Article in RFID Journal

Gentag to Commercialize Super RFID Technology

Until now, the long-range real-time location system has been utilized solely by the military, but Gentag hopes to develop the tag for use in the private sector, to pinpoint people and objects up to 12 miles away.

By Claire Swedberg

Sept. 12, 2007—After 10 years' use by the U.S. Department of Defense (DOD), a technology known as "super RFID" has been licensed by Washington, D.C.-based technology developer Gentag, which plans to commercialize the technology for civilian use. Initially, Gentag and Sandia National Laboratories co-owned the rights to the U.S. patent (6,031,454) that covers the non-military version of the technology. Now, Sandia and the U.S. government have released the full rights of the patent to Gentag.

Super RFID technology uses long-range radar responsive (RR) tags, so named during their initial development for the military. Originally, the active 430 MHz tags were designed using technology derived from a radar device requiring line-of-sight for reading. Since then, Sandia has modified the technology to its current form, which employs RFID to transmit ID numbers instead of radar. Gentag's founder and president, John Peeters, says Gentag's RR tags can be read from a distance of up to 12 miles, using highly sensitive interrogators.

Readers range from 5 watts (for small applications, such as within a building) to 100 watts (for broad-range search-and-rescue purposes). In either scenario, a tag's location can be pinpointed to within 3 feet via a triangulation involving three Gentag fixed-position interrogators, or one mobile reader with a built-in GPS satellite receiver that helps provide triangulation coordinates related to a specific tag's position.

The tag is the result of a development partnership Gentag started with Sandia and the DOD in the late 1990s, Peeters says, to create tracking devices for the military able to penetrate obstacles such as buildings and thick undergrowth, which often interfere with GPS tracking. The system, which uses 3,500-watt interrogators made by a manufacturer the government is not disclosing, was intended as a long-range radio frequency device for identifying and locating people and objects, and is still used today by the military to avoid friendly fire. RR tags affixed to U.S. and allied tanks are read by RR readers in aircraft up to 100 miles away. The interrogator captures the unique IDs, and the built-in GPS receiver provides coordinates to pinpoint the location. The military can then precisely identify whether the tanks are friendly.

To create a commercial version of the system, Peeters explains, Gentag will develop the RR tag using an application-specific integrated circuit (ASIC) built into a credit-card-size, battery-powered tag. The system could be deployed at a hospital, children's theme park or other confined area, employing triangulation to track the movement of tagged people or assets.

Because of the long read range, Peeters notes, only a few fixed-position RR interrogators (also known as base stations) would need to be deployed. At a hospital, for instance, only three fixed readers would typically be needed, he says—one on the roof, and two in the parking area or on the campus perimeter. "Therefore, the triangulation can be created and people can know exactly where doctors are [and] who is going out of the hospital when they are not supposed to."

The tag could also be useful for search-and–rescue operations, or to locate a missing asset (such as a vehicle or boat), by installing mobile RR readers in helicopters or other vehicles. In this case, the Gentag system could pinpoint its location using a GPS satellite in a way similar to how the military utilizes it.

In addition, Peeters says, the system could locate firefighters or other rescue personnel. Employees could be tracked via triangulation by fixed RR interrogators located within a building, or from mobile RR readers mounted on nearby vehicles, perhaps even a helicopter. Moreover, sensors on the tags could gather vital information—such as temperature, or the presence of toxic gas—and the tag could transmit that data to the RR interrogators. RR tag batteries are expected to have a life span of about one year, since they operate in low-power mode until receiving a wake-up signal from a reader.

Within two or three years, Peeters states, Gentag hopes to see RR tags embedded in cell phones, and to deploy RR interrogators on cellular towers. "What this would then do," he says, "is allow precise geolocation [of individual cell phones] in buildings. Current cell-phone technology does not allow that." Because the system enables added sensor functionality, Peeters also envisions using it for long-distance monitoring of structures, such as tracking stress levels on bridges.

Peeters estimates Gentag will have an ASIC-based RR tag ready for the market in about one year. In the meantime, the company is compiling potential customers. Interested parties so far, he says, include an airport, which hopes to use the technology to track the movements of luggage, and to match passengers with bags on a single aircraft; a national government interested in tracking citizens susceptible to being kidnapped; and a large sorting facility seeking to track items within its premises.

Gentag is taking steps to quell privacy concerns by encoding the chips only with unique ID numbers. The company intends to make it possible for those numbers to be linked to additional data in a user's back-end system, Peeters explains, or to a server hosted by Gentag. Furthermore, the company plans to provide the requisite interrogators, labels, software (to move data from readers and satellites to a user's back-end system or to a Web-based server) and integration services (if the data is directed to a back-end system). Prices are expected to be in line with active RFID systems currently available. "This is not an expensive solution," Peeters says.

Web site: http://www.gentag.com

Source: RFID Journal