

White paper

**Do You Know Where  
Your Assets Are?  
Maximizing ROI With RFID  
Asset Management**

## Introduction

Companies today are making millions of dollars' worth of decisions based on data that is only about 70% accurate. They may have an existing procedure for how assets move through their internal or external supply chains. But when they get an opportunity to look at actual data about that process, it usually doesn't match their perceptions. RFID technology can provide visibility into that unknown, and it can do this automatically.

It's past time to move away from focusing on the cost of radio frequency identification (RFID) and its use in compliance alone. Many manufacturing companies and other organizations are now using closed-loop, passive UHF RFID implementations to solve problems in enterprise asset management and fundamentally alter and improve business processes. In doing so, they are finding a positive financial return on their RFID investment.

The decision to use RFID is really about more accurate data, more accurate and timely information that allows companies to make better business decisions, thus driving ROI. The concern is not just for the value of the assets being tracked, but about the cost of not knowing where those assets are or how many there are.

### Case in Point

"Using RFID to track totes, lift trucks and work-in-process in a plant may not be as flashy as end-to-end supply chain visibility, but companies are generating real returns today with asset management solutions. That's the ROI from RFID."

*Bob Trebilcock, Editor at Large, Modern Materials Handling*

Every major company now has an RFID team examining how to apply the technology, and the tracking and utilization of assets is a key focus area. Even Sarbanes-Oxley compliance requirements now include asset accountability and visibility. Corporate executives are using RFID to reduce costs and drive profits to the bottom line. Research shows that more implementations are being driven by process improvement benefits than by compliance mandates. It is the implementations driven by process improvement that are delivering ROI, because once a company has visibility into a specific process and access to that more accurate information, the business process can be improved.

This white paper will examine asset tracking with RFID technology by providing:

- A brief overview of technologies available;
- An explanation of how passive UHF RFID can be used for asset tracking;
- An exploration of who's using RFID and why;
- A discussion about deciding what to track and making a business case for RFID;
- A guide to choosing the right RFID partners.

## What Technologies Are Available for Asset Tracking?

Several different technologies can be used for asset tracking. Today, bar codes and bar code readers are often used. But these are not always viable in critical processes. Since their use is time-consuming and labor-intensive, they can be prone to errors due to the tags not being read.

Active RFID can also be used to track assets, although its battery-powered tags make it an expensive method. The technology is susceptible to interference problems indoors and finer data granularity is more difficult to achieve with active than with passive UHF RFID. Real-time location systems (RTLS) also use battery-powered tags and are therefore more expensive than passive UHF RFID.

Passive UHF RFID systems can be implemented alongside of, and integrated with, all of these technologies. Passive RFID is often the best alternative in asset management applications. It is faster and more accurate than bar code readers because it is automated, and thus does not depend on people to ensure that tags are read, either at all or quickly enough. Passive RFID tags can be assigned to either an individual asset or a location. They can be read in environments where barcode labels are difficult to read, or in harsh environments where tags must be made of materials that cannot accept a bar code.

Since passive RFID tags do not require a power source, tags cost less than those used for active RFID or RTLS systems. The technology is thus cheaper than, and requires less infrastructure than, RTLS or active RFID systems and can be integrated easily with existing systems of either type.

### Case in Point

"Companies have been successful in identifying internal ROI-based applications for RFID. Asset tracking...is one of the focal points of this activity, due primarily to the contention that knowing the location of an asset, part, or finished good can drive better asset utilization, manufacturing process improvements, and upticks in their manufacturing performance metrics."

*Chantal Polsonetti, ARC Advisory Group*

## Utilizing Passive UHF RFID in Asset Tracking Applications

Passive UHF readers may be either fixed or mobile. Fixed read points and the ability to use mobile readers to search for assets combine to make passive RFID systems superior.

Passive UHF RFID tags can be read at distances of 1 to 30 feet. When the tag receives an RF signal from an appropriate reader, users can locate, read, write, and change data in the tag. Tags can therefore store specific types of data that can be used and changed throughout the life of the asset.

