



RFID for Passive Asset Tracking

Delivering process improvements and cost savings through automatic asset tracking

If your assets are worth tracking, then they're worth tracking with EPC Gen 2 RFID. Electronic asset tracking has long been considered the domain of active RFID or bar codes, which were improvements on manual methods. Lately, WiFi-based systems have emerged. But as UHF Gen 2 RFID hits the sweet spot of price and performance, it is replacing these technologies in many asset tracking applications.

Passive, UHF technology based on the EPC Gen 2 protocol is being used to track assets as diverse as file folders, pallets, library books and PCs. Passive tags are used to facilitate manage inventory of tools and equipment at far lower cost and with less ongoing maintenance. Passive RFID can also be used to control access to valuable assets and to maintain chain of custody.

The cost of UHF Gen 2 RFID is decreasing, with tag costs dropping by 70 percent and reader costs dropping by half in just 3 years. The price of a Gen 2 passive tag ranges from a few cents to a few dollars for a ruggedized, encapsulated model, whereas active tags can run anywhere from ten to over one hundred dollars. WiFi tags, while coming down, still run from \$30 to \$60. Active and WiFi tags also carry the additional cost

of battery maintenance, with both headcount and initial investment impacts.

Tags based on second wave Gen 2 ICs like the Alien® Higgs™ series have driven performance even further and deliver a medium range of several meters that's sufficient to cover most in-building asset tracking applications in office and manufacturing environments. Unless the application requires longer range, active tags are overkill and more expensive – a fatal combination.

This is not to say that Active and WiFi tags do not have their place. Some Real-Time Location Systems (RTLS) deliver precise, 3-d locationing of tags to within centimeters of accuracy. If this is required, active tags may be necessary as most RTLS systems use proprietary active tags. But this is rarely necessary for indoor asset tracking applications, where it is often adequate to know if the tag is in a certain room or has passed through a certain doorway.

WiFi has the advantage over active tags of relying on the existing WiFi access point infrastructure, making it an attractive option when the number of tags is modest. But for larger numbers of tracked objects, low cost passive tags enable the lowest initial and recurring cost, and the highest ROI.

Another alternative technology is high frequency (HF) RFID. HF tags, though somewhat more expensive than UHF tags, are used where the relatively short range they afford – a few centimeters – is adequate. The shorter range is a significant limitation for most asset tracking applications; however, excluding many use cases such as detecting assets as they pass





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through checkpoints. Historical comparisons of HF and UHF argued that HF performed better in most environments and in the vicinity of metals, but advances in UHF IC and tag design have largely eliminated these differences. Passive UHF tags are now proven on wine bottles and liquid pharmaceuticals. UHF solutions for on-metal tags are available from a number of vendors such as Omni-ID, Metalcraft, SonTec, HEI, Frontweb, and Frick.

The classic advantages of RFID over barcodes still apply: With passive RFID, tracking is automatic and line of sight is not required, as it is with barcodes. Data collection is automatic, thus eliminating employee compliance issues that often undermine the ROI of barcode-based systems.

The ecosystem for Gen 2 RFID is ready to deliver products and solutions. Industry standards like EPC Gen 2 and ISO 18000-6c deliver a high level of interoperability, which in turn has created a broad ecosystem of vendors that supply labels, encapsulated tags, readers, handhelds, software, printers and other related products.

Using Passive RFID for Document Tracking Applications

Passive RFID can be used to track high value documents effortlessly and automatically. In legal, financial services and life sciences firms, locating and tracking documents is resource-intensive. Files are shared in decentralized work environments but control must be maintained over these documents to meet regulatory compliance and confidentiality requirements. Manual methods are labor-intensive and subject to error. Misplaced files are common. And with highly valued, highly compensated employees, introducing intrusive methods of document tracking only serve to reduce productivity and slow the organization's workflow.

While Active, WiFi, HF and barcode technologies each have their place, for applications with large numbers of tags and medium range requirements, passive Gen 2 RFID delivers the best performance for the lowest cost of ownership.

Passive RFID applications can meet the challenges of tracking documents and other paper-based assets. Using a comprehensive solution from San Francisco-based FileTrail, a Washington, DC law firm can now conduct firm-wide file audits in four hours instead of four days. Automatic capture eliminates human error, improving accuracy and security.

New lower cost, low profile readers make it feasible to enable tracking across the office while new, paper-friendly, long-range tags are durable and ensure reliable capture even when folders are stacked with tags close together. With readers at every choke point, organizations can maintain accurate location information for documents and other assets as well as maintain accurate information about chain of custody. For instance, readers can read a user's security badge and tagged files when a user checks out files from a central library, establishing custody. Desk-mounted and handheld readers can be used to automatically locate lost files in offices. Doorway portals can detect files as they leave the building.





