RFID: The Future is Now

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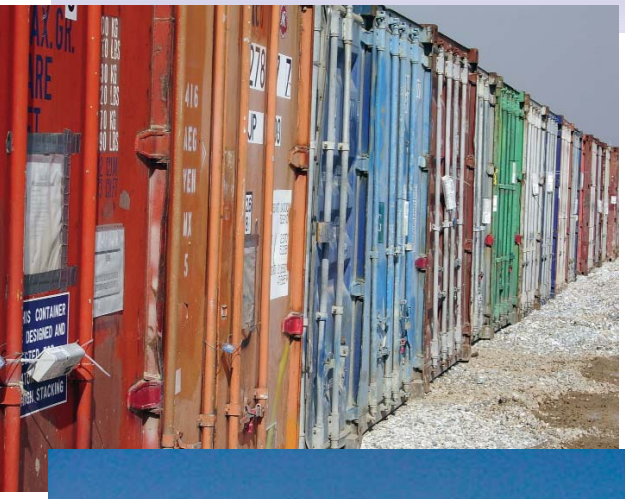

Transformation and RFID

Joint Vision 2020 (JV 2020) describes a future military capability based upon speed, precision, lethality, and information dominance. JV 2020 identifies "Focused Logistics" as a critical requirement to project and sustain forces. It emphasizes the development of common technologies and processes to further advance the power of the joint warfighter and it challenges both the warfighter community and the Defense Business Mission Area to develop innovative organizational structures and processes to dramatically improve the end-to-end management of the business mission area to support the joint force commander's priorities. Our answer to the challenge of JV2020 will dramatically change the way America fields weapons systems, supplies troops, projects power, and wins wars. The DoD vision for logistics states, "the joint logistics process will be a highly efficient, integrated system that ensures required support to the warfighter."

A key element of logistics transformation in support of the joint warfighter is asset visibility. According to the 2006 Quadrennial Defense Review, "Radio Frequency Identification (RFID) will play a key role in achieving the Department's vision for implementing knowledge-enabled logistics support to the warfighter ..." RFID, and asset visibility, are key pieces of a strategy to provide Combatant Commanders (COCOMs) with the ability to exercise discretionary authority over logistics in real time.

Application of RFID within the United States military began in the early 1990s with active RFID technologies. More contemporary developments in RFID have allowed the implementation of passive RFID approaches, while the use and implementation of active RFID continues.

RFID Demystified

RFID is a form of Automatic Identification Technology (AIT) which is "a suite of tools for facilitating total asset visibility (TAV) source data capture and transfer. AIT includes a variety of devices, such as bar codes, magnetic strips, optical memory cards, and radio frequency tags for marking or "tagging" individual items, multi-packs, equipment, air pallets, or containers, along with the hardware and software required to create the devices, read the information on them, and integrate that information with other logistic information. AIT integration with logistics information systems is key to the Department of Defense's TAV efforts."

Active RFID tags can hold relatively large amounts of data, are continuously powered, and are normally used when a longer tag read distance is desired (up to a few hundred feet). This technology provides military logisticians with the ability to

Top Photos: Hundreds of fixed and mobile RFID interrogators located at military bases, commercial vendors, worldwide sea and aerial ports, highways and rail lines send date/time stamp location updates to DoD's ITV Server as active RFID tags pass by, giving consignees and consignors in-transit visibility of requisitions as they flow through the transportation network. (USAF Photo)

identify and locate material while in motion or at rest, without operator involvement, as tags are automatically "read" by interrogators positioned throughout the supply chain. The interrogators pass tag information to a central repository where it can be accessed by users anywhere, anytime.

A Soldier in Iraq displays handheld RFID interrogator used to track shipments to the "last tactical mile." (USMC Photo)

Passive RFID tags contain less information than active tags and have a much shorter range because they generate only a low-level RF signal. Typical read distances range up to 10 feet, and in ideal circumstances may range as high as 20 – 30 feet.

RFID has a myriad of applications. Toll tags, badges, hotel room keys, and gas payment "speed pass" devices are but a few examples of how we already use RFID in our daily lives. Commercial innovators have demonstrated the power of widespread implementation of RFID to enhance business efficiencies. At Wal-Mart, researchers at the University of Arkansas found a 16 percent reduction in out-of-stocks at stores fully instrumented with passive RFID. Additionally, the study also showed that out-of-stock items with passive RFID tags were replenished three times faster than comparable items using standard bar code technology. Equally important, Wal-Mart experienced a meaningful reduction in manual orders resulting in a reduction of excess inventory. And, although the University of Arkansas study focused on the benefits to Wal-Mart, a cascade of benefits has also been reported in the press for suppliers who are participating in the program.

