IDTechEx

RFID Analyst

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2006

RFID Forecasts 2007-2017

Contents

IDTechEx has interviewed key RFID adopters and solution providers in the various applicational RFID markets. This research has been analysed in a brand new report launched this month, giving an unprecedented level of insight into the total RFID industry and what is really happening. In this month's RFID Analyst (formerly Smart Labels Analyst), Raghu Das, CEO of IDTechEx, summarizes some of the findings.

RFID Forecast, Players and Opportunities 2007-2017

www.idtechex.com/forecast

What really happened in 2006?

At the start of 2007, the cumulative number of RFID tags sold over the last 60 years is 3.752 billion. 27% of that number were sold in 2006 and 19% in 2005, showing how sales have showed a very robust increase.

However, the sale of 1.02 billion RFID tags in 2006 (35% of those being RFID cards) has been disap-

pointing to those expecting higher volume sales of versions in the form of labels. The chart on the following page shows the number of tags sold by application in 2006 and the total tag value.

Which sectors are booming and which are under performing?

Below we examine a few of these sectors and give a taste of the re-

RFID Forecasts 2007-2017
(continued)

The number of tags sold by application in 2006 and the total tag value

Tag Location	Number of tags supplied in 2006 (millions)	Value of spend on tags (USD $ millions)
Drugs	15	3.5
Other Healthcare	10	5.1
Retail apparel	50	10
Consumer goods	10	2.5
Tires	0.1	0.1
Postal	0.5	0.3
Books	50	17.3
Manufacturing parts, tools	10	4
Archiving (documents/samples)	8	2.6
Military	10	200
Pallet/case	200	34
Smart cards/payment key fobs	350	770
Smart tickets/ banknotes/ secure docs	65	13
Air baggage	25	5
Conveyances/Other, Freight	10	10
Animals	70	140
Vehicles	2.5	23.8
People	0.5	9.5
Car clickers	46	46
Passport page	25	100
Other tag applications	65	87.1
Total	**1022.6**	**1484**

Source IDTechEx RFID Forecasts, Players and Opportunities 2007-2017

RFID Forecasts 2007-2017
(continued)

sults. Those doing well in numbers sold are sometimes much less impressive in dollars taken and vice versa.

What missed forecasts in 2006

Pallet/case tagging

Despite the progressive mandates by retailers in the US, consumer packaged goods companies have yet to realise any significant benefits let alone payback. The benefit has flowed rapidly to the retailer from the RFID solution providers who significantly funded development for this sector. What was anticipated to be a market of perhaps 5-600 million tags in 2006 came out at only about a third of this number – 200 million. That's an average of a few hundred thousand tags that each mandated Wal-Mart supplier bought for the whole year. Technical problems (the need to read 100% of cases and pallets despite metal/fluid contained in them and nearby) persist although users are pleased with the significantly improved performance from Gen 2. Infrastructure is still threadbare. Sub 10 cents tag prices announced by suppliers in late 2005 were intended to trigger hundreds of millions to billions of tags being ordered. The volumes never came in 2006 and there is over capac-

ity. Indeed, IDTechEx now hear of some major tag producers looking to get out of the business or at least outsource tag production. In 2007, IDTechEx now forecasts that the demand for tags for pallet and cases worldwide will be 420 million units, rising to more than 1 billion per year by 2009. However, the end game will probably happen broadly as anticipated, which means the tagging of most pallets and cases (about 35 billion globally each year) ten years from now. Adoption will not be linear but "hockey stick" eventually.

Drugs

Steadily taking 4.5million tags every year since 1999, Astra-Zeneca continue to use a chipless RFID tag on syringes of their anaesthetic Diprivan. Encouraged in 2005 by the FDA urging drug companies to use RFID on virtually all drug packages in the USA by the end of 2007, many RFID suppliers were disappointed when, in late 2006, the FDA faltered and backed down. Despite a high profile and significant work by the industry tagging drugs such as Viagra (Pfizer used about 5 million 2006) and products of GSK, Purdue Pharma and others, adoption in 2007 will still be low. This is partly because the industry

has yet to agree on a frequency – indeed it may never do so (think of anti-theft tags) and the FDA needs to lay down the law on what should be used rather as IATA did with baggage tags and ICAO did with passport tags, triggering major new RFID applications. For drugs, HF was preferred but near field UHF – pushed in mid 2006 – is promised to be just as good when it is finally tested in volume. It also operates at the frequency that Wal-Mart wants. Without significant infrastructure – i.e. a kick start from the regulator - the business case for item level tagging of drugs purely for anti-counterfeiting may be weak.

The successes

Airline Baggage

In 2006, 25 million tags were used for baggage tagging. Airports and airlines have been hampered by technical problems at the chosen UHF global standard frequency for baggage. Airports have deal with this by increasing the separation distances between bags or by shielding each one in a metallised "curtain" to create a Faraday cage. Both solutions look suboptimal and not acceptable to the industry for mass rollout. However, in late 2006, Paul Foster of San Francisco International

RFID Forecasts 2007-2017
(continued)

Airport reported at the IDTechEx RFID Smart Labels Europe conference that working with Quatrotec (owned by Alien Technology), they had overcome this problem by using focussed beams. Andrew Price of IATA, who will be presenting at RFID Smart Labels USA in Boston on Feb 21-22, reports, "In the next few years, the air industry will be tagging an ever higher proportion of its two billion bags yearly and it will use RFID in other new applications as well." Korean airports have placed orders with Symbol Technologies and others are following.

Retail apparel, item level

UK-based retailer Marks & Spencer continues to extend its successful item-level RFID tagging from 42 to 120 stores by spring 2007, on the way to tagging all 350 million items of apparel yearly. M&S has seen a sales uplift by being able to have close visibility of stock availability. M&S are not using EPC tags but a 64 bit identification number on each tag, saying this is much cheaper than EPC RFID, which is ironic as this was the original concept of EPC. Others doing similar item level work have reported excellent results, such as Tesco and Best Buy, tagging DVDs and computer video games respectively, both reporting a sales uplift of these items by 5 to 20%, though not necessarily a payback. The tags are applied to each item so when stock on each shelf gets low staff are informed and can replenish the shelf, rather than losing sales due to empty shelves. M&S have charged ahead because they only sell their own branded goods. The others have not despite the payback because they were hand applying the tags to the items at each store in the pilot which is not scalable. They need the item to arrive with the tags applied, but unless enough stores have the infrastructure they won't get the payback and packaging companies we spoke to were therefore reluctant. Despite this, Tokyo Shirt, Mitsukoshi and Hankyu Sores and others in East Asia are moving forward with everything from tagged suits, shoes, jewellery and knives to sushi meals.

At IDTechEx, we see this sector as being one of the fastest growth areas of RFID in retail – the business case is sound and many other "closed" systems exist like Marks and Spencer. Even the big supermarkets now have massive own brand business. In 2006 the Dutch bookseller BGN tagged all books in one Selexyz store and is now rolling it to all others because the paybacks are so compelling. BGN are using Gen 2 tags at UHF because the suppliers are "discounting the tag prices" (presumably due to over supply) but they are not using the EPC numbering the system as the book numbering standard is entrenched. Hear BGN present at RFID Smart Labels USA (www.idtechex.com/USA).

RFID card and tickets

RFID card orders are sharply increasing from many quarters. ERG of Australia, with over US$100 million in sales of RFID card systems has just announced two major orders totaling US$40 million, one being in Manila in the Philippines and the other being in Italy. They involve card payment systems for mass transit but also the newly popular use of transport Stored Value Cards SVC for a general cash replacement in shops, vending and so on. In 2007 China will supply the peak number of RFID cards for their national ID scheme – the largest RFID project in the world. This has a dramatic effect on the total RFID market value in 2007 as the RFID card portion accounts for 60.3% of the total RFID market value (including tags, systems and services) in 2007, dropping to 17.2% in 2012.

