

Passive Tag Powers Sensors, Switches

U.K. company Instrumentel says its passive RFID tags can drive sensors and actuators, enabling a range of telemetric and security applications.

By Jonathan Collins

Apr. 20, 2005—Instrumentel Ltd., a U.K. company founded to develop a way to monitor moving engine pistons, says it is developing passive 13.56 MHz RFID tags capable of powering sensors and actuating switches as well as holding data. The company claims its prototype tags harvest significantly more power from its readers than other RFID systems operating in 13.56 MHz.

"What we have is essentially a passive RFID tag and reader technology, but one that uses the combination of antenna design and electronic scavenging for power [from the reader signal] to enable our tags capture enough power to drive sensors or actuators to generate movement," says Steve Couchman, CEO at Instrumentel Ltd., which is based in Leeds.

The company claims that its technology can deliver read ranges of up to 200 millimeters (8 inches)—longer than the range of many 13.56 MHz passive RFID tags available currently. The company has developed several reader designs, including fixed and handheld readers, to work with its tags.

Instrumentel says its technology represents an example of "super RFID"—next-generation RFID systems capable of creating sensor networks or sensor telemetry that can be used to monitor conditions, record data, initiate action and share information with RFID readers.

Unlike the sensor in an active RFID tag, the sensor in an Instrumentel passive tag monitors its environment only when a reader interrogates the tag. In an early test of the technology, the company worked with a U.K. dental school that placed an Instrumentel tag with a pH sensor into dentures and used the tag to monitor the level of acidity or alkalinity of food in the mouth of test patients.

The technology developed at Instrumentel grew from a project to find a way to monitor engine pistons in a working car engine. That work, started in 1994 and carried out by Instrumentel founder and technical director Greg Horler, ran into problems finding electronic components that could withstand the harsh environment inside a car engine and were small enough to be placed on a working piston. The experience from that initial work provided much the technology that led to the creation of Instrumentel in 2001, which won its initial investment from the University of Leeds.

Using its technology's ability to actuate switches, Instrumentel has designed unique locking mechanisms that be integrated with its tags and can be applied to containers to secure goods throughout the supply chain. Its planned IntraLoc SmartPot & SmartPak products comprise a smart container that includes a tag capable of storing data and locking and unlocking the container using a reader signal. According to the company, the technology would be well suited to a range of applications, including securing police evidence and medical specimens.

In an ongoing trial, Instrumentel is supplying its tags and readers to U.K. company Loadhog Ltd. Loadhog designed a reusable plastic lid that it markets as a replacement for the plastic cling film currently used to secure loads to pallets. The company is adding Instrumentel's RFID tags connected to a locking system that fastens ties around the pallet and could provide a way to lock Loadhog's lids to secure palletized shipments. The lids could be locked and unlocked only by Instrumentel readers specifically designated to do so.

Currently, Instrumentel's tag averages around 20mm by 10mm in size, including a circuit board that will eventually be replaced with a silicon chip. Work on the design of the chip is underway and is expected to take nine months. Commercial products using the chip design should be significantly smaller and available a year from now, says Couchman.

Instrumentel maintains its tag and reader designs are best suited to applications where the technology can be designed to suit the use, such as supply chain security, piston telemetry and smart bolts that could monitor the stresses they are experiencing when installed in buildings and other structures.

"We won't be another tag supplier in the EPC tag market. We will develop solutions right at the state-of-the-art end of the [RFID] game," says Couchman.

Instrumentel says that while the price will depend on volume, tags using its technology will come in "below 5 U.K. pounds each."

Copyright ©2005 RFID Journal, Inc. All Rights Reserved