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## The little chip that could

How radio frequency tags will reshape logistics from the bottom up

BY JOAB JACKSON

Imagine this dilemma: You are standing in the desert, overlooking 10,000 tractor-trailer-sized containers packed with everything needed to carry out a military operation. Your mission: find a pair of size 10 boots locked away in one of those metal vessels. What do you do?

Savi Technology Inc. of Sunnyvale, Calif., in February won a \$90 million contract from the Defense Department to provide the tools to make this kind of task easy. Now, all the military needs are systems integrators to make it happen.

Savi's technology involves a small device called a radio frequency identification tag, or RFID tag. The tags attach to the containers with magnets, and each has a memory module that holds the bill of lading for its host container.

Wireless readers around the perimeter of these containers query the tags. Back-end systems aggregate the data and feed it into the supply chain, data warehousing and enterprise resource planning systems that help commanders get the big picture ... or find the boots quickly.

Use of such tags is nothing new, as any holder of an automobile EZ-Pass knows. But the declining price of RFID tags and rapid standardization are setting the stage for widespread use in government and the commercial sector, industry experts said.

"There is so much return on investment here that organizations will be able to afford to install this infrastructure," said Dan Hushon, director of pervasive Java service for Sun Microsystems Inc. of Palo Alto, Calif.

Hushon said an agency can recoup its

investment in as little as six months, a fact that will become more attractive as devices and software become more standardized. Organizations such as the Washington-based Auto-ID Center, a consortium of private industry and government groups, are developing standards to replace commercial product bar codes with RFID tags.

Such widespread adaptation will facilitate mass production of the tags, reducing their cost to as little as five cents each, said Kevin Ashton, executive director of the Auto-ID Center, who spoke at a military supply chain conference held by Sapient Corp., Cambridge, Mass., last October.

One early adopter has been the Boston-based razor blade company Gillette Co., which in January ordered 500 million tags from Alien Technology Corp., Morgan Hill, Calif.

Consulting firm Frost & Sullivan Inc., San Jose, Calif., estimated that annual spending on RFID-related systems will grow from \$1.3 billion in 2001 to about \$7 billion by 2008, said Deepak Shetty, analyst for the company.

Wireless technologies such as RFID are the future of military logistics, said Tom Pavlick, managing director of the federal services practice at BearingPoint Inc., McLean, Va., formerly KPMG Consulting Inc. Last May, the company made a presentation to the Defense Information Systems Agency on the role wireless would play in the logistics field.

"The assets of all involved in the logistics supply chain will be wirelessly enabled," Pavlick said. "We'll know where our stuff is, where it is in flight. We will know how to repurpose it as the intensity of the conflict increases or decreases."

With RFID, an agency can "turn its network into a virtual warehouse," said Bruce

Jacquemard, who is Savi's executive vice president and general manager of global field operations.

### SAVI TO THE FRONTLINE

Founded in 1989, Savi was an early player in the RFID arena. Although the company expected its initial market to be parents who wanted to keep closer track of their children, the company soon found interest from another doting party: the Defense Department.

Operation Desert Storm was the impetus. While in the Persian Gulf, the U.S. military was plagued with logistics inefficiencies. Thousands of duplicate orders were issued from fighting units that were never sure when, or if, their orders would arrive. The Defense Department estimated it could have saved \$2 billion simply by giving the services a better status report of what they had ordered.

Commercial-grade logistics software could offer part of the view, but to get up-to-the-minute updates, the goods themselves needed to be tracked.

"Once this material has the [RFID] technology on it, the more you will have full real-time visibility on it, no matter where it is in the world," Jacquemard said.

Savi provides active RFID tags, which have an energy source such as a battery, so they can broadcast the information they hold to about 100 meters. An on-board memory module on the active tag can hold the container's manifest or other information and can be updated by a handheld reader. (Gillette purchased passive tags, which are cheaper, powerless transponders that return a signal only when polled by another device.)

Savi began working with the Defense Department in 1994, winning a \$70 million

contract, followed by a \$112 million contract in 1997 to provide RFID hardware and software to track items. The company received a \$90 million follow-on award in February.

