

Sensing Future Opportunities for RFID

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April 30, 2007—[AT&T](#)'s recent rollout of its managed RFID services highlights industry's growing focus on RFID and sensor-based networks (see [AT&T Expands Its RFID, Sensor Service Offerings](#)). RFID systems provide item and product visibility within the supply chain. However, this visibility can be translated into actionable data and predictive changes only with additional environmental information attained through sensors. The future vision for RFID technology, therefore, lies in achieving completely automated sensing networks that can react to external changes in real time.

Key end-user market opportunities include transportation and logistic systems, automated manufacturing systems, pharmaceuticals, health care, food supply chains, chemicals and petroleum. Sensing environmental conditions is a necessity with pharmaceuticals, foods and other products that have particularly short life cycles and are subject to regulatory and quality demands.

Legislation is also a critical driver furthering the case of RFID sensors within temperature-controlled logistics operations. Cold chain compliance is a key requirement for pharmaceuticals, hospital transfusions, clinical trials, foods and perishable items. With RFID slated to emerge as a pervasive supply chain management technology, integrating sensing capabilities within these tags would ensure the automated monitoring of transit and environmental conditions. This would also alleviate the need to invest in separate temperature loggers and sensors, reducing the total cost of ownership (TCO). The decreased investment costs are likely to be a huge driver within supply chains for low-value CPG items and food products with low trading margins. While the cost of RFID sensor tags is presently higher than that of their non-sensor counterparts, the increasing demand and the expected volumes are likely to drive prices downward, akin to price reductions seen in the passive RFID tag market.

Item-level tracking applications have gained significant traction since 2006, and this trend is likely to support the growth of RFID sensor offerings in the short term. Item-level tagging is currently being employed for high-priced retail goods, mission-critical equipment and items highly prone to counterfeiting. The relative price of such products can, hence, absorb the higher cost of RFID sensor tags. Thus, even though tagging cans of soda with RFID sensors is not a likely proposition today, a multitude of opportunities can be expected for item-level tagging.

Technology developments targeted at integrating RFID, sensors and cellular networks are expected to meet with considerable commercial success due to their customer-centric focus. Enabling personal wireless devices is a significant step toward ensuring a truly panoptic future for RFID technology across different applications and consumer segments.

The key challenge with such sensing networks includes a successful integration with the actual processes involved. Sensing information such as temperature or pressure needs to be understood in the context of the item being tracked, as well as the relevant location or stage in the process. The additional sensor-based inputs are likely to increase the data-management challenges that exist within RFID-based system architectures, and

system designs need to have the flexibility to scale up and process additional data streams.

RELATED_ARTICLES The RFID industry is slowly standardizing different product offerings. As a result, the landscape has become progressively more competitive. Increasing commoditization within the hardware segment is anticipated within the next few years, while technical innovation and sustained performance will ensure a significant differentiation in the marketplace. Ultimately, sensing capabilities within RFID product portfolios could be the key to increased differentiation.

While the potential for such solutions clearly exists in the coming years, an early-mover advantage in terms of product development and marketing could translate into capturing future market shares.

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