Passive UHF RFID can help with tracking assets in several different ways:

1. Assets can be tagged using either rigid, flexible label or hanging tags.
2. Fixed readers can be used on doorways, gates, conveyors and dedicated read zones, also called “choke points.”
3. Handheld mobile readers can be used to search for assets and communicate wirelessly. These are often used for exceptions and for applications outside the traditional four walls, and can be combined with GPS units for in-field location tracking.
4. Forklift mounted mobile readers and location tags can be used to track pallets of raw materials or inventory, as well as validate receipt and shipments of goods and containers.

### RFID Asset Tracking and Management: Who’s Doing It and Why

In order to manage assets, it must be possible to track them and get accurate, timely data on their locations and status. By automating the process, passive UHF RFID can remove the error factor that is introduced by direct human involvement in asset tracking.

Asset tracking and asset management are knowing:

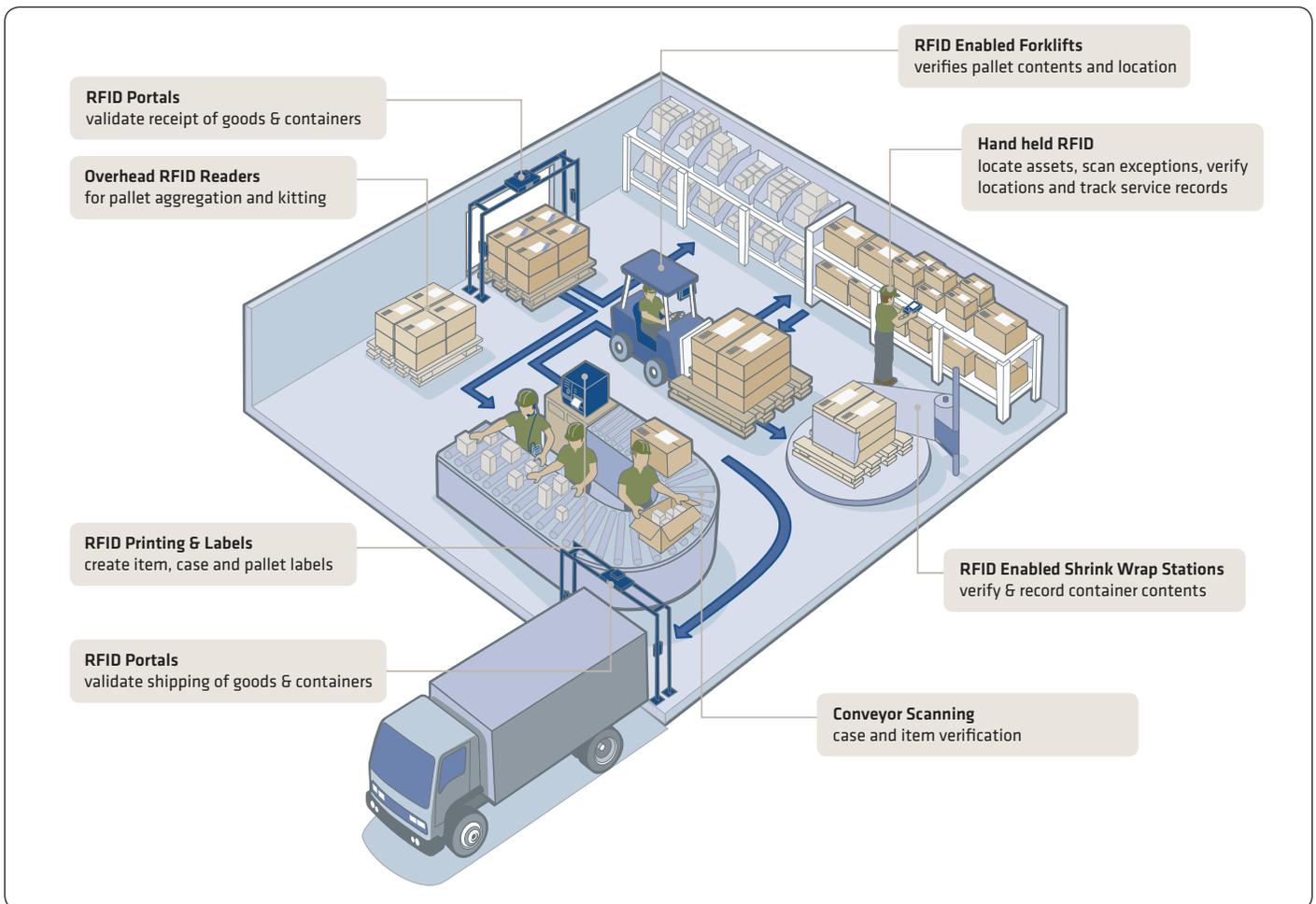
- where your assets are at present;
- where they are not (i.e., if any are missing);
- where they were last; and
- how many of them are in a given location.

