

**The Department of Defense's Institute of Heraldry is tracking its archived badges, medals and other insignia with RFID tags, and is using handheld readers to locate them, as well as a fixed portal to alert staff members if an item is removed.**

By Claire Swedberg

Mar. 31, 2010—The [Institute of Heraldry](#), a repository for all of the [U.S. Department of Defense's](#) (DOD) badges, medals and other military insignia, is employing EPC RFID technology to create a more open-door environment for insignia designers.

The institute, which supports the [U.S. Army](#), maintains approximately 15,000 items in its repository in [Fort Belvoir](#), Va. These items are manually indexed in metal drawers within storage cabinets, and the agency uses a database with an Excel spreadsheet to track the locations of specific objects. If someone, such as an illustrator, needs to access a particular insignia—some of which are rare—that individual must make a request, and the item is then retrieved from the repository by the institute's staff.

Prior to the RFID system's implementation, workers would go into the database and look up the drawer, compartment and storage cabinet numbers to determine where a particular item was stored. To confirm that they had the correct insignia, they simply had to examine it, as well as the ID number written on its packaging. The illustrator would then look at the item in an approved area of the building outside the repository. Typically, illustrators examine the insignia, take measurements and photographs, and base the creation of new insignia on those they have examined.

After that process, to actually manufacture the insignia, vendors must use DOD dyes and hubs (metal-forming tools used in the medal-manufacturing process), which are stored in another area at the Heraldry.

The manual system was not working well for the agency, however, says Thomas Casciaro, the chief of the Heraldry's technical and production division. It was time-consuming for staff members to locate items, he explains, and security concerns often kept illustrators and other individuals out of the repository, where they could otherwise be examining the insignia while planning the design of a new version. What's more, certain insignia simply could not be identified or located—or, in some cases, they might have been removed from the repository.

Casciaro went to [National Office Systems](#) (NOS), a Maryland records-management technology firm, for an automated solution. NOS sold the agency a system known as SAM Systematic Asset Management that includes passive EPC Gen 2 RFID tags and labels, as well as handheld RFID and bar-code readers. The company also provided a fixed RFID interrogator and antennas around the repository doorway (to provide an alarm system), bar-coded labels for the drawers, compartments and storage cabinets, software on a stand-alone server and an RFID printer to print the labels. Additionally, NOS provided installation and the initial tagging of the items.

The system was installed in January 2010, after each set of insignia was identified and catalogued (input into the SAM system by description and serial number). In the process of cataloging, some badges were discovered that could not be identified, and were then sent to experts to be examined and properly catalogued.

The badges were then tagged in several ways. In some cases, the insignia are sealed inside a plastic card and are used as "sealed samples," with the plastic card serving to protect against damage from frequent handling. These plastic cards are tagged with an adhesive ultrahigh-frequency (UHF) EPC Gen 2 RFID 4-inch-square label, printed on a [Ricoh GX5050](#) printer. All insignia, whether sealed samples or otherwise, are then placed in clear, zip-locked plastic bags that are also tagged. Frequently, one bag will contain multiple copies of the same insignia. Those tagged sealed samples, along with the tag on the zip-locked bag, are then linked in the SAM system as "parent and child".

The tags attached to the bag are assigned a location—a storage cabinet, as well as a compartment within that cabinet and a drawer within that compartment. Each drawer has a label printed with a bar-coded ID number corresponding with that specific drawer in the SAM back-end system. The system allows for RFID labels at the drawers, Diaz explains, though the Heraldry office requested bar-coded labels in this case, in order to reduce expenses. When an item is put away in the drawer, employees use one of three handheld devices to read the RFID tag on the insignia, and then scan the bar-coded label at the drawer, to associate the insignia with that specific location.

With the new system, Diaz says, the office staff can also identify which drawers (and in which storage cabinets) have free space in them, and can thus assign new insignia to those locations, based on that information.

When staff members seek a specific insignia, they can input the ID number of that item into the software system, and view the ID numbers of the storage cabinet, compartment and drawer in which it can be found. (Each drawer, compartment and storage cabinet has its own ID number, printed in bar-code form on a label attached to it.) That data can also be viewed on the handheld device itself. If the item cannot be found, says J.D. Diaz, NOS' director of professional services, the handheld can be used to read tags at all of the drawers, and will emit an alert when the tag of missing item is interrogated.

At the end of the day, workers plug the readers into the PC with a cable connection, and synchronize with the SAM software. In that way, the software also stores a record indicating which badges had been requested, and when this occurred. While NOS provided the initial tagging, Casciaro says, the Heraldry office is continuing to tag additional items.

The fixed RFID interrogator at the door provides an added layer of security. If the reader, cabled to the back-end system, captures a tag's RFID number—indicating that an insignia is being removed from the room—it emits an audible alert. At that time, Casciaro says, a staff member can move around the building looking for the insignia by using a handheld reader, in case it was, for example, removed inadvertently by an illustrator to another room.

In the future, Casciaro says he intends to also begin tagging hubs and dyes used by vendors for the manufacture of insignia. Tracking all of the 10,000 hubs and dyes sent out to vendors, he says, enables them to monitor their location in the SAM system, as well as track when they are sent out, and to which vendor, by inputting a particular vendor's data after reading the tag on an item. Later, the system could be used to confirm that a vendor had always utilized DOD products when producing insignia. For instance, if the company had manufactured an insignia in previous months or years, but there was no record of that vendor using the DOD hubs or dyes, the office would know that the items were made fraudulently—that is, using unauthorized hubs and dyes.

Casciaro plans to expand the way the Heraldry uses the RFID-enabled SAM system. "We're still learning what can be done with it," he states. Over time, for example, illustrators may be able check out the insignia, with the SAM software providing a record of which personnel take which items. The system can work with RFID-enabled employee ID badges to automatically link an insignia with a specific staff member, Diaz adds, though the Heraldry is not currently utilizing that function, since the insignia are not being removed from the repository.