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## **Routeware Launches RFID Solution for Waste Haulers**

Routeware, a provider of hardware and software for the waste industry, is integrating low-frequency RFID interrogators with its DMS 5000 onboard computer so its customers can gain better visibility of drivers' pickup activities, and so they can track valuable assets, such as large trash receptacles, that

are transported, according to Ed Arib, the company's VP of advanced product. Texas Instruments is supplying the RFID readers, as well as the passive tags—compliant with the ISO 11784 and 11785 RFID standards—that trash collectors attach to the receptacles, bins and other containers.

The technology, Arib says, could also be used to automate and improve the process by which Routeware's customers track the recycling efforts of residents they serve. As an incentive to recycle a larger portion of their waste stream, he adds, some municipalities offer residents coupons or other discounts. In order to determine the weight of each resident's recycling bin and its contents, scales are integrated into collection trucks.

If the houses are widely spaced apart—in a rural environment, for instance—a GPS receiver mounted on the collection truck can provide accurate location data that is associated with the weight of recycling bins being collected, then transmitted to Routeware's software. This, Arib says, makes it easy to determine the amount residents are recycling, and to reward them accordingly. However, in areas where many residents live close to one another, the GPS system is not precise enough to accurately differentiate the location of one resident's recycling bin from that of a neighbor's. What's more, tall buildings and other physical obstructions interfere with GPS signals.

In locations where GPS data can't be used for recycling incentive programs, drivers must manually enter the weight of the bins and the address from which they are collected. But if an RFID tag is attached to each recycling bin and a mobile interrogator is installed on every truck, Arib says, Routeware can make the task easier.

"We mount the reader antenna so that it reads only the tag on the bin when the container is being dumped into the truck," Arib explains. This eliminates the need to use software to

filter multiple tag reads, or reads pulled from a number of tags simultaneously, which could occur if the reader antenna were mounted on the truck's exterior and could read the tags attached to bins as it drove past them.

To circumvent the RF interference presented by the metallic truck frame and hydraulic arms that lift the recycle bins, Routeware chose a low-frequency tag and interrogator because their radio signals are less susceptible to interference from metal. The company also knew the tags would need to be readable even when attached to large metal trash receptacles. "We tested the [Texas Instruments] low-frequency tag on large metal containers, and it works well there," Arib says. "But we're using a spacer behind the tag to create a buffer between it and the metal containers."

Based in Beaverton, Ore., Routeware has customers across the United States, including Washington, Texas and California. These firms range in size from small hauling companies to large municipal waste contractors. Routeware customers interested in tracking the Dumpsters or other metal containers they routinely transport to places such as construction sites can mount the TI reader on the trucks used to haul the containers, and affix a tag onto each container.

Whether tracking these containers, or plastic recycling or waste bins, Routeware software running on the truck's onboard Routeware DMS 5000 computer collects the tag data from the TI interrogator and transmits this information, via a cellular data transmission, to Routeware BackOffice—Web-based back-end software that amasses data from all collection trucks on a particular route, and also transmits route information and directions to truck drivers through the DMS computer. If a Routeware customer so chooses, it can then pull that data from BackOffice to its in-house route-tracking or billing applications.

Routeware and Texas Instruments will demonstrate the solution at the Waste Expo trade show in Chicago, being held May 6 to

8. According to Arib, Routeware initially intends to target the solution to its customers interested in tracking such assets as containers for construction debris. However, he says, the company is also eager to help its customers deploy the RFID technology as part of their residential recycling tracking efforts.

Rafael Mena, business development and applications engineering manager of asset tracking for Texas Instruments RFID Systems, says waste-management companies in Europe have employed its LF tags and readers for waste tracking applications for more than 10 years.

A startup company known as RecycleBank also utilizes the TI tags for tracking and weighing the recycling bins of tens of thousands of consumers in numerous Eastern states (see RFID Helps Reward Consumers for Recycling). And a suburb of Athens, Greece, is using an ultrahigh-frequency (UHF) passive RFID system to track garbage collection (see Greek RFID Pilot Collects Garbage).



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