



ASSET TRACKING with RFID

Introduction

Fixed Asset Tracking has traditionally been a labour-intensive and paper based process while Radio Frequency Identification (RFID) has been reserved for the billing of traffic along toll-ways and as a registration and identification process for domestic pets.

When combined, these processes make for a powerful tracking and identification system.

Where bar codes made significant in-roads into the cost of Fixed Asset Tracking by improving the accuracy of information and provided for electronic and real-time data flows functionality, RFID based asset tracking will show even greater returns in the speed of the tracking process and the amount of information that can be processed.

Imagine being able to walk into a room and within less than a minute be able to confirm the presence of all assets and have this data recorded electronically simply by walking around!

RFID technology is available in many forms however all forms require use of a small computer CHIP which may act as a simple identifier or may contain data about the object it is attached to. The Chip is normally embedded in a substrate that can then be attached to an object - this is commonly referred to as the TAG.

The Asset Tracking Tool (ATT) from TIG International is Bar Code and RFID enabled with seamless integration with world-class ERP applications including SAP R/3, Oracle Financials, PeopleSoft, ODBC and systems that provide text interfaces.

How does RFID and Asset Tracking work?

The use of RFID technology in Asset Tracking is very similar to Asset Tracking using Bar Codes.

An RFID tag is attached to an object, in this case a Fixed Asset. The RFID tag stores a unique number or ID that corresponds to a record in the Fixed Assets Database. During the tracking process the operator, using a PDA (Personal Digital Assistant) styled device, scans RFID Tags. This automatically tracks the Asset and updates date and time information. The operator is also able to record any new information about the Fixed Asset for uploading to the Fixed Assets Database at a later time.

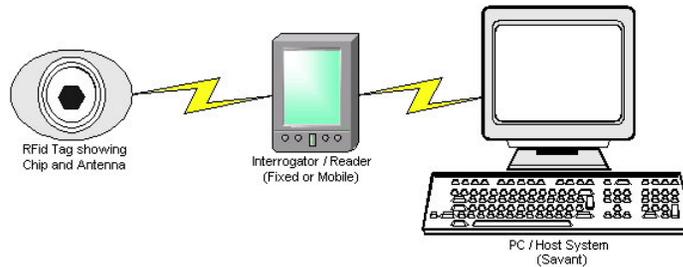
Unlike scanning bar codes, multiple reads of RFID Tags can be performed simultaneously. “Anti-collision” activities are managed by the ATT hardware and software to match up the various packets of scanned data to the records held on the PDA.

This simultaneous scanning, combined with the ease of RFID, allows for improved speed in the data collection process.



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Armed with a Symbol SPT1800 (PDA styled with an inbuilt bar code scan engine), the ATT software and a TSR222 RFID Reader, Fixed Asset Tracking becomes an easy to use, fully mobile computing solution.



What Assets should we Tag with RFID?

In some instances the use of a bar code is the most cost effective method of Asset Tracking however there are circumstances where the use of RFID will be more pertinent.

While bar codes are available in many substrates, they are mostly ideal for indoor environments where they are less exposed to harsh conditions and are less likely to become damaged. To the contrary, RFID Tags are well suited for use in extreme weather conditions, where temperate, light, water and dust do not interfere with the ability to read the data. For an Asset whose primary location is outdoors or is frequently exposed to the elements, would be well suited for RFID.

Bar codes work extremely well on those Assets where a bar code can be displayed within the reach of the scanning device. In those situations where the storage or physical location of the Asset does not make for an easy bar code scan, the use of RFID will be more appropriate as RFID requires only proximity to function and does not require line of sight. For example, when Assets are stacked high or are in difficult to reach places.

RFID is more likely to be employed in the Asset Tracking process when it is not ideal to have a visible bar code. This allows a Tag to be hidden for security or aesthetic purposes. Art Galleries welcome this option as they manage expensive pieces of art that are continually being identified and tracked where a visible Bar Code or Tag would detract from or damage the work of art.

Bar codes do have a significant advantage over RFID when it comes to issue of redundancy. Should a scan of a bar code fail technically, a reference or serial number is often printed on the bar code plate as a back up system. RFID does not easily supply this type of redundancy. One does have the option of printing the reference or serial number on the Tag however this would be expensive and may not be economically justifiable.



