

**The New Jersey hospital operator's initial deployment will consist of 5,500 hybrid RFID-infrared tags from GE Healthcare, for tracking assets, patients and employees.**

By Claire Swedberg

Nov. 24, 2009—New Jersey health-care company [Virtua Health](#) is installing an RFID system to track thousands of patients and staff members, as well as up to 10,000 assets, at its four hospitals, using a system provided by [GE Healthcare](#). The system enables Virtua to better manage patient admissions by knowing, in real time, which beds are available. It also allows the firm to improve efficiency by knowing where assets are located, and to use RFID data to learn where hospital processes could be made more efficient.

The two companies have a history together, says Alfred Campanella, Virtua's CIO. Since 2000, he says, GE Healthcare has been providing Virtua Health with Six Sigma and lean principles management, as well as supplying such equipment as CAT scan and MRI devices, and a picture archiving computerized system (PACS) for digitizing radiology and cardiology images.



*Alfred Campanella,  
Virtua's CIO*

Within the next six months, Virtua will begin tracking its patients and assets using a GE system known as AgileTrac Enterprise, which consists of active 433 MHz RFID tags, readers, infrared emitters and software to manage data from the tags. The system can be used to track equipment, patients and employees, and enables the management of assets, patient rooms and emergency departments. "GE knew we were in the market for that kind of system," Campanella says. The company, which had acquired RFID firm Agility Healthcare Solutions in 2008, offered to provide Agility's AgileTrac system that would help Virtua meet its needs.

Virtua Health has more than 10,000 moveable pieces of equipment that Campanella would like to track, including wheelchairs, pumps, OR equipment and beds. For example, he says, the process of trying to quickly locate missing infusion pumps "creates a lot of chaos—not to mention the cost related to replacing equipment that doesn't necessarily need to be replaced."

Virtua was also concerned about bed management. When patients come through the emergency department at one of its hospitals, for instance, that facility needs to locate available beds. As other patients check out between 10 am and 4 pm, the hospital needs to be aware of a bed's status, in order to assign a new patient from the emergency department to that bed. AgileTrac will help manage that entire process, Campanella says.

The system employs a combination of RFID and infrared technology, says Fran Dirksmeier, general manager of GE Healthcare's AgileTrac Solutions. The AgileTrac battery-powered 433 MHz RFID tag has a built-in IR receiver. The tags can be attached to assets, and patients can be provided with

wristbands containing the tags.

Virtua will install an IR emitter on the ceiling in the center of each room of its four hospitals. The emitter transmits infrared signals encoded with a unique ID number. If a tagged asset or individual enters a room, the tag captures the signal from that room's IR emitter, then sends the emitter's ID number, along with its own, to RFID readers installed in the hallways, via a 433 MHz signal using a proprietary air-interface protocol. (The AgileTrac system is available in a 915 MHz version.) Those interrogators are wired to the hospital's back-end system, where AgileTrac software interprets the tag's location based on the IR emitter ID and the strength of the RFID signal, and makes that location available on a hospital floor map, with icons indicating each tag.

The system can determine tag location based on RFID signal strength alone, while the IR emitter ID provides greater granularity. The information is displayed both on PCs used by the nursing staff and hospital management, and on flat-screen TVs installed in the hallways. On the TVs, each patient's identification number is displayed for the staff, as well as his or her location, such as a patient room, an examining or imagining room, or some other part of the facility.

Initially, Campanella says, each patient will wear two wristbands—the hospital's traditional bar-coded wristband with that individual's identification printed on it, to be read by employees during that person's stay, and the AgileTrac tagged wristband, which has a unique ID number encoded in the tag but no identifying information printed on the front. Staff members will also wear AgileTrac tags to allow the hospital visibility into their location, for such purposes as tracking down a specific health-care provider quickly, or determining who can respond most rapidly to an urgent call. Workers' tags will be worn around the neck with a lanyard, he says. The hospital may eventually dispense with traditional bar-code wristbands, he notes, by integrating the bar code and printed material onto the AgileTrac wristband.

When a patient is first admitted and assigned a room, he or she will be given an AgileTrac wristband, and the hospital's staff will enter an estimated time of discharge into the AgileTrac system. Then, if a patient remains in that room for a significant span of time beyond that estimate, the system will send an alert. On the other hand, once the system detects that a patient has been out of the room for a preset span of time, and on schedule with the discharge estimate, an alert will be transmitted to the housekeeping staff. Those in admitting will also see on the system that a room has been vacated. Campanella likens the system to air-traffic control, in terms of how it will help Virtua manage its patients and beds.

Virtua is initially installing the system at its hospital in Voorhees, N.J., even though the building that the hospital currently occupies is scheduled to close in 2011, when the facility will move to a newly constructed building. The system will be used in the older building now, he says, to acclimate staff members to that system before they utilize it at the new 700,000-square-foot facility. "We want them to get used to the system," Campanella says. AgileTrac will go live at the building in approximately six months, he estimates, and the new facility will also be built with the AgileTrac system. Once the old facility is closed, the hardware will be used in some of the other three hospitals.

The AgileTrac system software, on a server hosted by Virtua Health, will be integrated with the hospital's admission system and electronic medical records software. In that way, a record of each patient's admissions data (such as his or her name and date of birth) can be linked to the tag's unique ID number, as well as data related to the health-care services that person receives while at the hospital. The AgileTrac system software comes with four modules: one for equipment management, one for bed and room management, one for operating rooms and one for the emergency department. Authorized users can determine an asset's location in any of the modules by opening either a floor map, on which icons are displayed representing each tagged item, or by using a search function (similar to Google) and typing in the name of a required piece of equipment.

Initially, the first hospital (the existing Voorhees site, and then the new facility) will employ 4,000 asset tags, 1,500 patient tags, 38 RFID interrogators and 283 IR emitters. The second hospital will utilize 1,500 asset tags, 500 patient tags, 16 readers and 143 emitters. The third facility is expected to use 2,000 asset tags, 1,000 patient tags, 19 readers and 177 emitters. Finally, the fourth site will use 4,000 asset tags, 2,000 patient tags, 52 readers and 416 emitters. Virtua intends to install the system at the second, third and fourth hospitals within the next three and a half years.

As a result of helping Virtua's staff better know where patients are and when they leave, Campanella says, the system is likely to improve patient flow, thereby enabling a better patient experience. He also expects the system will help the hospital ensure that the necessary equipment is available—which is Virtua's first priority. "We want the patients to feel assured that we're trying to make it as easy, convenient and smooth as possible," he states. In addition, the company hopes to use the system to provide it with historical data, such as patient throughput, as well as where bottlenecks occur, and when. "It's hard to change what you can't measure," he says, "and the more you measure, the better chance you have to properly address the problems at hand, and then also measure your response to that problem."

Finally, Campanella adds, Virtua hopes to save money on assets by improving its equipment management. "Every year, we buy extra equipment because we are short," he says. With the RFID system, he hopes to significantly reduce the need to order replacement assets.