financial benefits. Multi-application implementations drive significant value for the deploying enterprise, while leveraging the cost of the RFID technology across the various applications. The result is a very high ROI on the RFID investment.

# The Road Ahead for RFID

## *Expect Multi-Modal, Hybrid AutoID Solutions to Shape the Future*

Within the four-walls, supply chain, retail, yard, or in-field environment, the evolution and adoption of RFID technology and its many applications continues. The world is using technology, including RFID, to better compete, save money, and communicate across the worldwide supply chain. Companies who utilize technology are the most efficient, profitable, and customer-respected companies in the world. If you look at the list of leading companies across the globe, each is using RFID in one way or another and continuously looking at ways to use technology to their advantage.

To this end, RFID is playing an influential, complementary role in the development and adoption of multi-modal, hybrid AutoID solutions. Leveraged with other automatic identification, location, and sensing technologies such as barcode, voice and environmental sensors, RFID is reinventing inventory control, safety, and security operations, most notably within manufacturing, supply chain, warehousing, and compliance-related markets. Expect to see a growing base of users across industries and around the world leverage barcode and other sensor-based input technologies (in addition to the various flavors of RFID) to address real-world business problems, create new operational efficiencies, and generate significant value.

## *Make RFID Part of Your Connected, Agile Enterprise and Customer Engagement*

RFID is increasingly becoming a part of the agile enterprise vision, supporting a broad range of applications from asset management to retail to unique applications. Not only does it enable companies to track items, but it cultivates stronger connections with customers. For example, RFID is used for customer loyalty programs, to automatically manage accounts (i.e., passports, tolling, payment, trash and recycling hauling), and to efficiently manage access to events and ski lifts. It's used to better understand buying habits and provide targeted marketing for better accessibility to the things that customers prefer. In the age of accessibility to information, RFID will continue to play a prominent role in connecting the world of physical assets, items, and people to the digital information world. The time is now to engage industry leaders such as Intermec to discover how your business can take advantage of the benefits that RFID can provide.

## About Intermec

Intermec, now part of Honeywell Scanning & Mobility, is focused on supply chain workflow performance. We design the leading data capture and information management solutions at the interface between mobile workers, assets, and customers. For more information about Intermec, please visit www.intermec.com

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