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What type of Tags should we use?

There are five main categories of RFID Tags available and these range from simple Read-Only Tags containing only a unique number to highly Smart Tags that are capable of communicating with other Smart Tags who they may come into contact with. When it comes to Fixed Asset Tracking there are only two types of Tags we need concern ourselves with.

Read-Only Tags are ideal for Fixed Asset Tracking as they contain a unique factory-burnt serial number within the chip and cannot be overwritten and are meaningless unless the serial number is linked to a Fixed Assets Database. This means there are no security issues to deal with, no duplications of data between the Tag and Fixed Asset Database which means data integrity is ensured. In this way the RFID Tag operates similarly to a bar code but with the advantages of being able to read the Tag without line of sight being necessary and with no concerns as to the physical state of the bar code.

The other type of Tag that may be employed in a Fixed Asset Tracking scenario is a Read-Write Tag. For example, if an electronic maintenance record is deemed appropriate to be attached to the physical Asset, the Tag may contain both sets of information, that is, the maintenance record and the Fixed Asset reference number. The ability to read and write data to a Tag comes with a number of issues and is best avoided with exception of extreme circumstances.

Tag and hardware durability

RFID Tags are extremely durable compared to a typical paper or even plastic based bar code.

The actual RFID Chip can be embedded in almost any substrate. RFID chips can be found embedded in the form of key-fobs, plastic credit cards, disks, keys, paper, plastic, stickers and so on. This means that a Tag can be made into almost any form to suit almost any environment, which means environmental conditions can be managed.

Their cost can be justified when looking at the lifetime of a bar code compared to a RFID Tag.

The hardware solution we have chosen to recommend for use with ATT was decided upon due to the robust operating system (PalmOS) and because both the Symbol SPT1800 and Northern Apex TSR222 RFID Reader are “ruggedised” devices. By ruggedised we mean have been trailed and tested to endure outdoor weather conditions and are water and dust resistant. Whether sending the devices between sites or for use in the outdoors, both devices will endure a high degree of rough handling.

Does RFID prevent me from using bar codes?

Far from it. TIG International encourages the use of both bar codes and RFID Tags in Fixed Asset Tracking. In some situations we would even go so far as to recommend the use of one or the other exclusively!



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The ATT solution from TIG International is both bar code and RFID enabled and has been designed to provide you with the best of both worlds in Asset Tracking options.

For Assets that are:

- Works of Art and Antiques - use RFID Tags to prevent the artwork from being defaced;
- Frequently exposed to the elements - use RFID Tags;
- Stored in out of the way places - use RFID Tags;
- Experiencing frequent damage or removal of the bar code- use RFID Tags;
- Document Tracking - use RFID Tags.

The current cost of RFID Tags means that if there are no benefits to your organisation by employing RFID at this time then simply don't do it. We can always add RFID technology to your Fixed Asset regime at a later date.

How do we Tag?

Tags can be attached to a Fixed Asset in a variety of ways, whether by sticking with an adhesive or attached via a cable tie.

Current research tells us that multiple Tags can be read simultaneously and will be sorted by the ATT software however we have run into a couple of restrictions along the way.

Using a low frequency Tag and Reading device with no external antenna, we have found that Tags stacked directly on top of each other are not always picked up during a single scan. The positioning of the Tag influences that ability of the Tag to be read. Likewise the positioning of the antenna can influence readability.

We have also found that the documented scanning range of low frequency Tags should have a typical read range of 0.5 metres however our experience tells us that reality is more like a 10cm read range without using external antennas. Undoubtedly there will be improvements in the technology as time progresses.

For Fixed Asset Tracking we recommend a Ultra High Frequency (UHF) reader that should provide the greatest read range. The typical read range of UHF is stated up to four metres, realistically we expect a typical read range of around 90cm, without special antennas.



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In some instances a Tag may not be required to be visible to the eye but may be required to have particular placement on or within the Fixed Asset. There has been much hype within the logistics industry that pallets will no longer be required to be packed with all bar codes facing outwards. However no one has yet successfully tested a pallet containing many boxes of food cans - they may find significant interference from the cans themselves as well as interference by the contents!

