The Initiative

The DoD, which is larger than most of the world’s businesses, has an annual budget of almost US$343 billion with logistics accounting for nearly one third of that budget. DoD vendors total around 43,000 companies, which employ nearly 1.4 million personnel. The challenge facing the government to accurately manage inventory on that huge scale and its need to supply far-flung locations is immense. The government has a critical need to have accurate inventory reporting and visibility capability to (1) know the quantity, location, condition, and value of assets it owns, (2) safeguard its assets from physical deterioration, theft, loss, or mismanagement, (3) prevent unnecessary storage and maintenance costs or purchase of assets already on hand, and (4) determine the full costs of government programs that use these assets.

In 2004, the Office of the Under Secretary of Defense (Supply Chain Integration) made an initiative to improve customer confidence in the ability of the DoD to provide a cost effective and hands-free data capture method for integrated end-to-end supply chain management. Simply put, barcodes were to be replaced with inexpensive passive RFID tags in order to streamline inventory and logistics by eliminating not only manual labor, but also human error from logistics processes.

The following whitepaper is a summary of applications where the DoD has employed passive RFID to solve business problems that are common to all global, large enterprises. Even smaller businesses can learn from the DoD since there is such a diversity of areas where the DoD has led the way.
Applications in the DoD

Kathy Smith, special assistant for end-to-end customer support for the DoD, described strategy for the DoD to improve accountability, as follows, “The goal is to implement what we call knowledge enabled logistics...We will use mature and emerging RFID technologies to optimize the supply chain” and “leverage these technologies as well as our automated information systems to automate routine functions and to give us more accurate and timely in-transit visibility and in-storage asset visibility with the least possible human intervention”. (1) The following report will center on three central RFID applications: Security, Supply Chain Management and Asset Tracking.

Security

Keeping track of laptop computers is the largest and most difficult task at hand. With sensitive information contained with each laptop, not to mention the sheer number of laptops in circulation, potential loss can be not only costly but also a serious risk to national security.

With web based management software, RFID tagged laptops may be monitored via doorway portals for current and “last known” locations, anywhere in the world. In addition, contractors and authorized non-DoD personnel may be granted instant access to asset data (including transfer documentation and inspection history) ensuring real-time and accurate data.

Supply Chain

Real-time inventory of items in warehouses and distribution centers is handled by automated registration of all assets and real-time access to current inventory levels and locations through enterprise management software. Like civilian supply chain applications with RFID, this helps improve asset visibility and efficiency of moving the correct assets out to requestors minimizing errors of lost and incorrect shipments, in addition to ensuring timely and correct shipment.
The Department of Defense (DoD) Directive 8320.03, created the standards for Unique Identification (UID) on items purchased or leased with value greater than $5,000. The UID standard is implemented across the entire DoD ecosystem, including contractors and contractor facilities. Most UHF EPC Gen2 RFID tags, enable a unique identifier that complies with the DoD standard. However, the standard does not mandate the use of RFID.

EPC Global has in addition approved a DOD specific EPC structure, DOD-96, which consists of an 8-bit header, 4-bit Filter, 48-bit DOD specific sequence and a 36-bit serial number. This ID format leverages the long-standing Commercial and Government Entity (CAGE) coding scheme, easing the implementation for both the DoD and their suppliers.

Asset Management

The U.S. military uses mobile RFID readers connected via Wi-Fi to a location’s logistics database allowing them to identify, track in real-time and effectively manage their asset inventory. Base commanders, are personally financially liable for all missing and un-accounted-for assets when a full inventory is executed, are able to track their deliveries, current inventory level and also order critical parts for timely delivery to battle fronts.

Base commanders are equally liable financially for assets even if they are decommissioned test equipment, computers and other misc. items. When an annual inventory is done each year, almost 3 months is taken taking physical inventory of all assets. At the end of 3 months, only then does a commander know if any assets are missing.

That is when the search begins. By installing perimeter and doorway “choke points”, the last known location of tagged assets is now available on demand. With instantaneous inventory, a commander can search for a specific series or individual asset and know its last known location. In this instance, they know where to start looking versus being caught off guard and not knowing where to begin.
Stepping outside of the conventional RFID box, the Army in 2008 spent $1.18 million on developing RFID-based tracking of the number of mortars fired from tank guns. Current method for war fighters is to count each by hand with regards to predictive maintenance of the gun. For example, after a certain number of rounds, the gun will require service.

With the RFID implementation, each mortar, tagged with rugged read-on-metal passive UHF RFID tags. Provides a signal when each round is fired. The force from the blast triggers a piezoelectric sensor connected to one of the RFID interrogator’s GPIO input ports. Each time a particular mortar is fired, a counter is incremented in the mortar’s tag memory. Thus when the mortar is returned to the weapons depot for reconditioning, the number of times it has been fired is retrieved. Tracking the mortar history provides maintenance accurate information to determine whether the mortar is within tolerance for further use or whether it should be decommissioned.

Embed-In-Metal Technology For DoD

A great portion of the military’s assets are metal, therefore the ability to embed-in-metals simplifies the asset tracking by leaps and bounds. Vendors can embed the RFID transponder during manufacturing and enable quality data, ensure preventative maintenance tracking, and authenticate their products. By embedding the RFID tag the risk of a tag being knocked off, tampered with, or damaged is reduced.

One common roadblock to implementing RFID is the proximity of and working with metallic assets. Well known in the military industry, RFID and metal have an often checkered past. The passive RFID tag’s unreliable performance on metal has required DoD to use expensive, active (battery-powered) RFID technology to track metal items.

For example, the government has long mandated tracking weapons. The military has previously tested with a battery-operated technology, using magnetic waves versus radio waves, to track guns. The magnetic technology is severely limited by
slow read rates and the fact that only one weapon may be read at any given time. In addition, the weapon tracking would only last as long as the battery. Weapon tracking can easily be solved using today’s embed-in-metal RFID technology. The Xeraf Nano^x tag can be embedded into the grip of a weapon and uniquely identify the gun for its lifetime.

XERAFY’S read-on-metal EPC Class 1 Gen2 technology has emerged to provide the military a cost effective solution for tracking metal items that is rugged to meet the extreme environments and last the lifetime of the asset.

About XERAFY

XERAFY is committed to bringing our customers the world’s smallest and most reliable passive UHF RFID-On-Metal (ROM) and iN metal tags that are qualified and tested to meet extreme conditions over the lifetime of the asset. XERAFY’s innovative technology offers the Industrial, Manufacturing, Defense, IT, and Supply Chain markets, an affordable, durable, high temperature smart tag that can be easily attached to or embedded to metal assets. XERAFY enables packaging solutions for automatic check-in / check-out tools, Work In Progress, IT auditing, product authentication and asset management with a competitive advantage in size, cost, design, quality, and performance of tags. XERAFY is headquartered in Hong Kong, and maintains sales & support offices in Dallas, Texas, Washington D.C. and in Shanghai, China.

For more information and samples please contact XERAFY at www.XERAFY.com

References:

- American City and County, “RFID At the DoD”, Dec. 1, 2004