Jacquemard said this work is just the beginning. While the Army was the quickest to tag its pallets, containers, rail cars and trucks, the other military services are picking up the pace, he said, though most are only tagging essential items, such as food and ammunition.

"If you think of the number of items that would be valuable to track, it would be hundreds of thousands," Jacquemard said. In July 2002, Army Gen. Tommy Franks, commander of the U.S. Central Command, issued a directive to his operations to tag all air pallets and containers with the RFID tags.

Beyond logistics, privately held Savi sees other markets in the military. RFID can help maintenance depots keep track of the scattered parts of airplanes or vehicles as they are being rebuilt. Hospitals can keep tabs on portable X-ray machines, defibrillators and other expensive equipment. In the security arena, RFID tags that follow containers can also assure they haven't been tampered with or opened en route.

"Any capital intensive environment for the military" could be better managed through RFID, Jacquemard said.

The company pitches its goods to systems integrators as a way to add more features to the work they do for their clients. Savi has worked with Northrop Grumman Corp., Unisys Corp. and others in the past.

## TSA JUMPS ONBOARD

RFID's next big step could be with the Transportation Security Administration. The agency put out a solicitation in November for its Operation Safe Commerce program to secure ship cargo containers that come into U.S. ports. Under this program, TSA hopes to put a system in place that, by using onboard tracking, sensors and door seals, will monitor

containers on freighters or in docks to ensure they don't get opened.

"If a container that was sealed has been opened or tampered with anywhere in its travels, an alarm can be sent," said Jerry Woolever, senior vice president for homeland security operations at Innovative Logistics Techniques Inc., or Innolog, of McLean, Va.

Congress has funded three demonstration projects to equip ports in Seattle, New York and Los Angeles this year. Approximately \$26 mil-

## **Frost & Sullivan Inc. estimates annual spending on RFID-related systems will grow from \$1.3 billion in 2001 to about \$7 billion by 2008.**

lion has been earmarked for these pilots, and each port will hold a competition for its own work. Each job should begin in spring or early summer and last about a year, according to requests for proposals issued by the ports.

"Once those technologies have been demonstrated as an improvement over the current way the supply chain is being monitored, the government will publish a standard for this technology to be applied by carriers, ports and manufacturers around the world," Woolever said. "We hope to have a leg up with our technologies to compete for this follow-on business, which is really where the marketplace will be."

Innolog, a military-focused logistics systems provider that has worked on Army RFID asset management solutions, is looking to take its logistics expertise to TSA and other agencies. The company has assembled a team of vendors and other support providers to compete for delivering a solution, which may include active tags that can be tracked with global positioning system tools.

Partners include travel intelligence provider America Systems Inc. (ASI), New York, NY; RFID systems provider Matrics Inc., Columbia, Md.; and ship container security consultants Shipsafe, Marblehead, Mass.

In addition to thwarting potential terrorist actions, such tagging will help keep lost goods to a minimum, Woolever said. And even the less-expensive passive tags can add considerably to the efficiency of a logistics operation.

"If you put a tag on every item inside a container, you can run the whole container by a reader, and it will read what is inside instantaneously," Woolever said.

The good news for integrators is that not a lot of re-engineering will be necessary to graft

RFID systems onto current systems, Pavlick said.

"I look at wireless as just another channel. Essentially, once you identify the asset, the system no longer knows that wireless identification has taken place. Once the data is in the system, it is relatively transparent," Pavlick said.

RFID can open a number of new markets to integrators, said Sun's Hushon. Sun is a member of the Auto-ID consortium and is extending its network servers, Web services software and identity authentication tools for RFID solutions.

Integrating RFID readers with the organization's networks and data processing facilities is where there is "potentially a lot of money to be made," Hushon said. Modules that allow RFID software to interface with enterprise resource management and other enterprisewide back-end systems will be required. Hardware and software installation, support and consulting will also be required.

"When this technology takes off, every loading dock and every forklift will end up having a reader installed," Hushon said. ■

Staff Writer Joab Jackson can be reached at [jjackson@postnewsweektech.com](mailto:jjackson@postnewsweektech.com).



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