RFID Forecasts 2007-2017
(continued)

Animals

In 2006 70 million tags were used to tag animals. This will rise to 90 million in 2007. Those that are the supplying the systems are few but sizeable and (we expect) profitable. Allflex, for example, are based in Australia and focus on tagging animals. They are Texas Instruments' "largest volume RFID customer". Legislation around the world is driving RFID roll outs in this sector, often subsidized by governments. For example, New Zealand brought in a law in 2006 to tag dogs. Beyond that, the pickings are still rich. Digital Angel has just landed an order for "up to $10 million" to tag fish for the US Army Corps of Engineers. This involves counting populations and monitoring migration patterns.

Niches in labelling

On the other hand, label and packaging converters continue to enter the RFID business to meet their customers' demands. "Previously, label printers offering RFID were large corporations with ties to major supermarkets," says one manufacturer of RFID label converting equipment. "Now, smaller label printers have entered into the fold, supplying much lower volumes to satisfy niche markets." Many converters that IDTechEx has spoken to are supplying relatively small numbers of labels (tens of thousands to hundreds of thousands) but are able to quickly change design (frequency, etc) as required by their customers and supply into closed loop markets such as asset tracking, libraries, components etc. One example in 2006 was Hyan Label delivering ten million RFID stickers to the Chinese Government to issue to students so they could obtain discounts when traveling by rail. XinTag, also in China, has been commissioned to make 125 million RFID rail tickets. Since the Chinese national rail system uses at least three billion tickets yearly that is an interesting beginning.

Outlook for 2007

In 2007 IDTechEx expect that 1.71 billion tags will be sold. The total RFID market value (including all hardware, systems, integration etc) across all countries will be $4.96 Billion. By far the biggest segment of this is RFID cards. For those not involved in that sector, the 2007 market value for non card RFID (e.g. RFID labels, fobs, tickets etc) will be $1.97 Billion. Excluding cards, 58.4% of the market in 2007 will be in the US and 33% in Europe. Conse-quently, although China, for the first time, dominates the total RFID business – virtually without exporting – the USA dominates everything beyond the card part.

To see detailed market analysis by frequency, application, territory, year, tag type and all other major parameters, buy the fully comprehensive, best selling IDTechEx report "RFID Forecasts, Players & Opportunities 2007-2017" – extensively researched by global experts in RFID. It will save you significant time and give you the insight that any RFID business has to have.

See www.idtechex.com/forecasts for more information.

Don't miss the sixth annual IDTechEx RFID event in Boston on Feb 21-22. Now with delegates from 22 countries, this is the only event to give you high profile speakers in all the major RFID sectors.

See www.idtechex.com/USA ◆

RFID Analyst readers save 15% on the report price until February 16.
Quote 'journal' when ordering at
www.idtechex.com/forecasts

Contactless Smart Card Orders Flood In

In the last few weeks alone, orders for well over US$100 million of contactless ie RFID smart cards and associated systems have been placed. The business is surging forward with the percentage of smart cards that are contactless rising to 16% of deliveries in 2007 after having been stuck at around 5% for the preceding twenty years. One can even foresee the day when those buying smart cards with contacts will be asked to explain themselves. One can even foresee the day when those buying smart cards with contacts will be asked to justify themselves. Contacts are intolerant to orientation and moisture, and are susceptible to criminal activity. Why use them in a smart card? The lame reply about having the old infrastructure and not being able to afford the contactless one is the nearest to a valid excuse. A high proportion of new purchasers now seek the lower cost of ownership and the user friendliness of contactless cards and the orders are flooding in. Here are some examples.

Guatemala

CPI Card Group and Inside Contactless have been chosen by Visa Latin America to provide such cards and technology for three major banks in Guatemala. As part of the Visa Smart Breakthrough program, CPI Card Group has issued over five million contactless cards in the US. The contactless cards, manufactured by CPI and with the MicroPass chip from Inside Contactless, will be issued at Banco Uno, Banco Custcatlan and Bi-Credit.

Manila

The Large Projects Division of ERG Group of Australia has signed a contract worth US$20.55 million for a smart card based payment system for Manila, in the Philippines. Signed with First Versatile Smartcard Solutions Corporation, a private investor in public transport and cashless payments, it will involve the issuance of 500,000 contactless cards for purchases in Manila, followed by a transit application for use on public transport in the greater Manila Region, but that is only the beginning.

The system will be implemented on the light and metro rail systems in the City of Manila, later expanding to rail and buses in the Luzon region. The contract includes the installation of 200 Point of Sale (POS) devices. These will be used for reloading value onto cards and to enable cashless purchases to be made. 20 ticket vending machines and 50 gates will be installed at railway stations.

Italy

ERG has also finalised a US$26.87 million agreement with transport operators Azienda Tramvie ed Autobus del Comune di Roma (ATAC) and Compagnia Transoprti Laziali – Societa regionale S.p.A (CoTral) in Italy to supply a smart card based ticketing system in the Lazio region around Rome. Available to the public from mid 2007, the scheme will expand to its full implementation by early 2008. It will allow patrons to use same smart cards within both the city of Rome and Lazio region.

ERG will install equipment on 1,627 buses. This will locate the vehicles and communicate in real time via GPRS to the CoTral Operations Centre. It will also process the electronic tickets and smart cards. 100 mobile inspection devices will be supplied and 1,200 POS terminals will be installed to allow customers to purchase electronic tickets and load additional value on

Contactless Smart Card Orders Flood In
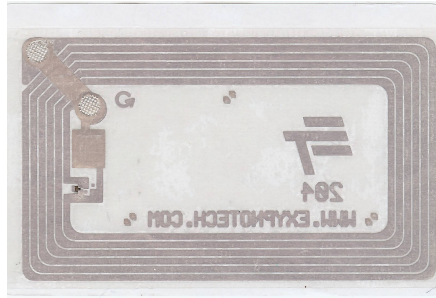## (continued)

the contactless cards. 48 bus depot computers will be linked to a central clearing and processing computer system for settlement of accounts of various service providers.

Dubai

Dubai International Airport has recently awarded Eastnets and Zebra Card Printer Solutions a contract to provide card management and issuance of contactless cards. These cards will be used on new electronic "eGates" in the airport, designed to reduce delays and give registered passengers automated entry or exit through the airport. Zebra printers with NXP Mifare cards are involved with 100,000 cardholders enrolled to date. Over 25 Zebra Card Printers are now being used at the airport to produce the contactless smart cards necessary to accelerate immigration procedures and enable passengers to merely swipe their cards and have a three second fingerprint scan.

USA

The Washington Metropolitan Area Transit Authority has awarded a US$11.58 million

contract modification to Cubic Transportation Systems, Inc to implement software and technology upgrades merging the Metropolitan Area rail, park-and-ride and regional bus systems through a common smart card and a centralized transaction processing and reporting back-office system. Enhancements will include new contactless card readers at all Metro subway and parking facilities, expanding the SmarTrip regional smart card system. The upgrades will increase efficiency and save the agency millions of dollars in annual operating costs.

China

Of course, the largest contactless smart card project of all is the national ID card for China where they are racing to issue 900 million to most adults by the time of the Olympic Games in 2008. That means $1.2 billion of readers and $2.25 billion of cards, deliveries peaking in 2007 at 250 million cards if you

believe Eurosmart or 300 million if you believe IDTechEx. With the massive city card schemes rolling out in China, this may make China the world's largest market for RFID by value in 2007, though this will be short-lived as the biggest schemes saturate. Nevertheless, many other contactless card schemes are on the way in China, so it will stay one of the largest markets for RFID. For example, China Expert Technology has received a US$57 million order for e-government systems in Fuzhou City in the Fujian province. It includes design and implementation of a contactless card security system.

Korea

There is much more to come. For example, the high technology New Songdo City being built in Korea at a cost of $25 billion will have universal contactless smart cards to pay bills, access medical records and open doors. If it uses a contactless interface for all of these things it will be progress indeed because health cards, though being issued in tens of millions worldwide are almost all of the unreliable, short lived user unfriendly variety, meaning they have contacts.

