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Automate With Active RFID

The Georgia Ports Authority's largest terminal yard is implementing a \$15 million active RFID (radio frequency identification) solution to increase yard capacity and throughput.

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With retailers and manufacturers facing decreasing sales and a commoditization of products, they're looking to increase profit margins wherever possible and are quite often turning to their supply chain – and you, their suppliers or logistics providers. Whether you operate a 500-acre terminal yard or a 200-square-foot warehouse, you are subject to the pressure of handling an increasing volume of shipments accurately and quickly for your customers, while still maintaining your own company's profit margins. One way to address this challenge is to turn to automation, and that often involves RFID. Passive, short-range RFID in the supply chain has been receiving the lion's share of coverage in the press, but active (battery-powered), long-range RFID is an approach to supply chain automation that is worth exploring, as the Georgia Ports Authority (GPA) is doing.



The GPA's Port of Savannah is composed of two terminals, one of which, the Garden City Terminal, is the GPA's largest and the United States' fourth-largest container terminal, with an area of 1,200 acres. Containers are shipped and received through 33 lanes spread across two gates and are moved to and from ships, trains, and trucks by 15 quay cranes. Containers are moved within the facility by 46 rubber-tired gantries (RTGs) (a commonly used crane-like device to safely lift and move containers within terminal yards; see photo on page 12) and/or 65 forklifts. The GPA has established its Port of Savannah as a key logistical hub in the Southeastern United States for national retailers (e.g. Target, Lowe's, Wal-Mart), and as more retailers move their cargo through the port, volume and throughput will increase.

The Garden City Terminal, which is now processing 7,000 daily gate moves (when a container is brought into or out of the facility through one of the yard's gates), expects to process more than 11,000 daily gate moves in three to five years. The GPA as a whole expects container volume to rise in the next 10 years from 2 million to more than 6 million a year. "We knew we needed to be able to handle this increase in volume without increasing truck turn times or causing delays at the gates," says Bill Sutton, general manager of IT for the GPA. "We made it our mission to create capacity, starting with the Garden City Terminal, to stay above the growth curve." To do so, GPA explored RFID technology.

The GPA was familiar with RFID on a limited basis, working with the Maritime Logistics Innovation Center (MLIC), a state program that promotes collaboration amongst private industry, colleges and universities, and state agencies. The project involves an active RFID-enabled global container shipment tracking solution from Savi Networks. But this project dealt with notifying customers of the movement of cargo, rather than creating automation and efficiencies within the terminal itself. The project could not be expanded for the GPA's needs, but the agency did get to familiarize itself with RFID and knew it wanted an active RFID solution. Active RFID involves a battery-powered tag, with the power source enabling the tag to constantly emit a radio frequency signal. This means active tags have longer read ranges, of at least 300 feet, whereas passive tags have a read range of 10 to 25 feet (for more information on active RFID tags, see the sidebar below). "We discussed passive versus active RFID, but passive just wasn't a good fit for our environment," says Sutton. "The RTGs

Active RFID Ideal In Logistics Environments

The Georgia Ports Authority (GPA) is in the process of implementing an RFID (radio frequency identification)-based yard automation system called ATAMS (Automated Terminal Asset Management System), developed in part by logistics and yard management software solutions provider Navis. The solution, along with other technologies, includes RFID tags and readers from IDENTEC SOLUTIONS.

When Navis developed the solution in response to an RFP from GPA, it needed RFID hardware that would provide identification and real-time visibility of over-the-road (OTR) carriers and in-yard vehicles while supporting automation of container handling processes within the yard. This required technology that could provide accurate long-range, high-speed data capture while withstanding the harsh outdoor environment. Navis chose IDENTEC ILR (Intelligent Long-Range) UHF (ultrahigh frequency) RFID tags and readers. "We had seen IDENTEC tags in other logistics and asset tracking situations and knew they could stand up to the task," says Mike Dempsey, VP and general manager of Navis. The tags are active, meaning they have a constant power source; in this case the battery lasts up to six years. IDENTEC offers its clients two different types of active tagging. True active tags enable users to work with RFID over greater distances, helping them to do their jobs faster and more securely. The call-response tags remain passive until requested to be active during the scanning process. This allows customers in rugged environments, such as the GPA's, additional flexibility in their RFID solutions.

