



Singapore Transit Operator Streamlines Vehicle Maintenance

SMRT is applying EPC Gen 2 RFID tags to 80,000 spare parts and components, and installing RFID interrogators at its three warehouses.

By Dave Friedlos

Aug. 5, 2009—Singapore's leading public transport operator is deploying radio frequency identification at three warehouses to track up to 80,000 items used in the maintenance of its vehicles. [SMRT Corp.](#), which carries approximately 2 million passengers every day on its trains, light rail, buses and taxis, maintains a large inventory of spare parts necessary for the maintenance of its fleet, in order to ensure a safe and reliable public transport system.

Over the next 12 months, SMRT plans to roll out an RFID-based inventory-management system at its warehouses in Ang Mo Kio, Woodlands and Kranji. SMRT expects to attach a passive ultrahigh-frequency (UHF) EPC Gen 2 RFID tag to each of the 80,000 spare parts or components in its inventory.

According to SMRT, the automated system will enable its staff to retrieve items for repair and maintenance more quickly, as well as speed up inventory-taking for parts in stock and improve inventory management through more accurate data and reporting. Employees will also be able to identify and retrieve items 24 hours a day, seven days a week, without compromising security, as radio frequency identification will capture and record the movements of every item.

Jason Chin, SMRT's information technology director, says RFID was chosen for its speed in reading information, the ability of data to be written to a tag for better identification, the technology's longer read range and the reusability of its tags. "These features made it a more attractive option compared to bar codes," he says, "which was an alternative."

With the cost of RFID now more affordable, SMRT first launched a rigorous study into the technology, and held discussions with potential RFID vendors, including [TCM RFID](#), to better understand the available solutions. A feasibility study was also conducted, to determine how long traditional warehouse activities would take using RFID.

"The next step," Chin says, "was to come up with specifications on a design and carry out a request for design proposal, where interested parties were given the opportunity to propose a solution that could meet our needs. TCM RFID was chosen for this project, as it had a good track record for providing quality RFID solutions. We saw a live demonstration of their software and tested their hardware equipment before awarding them the job."

TCM RFID has received funding from the [Singapore Agency for Science, Technology & Research](#) (A*STAR), under the RFID Innovation Platform initiative, to assist with the project.

According to Chin, TCM RFID had to overcome a number of challenges unique to the company, including the sheer number of physical items stored within the warehouse, the need to operate 24/7 with minimal manpower, the high level of security required and the ability to integrate with the firm's existing enterprise resource planning (ERP) system. What's more, the interrogators had to be capable of reading past metal structures in the building—the presence of metal can make it difficult to read an RFID tag—and the system had to accommodate items of different sizes during the tagging process.

The RFID-enabled warehouse management system will allow the efficient tracking and management of equipment, parts

and components, Chin explains, such as spare engines and other items used in the maintenance of SMRT's fleet. "Each RFID tag will have a unique number that will allow us to track the real-time movement of every item of equipment in the warehouse," he says. "It has a self-checkout system on a 24/7 basis that enables our technicians to correctly identify and retrieve spares, enabling faster turnaround times for repairs and maintenance. It also allows for a far more efficient stock take."

Once completed across all three warehouses, the rollout will comprise six handheld RFID interrogators, three desktop touch-screen readers and six fixed interrogators work in conjunction with an electronic article surveillance (EAS) application. The information captured from the tags will be transmitted to back-end SAP and RFID systems, in real time, via a wireless local area network .

The potential benefits to SMRT are significant, Chin says. "Firstly, the self-service concept allows us to optimally use staff," he explains. "The system will have a feature reminding end users to pick up items that have been reserved—a task previously performed manually—and the time spent on physical inventory count by staff would also be reduced, leading to greater productivity."

Second, Chin says, RFID enables the company to track the shelf life of items in the warehouse, to ensure those past (or nearing the end of) their shelf life are removed. "This ensures that the parts are current, lowering the possibility of breakdowns in the transport network," Chin states.

"Thirdly, with automation and simplification of manual processes, our records can be updated accurately through electronic means," Chin says. "There will be greater stock accuracy, as everything will be electronically accounted for. Lastly, closed-circuit televisions (CCTV) that are supported by EAS readers at warehouse exits will ensure items are properly checked out and accounted for."

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The EAS system helps detect the unauthorized removal of RFID-tagged items. If a user attempts to take a part from the warehouse without following the proper checkout procedure, the system sounds an alarm to alert the staff.

SMRT is currently installing the system at its first inventory warehouse, and expects the project to be complete by October 2009, a process that will have taken seven months overall. The second warehouse is slated to be rolled out in January 2010, with the final location set to be ready by April of next year.

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