Contactless Smart Card Orders Flood In
(continued)

Europe

After the great success of contactless cards in World Cup football in Germany, the Netherlands and the UK keen followers in this application. For example, at the end of 2006, London-based premiership football club Fulham started to issue contactless cards to fans to cut queues at the turnstiles. This will boost safety. A new card has been developed for use by the club, containing specific data on football matches that the cardholder has paid for. The card can be updated by telephone.

20,000 of these new cards have been issued to members and season-ticket customers. 46 Smart Card readers have been installed on turnstiles at the club's grounds. Fulham's head of IT, Matthew McGrory, says, "The old system took, at the best of times, ten to twenty seconds per season ticket holder on the turnstile," he said. "That is now down to four seconds."

Credit, debit, account and stored value cards from banks

The success of contactless card payments in the USA in 2006 was been such that Visa described its Visa Contactless product as "one of the most rapidly adopted payment innovations in Visa history". Since contactless bank card payments were first introduced in earnest in 2004, over 13 million MasterCard, Visa and American Express-branded cards have been issued. They are accepted at over 30,000 US merchant locations. Chase, Citigroup and Wells Fargo have led the way.

The market potential is huge – research by McKinsey, commissioned by MasterCard, indicates that about 2.5% of all cash transactions in Europe currently fall between €5 and €15, (about US$7-18) and that around 40% of these could potentially be carried out by card.

Such was the success of its UK contactless card trial in 2006 – which found that using a contactless card could have transaction times to less than five seconds – that MasterCard announced in November 2006 that it would be extended to the bank's London offices. Further, a MasterCard trial will be conducted in Toulouse, France, to test an EMV-enabled multi-application RFID card. MasterCard will work with LaSer Confinoga. Galeries Lafayette and Monoprix stores throughout the city.

Visa has also recently announced that it will roll out contactless cards in Europe in 2007 concentrating its efforts initially on London. With Barclays Bank and Transport for London it will introduce an integrated travel and payment contactless card, which customers can use to purchase items under £10 (about US$19) and to replace Oyster travel cards on the city's underground and bus services.

Visa finds that London has all the pre-requisites for use of contactless stored value bank cards, including a high level of commuters using public transport, a large student population, residential areas, offices, a large penetration of target merchants and the 2012 Olympic games coming up (of which Visa is a sponsor).

For more read "Contactless Smart Cards and Near Field Communication 2007-2017" www.idtechex.com and attend RFID Smart Labels USA 2007. ◆

Printed Electronics – On Track to Become a Major Industry

Nowadays, the term printed electronics is taken to include thin film electronics that will become printable. Most of the potential for printed electronics lies in what Toppan Forms calls Smart Media Products (SMP) which will be intelligent and mass producible yet often customisable as well. They will usually be used at the human interface or connected to networks and embedded ubiquitously into the environment. All this means that printed electronics will largely create new markets, such as tape around pipelines to detect leaks and impending leaks and signal that there is a problem. After all, leaks still occur in the Trans Alaska pipeline, in refineries and in utility pipes underground.

Certainly, printed electronics will commonly take the form of tape, "wallpaper", posters, patches and packaging rather than electronic equipment. Electronically savvy companies already making patches, tape or packaging such as 3M and Toppan Printing will be more comfortable with this world than the big computer and telecommunications businesses or even the silicon chip makers.

Smart everything

Basically, we are scoping a major change throughout society from the smart shop and office to the smart home. The US Army plans to use printed electronics to re-duce the weight of a warfighter's pack by two thirds and give him smart clothing that generates electricity, heats him, cools him, monitors vital signs, acts as a long range antenna and so on. Printed electronics can reduce cost but it also involves sophisticated structures some of which perform better and are more fault tolerant than traditional alternatives. Most commonly, it will be used where traditional technology is simply not a feasible solution.

Printed electronics technology

The biggest potential lies in organic or combined organic/inorganic structures because they often promise the lowest costs, allied to the fastest printing technology, such as gravure employing water-based inks, with low temperature curing. Ink-jet is also a most popular choice because of its tolerance of uneven substrates and its instant reprogramming. The silicon chip has little to offer beyond logic, memory and a few small sensors because it is only economical when small. By contrast co-deposition of different devices using printed electronics can exploit the fact that it is economical with a large footprint. For example, actuators, batteries, powerful capacitors and resistors, photovoltaics and a considerable choice of wide area sensors will be codeposited without the need for conventional unreli-able and expensive interconnects required when connecting silicon chips.

However, the only severe impact on an incumbent technology may limited to button batteries and a few other things. Later there will be a big impact on conventional lighting, when the up front cost, installation cost and running cost of flexible Organic Light Emitting Diodes OLEDs all become superior but that is probably ten years away. Most other applications of printed electronics and electrics will be huge only because they do new things and create new markets, not because they primarily replace existing solutions. Indeed, even with lighting it will often mean creating light in new ways and new locations.

Biggest opportunities are with flexible substrates

The biggest opportunity for printed electronics is for versions on flexible paper or polymer substrates because these will become lowest in cost and most suitable physically for the largest volume applications in future such as smart labels, smart packaging, books, newspapers, signage, posters and billboards. Flexible substrates also give us lowest installation cost compared with today when conventional electronics and electrics can cost as much to install as to buy.

Printed Electronics – On Track to Become a Major Industry
(continued)

The printed electronics value chain

The printed electronics value chain

The printed and thin film electronics value chain is shown in the diagram top right.

In the early stages of this industry, technologists have reported that life, performance and cost are variously delaying progress. However, lack of imagination is also holding things up. The most important challenges vary between the different types of component being developed and some are summarised below. They include Thin Film Transistor Circuits (TFTCs) combined with antennas to form RFID labels and the various forms of thin film photovoltaics PV, being launched in 2007/8. Main impediments to marketing in 2007 are shown in the diagram bottom right.

Nonetheless, as all eventually approach maturity it looks as if the shortage of technically savvy, imaginative product design and marketing will eventually apply to everything. For example, who can match the blistering pace of T-ink in applying today's printed technology to interactive tablecloths for Hallmark Inc, table mats for McDonald's, pillow radios for Toys 'R' Us, weight reduction and saving space in cars and secret equipment used by military forces?

Source IDTechEx / Toppan Forms

Main impediments to marketing of certain types of printed electronic component in 2007

Source IDTechEx

Printed Electronics – On Track to Become a Major Industry
(continued)

Lessons from the race for flexible electrophoretic displays

In 2007, the most significant announcement has been the raising of $100 million by a small company, Plastic Logic, to set up a factory to make flexible electrophoretic displays in Dresden in Germany. The facility will produce flexible active-matrix display modules for 'take anywhere, read anywhere' electronic reader products. It will utilize Plastic Logic's unique process to fabricate active-matrix displays using printed transistor backplanes that are thin, light and robust; enabling a reading experience closer to paper than any other technology.

The financing is one of the largest in the history of European venture capital. Bandel Carano, Managing Partner at Oak, an investor, said "Plastic Logic has created a pioneering technology that will revolutionize the way that people interact with their media on the move. This investment is a perfect fit with Oak's vision of future media interaction through handheld devices."

Hermann Hauser, Director of Amadeus commented "Having backed Plastic Logic from day one, I am delighted that the first full commercialization of plastic electronics is now firmly in our sights. With this investment we are not only scaling up a great company - we are also creating a

Plastic Logic "take anywhere, read anywhere" Imaging Film® display using E Ink

Source Plastic Logic

new electronics industry that will become a significant addition to silicon."

