RFID 2004 FORUM
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Summary:
It may seem surprising, but on average, as a consumer product is transported
from source to shelf, there are between fourteen to eighteen companies who
interact with that good. What if it was possible to know where the product had
been during each step of its journey? More importantly, what if the information
gathered at each transition point could be used, in real-time, to “feed” the supply
chain process, rather than view it as an independent batch process? This would
be a new business paradigm, and a monumental shift away the standard
business cliché, used by more than one conference speaker, that “uncertainty is
the mother of inventory.”

There is a gravitational “pull” occurring in supply chain logistics, and it involves
the mandated use of RFID (Radio Frequency Identification) technology, also
known as “smart tags”. In North America, the US Department of Defense, and
major box retailers, are spearheading an effort to require suppliers to use RFID
technology to aid with in-transit, and inventory “visibility”. Early commercial
adopters include retail, pharmaceutical and packaged goods companies
throughout the world. In addition, projects are underway in hospital patient
management, asset tracking and security. However, real-world barriers are
hampering the implementation of broad cost-effective solutions across the entire
enterprise.

The RFID phenomenon, though primarily at the pilot stage today, will impact
every company, for better, or for worse. To this end, UCLA hosted a one-day
program in which logisticians, vendors, suppliers, and consulting firms discussed
technology, logistics, best practices, and the future of the industry. In all, thirty-
eight speakers presented.

Report:
The UPC (Universal Product Code), commonly known as the barcode, was
introduced forty years ago. It took almost twenty years for it to be ubiquitous at
the retail level. The next evolutionary step is the “smart tag.”

An RFID “smart tag” comes in a variety of shapes, sizes, configurations and,
costs. The way it works is that there is a small microprocessor, surrounded by a
web-like antenna. The device profile is such that it fits on the back of a
packaging label. When a characteristic radio frequency energizes the
microprocessor, electromagnetic energy, in the form of pre-programmed digital key, is reflected back to an RF code reader. There is no line-of-sight required for smart tag scanning, only proximity. A smart tag can be read up to 30 times faster than a UPC barcode. In addition, multiple smart tags can be read simultaneously.

Smart tags can be passive or active. Passive tags contain no power source, are mass produced, relatively inexpensive, and have short-range readability. Active tags include a tiny embedded battery (2 milliwatts power source typically), are mass-produced, but at a higher price point than passive tags. Active tags have readability up to several hundred feet. Both passive and active tags are manufactured to well defined engineering specifications, defined as Class 0 or Class 1 in North America. There is an emerging worldwide standard known as EPC Global (Electronic Product Code). This standard will support the global tracking of goods.

Digital information is read by an RF code reader and uploaded to a database. When it enters a computer system internal to a company – it is considered a closed system. When data is passed to a computer network accessible by other parties in the value chain who have a need-to-know mandate, – it is considered an open system. It is important to remember that information from the smart tag, does not travel in the same direction as the package.

Gartner Research, in 2003, outlined the transition of RFID data flow as follows:
- Closed Loop technology developed: Pre 2002
- Closed Loop pilot projects: 2002 – 2004
- Open Loop pilot projects: 2004 – 2007

Historically, Texas Instruments (TI) in America, and Philips in Europe, have been using RFID technology commercially for many years. In fact, it is estimated that TI has used over 350 million tags to date. However, new Industry initiatives, which are more consumer-driven in nature, are now emerging.

**General RFID Target markets are:**
1) Retail supply chain logistics
2) US Department of Defense logistics and Inventory Control
3) Packaging and shipping industries
4) Airline baggage routes
5) Brand protection (pushed by FDA for food and pharmaceutical products)

**Early adoption RFID target market opportunities:**
1) Military asset tracking
2) Truck yard management
3) Marine cargo tracking
4) Inventory replenishment  
5) Vehicle inventory tracking  
6) Hazardous waste container tracking  
7) Hospital asset tracking

**RFID in the News – September 2004:**  
Wal*Mart announced that it has a pilot project mandating one hundred of its top suppliers to deliver EPC compliant UHF RFID tags by January 2005 to three distribution centers in Texas. Labeling is to be gradually introduced, at the palette and case level, not at the individual item level.

Boeing stated that it would announce, in the first half of 2005, specifications for RFID technology for its suppliers.

IBM announced that it would invest $250 million in its RFID Business unit to address commercial market needs.

