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# RFID TRACKING FOR MILITARY IT ASSETS

By Peter Collins, North Atlantic Chapter



In the 21st Century we have seen an explosion in the growth of computers and digital equipment. We are living in the Information Age, and the effects can be seen across almost every aspect of our modern cultures, organizations and enterprises. The proliferation of computers and electronic communication devices in the past ten years has forever changed our expectations for how we communicate and how we gather information.

The US military has tried its best to fully embrace the Information Age. The modern warfighter now has an array of digital communication tools and equipment available to them from smartphones, tablets and laptops to night vision goggles and navigation equipment. The modern soldiers are supported by their command and control centers that have an even larger amount of fixed and portable digital tools and equipment at their disposal.

The development of these digital communications, navigation and information systems have been instrumental to the success of the modern US military. It seems likely that in the future there will only be more reliance on this kind of information technology (IT) equipment. The military, along with the rest of our modern society, is committed to utilizing computers, mobile devices and other IT assets that will give them the tools to do their jobs better and faster.

## LOGISTICAL CHALLENGES

Of course, the downside is that all of this IT equipment comes at a cost. IT assets obviously incur an upfront cost that will hit the budgets; but even more importantly are the ongoing logistical costs. Congress mandates that the Department of Defense (DoD) maintain accountability on each and every asset in their possession. Tracking the location and movement of all computer equipment in any one of the military branches, let alone the entire armed services and the organizations that serve them, is a massive undertaking.

To further compound and complicate this issue, many of these computers and IT assets contain highly sensitive data and require storage in secure areas. Often this same digital equipment needs to be mission-ready -- which includes being fully charged, operable, compatible and in a portable storage container for transport and ready to go at a moment's notice. Maintaining frequent and regular accountability of the data and the storage devices, along with managing the location and the readiness of this equipment, is a major security issue along with being a formidable logistical challenge.

Many of the IT systems that the military uses rely on interoperability and thus there are computers with very specific

configurations that are set to integrate with other devices. This level of system integration can complicate the process and increase the amount of labor required to perform an inventory.

Digital assets are often embedded in larger assemblies, and many times end up being very difficult to access. Unfortunately, even though they are a component or a subcomponent of a larger system, we still need to account for them. There is also a concern, in some circles, for authenticating the integrity of the hardware and to prevent the infiltration of counterfeit computer components into the supply chain.

The DoD has an enormous number of computers and digital equipment for which they are required to maintain accountability. Performing manual inventories on equipment at this scale of magnitude is difficult, time consuming and risky. Recording serial numbers with a clipboard or even with a spreadsheet is error-prone and very labor intensive. Add to this, the challenge that some of the assets needing accountability are embedded in a larger assembly or are in a storage container that requires opening -- make a challenging process even more difficult. In short, using a manual method to track IT assets is asking for trouble.

The US military does not have the luxury to perform manual inventories on their digital equipment -- there are just too many items and not enough time. An organization that is the size of the DoD must automate its IT asset management process in order to maintain accountability, track each individual asset and fulfill the required annual audits.

#### **THE KILLER APP FOR THE MILITARY -- RADIO FREQUENCY IDENTIFICATION (RFID) ASSET TRACKING**

The two most common automatic-identification asset tracking systems currently in place utilize either barcodes or the use of RFID technology. Barcodes have been accepted as an asset tracking best practice for many years and organizations around the world, including the US military, have relied upon its effectiveness. RFID has also been around for many years, but more recently began gaining greater acceptance and adoption as the technology's costs reduced and the performance improved. Both systems have their strengths and weaknesses.

One of the inherent elements of a barcode tracking system is that you're working with assets one at a time. When performing a physical inventory each item is scanned individually using a barcode reader. This means that each barcode on each item must be physically located and accessible -- even if the items are hidden in a container or embedded in an assembly. For better or for worse, barcode technology relies on a line-of-sight between the scanner and the individual barcode identifier (ID) or the Item Unique Identification (IUID), as it is referred to in the US military.

While RFID also accounts for each individual asset, assets can be scanned at a much faster pace, as the scanner does not need a line of sight to the unique ID. An RFID system, doesn't require the need to "touch" each item individually, so high volumes of assets can be rapidly scanned within minutes.

**"IN A WELL-DESIGNED SCENARIO, ALONG WITH PROPER IMPLEMENTATION RFID HAS THE POTENTIAL TO PROVIDE INSTANT ACCOUNTABILITY WITH THE PULL OF A TRIGGER."**

Let's say you were attempting to take an inventory of a command center that contained multiple rooms of computers and digital equipment. Using a barcode system for this would require you to locate every barcode on every piece of digital equipment. The barcode process would require that you methodically go through each room in the command center and handle each unique item so that the barcode reader has a direct "line of sight" with each individual barcode. If that same command center was utilizing an RFID tracking system the employee could have accounted for the inventory in a matter of minutes.

This advantage becomes even more important when you are trying to account for embedded items, hidden tags or hard to reach items. This is when an RFID system can save an organization an enormous amount of time and labor. Another additional benefit of RFID comes into play when looking for lost items, such as those items listed on a variance report when reconciling against the expected inventory. An RFID system will display all of the RFID tags in a particular area - whether you expect to see them there or not - often uncovering items that have gone missing.

RFID Systems can also manage and monitor configuration controls. Using RFID, the configuration of an embedded component in a digital asset can be checked against the expected configuration without having to physically touch or open any of the assembly.

RFID can also improve inventory accuracy by adding a higher level of detailed asset tracking information. Because RFID has the ability to capture asset information so rapidly, systems can be put into place to record more detailed and frequent information. Because RFID allows for faster data sharing and decreases data processing time, performing an inventory is more efficient and easier to share.

