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U.S. State Dept.'s Security Bureau Checks Out RFID Weapons-Tracking App

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At one of the agency's armories in Virginia, 250 rifles, revolvers and other weaponry items are being fitted with EPC RFID tags, to automatically track their usage by its agents and officers.

By Claire Swedberg

Dec. 2, 2010—The U.S. State Department's law-enforcement and security division, the Bureau of Diplomatic Security (DS), has installed an RFID-based system at an armory within one of its facilities in the Washington, D.C, area. This enables the bureau to store an electronic record of which personnel have taken and returned which weapons, while also automating the checkout process. The RFID system can also issue alerts if an unauthorized event occurs. The system, known as EasyArms, was provided by ODIN, an RFID solutions provider and systems integrator based in Ashburn, Va.

The DS develops and implements security programs to safeguard all personnel working in every U.S. diplomatic mission around the world. In the United States, its agents protect the U.S. Secretary of State and the U.S. Ambassador to the United Nations, as well as visiting foreign dignitaries below the head-of-state level. The bureau stores more than 300 weapons in the armory, a 15-by-20-foot secured room located within one of its buildings. For the initial RFID deployment, the agency is tagging its permanent collection of 250 weapons. Each is being fitted, either covertly or visibly, with an EPC Gen 2 RFID tag provided by Titan, Confidex, Omni-ID or Xerafy.

ODIN's Kevin MacDonald

The new system also includes EPC Gen 2 passive RFID tags carried by officers who check out those weapons, an RFID portal at the doorway, and ODIN's EasyEdge software (installed on the reader) and EasyArms software (residing on the bureau's back-end server). Once the system is determined to be functioning properly, with a 100 percent read rate, the agency—which has declined to comment for this story—will consider installing the system at its other armories.

The armory stores pistols, revolvers, rifles, machine guns and grenade launchers that employees use either in training or while on duty. Upon reporting to the site, officers retrieve the weapons they are authorized to use—typically, about four guns apiece. Each officer utilizes an ID card with a high-frequency (HF) proximity RFID tag, worn on a lanyard around the neck, to unlock the room's only door. Inside that room, the weapons are stored in lockers with combination locks. With the manual checkout method, the officer would select the weapons needed and fill out a sheet of paper indicating his name and ID number, as well as each gun's serial number, make and model.

The problem with the manual method, according to Kevin MacDonald, ODIN's account leader for this deployment, is that it can be time-consuming and inaccurate. An officer must write down all required information, while other employees may be queuing up to do the same. What's more, there is a risk that an officer may fail to record the necessary checkout information. At police armories, MacDonald says, the accuracy rate of weapon tracking can be as low as 50 percent.

By using RFID, the bureau hopes to increase accuracy and thereby ensure that no weapon is ever misplaced, as well as make the checkout process more efficient. At the armory's single entranceway, ODIN installed an RFID portal consisting of one Sirit ultrahigh-frequency (UHF) EPC Gen 2 IN510 RFID interrogator and four antennas mounted around the doorway. Each staff member has an Alien Technology Squiggle passive EPC Gen 2 RFID tag, attached to the same lanyard used for the ID card.

Upon arriving at the armory, an officer must still present his ID card's HF proximity tag to unlock the door. As he enters the room, the Sirit reader captures the unique ID number encoded to the EPC Gen 2 RFID tag attached to his lanyard. The EasyEdge software installed on the reader functions as its operating system, controlling the device, filtering the data read from the tags and sending the resulting information to the EasyArms software, in which the ID is linked to the officer's name and other data. The system then shares that information with the agency's IBM Maximo asset-management solution. On a 42-inch video monitor facing the doorway, the officer sees his name and a listing of any tagged weapons he may be carrying, as well as any that he had checked out during a previous visit. In that way, the individual can immediately see if there is a discrepancy.

The officer can then either return any previously checked-out weaponry to the appropriate lockers, or take out the weapons he plans to use that day. Typically, officers place any chosen weapons into bags designed to transport several guns at a time. Upon leaving the armory, that individual sees another video screen that displays his name, as well as the identity of each tagged weapon read by the interrogator. If he finds a weapon's tag is not being read, or that it is being misread, he can then alert management.

In order for the RFID system to read the tags of all weapons that an officer is carrying, MacDonald says—and not those of guns being carried by another person nearby—all personnel must move through the doorway single-file. If several officers attempt to enter or leave the room simultaneously, the EasyEdge software will detect multiple EPC Gen 2 RFID personnel tags. The system will then issue an alert, including a notification displayed on the monitor, instructing those individuals to back up and approach the portal again, single-file. The Maximo asset-management system can also e-mail an alert to management, who may be located on-site or at another DS location.

If an officer attempts to leave the armory with a weapon he is not authorized to use, or if someone tries to leave with weapons and the system detects no EPC Gen 2 personnel tag for that individual, EasyEdge passes that information to the bureau's Maximo software, which sends an e-mail alert to authorized management. The management team can then act accordingly to determine who took the weapon and, if necessary, to retrieve it. An alert on the armory's exit screen displays the individual's name, as well as any items being removed or returned in violation of the rules.

One of the greatest challenges facing this deployment, MacDonald says, involved ensuring that the RFID tags could be attached to the many different types of weaponry so that they would not be damaged or dislodged, or interfere with a weapon's ability to function. In the case of pistols or other

handguns, a Xerafy tag measuring 1 inch by 0.5 inch by 0.0625 inch is attached inside the weapon in such a way that it can not be seen or rubbed loose. ODIN worked with weapons manufacturer Sig Sauer to be sure the placement of tags inside the handguns was carried out in such a way that they would not interfere with firing. In the case of machine guns, he notes, the potential heat from operating the weapons was a concern, but a Titan tag was selected that could sustain high temperatures. In addition, MacDonald says, some rifles are made of carbon (which absorbs RF waves) rather than metal (which reflects them). For carbon weapons, ODIN selected a tag designed by Omni-ID for mounting on non-metal or metal surfaces. All tags were attached with adhesives.

Although the system was deployed only a week ago, and although the process of attaching tags to weapons is not expected to be completed for another three weeks or so, MacDonald says he expects the system to operate with near 100 percent read accuracy. "The benefit will also be reduced time for checking in and out," he states, particularly when four or more weapons are being checked out simultaneously. "It will also provide better accuracy—and, therefore, better security."