

The Maryland hospital is deploying Versus Technology's hybrid system to help it accurately locate equipment throughout its facility.

By Claire Swedberg

Jan. 27, 2009—[Anne Arundel Medical Center](#), located in Annapolis, Md., is employing a hybrid RFID and infrared technology solution known as VISion Asset Management to pinpoint the locations of assets that can be accessed by medical staff. The system, provided by [Versus Technology](#), can locate an item to within a few feet, according to H.K. Snowday, Versus' chief technology officer.

Anne Arundel Health System expanded its hospital complex with a new acute-care pavilion in 2001. At the time of construction, the hospital's management began considering wireless tracking systems to be deployed in the new pavilion, as well as three other buildings, that would offer staff members the ability to track assets, patients and each other. Without a tracking system, searching for equipment can take nurses up to an hour or two each day. With such a system, however, not only would the time spent searching for assets, patients and personnel be reduced, data from the system could also be used for medical records and billing.



*Richard Constantineau,
the medical center's
biomedical engineering
manager*

But the systems were not as easily implemented as the staff had hoped, says Richard Constantineau, Anne Arundel Medical Center's manager of biomedical engineering. The hospital first installed a system that employed battery-powered ID tags that utilized infrared signals to communicate with readers. Manufactured by Versus Technology and deployed by a third-party integrator, the system failed to work properly and had unreliable read rates, in part because the readers (which Versus calls sensors) were not correctly placed. The hospital hired an integrator to add an RFID system with RFID tags being read by interrogators using the IEEE 802.11 protocol, but the system still failed to provide what it required. "The granularity we achieved just wasn't what we expected," Constantineau says, noting that the system could be off by 50 feet.

"At that point, we went back to the drawing board," Constantineau explains. The hospital decided to ask Versus to demonstrate a solution it had developed that used an auto-ID system utilizing both RF and infrared signals, instead of just infrared. In October 2007, Versus visited the hospital and set up a trial on one floor with 40 items, using the sensors previously installed, but adjusting the installation so the sensors could be read. With the hospital's help, the vendor also input the correct nomenclature into the software, such as room numbers and names (for instance, "storage room # 4"). The hospital had decided to initially tag only assets—rather than patients or employees—to ensure the system worked. This time, the system pinpointed assets as they moved around the floor accurately. "The staff really liked it," Constantineau states.

Versus spent the following six months working with the hospital to provide a facility-wide system in four buildings, tagging only assets. Unlike some hospitals, Anne Arundel wanted its clinical staff, as well its employees overseeing equipment usage and maintenance, to be able to utilize the system. In other words, it wanted a nurse to be able to log onto the system and, for example, locate an infusion pump—and find it fast.

Thus far, the hospital has tagged 600 items with battery-powered tags using both RF and infrared signals to transmit their unique ID numbers.

"Infrared is our primary technology for granularity," Snowday says. Unlike an RF signal, the infrared signal emitted from the tag's light emitting diode (LED) can not pass through walls and other opaque surfaces. Because of that limitation, a tag's infrared signal can be read only in the room containing the item to which that tag is attached.

Snowday maintains that RFID can not allow a reader to pinpoint location with as much accuracy. "There is no way to control an RF signal to that level of reliability," he says. "With RF alone, you can get good location accuracy," but only by deploying an increasing number of antennas. He adds, "You could start to approach the level of granularity that infrared provides, but you would spend more money than you would want to." On the other hand, the RFID component provides greater reliability when the infrared system fails to read, though Snowday indicates the infrared component does not fail often.

Each Versus VER 1830 tag contains a battery-powered chip that controls the RF and IR components. The tag transmits its RF and infrared signals simultaneously every three seconds, both encoded with the same unique ID number. The RFID component transmits a 433 MHz RF signal, using a proprietary air-interface protocol; the infrared component transmits a light signal that is imperceptible to the human eye.

The system employs two kinds of readers. RFID sensors mounted on the ceilings capture the unique ID number via the tag's RF transmission, while the Versus infrared sensors simultaneously capture the unique ID number via the tag's IR signals. Both types of sensors can read tags up to 40 feet away. Versus has installed them in every room, and in hallways and common areas as well. Upon receiving a tag's the readers forward the tag's unique ID number and location-related data via a wired connection to a concentrator that captures all of that information, then sends it back to Versus' VISion software, running on a server.

VISion analyzes the infrared and RFID data, and pinpoints the tag's whereabouts. It then displays that location on a floor map of the hospital, enabling hospital employees to then see the item's location, updated every three seconds. "They can log in and choose a selection, such as the type of equipment," Constantineau explains, "or do a search by floor."

Thus far, Constantineau says, the staff has been offering suggestions regarding the types of items they would like to add to the system. Although tagging began with a few frequently used medical devices, it

has since expanded to items for housekeeping and kitchen staff as well, such as vacuum cleaners and food carts. The hospital is now in the process of constructing a second patient tower. By the time it completes that project, which it expects to do by the first quarter of 2010, the hospital expects to have tagged more than 3,000 assets.

This month, the medical center began utilizing a Versus software system known as Versus Reports Plus, which enables the facility to track such things as where items congregate, where they are most frequently used and whether those items' storage location is the closest to the area in which they are typically used. Eventually, Constantineau says, Anne Arundel also plans to expand the system to incorporate the tracking of patients and staff, with initial testing of that capability slated to take place in April 2009.

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