**"WHILE BARCODE TRACKING CAN GENERATE A 10:1 RETURN ON LABOR, RFID TRACKING CAN GENERATE UP TO A 30:1 RETURN WHEN TRACKING IT ASSETS OVER A MANUAL CLIPBOARD AND PAPER PROCESS."**

There are common situations in the military where inventory needs to be accounted for on a regular basis. Of course, there are the required annual and semi-annual inventories, but there are also specific assets that must be accounted for on a daily basis or at every shift change. In certain situations, such as a secure IT data center, there is a desire for real-time accountability.

By utilizing RFID portals or "choke points" where all items are required to pass through a portal window, mounted readers and antennas can capture items as they enter or return through this gateway. This kind of a "lock-down" scenario records the movement and location of items as they move in and out of a secure area, creates a very valuable audit trail, and allows for a much faster and more efficient process to account for the inventory that is on-hand. In a well-designed scenario, along with proper implementation, RFID has the potential to provide instant accountability with the pull of a trigger.



## RFID TAG APPLICATION

An RFID system is only as good as the ability to obtain consistent, high quality readings from RFID tags. There are a number of considerations and decisions to make as you prepare for the application of your RFID tags. Here are a few of the most important ones to consider to get you started.

### Active vs. Passive

There are many types of tags, but at the most basic level, RFID tags can be put into two major categories -- Active and Passive.

- Active RFID tags contain an internal power source (a battery) that runs the radio frequency (RF) microchip circuitry and is used to broadcast a signal to a RFID reader or scanner. By design, an Active tag is always "on" or transmitting at a set cadence and looking for a reader's signal.
- In contrast, a Passive RFID tag has no internal power source and relies on the reader to power up and scan the tag. The Passive RF reader sends out electromagnetic waves that induce a current in the tag's antenna that is then broadcast back to the reader.
- A third category of tag, called the Semi-passive tag, has an improved read-range over passive tags. These semi-passive tags contain a battery but use the power from a reader to communicate.

### Tag Location

There are a few things to consider when determining the location on an item for the RFID tag. Sometimes your options are limited, but assuming that you have a choice, you will want to choose the location with the least chance of damage. If possible, choose a location where the tag will be protected during transport. Avoid the exterior of a crate or a container, as the tag could be crushed, knocked off the asset and potentially prevent the crate from stacking flush.

### Affixing the Tag

Properly attaching an RFID tag to the asset is an important process and one that requires accuracy and precision. Fortunately, there are RFID tags that are appropriate for virtually any asset surface; but make no mistake, using the wrong tag on the wrong surface can affect the read rate and significantly limit your effectiveness. There are many different options including different types of adhesives, mechanical fasteners and embedded tags. Some of the key questions to ask before determining the appropriate options are: the footprint size of the tag, the surface of the asset, the expected duration of time and the expected environmental conditions during that lifetime. All of these factors need to be considered in your planning.

### Tag Types

If you expect that your tags will be seeing some level of impact, consider field hardened tags that incorporate a hard shell for protection. On the other hand, if you're tagging IT assets that are never going to leave the office environment you can avoid the ruggedized versions and use something more standard. This is more cost efficient and will reduce the footprint of the tag on the asset. There are also a host of specialty tags designed for high temperature and pressure environments that can withstand extreme conditions. This is all to say that you need to evaluate the environment of the asset - for its entire lifecycle -- so that you can select the appropriate asset tag.

Most RFID tags do not require line of sight, but the environment in which the asset resides could impact the read range. If there is a large amount of metal or water in the surrounding area this can affect your read range and may require specific tags designed for non-traditional areas. Also consider that some RFID labels have human-readable components to them and therefore the location will need to allow for a worker to access and read the tag throughout the lifecycle of that asset.

It is an accepted RFID industry best practice to attach your tag after you have completed the association process and after you have verified that the tag is operating properly. You will need to think carefully through the entire process of assigning a tag to an asset pedigree and properly recording that data to your master database.

## MANAGING YOUR DATA

One of the cornerstones of the U.S. military's auto-ID policy is the mandatory reporting to a centralized master database for all DoD properties. Every branch of the military and the contractors that support them are required to report their unique asset data to the IUID Registry and the Invoicing, Receipt, Acceptance and Property Transfer (iRAPT) process. This kind of complex reporting requires modern, flexible, cloud-based asset-tracking software that can utilize barcode or RFID capabilities and share data with these government systems to manage all of the asset information.

Utilizing a modern, cloud-based asset tracking software will provide a flexible yet robust platform from which you can manage all of your asset information. Make sure that you find a system that provides accessibility in the secure cloud to any device (e.g. desktop computer, smartphone, tablet...). This kind of flexibility will allow management of the data across multiple locations so that the entire team can have access to the needed information. Be careful to find a system that meets the organization's unique demands for cycle counting and inventory tracking...making sure that you are able to precisely track the location, custody and condition of your assets anywhere and at any time.

RFID tags coupled with a robust asset tracking software allows you manage assets as they move around a facility, or are transported between buildings, locations, or around the globe. The US military should take an aggressive approach to further leverage RFID technology in order to automate their IT asset management capabilities. RFID technology provides improved visibility, improved accuracy, and maintains a higher level of accountability of each unique asset in order to comply with mandated audits.

### ABOUT THE AUTHOR:

**Peter Collins**, A2B Tracking President and CEO, has worked with many industries, including the Department of Defense, on Auto ID policy development and implementation. He has played a key role as a consultant to the DoD in the department's effort to adopt the use of IUID technology in 2004. He received the ID Global Leadership Award in 2009 for his role in worldwide adoption of IUID, and is an active participant in IUID industry trade associations.