

# RFID

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## RFID Interrogators Grow Up

Advancements in tag direction detection and tag distance calculation should improve data collection and asset tracking.

The inability to pinpoint the direction in which tagged pallets or cases are moving, and the issue of unwanted tag reads, particularly vexing in crowded areas such as manufacturing floors or warehouses, have been “major pain points” for radio frequency identification users, says Toby Rush, president of Rush Tracking Systems, a Lenexa, Kan.-based systems integrator specializing in RFID and other auto-identification technologies. If solving these problems has been on the top of your “wish list,” your wish may have been granted.



Impinj's Speedway reader, which is certified by EPCglobal, features a new tag direction sensing capability.

Tag direction detection and tag distance calculation are among the features being added to standards-based, off-the-shelf RFID interrogators, to provide more detailed location information about tagged goods and cut down on unwanted tag reads. These capabilities in readers increase the value of the RFID network, says Rush, because the

data is more reliable and more specific.

One company that has an early lead in the area of tag direction detection is Seattle-based Impinj, which last October announced an upgrade to its UHF Gen 2 Speedway readers. With the upgrade, the company added an algorithm to its Octane firmware that can sense the direction in which pallets, crates or carts equipped with Gen 2 UHF tags are moving when they pass through an RFID portal. The interrogators sense the tags, and the algorithm calculates the direction in which up to 10 tags are moving at the same time. The algorithm reports tag direction via a Low-Level Reader Protocol (LLRP) response message. (LLRP is an EPCglobal standard that provides a common but extensible interface for linking EPC Gen 2-compliant readers to middleware or other types of networking software.) The algorithm running on the Speedway readers works with any compatible Gen 2 UHF tags and off-the-shelf Gen 2 reader antennas.

The ability to know tag direction creates a deeper level of information about the location of tagged assets, says Mendy Ouzillou, product line director for Impinj. For example, with that information, a retailer can track whether a pallet of goods has been moved from the stockroom to the retail floor. In a hospital, the medical staff can track whether carts of surgical equipment have been moved into the operating room. “This solves a real business problem,” Ouzillou says. “Data without tag direction is fine, but there’s not a lot that you can do with it.”

To date, Ouzillou says, companies deploying RFID systems have tried a variety of methods

to achieve tag direction detection, with varying degrees of success and at a range of costs. Some have tried installing motion sensors at portal doors, while others have used phased antenna arrays, and some have even used a combination of active tags and GPS technology.

The firmware upgrade has been in beta testing in recent months and is scheduled for general availability in January. Impinj declined to disclose the names of customers that had tested the product. The company is continuing to refine the tag direction technology and expects future releases to be more powerful, with the capability of determining the direction of larger populations of tags. In addition, Ouzillou says several middleware vendors have expressed interest in integrating the tag direction functionality into their software.

Omron is another company that is taking steps to improve the quality of the data read by its interrogators. Last fall, the Tokyo-based company announced that it had developed the technology to measure the distance between EPC-compliant RFID tags and its V750 UHF readers, based on time-delay calculations. Omron's intent is to cut down on unwanted tag reads by allowing its customers to set limits on the distance at which tags should be read, says Masa Kameyama, U.S. division manager for Omron.

According to Omron, the crowded environments in warehouses and manufacturing sites have made it difficult to implement UHF RFID systems. That's because the long read range of the interrogators can lead to unintentional tag reading, which can compromise the quality of the data. Setting the parameters for

tag reads should help eliminate unwanted reads on goods stacked near interrogators that are mounted on gates or in areas where tagged products are traveling on multiple conveyor belts, the company says.

Omron calculates the distance between the tag and the reader's antenna based on the time lapse of the electromagnetic waves used in communication between readers and tags. The company says this time-delay calculation used in combination with its electronic-control scan-antenna technology, which debuted in late 2006, will allow users to specify where they want the tags to be read. The scan antenna, which has a very narrow directivity and moves horizontally, will set the lateral dimensions, and the distance measurement technology will control the depth to define the area for tag reads.

Omron's efforts are a few steps away from being market-ready. The company says it has not yet started beta-testing the time-delay calculation feature with customers. Its goal is to make the technology available sometime in 2008, and it will probably be provided as firmware.

Impinj and Omron are expected to have increased competition from other RFID vendors in the coming months. The fact that manufacturers are looking to incorporate new features such as tag direction detection into their interrogators demonstrates that RFID technology is quickly maturing,

Ouzillou says: "It's a staggering amount of progress in a short amount of time."

Rush agrees: "Twelve months ago I would have said this was physically impossible. It's a significant step forward for the RFID industry." —*Jill Gambon*

### Who's Who in Advanced RFID Interrogators

Impinj  
[www.impinj.com](http://www.impinj.com)

Omron  
[www.omron.com](http://www.omron.com)