The remarkable progress of Plastic Logic in setting up production for flexible electrophoretic displays enabled by its printed organic field effect transistors can be contrasted with Sony in Japan setting out to do the same thing. In this case we have a giant corporation that is already selling rigid electrophoretic displays. However, it has been late in developing printed organic thin film transistors on flexible substrates, issuing most patents in 2006/7 as it races to catch up. The new markets that the two companies create for e-books, signage, military roll up displays and so on will be big enough for both of them to prosper. Perhaps they will both

end up making their highest volumes in China but one giant will be notably absent. Xerox has shut down its Gyricon subsidiary developing flexible electrophoretic displays. This sort of interplay will be worked out with photovoltaics, batteries and many other printed components in the next few years and clearly it is wrong to believe that the giants will always win. Some of the small companies like Plastic Logic have many giant backers anyway. It would also be wrong to say that manufacture in a certain part of the world is a guarantee of success.

All these issues will be aired at the global conference Printed Electronics Europe 2007 in Cambridge, UK on 17-18 April 2007. www.printelec.com ◆

RFID in Healthcare and Pharmaceutical Applications

2006 was a pivotal year for RFID in healthcare and pharmaceutical applications. At last there was widespread adoption of patient compliance monitoring blister-packs in drug trials. These packs, costing $15 or so, improve the quality of data gathered in drug trials by recording which tablet was taken when and, thanks to RFID in the pack, relate that information to a specific patient without unreliable manual input. With 40-50% of patients taking their medicine incorrectly, that reform was long overdue. Leaders in best practice now include the US National Institutes of Health using 30,000 such packs to trial their new antibiotic Azithromycin and Novartis using the packs in drug trials.

Another wakeup call was heeded by hospitals. They typically lose up to 15% of assets by value every year. Indeed, Modern healthcare has reported that the typical hospital can not locate 15-20% of its assets and time spent searching for them equates to $1900 per nurse. Here active RFID is now used, where there is a battery in the tag to give long range or sensing capability. Particularly popular in the last year has been the more sophisticated version of this called Real Time Locating Systems RTLS, which locate tagged items at a distance without them needing to pass near the reader electronics. About 100 hospitals have adopted RTLS for either key assets or staff. Particularly popular has been the new version that does not need its own infrastructure because the tag locates itself using a pre-existing WiFi infrastructure. This saves cost and problems of tag batteries lasting only a few days and tags being expensive have largely been overcome in the last year. However, there are still concerns about software maintenance, availability and accuracy with some such schemes and even the risk of overloading a WiFi network used for life saving actions such as data capture by physicians in transit. Conventional RTLS systems from TrenStar, Wavetrend, WhereNet and others have therefore also proved popular in hospitals in the last year. Indeed, versions that let a nurse press an alarm and be instantly located have been valued in dealing with the increase in violence towards medical staff.

The world's largest database of case studies of RFID in action is the IDTechEx RFID Knowledgebase www.rfidbase.com and this has seen Healthcare applications rise to 8.1% (199) of all cases, so it is now the sixth most important applicational sector for RFID by this measure. By money spent, Healthcare is even higher in the pecking order and progress is rapid, not least because, with FDA encouragement, many pharmaceutical manufacturers in the USA are now tagging even the smallest containers of tablets to provide full reverse audit at item level ("pedigree") to combat the rise in counterfeiting.

The only disappointment is the perseverance with the old contacted smart cards for patient records and access, given the fact that cards with contacts are disabled by the slightest amount of moisture and dirt and have to be put in a slot the right way up and the right way round. Contactless ie RFID cards should be used as they simply have to be held near the reader and they are more reliable and have longer life. That is why they are the norm for bus and train systems and are being adopted by the major credit and debit card brands. Time for healthcare professionals to catch up.

For more see "RFID in Healthcare 2007-2017" and attend RFID Smart Labels USA 2007 in Boston, USA, on February 21-22, 2007. www.idtechex.com/USA ◆

Printed Electronics – the Missing Fragments

Nowadays, the term printed electronics is taken to include printed electrics and even thin film devices that are likely to be printed in due course. Anything less risks missing the big picture, the subject is moving on so rapidly.

Organic Light Emitting Diodes

Of the different components that are becoming printable, Organic Light Emitting Diodes (OLEDs) are very important. This is because they are set to replace many of today's electronic displays with something more economical and with better performance. They will do the same with much of today's lighting as well. In both cases, the change will be accelerated by the advent of cost-effective flexible displays because they will have lower purchase and installation costs and they will open up a vast number of new applications where light emitting surfaces have been impractical in the past.

However, cost-effective, flexible OLEDs with suitably long life may not be in mass production for a decade despite hundreds of organisations developing them.

About 70% of the patents on printed electronics, in the broad definition, relate to OLEDs and that is out of proportion to their potential.

For example, light emitting displays will probably always suffer from being more expensive, poorer in definition and more wasteful of power than the best non-emitting displays.

By contrast, electrophoretic signage and e-books only need power when their images are changed. Electrochromic and thermochromic displays are inherently cheaper and they, and ac electroluminescent displays, are available in flexible form today. Printed flexible AC electroluminescent displays are even available in areas of hundreds of square meters.

All displays can be improved and all have considerable unrealised market potential. There is therefore scope for many more companies to work on the other displays, because under twenty companies are involved seriously today. For example, more effort in improving their colours and lifetime would be well justified.

Some neglected areas

Many other areas of printed and potentially printed electronics are being relatively neglected. Take batteries. Most potential applications of printed electronics call for batteries, preferably of low cost and flexible. The technical requirements vary greatly between the different applications, yet we are stuck with a handful of suppliers who either offer carbon zinc with its limited life, power storage and rate of delivery or lithium technologies with their problems of cost and environmental credentials.

Some would add that lithium is also a fire hazard given what has happened with large lithium batteries in electric vehicles and laptops but the tiny amount of material in a printed lithium battery means that fire or explosion is the least of its problems.

The important question is:

Printed Electronics – the Missing Fragments
(continued)

"Who is working on the intermediate printed battery technology demanded by the market place?"

With large battery technology we have nickel metal hydride for example. For printed electronics we have nothing.

A similar question can be asked about large printed memory – from kilobytes to gigabytes. So few companies are working on this that AMD has about 80% of the patents for potentially printable, thin film versions, yet large memory will be needed for a high proportion of applications involving printed transistors.

Many companies print transistors and photovoltaics

Printing of transistors and of photovoltaics seem to have their fair share of the cake, with about 100 organisations now working on each. Several companies promise initial commercialisation one or other of these this year and many are to be on flexible substrates. In particular, the Japanese have moved into overdrive in registering patents relevant to printed transistors in the last year.

One can not be as sanguine about printed sensors, fuel cells or even development of alternatives to printing silver for conductors, fuses, antennas and so on. Too few organisations are working on these aspects.

A major impediment to the commercialisation of printed electronics is the large footprint. For transistors, this is caused by the large feature size, for con-ductors by the poor conductance of the inks and for photovoltaics by the poor efficiency. It therefore comes as a surprise that few are working on the printing of one component on top of another because this would reduce overall footprint and improve reliability by eliminating conventional interconnects.

There are therefore many sectors of printed electronics with little competition and great needs and most players would be wise to be profitably serving these as they watch the impending shakeout of OLED developers from a safe distance.

For the latest on all these opportunities and other aspects of the printed electronics industry attend Printed Electronics Europe 2007; held in Cambridge, UK, on 17-18 April 2007 with optional masterclasses on 16 and 19 April.

See
www.IDTechEx.com/peEUROPE
for more details.◆

Biocompatible Chipless RFID Ink in Cattle and Laboratory Rats

Somark Innovations, based in Saint Louis, USA, recently announced the successful testing of Biocompatible Chipless RFID Ink in cattle and laboratory rats.

The test proved the efficacy of injecting and reading a Biocompatible Chipless RFID Ink "tattoo" within the skin of animals. The technology will be initially leveraged to the livestock industry to help identify/track cattle and thus mitigate export trade loss from BSE (a.k.a. Mad Cow Disease) scares.

Secondary target markets include laboratory animals, as well as dogs and cats, prime cuts of meat, and military personnel. The company, which is currently raising a Series A equity financing, will license the technology to secondary target markets.

Chief Scientist Ramos M. Mays is excited with the results: "This is a true proof-of-principle and mitigates most of the technological risk. This proves the ability to create a synthetic biometric, in other words a fake fingerprint, with Biocompatible Chipless RFID Ink and read it through hair."