With this information, a company can collect, reposition, and redeploy its assets in the most effective manner.

#### Case in Point

“[Enterprise asset management] users have reported that inaccurate and incomplete data is the most persistent problem firms face...Some firms attribute the problems to their existing processes or to their system’s poor usability and tedious data entry requirements.”

*April 24, 2006 Forrester Research Market Overview*



### RFID in Manufacturing and the Warehouse

### Who Is Tracking Assets and What Are They Tracking?

A wide variety of industries can benefit or are benefiting from the use of passive UHF RFID to achieve ROI with asset tracking. They include retail, consumer goods, industrial manufacturing, transportation and logistics, and field service.

Assets currently being tracked include:

- Reusable containers, such as totes, bins, racks, barrels
- Pallets, including raw materials and finished goods
- Vehicles, such as cars, trucks, and trailers
- Chassis carriers used in auto production maintenance
- Engines, including aircraft, diesel, power train assemblies
- Medical supplies, including instrument containers and equipment
- Computers, furniture, and IT equipment
- Social Security forms, files and records
- Appliances, air conditioners, gas cylinders
- Rolls of paper and steel
- Tobacco pallets
- Meat hooks and other equipment used in beef production
- Emergency equipment and hazardous chemicals
- Navy and Marine Corp. components and equipment
- Power tools
- Stadium Astroturf

### Case in Point

The U.S. Navy Regional Supply Office in Virginia provides logistical support for aircraft squadrons stationed nearby at Naval Air Station Norfolk. Each time a squadron is deployed, a pack-up kit (PUK) is sent along with it, traveling from the regional supply office command to the supply command assigned to the squadron. The PUK consists of several pallets and five-by-five-by-five foot cartons containing hundreds of replacement supplies and spare parts. Before departure, both commands must agree on the contents. In the past, this was done by comparing paper inventory lists, requiring three people and 24 man-hours. Since 64 PUKs were inventoried at least four times per year at that location alone, the result was a costly logistical nightmare.

The Navy ordered a pilot technological overhaul of the PUK inventory process. This consisted of EPC Class 1 RFID tags, passive UHF RFID fixed-mounted and mobile readers, RFID printers and related equipment, and technical engineering service. The system reduced the time required for inventorying one PUK to less than 30 minutes. It also improved overall inventory accuracy: the previous manual system gave little or no visibility to the actual inventory on hand, causing lost parts and duplicate orders. With RFID in place, the U.S. Navy now has just-in-time replenishing and just-in-time inventory management.

### Case in Point

Blue C Sushi is a kaiten sushi restaurant, where customers are presented with an array of sushi and Japanese-inspired cuisine that circulates throughout the restaurant on a conveyor belt. Monitoring the quality of its products is imperative for the restaurant's business success.

When the restaurant first opened, a bar code system was implemented for monitoring how long a particular plate was on the belt to ensure freshness and quality. While the bar code system was effective in monitoring for freshness, it could not provide important details such as what time the plate was taken off the belt, what item was served on the plate, or how many plates of a specific item were sold.