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are 65 feet high, and we wanted to ensure we'd have reads if we placed RFID readers on the vehicle."

FIND AN RFID SOLUTION PARTNER WHO KNOWS YOUR BUSINESS SETUP

After establishing that it needed automation, the GPA created an RFP for a solution at the Garden City Terminal that would integrate with its existing gate and yard management system, Navis SPARCS terminal operating system (TOS). Navis is a software solutions provider of logistics and container management systems, and GPA had been a client for years. But after collecting more than 20 completed RFPs, the GPA was surprised to see a response from Navis that met GPA's requirements. "We didn't realize Navis could provide solutions in this vein," says Sutton. "But we were glad to work with a company that already knew our business and terminal needs." GPA developed a contract worth \$15 million with Navis as the prime contractor to design and build an Automated Terminal Asset Management System (ATAMS) in the Garden City Terminal to do the following:

- enhance operational efficiency through the automation of gate and yard processes
- identify and track containers whether they come via truck, rail, or sea
- automate container handling processes within the terminal using RFID to integrate data with GPA's existing TOS.

The ATAMS solution is composed of five key elements:

1. Navis software, including upgrades to SPARCS and the Navis Edge Manager middleware, the latter of which sits between the solution components and streamlines and processes data with the back end SPARCS system
2. an OCR (optical character recognition) solution from SAIC, which consists of an advanced camera system installed at the terminal gates. The cameras scan the large serial numbers printed on the sides of containers, converting the image of the numbers into a digital format that can be processed by computer systems
3. active, 915-MHz RFID tags and RFID readers from IDENTEC SOLUTIONS
4. a position detection system (PDS) from Sattel, which monitors the position of all container handling equipment via telemetry to automate yard location updates of the containers handled
5. a Motorola WLAN (wireless LAN) throughout the yard.

ACTIVE RFID, OCR REDUCE TERMINAL ENTRY TIME

Under ATAMS, the GPA will purchase 7,500 RFID tags to be distributed to the local drayage companies that come into the port. The tags are encoded with unique ID numbers; the drayage companies affix the tags to their truck cabs and use the Navis WebAccess application portal to enter the ID numbers of the tags and associate them with their truck ID numbers.

As a truck enters the gate, RFID readers collect the truck information from the tag and pass it through to the TOS. The truck then passes through the OCR portal, where the container number is read and communicated with the TOS via the middleware solution. In the Navis system, the information is cross-referenced and verified; then instructions for the drivers are sent to the gate pedestal where a ticket is printed. This process used to be done manually, with gate clerks visually reading container numbers and communicating with truck drivers via speakers to create the transaction. Without the automation, it would typically take 10 to 15 minutes for a truck to get through a gate. Once ATAMS is in place, a truck can travel through the RFID/OCR portal at 10 mph and initiate the transaction for the clerk to authorize, minimizing the verbal interview at the gate, resulting in quick truck turns and higher gate capacity. With the Garden City Terminal averaging more than 4,000 truck visits per day, that's a potential savings of hundreds of hours daily.

After passing through the gate, a driver travels to the assigned container handling equipment (e.g. an RTG), where a reader mounted on the equipment reads the tag on the truck cab. The ID of the truck is associated with the correct container number in the TOS and instructions for where the container should be put away are given to the RTG operator via a data terminal in the cab. The container is stored in a stack and its final location is updated in the PDS system. RFID readers or tags are placed on the various cranes and forklift trucks that will move the container to its rail or sea destinations, all while verifying the container's progress through association with RFID reads.

ATAMS is in its initial deployment stage and will be complete in the third quarter of 2008. Sutton is confident the system will help the port accommodate future growth and increase the efficiency, as well as the security (via increased visibility and accuracy), of the port. Shipping lines and trading partners, as well as U.S. Customs and the Coast Guard, can know what cargo is in the port and where it is.

Perhaps a \$15 million RFID solution isn't in the budget for your company, but elements of the solution can be used to increase your yard's throughput, and thus, capacity. For instance, tagging not the container but other proprietary equipment lessens the volume of RFID tags necessary to purchase (you don't have to tag and then lose the containers as they leave the yard/port), as long as you have a way of associating the container number with the tag. Regardless of what level of RFID technology you may consider, Sutton cautions those implementing to take it slowly. "You don't want to hinder your existing business, so do the integration piece by piece," he says.

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