Additionally, the company is pleased to announce the establishment of its Advisory Board, which includes scientists, engineers, and executives in the agriculture industry. Mark C. Pydynowski, Somark's President, said: "Our new advisors in conjunction with the live animal tests provide significant validation for our technology and team. This brings us closer to our goals of helping the United States reclaim the title of world's premier producer of high quality beef and ensuring a safe food supply."

Since the system is based on ink, the cost of each ID is inexpensive compared to leading technology, the RFID ear tag. Conventional RFID ear tags, which sell for $2.25, include a microchip and antenna. Price of the other system components, applicator and readers, which are one-time purchases, are less important than the price of the "ID" because if the ID's high turnover rate. The turnover rate of cattle (IDs) is similar to the razor/razor blade business model.

Somark will solve the retention problem of ear tags, which fall off at a rate of 60%-97%, with complete skin/hide integration similar to a human tattoo. Somark's ID and reader placement will solve the readability problem of ear tags, which suffer from read rates of 76%-98%.

Speed of Commerce Compatibility

Ear tags can lose functionality as a result of inclement weather conditions. Somark's ID will not degrade with time of harsh environmental conditions. Additionally, the ID's integration with the hide will help prevent tampering and cattle rustling.

About Somark Innovations

Somark is a technology company located at the Center for Emerging Technologies and is developing a proprietary ID system based on a biocompatible ink with chipless RFID functionality. When applied, the ink creates a unique ID that can be read without line of sight. This technology will be initially leveraged to the livestock industry to help identify/track cattle and thus mitigate export trade loss from BSE scares aka Mad Cow Disease. Secondary target markets include dogs & cats, laboratory animals, and individual prime cuts of meat. www.somarkinnovations.com

Somark Innovations will be presenting at RFID Smart Labels USA 2007 in Boston, MA, on February 20-23, 2007

www.idtechex.com/USA ◆

RFID Smart Labels USA 2007

Active RFID & RTLS

Premium RFID Insight and Analysis for Your Business

The 2007 IDTechEx RFID conference and exhibition exclusively delivers:

- Over 80 of the world's premier companies sharing what works and where the money is made

- Full technology analysis from printed RFID to Real Time Locating Systems and everything in between

- The global situation with developments in Asia, Europe and the Americas

- Business case insight to enable you to add value to differentiate your company

- FREE access to IDTechEx research including over 2,500 RFID case studies in 91 countries and on-going market analysis

Network and learn with over 600 delegates from 30 countries at this content-driven conference and exhibition with optional masterclasses, Investment Summit and company tours. Growing by over 25% each year!

World-class speakers include:

Coca-Cola

UNITED STATES POSTAL SERVICE

Unilever

ROLLS ROYCE

CAT

bp

IATA

Sponsors:

DELO • DOW CORNING • Electronics Solutions • Emerson & Cuming • IBM • Impinj • Mühlbauer High Tech International • Parelec • symbol The Enterprise Mobility Company • TAGSYS RFID e-connecting goods

The big picture - nothing less

The sixth annual IDTechEx event features detailed user experiences and implementation case studies allowing you to learn the business case by market segment. The second day of the event gives you unrivalled assessment of all the RFID technologies, including for the first time a full day track dedicated to active RFID and real time locating systems. Learn about:

• Profitable RFID sectors and big forthcoming orders - who, where, what for?
• Progress from around the world – Asia, Americas and Europe
• The good and bad technical and business issues that users across different sectors are experiencing
• Opportunities across the full value chain – how to add value

RFID assessed for YOUR needs.

What you get

You don't just keep up - you stay ahead: All conference delegates receive free access to IDTechEx research including:

• Three months access to over 2,500 RFID case studies in 91 countries from the **IDTechEx RFID Knowledgebase** (worth $750). Learn what is being done by territory, technology and company in the world's largest online RFID database. Covering real-world lessons, paybacks and RFID ROI and technical detail.

• Six months access to the **IDTechEx** monthly journal **RFID Analyst** (worth $500), containing original in-depth analysis of markets, technologies and conference presentations worldwide. Over the last 12 months, for example, our researchers have toured Japan, China, Australia, America and Europe all exclusively covered in this journal.

• **Free Copy of RFID in Action 2006/7 report**, containing detailed descriptions of 23 RFID case studies in many different end use sectors. Supported by GS1 UK, the UK providers of the EPCglobal network.

• Access to **IDTechEx Analyst webinars** covering new RFID market forecasts.

"To baseline where you are, what you want to achieve and how far you are on that RFID journey, there is no better event to become truly informed" - Rolls-Royce

"Very good mix of actual experiences, technologies and industry visions" - Asymtek

"An eye opening wide view of the RFID world" - Boots Healthcare

"Excellent overview of up-to-date status of RFID" - Samsung

"Well attended by key participants in RFID" - Marks & Spencer

"Remarkable, gets better each year" - Schick & Wilkinson Sword

"A must attend for anyone involved in RFID" - Ohio State University

Your Guarantee with personal advisors

IDTechEx provides independent research and consultancy on RFID and printed electronics. We think that this event covers all the RFID issues and topics that you need to know about. If you leave with questions you still need answers to, IDTechEx consultants will provide you with up to one hour of free consulting time, by telephone. This needs to be used by March 30th 2007.

IDTechEx experts will be on hand to answer your questions:

Raghu Das   Dan Lawrence   Peter Harrop

Exhibitors and Sponsors

symbol® The Enterprise Mobility Company™
POLY IC The chip printers
Ubisense
DELO
DOW CORNING Electronics Solutions
SHIPCOM
Emerson & Cuming a National Starch & Chemical Company
Parelec
DAG SYSTEM www.dag-system.com
TAGSYS RFID™ e-connecting goods
TagSense
Mühlbauer High Tech International
ADASA RFID INNOVATION™
bielomatik
IDTechEx
Lyngsoe Systems
STOP STATIC.COM
Impinj
TBT Thin Battery Technologies Powering Innovation
Plastic Logic
InkTec
IBM
adozu
INFRATAB INC.

Association Sponsors and Media Partners

RFID Tribe
GS1 EPCglobal
Ink Maker
THE LABEL SHIMBUN Japan's source in labelling now
CurnTag
Data Collection Online
MoreRFID
Packaging Essentials Converting
RFID
Conversión
RFID SOCIETY
RFID Solutions Online
RFIDswitchboard
CONVERTING
RFID
USING RFID FOR WIRELESS MOBILITY RFID
Integrated Solutions
RFIDConnectionsWEEKLY
packagePRINTING

Retail, Consumer Goods and Item Level RFID

"RFID at the Coca-Cola Company"
The Coca-Cola Company, USA
Dr Michael Okoroafor, Technology Director

"RFID and Unilever: Our progress so far and future outlook"
Unilever, USA
Zachary Thom, RFID Analyst
- Unilever background in RFID and project philosophy
- Retail activities to date globally
- Where we find value working with retailers to achieve value

"RFID at Ahold"
Ahold, USA
Leslie Hand, RFID Director

"2006 Selexyz Bookstore: The world's first item level tagged store"
BGN, The Netherlands
Jan Vink, Director ICT
- Why RFID on item level
- Costs and ROI (business case)
- Beyond RFID
- Multi channel approach will survive

"RFID Industrialization and Application Highlights"
Michelin, USA
Patrick King, Global Electronics Strategies
- Tire RFID is the first example of commercial item level tagging
- Item level tagging challenges and opportunities

Manufacturing/Logistics

"RFID at BP"
BP, USA
Curt Smith, Director of Applications - Chief Technology Office
- What we have learnt about RFID
- Results from multiple projects including:
  * Wal*Mart RFID labeling (Gen 2 passive tags)
  * LPG cylinder tracking (HF passive tags)
  * Retail asset auditing (HF passive tags with 2k memory)
  * People locating (UWB Active Tags) for improved safety
- The future of RFID at BP