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Tracking Pallets and High Value Capital Equipment

There are many other use cases for asset tracking with passive RFID, including for pallets and other reusable plastic assets, voting equipment and high value capital equipment.

Passive RFID can be used to track pallets, Kanban bins and other reusable plastic assets. A pallet manufacturer may allot its pallets in pools to its customers and bill them based on estimated usage. Customers may feel like they're being overcharged, and the pallet company invariably thinks it's undercharging its customers. But by adopting a passive RFID-based tracking system, the pallet company can get 100 percent visibility into pallet usage with no operator intervention. Delivery and return of pallets can be automated, with tags embedded in the pallets and the installation of dock door portals at the customer sites and the pallet company. The result is more accurate billing and greater asset control, and ultimately better customer satisfaction because customers are billed based on verifiable usage.

RFID asset tracking can play a vital role in secure applications such as ballot box management during elections. Automating the process is particularly important for states that do not permit electronic voting for security reasons. Vote tallying is a labor-intensive process that's typically done by inexperienced workers. With RFID, election boards can ensure that voting information is quickly retrieved while protecting the integrity of the process and controlling the chain of custody. Voting equipment is tagged and sent in a sealed shipment to the polling site. Once citizens vote, the voting equipment is bagged again and shipped to the tally facility where the materials are registered and confirmed upon their return. Voting equipment is removed and scanned with handhelds. Exception cases are flagged by the system for intervention.

Libraries and book retailers will find efficiencies in using passive RFID to automate the checkout and return of books. RFID can also help eliminate problems with misplaced books and dramatically cut inventory times. Instead of a labor-intensive manual inventory process, librarians can walk around the stacks with



a cart-based reader to automatically inventory books. Shelf tags are used to identify sections and locate books that were shelved incorrectly. Readers mounted under desks are used as checkout and return stations. Doorway portals detect books as they leave the building.

Passive RFID can prove invaluable in protecting capital equipment such as used in hospitals. With RFID, hospitals can ensure the efficient use of equipment such as crash carts, diagnostic equipment or even bedpans and locate lost (or hidden) equipment rapidly and without searching the floor. Early difficulty with using UHF tags with metals has been alleviated through the use of innovative antenna design and more sensitive ICs. Even operating equipment such as scalpels have been tagged, and the tags can survive sterilization in the autoclave machine. Passive tracking also serves to reduce theft and hoarding of equipment and allows hospitals to quickly identify and inventory equipment.

To implement an RFID-based asset tracking system, hospitals can use readers mounted in ceilings and doorways to locate assets with accuracy to the room level. Exterior door portals can detect tagged equipment as it leaves the building. Scanning equipment and the employee ID badge at the same



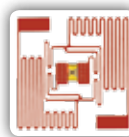
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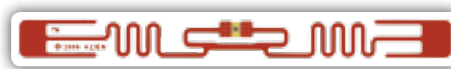
time automatically establishes custody. Handheld readers make it possible to quickly find equipment for maintenance.

Alien provides a number of products suited to asset tracking. Enterprise-class readers like the ALR-9900 combine exceptional performance with programming flexibility for highly reliable tracking systems that can be adapted to many business processes and situations. "Smart Antenna"-class readers, like the ALR-9650, combine a reader with an integrated antenna to enable a low-profile read point suitable for in-building asset tracking. Additionally, the power-over Ethernet (POE) capability of this model reduces system cost by hundreds of dollars and enables a discrete, neat and tidy implementation.

Alien tags come in several sizes and shapes, starting with the industry-standard Squiggle® tag, to enable tagging of virtually any asset. Alien partners offer a variety of methods for encapsulating tags to enable use on metal, or in harsh environments, and of course,



Squiggle-SQ



Squiggle



Squiggle-SH

there are many sources for RFID-enabled labels using Alien tags.

Passive RFID has become a viable solution for asset tracking, once considered the domain of costly active tags and readers. With passive RFID, data about assets can be captured automatically without employee effort or compliance. Second generation Gen 2 technology delivers reliable and even rising performance at falling costs. A vibrant ecosystem of standards-based software, tag and reader products continues to grow and offer flexibility and broad utility to customers. The time is right for passive RFID for asset tracking.

Alien Technology Partners featured in this article:

- › Plastic Pallets – Xterprise
- › Voting Equipment – RFID Global Solutions
- › File folders – FileTrail
- › Library books – Civica
- › Encapsulated tags for metal and other assets: Frick, Frontweb, HEI, Omni-ID, Metalcraft, SonTec



ALR-9900



ALR-9650

Alien Technology. RFID Technology for Automatic Asset Tracking

Contact us today at
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