The restaurant implemented a total RFID system consisting of fixed RFID readers and antennas, RFID device management and event processing software, and inventory management software. Customized antennas are placed in the chefs' cutting boards and integrated into the conveyor belt to read information from passing RFID-tagged plates. Chefs know what is on the conveyor belt, what needs to be made and what the inventory levels are, improving quality control and eliminating waste. The system also automates billing to ensure more accurate checks, improving customer satisfaction and boosting profits. Blue C Sushi can now track food as it moves from kitchen to customer and has improved its ROI in the process.

### Why Are They Tracking Assets?

There is more than one reason to track assets, and not all are directly related to financial gains. The ROI of RFID can also include non-monetary elements, such as efficiency gains, improved productivity and visibility, speeding up the supply chain, a higher quality of service to customers, and correcting mistakes when they occur. All of these can provide ROI in the sense of giving a company a differentiator and an advantage over its competition.

Financial benefits may include saving money by locating and redeploying existing assets instead of buying or producing new ones, reducing labor costs, improving profits, and increasing customer satisfaction by making sure products arrive at the right location at the right time, and in the right condition.

### Case in Point

The U.S. Social Security Administration is using RFID to improve data collection accuracy and reduce labor costs. Each year, the SSA fulfills more than 42,000 orders for forms, publications and other documents and ships 240,000 line items to SSA office locations worldwide. The agency replaced a paper-based, manual system with a paperless warehouse management control system that integrates portable RFID readers and printers with RFID software and warehouse management system software. The system tracks and validates each warehouse operation and incorporates workload scheduling software to optimize employee productivity and provide control over the inventory management processes.

The previous system was labor-intensive and resulted in system inaccuracies and delays in getting documents to the agency's customers. The passive UHF RFID system has reduced the SSA's labor costs by 35%.

Asset tracking can also identify certain business processes that can or should be changed or improved.

Another major reason to track assets is when the cost of not knowing where an asset is at a given time can be considerable. Sometimes the value of the asset itself is not as important as the cost of the consequence of losing track of the asset or of information about it. The potential cost of not knowing can include bad publicity, loss of customer trust, lost opportunities, and lost revenue.

### Case in Point

Shaw Industries Group, Inc. is a full-service flooring company with over \$5 billion in annual sales. As a major supplier to WalMart, Shaw needed to label its products with RFID tags to meet WalMart's compliance mandate. But instead of just implementing an RFID system as a cost of doing business, the company also wanted to identify areas that could leverage RFID to solve issues and improve business processes.

One area was the need for a simple, automated process for labeling pallets. The solution was an RFID portal system consisting of readers, tags and device optimization software. When a pallet containing products enters the stretch wrapper, all of the RFID tags of the products on that pallet are read. A pallet tag is then printed, and any missed case tags are also printed. The system achieves 100% read rates.

The system also tracks the master bills of lading, making sure that information about shipments of finished goods and work-in-progress information flows between facilities, including truck arrival and departure times between distribution centers. Previously, truck arrival and departure times were not reported well and reported times were often incorrect. The accurate information proved to be more important for improving asset visibility and real-time notification, as well as customer service. Shaw is rolling out this system to 39 U.S. facilities.

## Deciding What To Track and Making A Business Case for RFID

### *Deciding What Should Be Tracked*

This decision is not a simple one. The assets a company eventually decides to track may not be the obvious first choices. The ones that are easiest to track are not necessarily the assets that should be tracked. The most important asset may be the one about which there is the least knowledge, but that lack of knowledge may be costing more than is apparent.

The only way to determine where the greatest benefit can be found is for a company to understand where its knowledge gaps lie. Doing so often requires an in-depth review of current operations and business processes and search for data deficiencies.

Once users have determined their areas of greatest benefit, they must then determine what should be tracked. This can be determined by identifying an area in the organization where there is a particular problem that may be helped by a process improvement.

According to Dwight Klappich of Gartner, "...several types of business cases are well-suited to [RFID's] use. To find such projects, look for places inside the business where traditional data collection technologies have failed to capture reliable-enough information to manage the process, and determine whether RFID can overcome these data collection issues" (Gartner Wireless & Mobile Summit, February 2007).

