

**The New Hampshire facility is tracking equipment and the temperature of medicine that emergency medical technicians take with them whenever an ambulance is dispatched.**

By Claire Swedberg

Feb. 25, 2011—When one of [Frisbie Memorial Hospital's](#) four emergency vehicles leaves the garage on an emergency call, the facility never entirely loses sight of the vehicle or some of the assets inside. Thanks to a system installed in September 2010, the Rochester, N.H., hospital uses GPS technology to track the vehicle's location and speed in real time, and RFID to determine if a piece of equipment was left behind by a vehicle's crew and what the temperature is inside a medicine bag.

When the hospital management started searching for technological solutions to emergency vehicle visibility in 2010, the greatest concern was monitoring the temperature of medications. Therefore, Frisbie began looking into tagging and tracking each medicine bag. "We weren't worried about medicine bags going away [getting lost], as much as we were worried that the temperature stayed within the required threshold," says John Levitow, Frisbie's director of EMS and preparedness. For example, on a hot summer day, a medicine bag could sit in the sun outside of the ambulance while personnel assisted a patient. After the bag was returned to the ambulance, there was no record as to how warm the medication might have gotten before it was again cooled to an acceptable temperature. The hospital also wanted to ensure that expensive equipment did not get lost.

The solution that Frisbie chose for its three ambulances and single interception vehicle (which transports needed equipment or people to an emergency site) was supplied by [In Motion Technology](#). Through the combined use of GPS and RFID technologies, the hospital has been able to collect data not just about the bags' temperatures but also when they were removed from the ambulance, how long they are outside the ambulance and if they were being left behind, explains Stephanie Hughes-White, In Motion's public relations manager. The GPS unit provides data about where the ambulance is and has been, and how fast it traveled. After the hospital began using the system to track the temperatures of its medicine bag, it opted to use RFID tags to also track some of its equipment and to receive an alert if a piece of equipment was not returned to the ambulance before the vehicle drove away.

"When I bought the system, I didn't think we'd have this kind of functionality," Levitow says. The hospital is small, but it receives 5,000 emergency calls per year, and he had expected to have access to a minimal amount of information—first the location of an ambulance itself via GPS, then the temperature of medicines onboard via RFID. Within several months after the automated system was installed, however, he thinks the technology has already provided a return on investment by ensuring that equipment doesn't get lost, and that medication is returned to cold storage before it can be spoiled.

The hospital placed [AeroScout T5](#) temperature sensor tags inside the medicine bags used in all vehicles, and installed [AeroScout T2](#) RFID tags without sensors on equipment such as portable suction units and heart monitors, using a total of about 16 tags. Each vehicle has an Onboard Mobile Gateway device installed under a seat toward the front of the vehicle that has a built-in GPS unit as well as Wi-Fi

receiver to capture data from the RFID tags. The temperature tags transmit the unique ID number of the tag as well as the temperature (with a default setting of every 30 seconds, although they can be set to transmit at other intervals). This data is captured by the Wi-Fi receiver and sent via a cellular connection to the Onboard Mobility Manager (OMM) software on a server hosted by In Motion, which Frisbie management can access via the Internet. The asset tags transmit only a unique ID number linked to details about the asset in the software. When a tagged item is taken out of a vehicle, the strength the tag transmission received by the reader changes and the software detects that change and determines how far the item has been taken from that vehicle. It can also determine if an item has been returned to one of Frisbie's three other emergency vehicles, instead of the one from which it was originally removed. The tag's read range is about 600 feet outdoors, and 180 feet indoors.

If the temperature in a medicine bag exceeds the approved temperature threshold, or if an asset or medicine bag tag is transmitting at a sharply different strength, such as would be the case if a vehicle began driving away from the tag, an alert is sent to Levitow in the form of an e-mail message. He can then notify the vehicle driver that an item must be retrieved or that the medicine bag needs to be moved to a cool location. The OMM software can indicate not only that an item was lost, but also, based on GPS data, approximately where—for example, at a specific clinic where the ambulance had stopped.

The In Motion software provides general real-time monitoring of an ambulance's location. As the vehicle leaves on an emergency call, the software displays an icon that depicts the vehicle's whereabouts on a [Microsoft Bing map](#) or [Google map](#).

The system is configured so that after a vehicle's engine has been off for one hour (for instance, after returning to the garage), the Onboard Mobile Gateways shut down, and the RFID tags go dormant.

Levitow says he is still considering expanding the system, such as using it to track other assets that go in a vehicle, which could, for example, indicate exactly which items were taken on emergency calls, and whether any were left behind at the hospital. "I think we're still just scratching the surface of what we can do with this technology," he says.