



# Big Chief Partners, Inc.

## Automatic Identification Update

May, 2003

We are providing this document to keep you informed on our latest observations on the Automatic Identification industry, applications and technology. Please let us have your comments and observations. Thank you.

### Big Chief Activities

- Continuing work on commercial applications for the WebLink system developed by Big Chief for Philips Semiconductors GmbH.
- Travel to the U.K. for meetings with entrepreneurs and investors focusing on Automatic Identification in the European market.
- Presenting the "Security and Authentication Technologies" session at RFID-World in Fort Lauderdale, Florida, May 13, 2003.
- Providing RFID-enhanced conference kiosks and badges for attendees at RFID Journal Live in Chicago, June 11 – 13.
- Participating in RFID panel discussion presented by the Stanford MIT Venture Lab at Stanford University on June 17, 2003.

### WebLink from Big Chief Partners and Philips Semiconductors

Since early 2001, Big Chief Partners has been developing the WebLink system with Philips Semiconductors.

WebLink is software infrastructure or middleware for Automatic Identification focused on the desktop and consumer markets. The WebLink system collects information from RFID tags with filtering, aggregation and reporting while providing security and authentication at all critical points.

In September 2002, Philips and Sony jointly announced a partnership to develop Near Field Communications (NFC). This technology will enable new products and services based on industry-standard RF communications and close-range peer-to-peer networking. Big Chief is helping to define the new systems and infrastructure for NFC.

More information on WebLink and NFC can be found at:

- RFID Journal  
<http://www.rfidjournal.com/article/articleview/404/1/1/>
- News.com  
<http://news.com.com/2100-1040-956779.html>

**Observations from  
RFID World, Ft.  
Lauderdale, May  
2003**

RFID-World was a three-day industry event produced by Shorecliff Communications and sponsored by Texas Instruments. More than half the 500 attendees were vendors offering products and/or services that support deployments of RFID.

As with any RFID-oriented gathering, the work of the MIT Auto ID Center (<http://www.autoidcenter.org>) commanded significant mind share. There was much discussion of the Center's proposed standards and highly visible trial deployments. Most insiders agreed that the Center's emphasis on five-cent passive tags is both expanding and delaying potential RFID deployments.

Throughout the conference, there were numerous discussions about RFID reader antennas. Since passive RFID tags cannot generate strong RF signals, tag frequencies reader antennas have to be carefully chosen and tuned for each deployment. Speed, anti-collision and read range are all factors. In addition, the orientation of the tags and the materials present in the tagged objects also play a role. For example, liquid-filled objects such as beverage containers demand different equipment and configuration from metal objects such as automotive sub-assemblies.

This makes us wonder about the viability of the widespread distribution and retail deployments predicted by the Auto ID Center. It appears that no single configuration will be able to track the diverse products that are handled by a typical retailer. In particular, there can be no single, ubiquitous "smart shelf" product. The specifics of any smart shelf are highly dependent which products are displayed on that shelf.

We are starting to explore active RFID tags that generate stronger signals that can be more easily read in diverse environments (see section below). Emerging technologies could drive down the price of active tags and provide a competitive alternative to passive RFID tags.

Consumer privacy, counterfeit protection, security and authentication were also discussed widely at the conference. A specific focus was the Benetton announcements from March 2003. Several presenters mentioned the new "kill" feature that has been added to the Auto ID Center's Electronic Product Code (EPC) specification for compliant

tags. This kill feature can be used to permanently disable any tag when a tagged product is purchased. This would presumably reduce concerns from consumers who fear being tracked by the tagged products they own and wear.

This solution is incomplete but it's worth further consideration. In addition, companies deploying RFID in consumer applications need to better communicate the limitations and intentions of the technology because this would also reduce consumer privacy concerns.

The most widely discussed RFID applications involved manufacturing, supply chain, distribution and retail of Consumer Packaged Goods (CPG). We are also interested in other application areas including:

- **Mass transit** especially when it includes electronic cash for non-transit purchases. A prime example of this is the Hong Kong based Octopus card (<http://www.octopuscards.com/eng/index.jsp>).
- **Specific inventory management applications** that provide increased visibility, labor savings and reduce inventory loss and where technology challenges are not overwhelming.
- **Healthcare applications** that deliver benefits of patient safety, government compliance, reducing fraud, and improving the quality of care.

On May 14, the final day of the conference, Philips Semiconductors announced that its MIFARE® contactless smart card technology has been selected by Metro Transit in Minneapolis / St. Paul, Minnesota as the card to be used in opening the nation's first seamless, contactless automatic fare collection system.

## Auto ID Center Report Card

The Auto ID Center's stated purpose is to create the standards and develop the building blocks to create the "Internet of things". The Auto ID Center includes almost 100 global companies and five of the world's leading research universities. To a great extent, the work of the Auto ID Center has become the de facto vision for the emergence of Automatic Identification technology.