Is RFID dangerous?

There is much worldwide debate regarding RFID standards. Much of this debate focuses around global Electronic Product Code (EPC) and the supply chain and does not directly influence Fixed Asset Tracking.

What we do know is that the UHF range (900 MHz) is generally accepted across the globe. This operating frequency is best suited to Fixed Asset Tracking largely attributable to read ranges of up to 1 metre.

However, companies should assess their Occupational Health and Safety standards regarding the use of Radio Frequency.

Benefits

There are numerous benefits that are currently attributed to the employment of RFID.

- Tags can be as simple as identifiers that relate a serial number back to a database that holds information about an object much in the same way a bar code operates, or Tags may be Smart and have the ability to read as well as record new data to them.

- Used as simple identifiers, Tags can be employed into the Asset Tracking regime as readily as bar codes. The major advantage is that line of sight is not required for a Tag to be identified and means that Tags can be hidden for security or aesthetic purposes.
- Smart Tags can hold significant amounts of data about an object. This could be information pertaining to the description of the object including serial numbers, details of maintenance records, who owns the object, where it has previous been found. The type of information that can be held in the Tag is limitless however security and data integrity issues start to distract from Smart Tags as a viable Fixed Asset Tracking option.

- Multiple Tags can be read simultaneously. If scanning a bar code was an improvement to the speed and accuracy of Fixed Asset Tracking, then this is the one area that can introduce further improvements.

- Line of Sight is not required for a scan of the Tag as the proximity of the Reader to the Tag is the catalyst. When a Reader comes close to a Tag it supplies the Tag with enough power to respond to the reader without necessarily being visible to the eye. This allows the Tag to be hidden for security or aesthetic purposes. Art Galleries welcome this option as



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they manage expensive pieces of art that are continually being identified and tracked where a visible Bar Code or Tag would detract from the work of art.

- Scan-Free operations - walk around the room and collect real-time data without picking up a pen.
- Various RFID Tags operate at varying frequencies - this allows for short range or long range scanning options.
- RFID Tags and Asset Stock Takes can also show reduced operational costs and increased profits in the areas of:
 - Reduced shrinkage
 - Reduction in labour expenses for tracking
 - Reduction and identification of theft.
- Good news for ATT users - the RFID Asset Tracking solution is almost as good as “Plug and Play” technology - meaning that changes to IT infrastructure are not required.

Considerations

Most of the considerations in regard to the use of RFID technologies are redundant when it comes to Fixed Asset Tracking. In fact, Fixed Asset Tracking is one of the few uses for RFID that is practical in almost every way.

In the points below we describe some of the scenarios where consideration may need to be given to the use of RFID in Fixed Asset Tracking.

- Interference may occur from nearby objects, in particular various metals or liquids have been identified as problem areas, however the extent of the interference is not well documented.
- Speed at which Readers may move past Tags - what if I miss scanning an Asset? How do I know?
- Price of Tags compared to Fixed Assets - a combination of Bar Codes and RFID Tags is recommended in many situations and ATT from TIG International is designed to handle both types of tracking simultaneously.
 - The type and number of Tags required will be a factor in price
 - As the market embraces RFID technologies the costs involved should naturally head downwards. It is unknown what realistic prices will be.
- Lack of RFID standards and compliance - both locally and globally. However Asset Tracking and RFID only requires a unique identifier and there are standards that deal with type of Tag.



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- In regard to Asset Tracking and the use of RFID, changes to work and labour practices should be minimal under normal circumstances. Within secure environments higher levels of security may need to be addressed.
- Privacy and Security issues may arise dependant on the use of the RFID technology.
 - Privacy issues are most likely to affect retail use of RFID technologies rather than become an Asset Tracking issue. However it is important to keep in mind that Read Only Tags that contain data may be read by anyone with a corresponding reader and the situation is the same for Read-Write Tags however these are even more vulnerable as the Tags have the ability for someone to write new data to them.
 - Where company sensitive information is stored in an RFID Tag, security may become an issue. A simple way of avoiding this issue is to retain all company sensitive data in a database and using RFID only for storing a unique ID number.
 - When sensitive information is deemed to be necessary to store on a Tag, encryption of the data is the likely solution.