



## **Metal detector safeguards against threats in MR suite Technology complements screening procedures that may fail to catch potential missiles at busy hospitals**

**By: Greg Freiherr, July 2005**

Hospitals are full of the kind of metal that can change calm into chaos: patient carts, oxygen tanks, cleaning buckets. A momentary lapse or a step too close to an MR scanner can turn a mundane staple of hospital life into a lethal projectile.

Before that could happen at Doctor's Hospital at Renaissance in Edinburg, TX, the staff would hear an alarm. They would see an icon light up on a desktop console the size of toaster, indicating the approximate location of the object.

The alert would come from the FerrAlert Entry sensors mounted around the door of the hospital's MR suite. The sensors take note of objects such as wrenches, air tanks, or floor buffers that can injure patients or damage scanners. The FerrAlert detector has been in place for a year, mainly to alert people carrying what they know they should not be carrying, said Bob Pourgol, formerly director of radiology and now director of business development at the hospital.

"Many times, people walk through with a cell phone or stethoscope, and the alarm goes off, and they'll say, 'Oh, I forgot,'" Pourgol said.

The detector is one component of a two-part warning system in use at the hospital. The other element, FerrAlert Prescreen, checks patients for small objects like hairpins that might cause image artifacts or compromise the scanner. It looks like a freestanding door jamb and may be located in the dressing or interview room.



The two detectors, one designed for small objects and the other for large objects, are intended to be used together. But Keith A. Kopp, inventor of the device, defers to sites' individual needs. FerrAlert components can be purchased individually from his company, Kopp Development, for under \$17,000 or as a pair for \$28,500.

Florida Hospital Fish Memorial installed only the large object sensors to guard the door leading to the MR suite, which adjoins a busy hospital corridor.

"The entrance to our MRI unit is not visible from the control area," said Jerry May, director of radiology and radiation oncology at the Orange City hospital. "So we had no way of knowing if someone was going to try to enter the room with a dangerous object."

The device is designed to help prevent injury, equipment damage, and image artifacts leading to diagnostic errors, but it is not a complete solution. Florida Hospital Fish Memorial has made FerrAlert Entry part of a safety program that also includes staff and patient education about the dangers of bringing ferrous objects near an MR scanner.

FerrAlert, first shown at the RSNA meeting last year, now plays this role at eight sites in the U.S. It is unaffected by nonferrous metals such as aluminum or brass or by electromagnetic signals from other electronic equipment. Ferrous metals installed in the surrounding walls or positioned nearby have no effect on the device, which can be set to tune them out, Kopp said.

The situation may be more challenging, however, when the detector is positioned near a busy hallway, as it is at Florida Hospital Fish Memorial. When the device was first installed, passing wheelchairs routinely set off the alarm. A Kopp engineer reset the system to scan for metal only when the door is open.

The detector is totally passive, emitting no radiation. It works by detecting disruptions in the ambient magnetic field.

"This works on a principle not unlike the one that explains why a compass spins when you put a wrench near it. The wrench distorts the local magnetic field," Kopp said.

FerrAlert may be the first in a family of products based on this principle. A related device on the company's drawing board would detect ferrous metal particles in the eyes of patients. Staff currently ask patients if they work with metal, and if there is any indication that metal shavings or other particles may have gotten into the eye, patients undergo an x-ray examination to determine whether such particles might still be in place.

"The problem is that x-rays are not very good at picking up small particles, nor can they tell if they are ferrous," Kopp said.



The product he is designing now, a detector ring the patient could quickly duck into and out of, would solve those problems. Another device in the concept stage would be installed in surgical suites attached to MR rooms. Patients leaving the surgical theater would be scanned for ferrous instruments before transferring to the scanner. Both devices are a year or more away from market.