RFID—A Tool for "Sandbox Logistics"

Active RFID is already field proven. It has been deployed operationally in Kosovo, Ethiopia, Haiti, and Iraq, to name some highly visible examples. Passive RFID, on the other hand, is recently emergent and has not yet been widely used in a forward deployed location. Following is a synopsis of some of the ongoing initiatives within DoD to integrate RFID, both active and passive, into operations. "Sandbox Logistics" will never be the same.

The Army and RFID

The Army led DoD in the application of active RFID beginning with its use to gain asset visibility during operations in Somalia, Haiti and Bosnia in the early to mid-1990s. It has made widespread use of the technology to maintain asset visibility during Operations ENDURING FREEDOM (OEF) and IRAQI FREEDOM (OIF). Results speak for themselves.

"The Joint Distribution Center here in Balad, Iraq is a logistics hub for the entire country. Many trucks, packages, containers, pallets, etc. pass through the JDC each day. Many of them are tagged, some are not. Gary and Charles work hard to get tags on everything. Charles also walks the yard twice a day and rescans the inventory. Two days ago, I was contacted by a fellow Logistics Assistance Representative (LAR) in Baghdad. A modem cable for a communications system was shipped from Germany on 21 March with RF tag 761075. It was now 10 April, and the part hadn't arrived. ITV said the last location was the JDC yard. After some research, we found the part buried in a tri-wall container . . . I was able to pull the box, and mail it to the unit.

A couple of weeks ago, an engineer unit in Baghdad was looking for a Tool Outfit, Hydraulic System Test and Repair Unit (HSTRU) that had been shipped from the U.S. The 3rd COSCOM Logistics Management Specialist was able to obtain the RF tag number (4448109) of the shipment. After entering the tag number into the In-Transit Visibility (ITV) system, I was able to determine that the equipment had been at the Air Force Cargo Facility on Balad since 12 February. We went to the facility, where we located the equipment, and transported it back to our office, where it was held until the unit picked up the equipment that afternoon.

A medical unit in Baghdad had shipped 4 containers of excess medical equipment to the ... DRMO here in Balad. Shipment had been en route for over 2 weeks, and the unit was trying to find it. Once the unit provided the RF Tag numbers to the DRMO, ITV told me that the containers were at the JDC yard. I went to the JDC and located the 4

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containers in the Misrouted Cargo Holding area. The containers were delivered to the DRMO the next day." (Email from Emmett Wayne CECOM STAMIS LAR CAMP ANACONDA, IRAQ, April 11, 2006.)

Airman collects shipping information from an active RFID on an air pallet in Kuwait. (USAF Photo)

The Marine Corps and RFID

Marines of the Marine Logistics Group (MLG) are using in-transit visibility in a process that not only speeds up delivery but also allows service members to track shipments of supplies from the vendor to the individual Marine. They are using the tools at hand to create situational awareness, promote visibility, and allow on-the-ground commanders to use a decision support enabler to exercise discretionary authority over logistics.

The tracking system has two main elements. The first element is RFID tags, which are individually applied to shipments. The second is a satellite device on the transport vehicles, which is then logically tied to each RFID tag. Spiral 1 of the implementation has made use of active RFID, but spiral 2 is envisioned to replace the costly active tags with passive tags. By tracking the satellite transponder, Marines are able to track shipments as they move in an austere environment without reliance on fixed RFID reader locations.

"It is easy, the warfighter, can place an order from the field, and we just pull the items from our shelves and deliver them," said Major Michael Lepson, officer in charge Marine Air Ground Task Force Distribution Center, Combat Logistics Regiment 25. "The customer can then track the requested item from the time it is palletized until it reaches him."

The data captured through RFID is fed into the joint-approved interim Logistics Common Operating Picture (LCOP), known as the Battle Command Sustainment Support System (BCS3). BCS3 takes feeds from many national level logistics systems and servers (e.g., RF-ITV server, Asset Visibility (AV), global transportation network, worldwide port system, joint operation planning and execution system, etc.) and displays that information on National Imagery and Mapping Agency mapping and imagery products. BCS3 produces actionable logistics information related to ITV, supply point status, logistics-related commander's critical information requirements, logistics course of action analysis, and projection of combat power, in addition to vital position location of distribution assets. By marrying the position location of BCS3 to the content level detail of the Marine Corps "warehouse to warfighter" RFID implementation, 2d FSSG has achieved factory-to-foxhole LTM visibility of the entire distribution process and can share that visibility across the Marine Air Ground Task Force (MAGTF). The end results have been spectacular. The Marines have reduced inventory in Iraq $127M to $70M, reduced wait time from 28 to 16 days, increased theater fill rate from 77% to 89%, and reduced retail backlog from 92,000 to 11,000 orders.