"RFID at Caterpillar"
Caterpillar, USA
Byron W. Blackburn, Technology Research & Development
- From shoes to some of the largest vehicles - why RFID is important to Caterpillar
- Our progress so far and results

"RFID at Lockheed Martin"
Lockheed Martin, USA
Denton Clark, AIT Manager
- Application in RFID in manufacturing environment
- The role of AIDC technologies in the value chain

Bstal

"RFID at the World's largest Postal Company"
United States Postal Service (USPS), USA
USA John Weller, Program Manager
- How RFID can help us
- Our RFID experiences so far at

"RFID and DHL"
DHL, USA
Jim Kerr, Senior Account Executive
- What we are doing and what we have learnt

"The World's largest RFID network"
Lyngsoe Systems, Denmark
Bo Helmer Larsen, VP, Postal Solutions
- Process optimization, increased quality of service and complete logistic assets visibility with RFID in postal/parcel operations
- How postal and parcel operators all over the world are using RFID technology to optimize their collections

"Europe's Largest EPC UHF Roll-Out at Spanish Post"
AIDA Centre - RFID Solutions, Spain
Joan Pons, Project Consultant
- Implementing over 332 readers and 2,000 reader antennas at Correos, the Spanish National Post Office
- Costs and ROI (business case)

Military / Security

"RFID at Rolls-Royce"
Rolls-Royce, UK
Lee Doherty, Head of Supply Chain - Services
- Requirements for the defence industry: Imperatives, mandates and policies, wider requirements
- Operational benefits that RFID can offer: Network enabled warfare, planning, end-to-end visibility, reverse logistics
- Rolls-Royce RFID pilots and deployments

"RFID and Supply Chain Effectiveness"
Boeing Integrated Defense Systems, USA
Steve Georgevitch, Total Asset Visibility Program Manager
- Addressing the problem you're trying to solve
- RFID has many flavors that all taste good to the technologist, but what does the end user really need?

"Asset Visibility and Beyond"
US Department of Defense (DoD), USA
Gerald Darsch, US Army Solider Systems Center
- Sensor enabled RFID tags for use in supply chain security and shelf life management applications
- Expanded functionality of RFID through the integration of sensors
- Tamper detection at the pallet and container level, ongoing research and recent technology demonstration

Around The World

Korea

"Korea RFID projects in public sectors"
National Information Society Agency, Korea
Chang-Hun Lee, Sr Researcher, RFID/USN Team, IT Strategy Division
- RFID/USN (Ubiquitous Sensor Networks) strategy
- RFID/USN pilots and full-scale projects in 2006
- Future plans

Japan

"RFID in Japan"
Marubeni, Japan
Shinsuke Suyama, Manager, Sales & Marketing Division
- Status of the RFID Market in Japan
- RFID implemented business cases – Yodobashi (first Japanese retail mandate), Tokyo Shirts and more

Taiwan

"RFID in Taiwan"
Institute for Information Industry, Taiwan
Dr Jimmy Li, Deputy Director, Initiative Office for Government RFID Applications, MOEA (Ministry of Economic Affairs) and Senior Advisor, IDEAS, Institute for Information Industry
- RFID industry in Taiwan
- Public sector applications
- Future plan

China

"RFID in China"
Sparkice, China
Edward Zeng, CEO
- The biggest RFID order in the world national ID
- Tagging 120 million cattle and tens of millions of RFID tickets - where the RFID spend is
- The China RFID company hot list
- Future prospects of RFID in China

US & Europe

"RFID progress in America and Europe"
IDTechEx, UK
Dr Peter Harrop, Chairman
- Ten year forecasts
- Number of tags sold to date and into which markets
- Movement in the value chain and opportunities
- America vs Europe vs ROW

Healthcare / Pharmaceutical

"A Successful Item Level Tracking Pharmaceutical Project Utilizing UHF Technology"
Purdue Pharma, USA
Harry Ramsey, Senior Package Development Engineer
George Schmitt & Co., USA
Andy Grace, Director - RFID Business Unit
- How Purdue Pharma successfully approached the utilization of UHF RFID technology into the supply chain at the item and case level
- Purdue Pharma's Item Level tagging project from its early conception, the pilot stages, and the migration from Class 0 to GEN2 technology
- Purdue's experiences as well as those of its label converting partner (George Schmitt & Co.)
- This joint presentation will explore the challenges, successes, learnings, and experiences of the first major item level pharma tagging project that was undertaken in the marketplace

"RFID in McKesson"
McKesson, USA
Ben Sperling, Director, RFID Programs

"RFID in the health sector 2007-2017"
IDTechEx, USA
Raghu Das, CEO
- Top applications in this sector by tag volume and value
- Who's doing what - the biggest projects
- The opportunity - Exclusive 10 year IDTechEx forecasts

Aviation

"The Business Cases for Baggage and Inflight RFID"
IATA, USA
Andrew Price, Project Manager, RFID
- IATA has developed business cases for several airlines
- Here we present the detailed baggage business case and a high level inflight business case
- Barriers to implementation in these areas

"RFID Technology at McCarran Airport"
McCarran Airport, Las Vegas, USA
David Bourgon, Manager, Airport IT Services
- Learn about how McCarran has used RFID to track 100% of all baggage through the screening process
- See why RFID was the only viable solution to McCarran's baggage systems
- Learn how McCarran uses RFID to enhance customer service
- Hear lessons learned from the implementation of the largest RFID system in aviation

"Flying High with RFID in Aviation"
Shipcom Wireless, USA
John Shoemaker, President
- What are the critical components to a successful RFID implementation for aviation?
- With IATA doing lots of research and justification now done proving the case for RFID, what does this mean for any one airport or airline?
- The challenge is the solution, not the hardware
- Solutions are Enterprise wide for Aviation: any answer must be scalable and extensible to support multiple applications using multiple data capture devices and connecting them to multiple aviation IT Systems.

US Department of Homeland Security, Transportation Security Administration
Anthony (Buzz) Cerino, Communications Technology Lead, Advisor

Contactless Cards / Passports / Cell Phones

"Motorola's NFC activities in Europe"
Motorola, Germany
Andreas Schaller, Corporate R&D
- NFC in the world of Short Range RF Communication
- NFC enabling Seamless Mobility Services
  *NFC for mobile payment services
  *NFC enabling new retail services
  *NFC for product authentication: A business case for mobile operators?
- Merging the physical and the real world: NFC and Printed RFIDs

"RFID cards for Pharmaceuticals"
Infineon, USA
Joerg Borchert, VP Chip cards
- The security challenge
- The performance challenge
- The answer

"The Global market for e-Passports"
IDTechEx, USA
Dan Lawrence, VP
- The demand and progress so far

"RFID cards: the biggest RFID market by value and growing!"
Card Technology, USA
Don Davis, Editor

Passive RFID Tags, Readers Middleware and System Integration

"Item level RFID tagging today - the biggest implementations so far"
Tagsys, USA
Alastair McArthur, CTO
- Penetration into retail, healthcare, laundry and manufacturing
- Choosing the right technology

"Emerging Trends for Embedded RFID and UHF Item-Level Tagging"
TagSense, USA
Richard Fletcher, CEO
- Options for low-cost readers
- Integrated antennas for smart shelves and retail
- Easy networking for large numbers of readers

"Near Field UHF for item level tagging"
Impinj, USA
Dimitri Desmons, VP of RFID Marketing

"RFID case studies analyzed"
Symbol Technologies, USA

"Step by Step guide to successful RFID implementation"
IBM, USA
Christer Johnson

"Quantified paybacks from item level tagging - results from live pilots"
Vue Technology, USA
Robert Locke, President
- The Return on Investment of item level tagging
- Item level tagging in healthcare and retail

"Passive RFID combined with GPS/GPRS traceability"
DAG System, France
Patrick Bonneau, RFID Solutions Architect
- Real time RFID traceability with global positioning

