

The U.K. automaker is working with a U.K. research group on a pilot using active RFID tags to increase the visibility of containers, full or empty, entering or leaving an assembly plant.

By Claire Swedberg

Feb. 5, 2008—[Land Rover](#), a U.K. division of [Ford Motor Co.](#), is working with the [Warwick Manufacturing Group](#) (WMG), a research group at the [University of Warwick](#) in Coventry, to test the use of RFID for tracking containers filled with automotive parts coming into the automaker's assembly plant in the West Midlands, as well as empty containers leaving the factory.

The pilot has been running for three months and is part of a major program funded by [Advantage West Midlands](#), a federally run regional development agency that provided £32 million (\$64 million) to help the West Midlands manufacturing community better compete with manufacturers in Asia. Funding for the RFID pilot has totaled about £600,000 (\$1.2 million).



Philip Foster

The trial set out to determine whether RFID could cut down on lost or misplaced containers. Generally, says Philip Foster, a principal fellow at the WMG, the loss of containers carrying auto parts to assembly plants averages at about 10 percent of all shipments—a problem that costs Land Rover approximately £1.2 million (\$2.4 million) annually, due to the value of the containers and the parts being shipped, as well as the time needed to locate them.

The WMG first began seeking an RFID-based solution in 2003, to help companies track parts-filled containers en route to the assembly plant. The group found that [Savi Technology](#) offered an ideal solution, which included a 433 MHz active RFID tag that bolts to containers and can be read from up to 100 meters away. The tag is designed to work in a heavy metal environment where containers are move through portals and gates often and quickly.

After four years of research and development, the WMG launched the RFID pilot in October 2007, involving 22 suppliers and the 308-acre Land Rover assembly facility in the West Midlands' town of Solihull. The lengthy research phase was necessary due to time spent not only locating an RFID hardware vendor, but also securing participation from auto parts vendors, writing software for the system and testing the hardware. According to Foster, Land Rover's assembly plant was a good choice for the pilot because it recently began producing four additional vehicle lines (Range Rover, Range Rover Sport, Discovery and Defender). Thus, he says, production is relatively high-volume and high-profile. The plant now assembles 200,000 vehicles annually.

At the start of the pilot, suppliers began affixing Savi's ST-614 active 433 MHz tags to containers with rivets. Since then, Savi interrogators and EchoPoint "signposts" have been installed at the gates at 16 of the 22 participating suppliers, all based in the United Kingdom. EchoPoint signposts are deployed at

dock doors or other portals, or placed in specific storage locations or parking slots. Each signpost uses a short-range inductive low-frequency (123 kHz) signal to awaken the dormant tags so they'll begin transmitting a 433 MHz signal.

The use of active tag technology for the Land Rover pilot is critical, says Kempton Cannons, Savi's business development director, because "these containers are not gently and slowly carried through a narrow portal." Rather, he explains, the cage-like containers filled with metal car parts are driven at high speeds through wide warehouse-style portals. "The key," says Cannons, is to have the ability to read at distance and speed," and to do so in a metal-rich environment.

When a tagged container leaves the supplier site, it is loaded onto a truck and the vehicle passes through a gate. At that gate, the EchoPoint signpost wakes up the tag, which transmits its unique ID number to the nearest reader. Because each supplier tends to provide only one specific product, the ID numbers are not linked to any other data, such as the container's contents.

Although Savi provides a Smart Chain Platform to translate and route (via the Internet) the ID number, date and time of the read to the appropriate users (such as Land Rover), the WMG opted to use a simpler, less expensive method for the pilot, Foster says. That was due, in part, to the automaker and suppliers not wanting to have to integrate the RFID readers with their local area network—an integration necessary to obtain Internet connectivity—because of security concerns. Instead, the interrogator's data (time, date and location of a read, along with the tag's ID number) is routed via a GPRS connection to a server hosted by the WMG. That data is then made available via a secure password to pilot participants—namely, the automaker, the suppliers, Savi and the WMG. The university research team wrote the software that routes and translates the data.

When the truck arrives at Land Rover's assembly plant, it passes through another gate equipped with RFID interrogators, thereby alerting Land Rover and the supplier that the product has arrived. The automaker routes the containers to the appropriate assembly location, where they are unloaded with forklifts and driven through another RFID portal. In this way, Land Rover and the suppliers can know the items have been received in the proper location and are ready for assembly. If a shipment is late, a voice or text message can be sent automatically to Land Rover or the supplier.

As empty containers are returned to the supplier, the RFID system transmits data to the server regarding when the containers left one location and arrived at another, thereby ensuring not only that the containers don't get lost, but that the suppliers have the containers available when they need to ship products.

"Everyone is focused on inventory," Cannons says, "and there are great mechanisms for management of inventory, but what people have missed is the movement of these very specific containers." Each container is designed for the product it carries. If, for instance, a supplier of door panels lacks the specific container for such panels, it will not be able to ship them. Moreover, the containers aren't cheap. On average, they cost about £400 (\$800) apiece. By tracking both containers and inventory,

Cannons says, "you have a crossover of asset management and supply chain management."

The system offers other advantages as well, Foster notes. The RFID reads should help reveal weak links in the logistics operations, such as inefficient delivery routes. "Land Rover is under huge pressure to reduce their carbon footprint," he says. This system could help the manufacturer find ways to reduce the amount of driving (and, hence, fuel) needed to deliver goods from the supplier to the assembly plant.

While more work needs to be done to validate the business case, Foster says, thus far the tags' read rates have been high. Cannons adds that they have had to do very little "tinkering" with the system, other than adjusting the placement and angle of the EchoPoint devices to accommodate the speed at which forklift drivers travel through portals.

The pilot is expected to be completed in March 2008, Foster says, at which time WMG, Land Rover and the suppliers will evaluate its success and determine whether a full deployment would benefit the supply chain. Land Rover is presently in the process of being acquired by [Tata Motors](#), however, and that transition could affect the completion date. Foster predicts the system will be adopted by other types of manufacturers, and sees a specific use for it in the aerospace and appliances industries.