

A new tag from Numerex and Savi Technology can intelligently determine whether to communicate via an active RFID network or satellite communications, thereby promising more thorough, end-to-end visibility in a global supply chain.

By Beth Bacheldor

Feb. 24, 2009—[Numerex](#), an Atlanta-based provider of fixed and mobile machine-to-machine wireless solutions and network services, and RFID systems supplier [Savi Technology](#) have unveiled an intelligent hybrid tag that combines active RFID, satellite communications and Global Positioning System (GPS) technologies. The tag is designed to track goods anywhere within a global supply chain, whether they are waiting in a warehouse, being loaded onto a ship or sitting in a desert at a bare-bones military outpost.

The tag, known as the ST-694 GlobalTag, has been in development since the summer of 2007, as part of a cooperative research and development contract for the [U.S Transportation Command](#) (USTRANSCOM), the [U.S. Department of Defense](#) (DOD) group responsible for creating and implementing global deployment and distribution solutions for the U.S. military and government.

"The DOD has a mandate for an asset tag that can be used to track assets end-to-end," says Pierre Parent, Numerex's VP and general manager of satellite solutions, "which includes the entire time that asset is in the supply chain—from the time it is packed up in a container, loaded onto a ship, unloaded and delivered."

Radio frequency identification works well to track goods, Parent says, as long as there are RFID interrogators located at various points along the supply chain to capture tag reads. But the U.S. military shipments are often beyond the reach of an RFID reader—the typical RFID read range for the ST-694 GlobalTag, for instance, is 100 meters (328 feet). When goods are moved into desert or mountainous regions to support troops in battle, that's where they can be misplaced and become vulnerable to theft.

Therefore, Savi Technology and Numerex opted to marry satellite and GPS tracking with active RFID into a single device controlled by one microprocessor. Not only can the tag automatically and intelligently switch between active RFID and satellite communications as necessary, but the data can be viewed using a single back-end system.

The ST-694 includes an active Savi tag that complies with ISO 18000-7, the standard for real-time locating systems that employ active tags operating at 433 MHz. The ST-694 also includes the SX1, a tag unveiled one year ago by [Orbit One](#), a division of Numerex. The SX1, which comes with a field-replaceable lithium battery, an internal motion sensor and an integrated GPS chipset, communicates with [Globalstar's](#) low Earth orbit (LEO) satellites (see [Orbit One Launches Satellite-Based RFID Service](#)).

The SX1 tag is programmed to activate several times per day, then send its GPS-determined location

information (latitude and longitude) to the nearest LEO satellite. Whether operating as an active RFID tag or as a satellite tag, the ST-694 transmits its unique ID number. The active RFID tag serves as the master component in the ST-694, leveraging a set of algorithms developed by Savi that can intelligently determine whether to operate in active RFID or satellite communications mode.

"When the tag is in the supply chain where there are nearby RFID readers," Parent says, "the tag will automatically shut off the satellite controller. And the tag is smart enough to know, when a container leaves a depot and is not within range of an RFID reader, to automatically flip on the satellite controller." Each time the tag communicates with the Globalstar satellite system, however, a fee is charged.

Additionally, the ST-694 comes equipped with a motion sensor. In the event that motion is detected for at least a half-hour, the sensor will automatically instruct the tag to operate in satellite communications mode.

"The tag always wants to use the RFID system, if it is available, because the RFID readers are an already installed system, and there is no cost," Parent states. "If the tag has to use a satellite, of course, there are costs."

There are auto-ID systems currently on the market that support cellular and satellite communications, as well as others that leverage active RFID and satellite technology. The DOD, for example, recently deployed a solution leveraging devices that act like RFID tags and communicate via satellite and cellular communications, that is helping ensure troops in Iraq receive their necessary supplies. This is being achieved thanks to a remote tracking solution implemented and managed by [Impeva Labs](#), a provider of asset-management systems, and logistics provider [Agility](#) (see [U.S. Army Achieves Real-Time Visibility of Supply Trucks Traveling in the Middle East](#)).

In addition, agriculture technology firm [TekVet](#), offers an RFID cattle-tracking system that utilizes active 418 MHz RFID tags, sensors that monitor an animal's internal temperature and transceivers to transmit each tag's unique serial number, as along with the animal's temperature, to an Internet server hosted by [IBM](#). Communication between the transceivers, which can be attached to poles or other fixed structures, and the Internet server is conducted via a 900 MHz private satellite communication network (see [TekVet-IBM Cattle Tracker Uses Active RFID Tags, Satellite Communication](#)).

There have also been prototype hybrid tags that combine RFID and satellite communications. In 2005, in fact, the Department of Defense tested a version that included a Savi active tag (see [DOD Tries Tags That Phone Home](#)).

A year ago, [Siemens IT Solutions and Services](#) conducted a proof-of-technology test on a solution that combined active RFID transponders and sensors with GSM and GPRS telecommunications technology installed on ships. The solution communicated the RFID and sensor data to a satellite telecommunications service operated by [Inmarsat](#) (see [Cargo-Tracking System Combines RFID, Sensors, GSM and Satellite](#)).

The new ST-694 tag is still a few months away from commercial availability, and pricing has yet to be determined. The tag will first have to undergo a series of tests to ensure it meets DOD requirements, including environmental tests and Hazards of Electromagnetic Radiation to Ordnance (HERO) testing to make sure the system won't accidentally detonate explosives. Once that has been completed, Numerex, Savi and USTRANSCOM intend to deploy the tags in a variety of military exercises and environments, as part of concept-of-operations testing.

"Testing in the lab can be quite extensive," Parent indicates, "but is never as thorough as testing in the real world."