How To Manufacture RFID

"Printing RFID antennas - what you need to know to get the lowest cost and highest yield"
Parelec, USA
Geva Barash, CEO
- Printing RFID antennas for HF and UHF on PET, paper and on to the packaging

"Producing and testing RFID smart labels: technology choices, costs, yield and other issues"
Muehlbauer, Germany
Thomas Betz
- High speed RFID production methods analyzed
- Future potential of new assembly technologies

"Printing RFID antenna with conductive inks"
Emerson & Cuming, USA
Jeff Parker
- Advantages of water based inks for high speed printing applications vs. solvent and UV platforms for label converters
- Application of inks for high speed processes
- Positive results from initial trials and completed transponder testing

"Snap cure adhesives for the inlay manufacturing in smart labels"
Delo, Germany
Florian Hierl, Business Development Manager
- Principle of flip-chip bonding with ACP / NCP- adhesives
- Strap attach with ICP-adhesives
- Performance in harsh environments

"RFID antenna production – today and tomorrow"
Meco, Germany
- Does scale up of antenna production show similarities with the semiconductor leadframe production path towards industry maturity?
- Additive copper process: the next step toward low cost production?
- Antenna design guidelines

Printed RFID / Chipless RFID

"Printed RFID tags: Performance needs and technology trends"
University of California, Berkeley, USA
Vivek Subramanian
- Review of characteristics of state of the art printed transistors, including performance and SPICE modeling
- Topology issues in printed RFID, including reader-tag interactions, stability, and performance requirements
- Design tradeoffs in printed RFID tags

"Building an Item Level RFID Roadmap"
Motorola, USA
Dan Gamota Director, Printed Electronics Platforms

"Printed RFID for high volume applications"
PolyIC, Germany
Dr Wolfgang Clemens, Head of Applications
- What is printed RFID
- Roadmap of printed RFID
- First products of printed RFID
- Printed RFID for brand protection, marketing and logistics

"Active tag ranges at passive tag prices"
Vubiq, USA
Adam Button, CEO
- Millimeter wave radar technology
- Completely passive tags – no chip required
- Read ranges in the hundreds of feet
- Real time location and tracking

"Fake Fingerprints…Biocompatible Chipless RFID Ink Tattoo"
Somark Innovations, USA
Mark Pydynowski
- A novel synthetic biometric…chipless, liquid, edible
- Target Markets: cattle, lab mice, dogs, & humans
- Unique advantages
- Somark vs. conventional RFID

"RFID based on SAW (Surface Acoustic Wave) Technology"
THORONICS, Switzerland
Thor Thorvaldsson, Managing Director
- Operational principle of SAW RFID
- Basic device properties and specifications
- Benefits of SAW RFID
- Application areas

"Printed Displays and RFID"
Aveso Printed Electronic Displays, USA
Emily Selene De Rotstein, VP

Company Visits

There are over 30 major RFID companies and organizations based in Boston, home to the original Auto-ID Center at MIT. Make the most of your trip with on-site visits. **IDTechEx** will be facilitating organized tours to local companies on a first come first serve basis. Those attending **Masterclass 3 - Implementing RFID** will automatically be registered on the tour and will visit the Auto-ID Lab at MIT as part of the masterclass.

"Meet the Experts" Gala Dinner

Network with delegates in an exceptional venue at our optional dinner on February 21st (the evening of the first day of the two day conference). The dinner will be held at the "Top of the Hub" at the Prudential Tower, with breath-taking views across Boston, MIT and Boston Harbour. Open to all delegates - optional registration required.

Active RFID and Real Time Locating Systems (RTLS)

Active RFID is becoming a larger part of the RFID market by value. Often it does new things that could not be done easily before. A wide range of solutions exist, from systems providing real time location of tags to a few inches accuracy working over Ultra Wide Band to systems using existing Wi-Fi infrastructure. Other forms of active RFID include labels which incorporate a laminar battery with sensors. We cover all these options in this session.

Active RFID in Action

"Theft prevention system based on networked active tags (sensor networks)"
Mark IV, Canada
Martin Capper, President
- The vision, technology and deployment
- The ROI and future

"The business case for Active RFID"
Wavetrend, UK
Chris Bishop, CEO
- The benefits of active RFID technology
- Payback and Return On Investment (ROI) from active RFID implementations

"A step by step implementation of Active RFID - what you need to know"
Wherenet, USA

"Theft prevention system based on networked active tags (sensor networks)"
Fraunhofer Gesellschaft, Germany
Alexander Pflaum, Head of Department for IT and SCM
- Description of user requirements from the application point of view
- Discussion of design issues for network solutions
- Matching technical requirements with existing sensor networks products

Active RFID and Wi-Fi/Zigbee/RuBee/UWB

"Cisco and active RFID/RTLS"
Cisco Systems, USA
Pradeep Gandhi, Director - Business Development
- Real Time Locating Systems solutions
- Active RFID eco system and the convergence of active and passive RFID

"RFID and Zigbee"
Adozu, USA
Robert Poor

"How Ultra Wide Band (UWB) is changing the game in logistics and manufacturing"
Ubisense, UK
David Theriault, Director, Strategic Relations
- What is UWB RFID?
- Real time locating with Active RFID: Sucess and ROI in Logistics

"RuBee™ in the Real World: A case study of vertical integration in a high security application"
Visible Assets, USA
John Stevens, CEO

Sensors and Active Labels

"Managing the condition of perishable goods in the supply chain"
Infratab, USA
Terry Myers, CEO Engineering
- EPC Gen2 tags, readers and software focus on answering 2 questions:
  "Is this fresh?" and "How fresh?"
- Unique way of monitoring temperature abuse enables real-time monitoring of the condition of a perishable — from either "pack to sale" or on a specific segment of the cold chain, such as transport
- Budgeting and managing temperature abuse

"Flexible, low cost and environmental printed batteries"
Thin Battery Technologies, USA
Leonard Allison, VP Business Development
- Construction, performance and integration

Optional pre-conference event

RFID Investment Summit
Tuesday, February 20th 2007

High-quality RFID investment opportunities and perspectives
Attend presentations from 20 CEOs of the creme-de-la-creme pure-play RFID companies as well as stealthy start-ups presenting exclusively for the first time.

Attendees will also have access to industry thought-leaders, valuable quantitative and qualitative research, and one-on-one meetings with RFID CEOs and Investors.

The RFID industry is emerging from its transition stage. Mandates are beginning to take hold, and lesser-publicized RFID niches like Real Time Locating Systems (RTLS) are beginning to flourish. The appetite for funding for RFID technology is growing rapidly - up five times in 2006 over 2005 - but is still well below what the market demands. With about 1000 companies doing something significant in the RFID value chain and mergers being less than the rate of formation of new RFID companies, there is scope for much more merger and acquisition (M&A) activity and for the weak to disappear. Attend this event to learn more.

Company CEOs will present in four categories:

RFID Hardware Systems	RFID Software, Networks and Services	Real-Time Locating Solutions	Emerging Sectors
-CEO, Tagsys	-CEO, Trenstar	-CEO, Ubisense	-CEO, Vubiq
-CEO, Impinj	-CEO, Xterprise	-CEO, Sandlinks	-CEO, Inside Contactless
-CEO, Intelleflex	-Chairman, Reva Systems	-CEO, Ekahau	-CEO, TBT
-CEO, ThingMagic	-CEO, OAT Systems	-CEO, Wavetrend	-CEO, ViVOTech
-CEO, Skyetek		-and others	-and others

You will also receive an Investor Report including difficult-to-find RFID company and industry financial data, market adoption data, competition matrix and discussion of RFID opportunities and issues.

This one day conference should be especially appealing to venture capitalists and other investors, RFID companies that may need future funding, investment bankers, industry analysts and other RFID solution providers looking to better understand the competitive landscape.

