

Integrator Runs Item-Level RFID Study

R4 Global Solutions tries to quantify how retailers can benefit from item-level tagging and smart shelving.

By Mary Catherine O'Connor

Mar. 31, 2004—Most manufacturers don't plan to implement item-level tagging until many months from now. And for good reason: Trying to effectively tag cases and pallets of goods in order to meet retailer and government mandates—and maybe even gather some valuable data for optimizing business processes—is still a work in progress and the top priority. But the results of a study conducted by San Francisco systems integrator [R4 Global Solutions](#), using radio frequency identification technology from [Intelligent Systems](#), might help entice retailers to push manufacturers toward item-level tagging sooner than later.

The results of its study, according to R4, indicate that item-level tagging has the potential to reduce inventory shrinkage—which includes lost and stolen merchandise—by as much as 40 percent in an actual retail outlet. It also shows an eight-fold improvement in employee productivity in areas attributed to inventory management. Non-RFID-enabled inventory tasks (including replacing misshelved items, counting stock and running reports) that would take an employee four hours, took only a half hour in the R4 study. This eight-fold reduction matches the time reduction found in British retailer Marks & Spencer's item-level pilot test (see [Marks & Spencer to Extend Trial to 53 Stores](#)).

R4 president and CEO Jeff Richards says that while the company is not attempting to compete with independent research firms, it initiated its item-level study in order to provide thought leadership and education on the economic drivers behind the use of item-level RFID in retail applications. In compiling the study, the company combined findings from a one-day study it conducted in its 4,000 square-foot San Francisco facility with findings from its retailer clients' ongoing item-level pilot projects. The one-day study involved three people carrying out in-store processes, such as inventory counting and restocking, in a simulated retail floor and back room. They ran through the processes both with and without the aid of RFID-enabled system of smart shelves developed by Intelligent Systems, a provider of RFID-enabled inventory-management solutions and a division of paper products company [MeadWestvaco](#).

While the R4 study consisted of limited, internal testing using only DVDs, Richards believes the benefits seen in the study would apply to item-level tagging of other products that have high shrinkage and a high margin, such as apparel and consumer electronics.

"There are three major areas that retailers want to improve: out-of-stocks, inventory shrinkage and labor costs," says Richards. He believes the smart shelf technology will help retailers limit all three. Richards notes that many end users don't think item-level tagging will really happen for another five years. "But the technology is here now," he says.

R4 and Intelligent Systems are working with a number of unnamed retailers, in the U.S. and abroad, in conducting pilot projects using the Intelligent System's smart shelf hardware and software system. But he says none of these trials have involved placing the shelves in front-of-store environments, where the public would

be interacting with the shelves. Instead, he says the pilots are being done in the retailers' back-room areas or other facilities.

To install the smart shelves, Intelligent Systems retrofits a retailer's existing shelving with a number of antennas that are linked into readers. The cost of the readers, which can run thousands of dollars each, is often cited as the main cost obstacle for retailers. Intelligent Systems uses a proprietary method of linking antennas so that one reader can support up to 250 antennas, according to Keyur Patel, Intelligent System's director of product management. "That's our main IP," he says.

The smart shelf demonstration area used to conduct R4's study consisted of a simulated front-of-store shelf setup with six rows of shelves. The antennas were built into the shelves and linked into a 13.56 MHz I-Code reader by Philips (when the study was conducted in February, the UHF version of the smart shelf was not yet available). The shelves were filled with DVDs to which R4 attached Rafsec 13.56 MHz RFID tags made with Philips I-Code chips. DVDs were picked for the pilot because they are among the first types of products that retailers are considering for item-level tagging.

The smart shelf software was programmed with each DVD's SKU and its location among the six shelves, which had been divided into a total of four zones each. The number of zones in the shelf corresponded with the number of antennas, so each shelf in the demo setup had four antennas.

In a real deployment, Intelligent Systems can customize the number of antennas used on a shelf, depending on how much granularity the customer wants. If a DVD is picked up and then replaced on a different zone, the software can send an alert to a store employee. Or, more likely, the employee would run periodic reports to see which tagged items have been misplaced and where they are supposed to be placed, and which zones have fallen below a predetermined thresholds of stock and therefore need to be restocked.

Tesco announced this fall that it is moving from high-frequency to ultra-high frequency tags and readers for its pilot program. Patel says that for Tesco's UHF pilot, Intelligent Systems has developed a version of the smart shelf system that uses UHF antennas manufactured by Alien Technology. Most retailers, according to Richards, will want to use UHF shelf readers so that they can work with items carrying EPCglobal's standard Gen 2 UHF tags.

R4 has published a 16-page whitepaper (entitled "Item-Level RFID in the Retail Store Front") based on its recent study. The white paper can be downloaded from R4's Web site at www.r4gs.com/rfid-resources.

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