### *Run A Pilot Program*

Initially, the best way to start is to run a small pilot program in order to gather data. Then, users should analyze that data to determine how the process needs to be improved and whether that improvement can be done, and change the process as needed to achieve savings. The next step is to determine what the value of the change is and calculate the ROI or benefits.

The benefits, profitability, payback, and ROI in all of this can be found by examining the backend systems that support the process. For example, is it knowing more about the item and its location that delivers benefits or the cost of not knowing that is more important?

### Case in Point

After examining the results from eight consumer products (CP) companies' RFID pilot programs, AMR Research concluded that: "We...believe that there is no one-size-fits-all answer: the ROI varies by category, by channel, and by the sophistication of current processes to work with retailers to do store merchandising. The analysis has to start with a true understanding of a company's current out-of-stock performance." and "...the data supports that 25% to 27% of the out-of-stock problem can be fixed by improving the CP company's supply chain response." (April 23, 2007 Alert Article)

The vast majority of companies that conduct pilot programs go on to roll out the asset tracking pilot program into full production. Many of them then expand the system to other operations in the company. Scalability of the deployed RFID system is therefore important: rolling out an RFID system from the pilot stage into full production drastically increases the amount of data that needs to be managed and the complexity of the system. Choosing a system that can scale to meet complex future needs as well as current requirements decreases total cost of ownership.

### **Why Do Companies Choose Not To Track?**

Some companies are choosing not to track assets. The biggest reason is the fact that they are looking only at the additional cost of the implementation, both equipment and deployment costs. They are not considering how much money can be saved, or what other ROI benefits can be accrued, by acquiring information about that process which is currently invisible.

### **Case in Point**

After examining the results from eight consumer products (CP) companies' RFID pilot programs, AMR Research concluded that: "When an out of stock occurs, the disruption is longer than originally thought...Today's CP processes for demand sensing and shaping take 7 to 9 days to correct an out of stock. These pilots support that 80% of lost sales days are from out-of-stock episodes that last more than 7 days. With most out of stocks occurring in heavily promoted products and new product launches (products that are essential to the enablement of growth strategies), this is just too long."

"Retail perpetual inventory accuracy is worse than originally believed. The inaccuracies of even Wal-Mart store level inventory data triggers manufacturing replenishment two days too late at a store level."

"CP companies that are ahead of the curve in RFID analysis know the impact of RFID pilots on the true cost to their business. While most companies know the cost of their tags, few know their total cost of tagging—inventory, logistics, and labor—and the impact on margins." (April 23, 2007 Alert Article)

### **Conclusion: Choose the Right RFID Partner**

Everyone wants RFID to be easy, but unfortunately it's not because not all RFID systems are alike. Successful implementation requires help from a partner that has several different types of experience, including deep technical knowledge, system design and implementation expertise. An experienced RFID partner is one that can integrate an RFID system with a company's current data collection systems, including bar codes, mobile computing, and wireless connectivity, as well as its business processes and existing software infrastructure.

There are key concerns with using multiple providers for an RFID system. Scalability is one such major issue. No matter what the size, scope or sophistication of a company's current system, it will change in five to 10 years. A key consideration is choosing a system today that can accommodate your needs in the future. Scalability is difficult, if not impossible, if multiple vendors' products are used, due to the need to coordinate multiple systems and accountabilities.

Intermec, an RFID pioneer, has extensive experience in helping organizations understand their RFID needs and opportunities and in designing and implementing successful systems. Intermec Inc. (NYSE:IN) develops, manufactures and integrates technologies that identify, track and manage supply chain assets. Core technologies include RFID, mobile computing and data collection systems, bar code printers and label media. The company's products and services are used by customers in many industries worldwide to improve the productivity, quality and responsiveness of business operations.

Contact Intermec to learn more about how to take advantage of innovative RFID forklift systems or visit [www.intermec.com/rfid](http://www.intermec.com/rfid) to see more white papers, case studies and other resources about RFID, mobile and wireless computing, data capture systems for industrial environments.

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