German-based global software firm SAP, announced a formal partnership with German-based semiconductor firm Infineon, to provide RFID solutions to industries worldwide.

**RFID Pilot Projects:**  
United Parcel Service has been using active RFID tags to track trailers for more than fifteen years. They are now piloting a passive smart tag program on packages.

British retailer Tesco, is focusing on item level tracking. A pilot project is underway with a DVD and gaming retailer in London. All shrink-wrapped products include smart tags. Store displays include embedded antennas in the shelving. When products are removed, or misplaced, store RF code reader can detect product quantities and position. A back room reader monitors inventory. At beginning of each day, a printout is provided to store manager indicating where product has to be replenished, or re-positioned.

CVS, a US pharmaceutical national retailer, is looking at embedding antennas in countertops within the pharmacy. If each pillbox, or drug container, has a smart tag label, then several questions can be immediately answered when referencing the database. For the store manager: Do I have the product in inventory? What products are out, or will be out-of-date within the next two weeks? Has there been a recall? For the territorial representative, or pharmaceutical manufacturer: Which stores have been the most efficient in moving product? Does one product sell better than another?
RFID Applications in Healthcare Industry:
1) The patient is seen as the key focal point in the hospital architectural model which is highly fragmented in its delivery of professional services.
2) RFID goal will be to improve patient identification and safety.
3) FDA is requiring Five Rights: Right patient, Right Site, Right dosage, Right delivery method, Right time. A “Smart Band” may be just what the doctor prescribes in fulfilling this legislative requirement.
4) Outgoing hazardous waste transport, either biological or radioactive, can be tracked.
5) Incoming pharmaceuticals can be managed, tracked, and secured.

Shortcomings of RFID Technology:
1) RFID technology is in constant evolution. Standards bodies exist, but not all parties are in agreement.
2) A complete system involves selecting the proper RFID Tag, the proper RF code reader, and the correct middleware to filter and aggregate the digital information. This is not an easy process, and over the last twenty years has not substantially improved toward an “off-the-shelf” solution.
3) Shipping information is competitive information. There is no willingness among retailers, shippers and logistics firms to share this information. RFID will not smooth the process.
4) It has been suggested that pre-approved “safe zones” will exist in the supply chain. This entails unconditional trust in certain participants as to where the goods are during transportation.
5) RFID is capable of tracking palettes of inventory, but most firms work with mixed palettes, and reverse inventory. RFID doesn’t address this true business concern.
6) There is no connection between a palette RFID tag, and a case on that palette.
7) In Healthcare, passive eavesdropping of patient information, or rogue scanning, could easily jeopardize consumer and corporate information confidentiality.
8) Where does one place the tag on an individual item?
   a. On pharmaceuticals its not a trivial matter
   b. On metal object it is difficult to select a good area.
9) How does one apply a smart tag? Current methodology is by hand!
10) Eventually the market will move to in-line label application, possibly 40 to 70 bottles per minute down the assembly line; however, RFID tags take approximately 0.5 seconds to print.

What does it mean to Canada?
Canadian firms are involved with developing RFID technology. For instance, SAMSys Technologies, Inc., based in Richmond Hill, Ontario, Canada, is a world leading provider of RFID hardware solutions, and was a presenting firm.
Furthermore, a select number of oil and gas firms, located in Western Canada, have been pioneers in the use of RFID technology to track the shipment of hazardous waste containers.

For businesses that ship products, and generally have more than fifty employees, the implication of RFID technology will be significant.

It is important to understand that there are a variety of market solutions available. Companies larger than fifty employees probably already have most of the infrastructure (i.e. computer network) in place. Management must view an RFID solution, not as a Return-on-Investment (ROI), but as a necessary operational cost.

System costs may be controlled on the basis of a phase-in strategy (a three-phase program is standard industry practice), and performing the necessary due diligence on a systems integrator before contracting the work.

**Conclusion:**
The retailer has the most to gain in the adoption of RFID technology. Wal*Mart’s long-range objective, which is supported by an academic institution study, suggests a total cost of goods savings of 0.5 to 1.0 percent. With annual sales of $240 billion dollars, that is a cost savings of $1.2 to 2.4 billion. That’s motivation enough!

More firms than those listed in this report are working on RFID solutions. The future of RFID will be surely shaped, not by the capability of the technology, but by the economies of scale of a complete solution, and personal security. It will more than likely take another five-to-seven years for RFID adoption to be commonplace within the supply chain.


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