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SA electronics companies profile: Trolley Scan

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Another area where the South African industry has been very innovative, although perhaps somewhat ahead of its time, has been low-cost RFID devices. While still working for the CSIR in Pretoria, Mike Marsh developed the Supertag protocol and as part of this programme, the research team developed the first RFID supermarket trolley system which was demonstrated at a Pick 'n Pay store during 1994.

In the same year, Marsh and his colleague, Trevor Hodson, left the CSIR and started the company Trolley Scan to further develop low cost RFID systems. Within a short time they had developed a completely new protocol called Trolleyponder which was followed by further developments in the field of low energising RFID transponders, the first product being known as EcoTag. Together, these developments reduced the entry barriers for companies wanting to become RFID suppliers and made further advances in lowering the cost of the technology. The Trolley Scan technology is covered by both US and European patents as well as patents registered in several other countries.

Trolley Scan itself is not a mass producer of tags or readers. The focus of the company is to licence its technology for use by others. Trolley Scan do provide pilot systems however, which comprise a reader, antennas and 100 transponders based on the EcoTag technology. Alternatively, compact fixed and portable

readers can be acquired as well as OEM reader modules for incorporation into the customers own electronic system. The company's equipment is currently being evaluated in more than 38 countries and it is interesting to note that many leading first-world countries have licensed radio frequencies (860 to 956 MHz) suitable for passive RFID technology.

Trolleyponder technology allows many simple low-cost transponders to be attached to items that are to be identified, and for a reader located up to 11 m away to read all of these tags accurately. The transponders themselves comprise of a simple electronic circuit connected to a simple antenna in a form suitable for the packaging requirements of the application. Trolley Scan offers a number of different transponders including the credit-card sized Ecochiptag, a tiny thin-wire Laundrytag, the Ecowoodtag (specially designed to be attached to wooden objects such as pallets, trees and furniture) and the Ecofarmtag (ear tags for animals). The technology includes patented features that allow the passive UHF RFID transponders to operate on extremely low power, claimed to be just 0,5% of the industry standard. Although the original concept evolved from the requirement to automatically scan supermarket trolleys, the potential applications are endless, and could include such things as warehousing, animal herd counting, tracking aircraft baggage, laundry tags, timing of sporting events etc. It is also important to note that the transponders themselves are passive and respond only when interrogated with the electric field from the reader.

Following on the CSIR demonstration, the University of New South Wales in Australia demonstrated its Branders Point of Sale system based on the Trolley Scan technology during 1998. The Branders system is fully-automated and will scan a trolley or a basket within seconds with its

three-axis scanner. It then allows the customer to pay using a smartcard or a conventional magnetic swipe card. The most recent demonstration of the use of Trolleyponder technology for supermarkets occurred in the Philippines during 2004. Here, an industrial design student designed, built and installed an innovative automatic self-service scanning system for baskets. The system is known as Waverider. Note should be taken that in the original Supertag version demonstrated in the supermarket, the transponder required some 6000 μ W of RF power to operate. The latest transponder technology is looking at 200 μ W or less, a massive step forward. The Trolleyponder protocol allows up to 1000 transponders to communicate with the reader, even if they all have the same identity.

In late 2004 it was announced that a local company, *Global Auto ID*, had started large-scale production of Trolleyponder transponders and readers under licence from Trolley Scan. The company is initially manufacturing a mains-powered reader together with credit card sized transponders.

RFID technology is definitely about to take off in a big way with companies such as *Walmart* and the *US Department of Defense* having committed themselves to the technology. As Mike Marsh indicates, however, the capacity to produce the required estimate of 7 million transponders per second just does not exist at present. We must hope that Trolley Scan gets some of the action and that another local innovation becomes part of our daily lives. There still is discussion on whether the technology should be based on 'tags talk first' protocol (as with Trolleyponder) or 'reader talks first' protocol. Trolley Scan believes the latter approach will not be effective as readers placed in close proximity will interfere with each other.

