Air Force Base Deploys Wi-Fi/GPS RFID System Across 2,500 Acres

Davis-Monthan Air Force base will use AeroScout's new Unified Asset Visibility solution to track equipment anywhere on its vast compound.

By Claire Swedberg

Nov. 11, 2008—The 309th Aerospace Maintenance and Regeneration Group (AMARG) is adopting a system that combines Wi-Fi-based active RFID tags and GPS to help it track equipment and tools at its 110-million-square-foot compound at the Davis-Monthan Air Force Base in Arizona. The system, slated to become operational in January 2009, employs AeroScout's new Unified Asset Visibility (UAV) solution, designed to enable users to pinpoint an asset's location throughout the vast compound, even in remote locations where Wi-Fi access points are sparse.

Sometimes known as the "boneyard," the U.S. Air Force's giant aircraft storage and maintenance area includes more than 4,400 aircraft and employs 550 workers—almost all of whom are civilians. A plane arriving at the outdoor facility can be directed in several ways: either to be moved into storage, be routed to an area where it will undergo maintenance and repair work before being returned to service for the U.S. military, or be refurbished and sold to another source, such as a friendly foreign government.

When an order comes in for aircraft maintenance, AMARG employees must move quickly to have the aircraft repaired and sent to the users. Typically, with a facility of this size, locating the maintenance equipment to be used on that aircraft can be time-consuming. Employees often enter a vehicle and drive to a location to find the tools or equipment (a generator or other mobile equipment on wheels, for instance) required to complete the job. AMARG, which declines to comment for this article, sought a system that would make the repair and maintenance process more efficient.

The sheer size of the desert area where the equipment and aircraft are stored and utilized, however, creates an obstacle to most traditional RFID solutions. Developing an RFID reader infrastructure capable of providing the real-time location of equipment anywhere in the yard would be too costly, and would require erecting poles and installing antennas on them in a large open area where aircraft frequently pass.

AeroScout UAV is a new system that provides an alternative by combining GPS with Wi-Fi-based active RFID tags. UAV's MobileView 4.0 software allows users to locate a tagged item based on the transmission strength of the tag's signal as it is received by multiple standard 802.11 Wi-Fi access points, which also function as RFID interrogators. But when an AeroScout GPS Wi-Fi 2.4 GHz tag is too far away for its signal to be picked up by at least three Wi-Fi access points, the tag's built-in GPS receiver enables it to determine its longitude and latitude measurements by satellite, then transmit that data via the Wi-Fi transmission.

Whether functioning in GPS or Wi-Fi mode, the tag can be pinpointed to within five to 10 meters (16 to 33 feet). However, GPS would not work in every environment either. Some storage sites on the are under roofs and are, therefore, be unable to receive satellite transmissions. Davis-Monthan Air Force Base has 42 Wi-Fi

access points (most of which were already installed at the base for data Wi-Fi access), enabling the network to receive transmissions from a tag regardless of its location on the 110-million-square-foot compound.

AMARG is currently tagging 1,000 pieces of aircraft maintenance support equipment with the AeroScout tags, which measure about 5 by 3 by 1.5 inches and contain a Wi-Fi RFID chip, antenna, GPS chip, motion sensor and battery. The tags can be taped or screwed to flanges on the equipment. At first, AMARG will employ the MobileView software as a stand-alone system, says Amir Ben-Assa, AeroScout's industry solutions marketing director, though the agency ultimately plans to integrate the system into its existing inventory management system as it tags additional assets.

"This is a large outdoor area without a dense Wi-Fi network," says Steffan Haithcox, AeroScout's senior director of marketing. "They have a very challenging logistics operation," Ben-Assa adds. AMARG is beginning the deployment by tagging the most critical maintenance equipment, while the agency and AeroScout are now discussing expanding the system to the tagging of airplane parts and other items.

When an order comes in for an aircraft that requires servicing, employees will determine which tools will be needed for that task, then key the item, such as a mobile generator, into the AeroScout UAV standalone system. The MobileView software will display a map of the facility with an icon indicating where the requested item is located. The system can also query all items within chosen classifications, such as a specific type of tool, or any that may need to be serviced.

RELATED_ARTICLES The tags send an ID number and GPS configuration at preset intervals, but thanks to a built-in motion sensor, they can be set to beacon less frequently when stationary, or more rapidly when moved.

According to Haithcox, AeroScout is now marketing the system for other large outdoor facilities, such as airports, seaports and public transportation storage areas.