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[Bridging the Gap]

RFID Beyond Defense

Agencies across government begin to realize the potential of RFID in harnessing the power of the supply chain.

By Karen D. Schwartz

From its roots in the commercial sector to its penetration into the Defense Department, radio frequency identification has been a revolutionary technology for tracking assets throughout the supply chain. Within the last year or two, civilian agencies have begun realizing the value of RFID. These systems, relying on tags and readers, can help agencies comply with government mandates to track equipment, while offering unparalleled security.

"There are many agencies that have either reported use or planned use of RFID," says Gregory C. Wilshusen, director for information security issues at the Government Accountability Office. The Labor Department, for example, uses RFID to track and locate case files, the State Department for electronic passports, the Transportation Department for electronic screening and the Treasury Department for records management, as well as for physical and logical access control.

"During the past 18 months, we've really seen more activity regarding RFID," notes Greg Clawson, director of business development and channel partners for Symbol of Holtsville, N.Y., a manufacturer of passive RFID tags.



RFID offers a way for Dryden Flight Research Center to track chemicals with fewer resources while upholding existing business processes, NASA's Ralph Anton says.

Although security is perhaps the first frontier for RFID in many agencies, Clawson says asset tracking presents the most opportunities, for everything from monitoring IT equipment to following baggage flow. There are three main reasons why civilian agencies are starting to adopt RFID: asset tracking, security and supply chain management.

NASA's ChemSecure program at Dryden Flight Research Center at Edwards Air Force Base, Calif., uses RFID for all three. The program uses a wireless sensor system for monitoring hazardous materials.

Where Is It?

NASA worked with DOD to develop the system, in part to build on Defense's experience with the technology and to ensure that ChemSecure dovetailed with DOD's Hazardous Material Management System, which the space agency uses to track hazardous chemicals, says NASA environmental protection specialist Ralph Anton.

The system, built on components from Intermecc Technologies and Oracle, relies on RFID tags affixed to all containers carrying hazardous materials. The tags, which remain affixed to the containers, let NASA track the containers along the entire inventory path.

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Fact

UNBREACHED: In a decade, no identity thefts have occurred via RFID technologies.

— *Progress and Freedom Foundation*

The ChemSecure system monitors key indicators that provide details about the state of chemicals via the RFID tags. In case of hazardous material spills or any other changes to the inventory, such as temperature, pressure or weight, the system notifies first responders, such as local police and emergency HAZMAT units, via cell phones, and dispatch-center networks and notebook computers in response vehicles.

RFID was an ideal solution for many reasons, Anton says.

“Right after the 9/11 attacks, when we were developing ChemSecure, government was downsizing in a lot of areas, and we were concerned that the way we had tracked chemicals in the past took too many people and too much time and energy,” he says. “We had to find a way to track those chemicals with fewer resources and figure out a way to uphold our existing business processes and maintain the high level of management systems we have in place — while turning it into a more autonomous system.”

Although NASA has yet to perform a formal return on investment analysis, “it all begins and ends with public safety,” says Vincent Kinsey, a senior information systems manager with Integrated Science Solutions of Walnut Creek, Calif., who is helping NASA with the project.

“Just knowing there is the presence of chemicals in a particular building means we can pretty much lock down people from getting too close or getting exposed to those chemicals,” he says.

Other benefits include real-time, end-to-end visibility, protection and security for all transactions captured via RFID tracking, and strong audit capabilities.

Overcoming Hurdles

Of course, the project encountered challenges along the way. Because NASA’s environment at Dryden includes many other RF-enabled systems, such as those for aircraft on the base, developers had to make sure that the system not only matched NASA guidelines for RFID frequencies, but DOD and Air Force guidelines as well.

Another challenge was developing a system that could communicate with any number of technologies that first responders might use to communicate with the RFID tags. “We worked with the lowest common denominator — the device they had on hand — and looked at ways to provide the information on our systems to the field in a secure fashion,” Kinsey says.

Although RFID has become an important part of NASA’s ChemSecure program, it could become even more useful as the cost of tags and readers decreases — something industry analysts predict will happen over the next several years.

“If we are trying to protect a chemical from a thief or terrorist and there is a noticeable tag on the container, it acts as a deterrent,” Kinsey says. “We’re looking for industry to start producing containers with integrated RF technology either on the container itself or through some other packaging mechanism.”

Online Exclusive

The project has attracted interest among other agencies that must track hazardous waste, and NASA has filed for a U.S. patent for its system for monitoring high-value assets.

Other agencies have expressed interest. During Phase II of the project, the Environmental Protection Agency has signed on, and the two agencies are working on an RFID system to track chemicals entering from other countries. According to a 2006 EPA study, RFID will enable accurate, timely notification of when hazardous waste enters the United States and when it reaches a designated treatment storage or disposal facility. The agency also expects it will reduce illegal dumping of hazardous waste along the borders.

The Tags: Three Types

- 1 Passive tag:** no power source; cannot initiate communication with readers; tag responds to RF emissions from the readers at a distance of 10 to 20 feet; relatively inexpensive, with tags starting at 20 cents
- 2 Semipassive tag:** battery-powered; can monitor things such as climate or be connected to sensors to store information; does not actively transmit a signal
- 3 Active tag:** has a power source and a transmitter to send a continuous signal; data on the tag can be written and modified; can communicate up to 750 feet; can cost \$20 or more per tag

RFID Pointers

Dan Caprio, president of the Progress and Freedom Foundation, a think tank that studies the ramifications of IT on policy issues, offers four pointers on implementing RFID systems:

- To justify the potential up-front expense, there has to be an assessment of the security value that using RFID will bring to a program.
- Agencies must consider database access controls for the systems on the back end that amass information to support RFID or gather information from the tags because those will be the targets for security attacks.
- One size does not fit all; agencies must define the process for which they will use RFID and then fit the RFID tools to their needs, especially when it comes to using passive versus active tags.
- Because RFID often raises Big Brother concerns about government, it's incumbent on agencies to explain why it's useful and why they can trust a specific application.

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