The Auto ID Center's primary focus is the tagging of Consumer Packaged Goods (CPG) to improve competitiveness, economies and efficiencies in manufacturing, supply chain, distribution and retail. The Center has conducted a series of high profile trials in which selected products are tracked through controlled environments.

We are concerned that success of the Auto ID Center trials will obscure the challenges involved in real-world deployments. In retail and distribution of CPG, we know that the products handled are made of highly diverse substances. This diversity specifically challenges the

performance of RFID. We are also concerned that the trials imply unprecedented cost sharing and information sharing between manufacturers and retailers. We believe these forms of collaboration could be very challenging in real world deployments.

The Auto ID Center has developed four standards to support the deployment of RFID. The Electronic Product Code (EPC) is a system for assigning unique identities to all objects. The EPC standard is simple and we expect widespread adoption. The Center has also defined standards for EPC-compliant RFID tags. These definitions do not include read/write memory or security and authentication features. It is reasonable to expect future versions of the EPC-compliant definition to include these important RFID features.

Product Markup Language (PML) is an XML-based format for communicating RFID-related information about products across systems infrastructure. PML is a core specification and we expect it to be expanded to include broader and more extensive information. We also expect many application-specific and industry-specific enhancements.

In the area of software infrastructure for moving information from today's readers to legacy enterprise applications, the Auto ID Center has defined Savants and Object Naming Service (ONS) as standards. Savants are distributed programs that manage RFID-generated data and route it to intended recipients. ONS is a derivative of the Internet's Domain Name Service (DNS) for matching specific EPC identities with their owners.

In general, we support defining infrastructure standards to create frameworks of functional components. Such standards can also delineate business focus for startups and established players. We expect software infrastructure for RFID to take many forms, driven by specific application, industry and technical requirements. As such, the Auto ID Center contributions represent a starting point for the development of this infrastructure. We hope these standards don't limit innovation.

**Software  
Infrastructure for  
Automatic  
Identification**

Software infrastructure continues to be an area of interest and focus for Big Chief Partners. Infrastructure includes both hardware and software, and industry-specific solutions are required. We believe this is a need for better infrastructure solutions.

According to consulting firm Accenture, over 50% of the cost of RFID deployment is consumed by infrastructure and systems integration. We believe better infrastructure solutions will reduce such costs and foster broader and more rapid adoption of automatic identification solutions.

In this context, infrastructure is the hardware and software technology required to bridge between today's RFID readers and legacy enterprise applications that deliver return on information. The need to handle large volumes of data generated by automatic identification is well known. Infrastructure will address this problem by collecting, filtering and aggregating information near the network edge. In addition, information will be enhanced, transformed and routed to the appropriate recipient or recipients. End-to-end security and authentication is a critical element of this infrastructure.

During the past six months, we have evaluated eleven systems integrators and infrastructure developers who are focusing on automatic identification. We have yet to see a vendor who's declared business model and goals exactly match our targets for success in infrastructure. The most compelling visible companies we have seen are:

- Globe Ranger (<http://www.globeranger.com>)
- Embrace (<http://www.embrace.com>)
- Ember (<http://www.ember.com>)

In addition, we are tracking four stealth companies. One of these has received Series A funding and another has received seed funding. The other two stealth companies are still seeking their first funding rounds.

## **Reconsidering Active RF Tags**

An active tag is one that comes with a battery to power the chip's circuitry and transmit a signal to the reader. They are historically more powerful and expensive than passive tags. A passive tag is one without a battery, and communicates with the reader by harvesting power from the reader's magnetic field.

Recently, passive RFID tags have received the vast majority of market focus. But, antenna limitations could severely inhibit universal infrastructure and mass adoption. Many applications require specialized antennas. Liquid and metals require different types of antennas. Wal-Mart, for example, sells products of both types, and would need antennas that could handle both types of goods.

We believe these limitations of passive RFID tags could inhibit their adoption in diverse and challenging environments. Coincidentally, some of the most-touted predictions for RFID adoption center on such environments. For this reason, we believe active RFID tags deserve consideration for certain types of RFID deployment.

The emergence of low profile and thin film batteries has the potential to significantly reduce the cost and increase the uses for active tags.

Companies to watch in this space include:

- Infinite Power Solutions  
(<http://www.infinitepowersolutions.com>)
- Power Paper (<http://www.powerpaper.com>)
- Cymbet (<http://www.cymbet.com>)

In a related development, the Smart Active Labels Consortium (<http://www.sal-c.org>) was formed in March 2003 to develop the use of smart active label technologies.

### **Postscript**

We welcome your comments, opinions and suggestions on these topics. If you're at RFID Journal Live (Chicago, June 11 – 13) or the Venture Lab presentation (Stanford University, June 17), please look for us for a further update.

### **For more information**

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