The Navy and RFID

The Navy has made significant strides in advancing OSD's RFID Policy by integrating passive RFID into its supply chain processes. Beginning in late 2003, the Navy made use of passive RFID to control consolidation, validate container contents, and ultimately generate manifests for materiel bound for Iraq and other forward deployed locations passing through the United States Navy Ocean Terminal, Norfolk, VA. And at Al Asad, located in northern Iraq approximately 180 kilometers West of Baghdad, the Navy successfully implemented passive RFID, both read and write. In conjunction with Defense Distribution Center – Norfolk, Al Asad, and the Advanced Traceablity and Control (ATAC) Hub at the Fleet and Industrial Supply Center (FISC) Norfolk, passive RFID is being used to retrograde track the movement of repairables.

The Navy began another demonstration of passive RFID ashore at Trident Refit Facility (TRF) Bangor, WA on 16 March 2006. The successful "Go Live" of the Bangor RFID Evaluation (BRE) put into production the simultaneous integration of business process reengineering (BPR), SAP warehouse management functionality, and passive RFID tag read

capability; and accelerated the delivery of Navy's ERP warehouse management solution.

Navy's first demonstration of passive RFID afloat occurred in July 2005 onboard USS NASSAU (LHA-4) in Norfolk, VA. The successful completion of the "Value Chain" initiative showed that passive RFID tags written to line items shipped from the Defense Depot Susquehanna, PA, and the Defense Depot Norfolk, VA, could be successfully read and "forwarded" via Advance Shipping Notices through the supply chain to the ultimate consignee, USS NASSAU (LHA-4). Onboard the ship, passive RFID portable portals and Smart Tables were used to read the tagged material when it physically came aboard ship, automating the receipt process and synchronizing receipts with the shipboard supply system, R-Supply. Through the efficiencies gained in the Value Chain process, the Navy estimated that significant amounts of "sailor labor" could be redirected to other tasks aboard ship. The Navy is currently developing plans to expand the Value Chain capabilities to other fleet units, outfitting the largest ships first.

The Air Force and RFID

The Air Force already makes use of RFID in a number of its processes. One example is the "Real Time Locator System," used for tracking gyros through a repair operation at Warner Robbins. Another is the active RFID tagging capability Air Mobility Command has established at CONUS and OCONUS aerial ports to support CENTCOM asset visibility requirements for OEF and OIF. The Air Force is also actively engaged in the "Alaska Project," the most joint implementation of passive RFID to date. The Alaska Project began in 2005 and is an implementation of RFID designed to support the end-to-end integrated supply chain by implementing passive technologies in conjunction with active RFID to ship, track, and receive multi-modal (land, air, and sea) shipments. The project is headed by the Defense Logistics Agency in conjunction with the United States Transportation Command, and includes key distribution nodes and supply points on the West Coast and in Alaska belonging to several Service Components. It builds on earlier experiences in the implementation of RFID and steps up to the challenge of implementing RFID from a Joint Enterprise Capability perspective.

Alaska Project Participants

- DLA's Defense Distribution Center San Joaquin, CA (DDJC)
- USTRANSCOM (AMC) at Travis AFB, CA
- PACOM and the 11th Air Force at Elmendorf AFB, AK
- PACOM and the Alaska Command at the Army's Fort Richardson, AK
- Army and the Stryker Brigade Combat Team at Fort Lewis, WA
- The Port of Tacoma, Washington
- The Port of Anchorage, Alaska

The objective of the Alaska Project is to drive RFID implementation though the integration of passive and active technologies, demonstrate the capabilities of RFID to enhance materiel visibility across the supply chain, implement the DoD data architecture related to RFID using standard DoD information systems, identify logistics business process changes needed to take full advantage of the technology and resultant visibility, and ultimately, reduce customer wait time, improve delivery reliability, and improve inventory management processes to increase readiness. While it is too soon to report results, work completed to date has demonstrated the value of working in a complex environment that is a representative microcosm of the end-to-end supply chain. The Alaska Project is confronting the challenge of creating net centric logistics in a Joint Environment.

Imagine the Future

The U.S. military has overwhelming flexibility and dominance in the combat force; it is developing comparable capabilities in logistics. Logisticians are developing the ability to match the warfighter's speed, flexibility, and responsiveness with seamless and agile logistics, expanding on the initial successes of RFID to create true end-to-end visibility. RFID offers us the opportunity to control the supply chain from factory to foxhole in order to deliver the right item to the right place at the right time in support of today's swarming, net-centric combat force, even in the face of rapidly evolving and adverse conditions.

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