RFID Investment Summit is organized by a unique analyst-investor collaboration between **IDTechEx** and **Quan Ventures** – companies with extensive experience in RFID investments. **IDTechEx**, an independent RFID analyst, has provided due diligence and benchmarking for venture capital firms investing in RFID companies for over six years, in addition to profiling companies to help them raise funds. **Quan Ventures** was an early investor in RFID companies with subsequent RFID exits, and is well-known for presenting at RFID events.

IDTechEx   **QUAN VENTURES**

www.idtechex.com/invest

Get the answers to your questions in our interactive masterclasses.

The four optional expert-led masterclasses are intended for audience participation and discussion. They are interactive consultancy sessions, delivered by **IDTechEx** and other experts, providing impartial analysis and information. The masterclasses will ensure you get the most from the conference by bringing you up to date with the latest issues and market developments. Experts will be on hand to privately discuss your questions.

"IDTechEx is very much in an informational sweet spot. The knowledge based research and scenario projections shared place IDTechEx right within the tipping point."
Gary Lundberg, Quad Graphics, USA

"It's great to actually get real information on where RFID is going INDEPENDENTLY, without someone trying to sell their particular product"
Jim Chatz, Label Makers Australia

"Excellent"   James Zhang, GE Global Research Center

All masterclass delegates receive FREE access to the IDTechEx RFID Encyclopedia, worth $500!

Masterclass 1: RFID Technologies, Markets, Players & Forecasts
Tuesday February 20: 08:30-12:30

This masterclass provides a complete introduction and update to RFID systems, markets and trends – everything from printed RFID to Active RFID technologies; how many tags Wal-Mart are using and ROI for their suppliers; hot niche profitable RFID sectors; the biggest RFID orders and vital ten year market, territorial and technology forecasts. The session covers:

- An introduction to RFID systems and hardware choices
- Chip and chipless tag technology evaluations and their applications
- Active RFID, Real Time Locating Systems (RTLS) and RFID based on Wi-fi, Bluetooth, DSRC, UWB, etc
- Examples of RFID being used, how many tags and systems have been sold and into which markets
- Markets driving volume use of RFID to 2016
- New applications and advice on entry to market
- Comparison of RFID frequencies
- The RFID value chain, major players and opportunities
- Failures and successes
- RFID standards, impediments and actual progress by vertical market
- RFID forecasts and trends 2006-2016
- Network at the masterclass, lunch with delegates from masterclass 1 and 2

Masterclass 2: How to Manufacture RFID (labels, tickets & cards)
Tuesday February 20: 13:30-17:30

Aimed at converters, packagers, labelers, printers, label suppliers, specifiers, buyers and brand owners, this masterclass will explain the full value chain of manufacturing RFID smart labels. Topics include evaluation of manufacturing methods, chip attachment processes, antenna technologies, overprinting and insertion, specifying RFID labels, managing data and best practice. The session covers:

- Understanding the tag production value chain and entry points
- Evaluation of the choices for manufacturing complete RFID labels, tickets and cards
- How things are made and what they cost
- Manufacturing RFID tag antennas: technologies, performance and cost
- Substrates, inks and adhesives: suppliers, costs and performance
- Chip attach options
- Analysis of routes to high volume manufacture
- Oversupply and undersupply
- Applying RFID to products: required throughput, testing and finish
- Major players, emerging players and unsatisfied needs i.e. opportunities
- Current industry manufacturing capacity and future needs
- Network at the masterclass, lunch with delegates from masterclass 1 and 2

Masterclass 3: Implementing RFID
Friday February 23: 08:00-12:00 includes tour

This masterclass is aimed at those wishing to implement or extend an RFID system. Run by leading system integrators, it includes planning your RFID project, avoiding common pitfalls, determining ROI, standards and system performance, configuring your RFID system and step-by-step lessons from case studies. In particular, we cover:

- Determining the paybacks of RFID and how to begin your project
- Evaluating systems and the Return On Investment (ROI): RFID ROI evaluated by vertical market
- How to configure an RFID system for your needs: antenna arrangement, knowing where to place tags
- RFID system performance and radio regulations
- Step-by-step walk through of actual implementations
- Learn lessons from experts to save time and money
- Network at the masterclass, lunch with delegates from masterclass 3 and 4

Masterclass 4: Printed RFID and Printed Electronics
Friday February 23: 13:00-17:00

Aimed at those who are new to the topic or who need to understand the big picture to assess the challenges and opportunities, this masterclass will arm you with the latest knowledge of the applications and technology developments involving printed electronics – from printed RFID tags to printed displays. Printed electronics enables you to replace components such as silicon chips, conventional displays, interconnects, batteries and much more with electronic and electrical devices that can be printed. Not all thin film electronics is printed today but we include printing where it is seen as the end game to enable low cost dispersed manufacturing. Learn of the toolkit of technologies that are available and emerging at this masterclass. The session will cover:

- Applications of printed electronics: now and near future
- Lessons to be learnt from early successes and failures
    - The value chain and market forcasts
    - Progression of RFID towards being printed
- The need for printed electronics
    - Key markets that need printed electronics: reasons why and their technology requirements
    - Creating new markets versus competing with conventional electronics in existing ones
- Assessment of technologies, companies, strategies and progress so far, including
    - Thin Film Transistor Circuits (organic, inorganic semiconductors, thin film silicon)
    - Displays (OLEDs, electrophoretic, electroluminescent, electrochromic and others)
    - Sensors, batteries, photovoltaics and conductive inks
- A discussion of printing techniques, their relevancy and challenges
- Challenges and the roadmap to the full printed electronics toolkit
- Network at the masterclass, lunch with delegates from masterclass 3 and 4

See www.idtechex.com/USA for full masterclass details

IDTechEx   Conference | Exhibition | Masterclasses

| Registration form |

Please complete and return the form
Online **www.idtechex.com/USA**
Fax   +44 (0)1223 812 400 or +44 (0)1223 810 280
Post   **IDTechEx Ltd**, Downing Park, Swaffham Bulbeck, Cambridge CB5 0NB, UK

Description	Price
Extra value conference packages - best value!	
2 day conference, Meet the Experts gala dinner, audio and electronic copies of proceedings (Gala Dinner Free!)	☐ $1698
2 day conference, Meet the Experts gala dinner, audio and electronic copies of the proceedings plus **TWO** masterclasses of your choice (investment summit counts as 1 masterclass) Please tick the Masterclasses you wish to attend ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ Investment Summit	☐ $2999
2 day conference, Meet the Experts gala dinner, audio and electronic copies of the proceedings plus **FOUR** masterclasses (get one masterclass free, save $699!)	☐ $3884
Individual prices	
2 day conference and exhibition, electronic proceedings (Feb 21-22)	☐ $1399
Audio copies of presentations from 21-22 (only when attending the conference)	☐ $299
Meet the Experts gala dinner (Feb 21)	☐ $89
Masterclass 1: RFID Technologies, Markets, Players and Forecasts (Feb 20 am)	☐ $699
Masterclass 2: How to Manufacture RFID Smart Labels (Feb 20 pm)	☐ $699
Masterclass 3: Implementing RFID (Feb 23 am)	☐ $699
Masterclass 4: Printed RFID and Printed Electronics (Feb 23 pm)	☐ $699
RFID Investment Summit (Feb 20 full day)	☐ $699
Special Offer: Best Selling Research from RFID Experts (30% off all IDTechEx research)	
The IDTechEx RFID Forecasts, Players & Opportunities 2007-2017 30% OFF WITH CONFERENCE, normally $3500.	☐ $2450
I cannot attend, please send me conference proceedings and audio of the presentations	☐ $999
RFID Investment Summit Report for those that cannot attend the event	☐ $499
Total	

PAYMENT METHOD

☐ Direct bank transfer free of all charges to: HSBC, International Branch, PO Box 181, 27-32 Poultry Lane, London EC2P 2BX, UK. Sort code: 40-05-15; Account number: 58860628 IBAN: GB82 MIDL 4005 1558 8606 28; Bank BIC code: MIDLGB22

☐ Please invoice me

☐ VISA   ☐ MasterCard   ☐ AMEX

Card Number	
Name of Card Holder	
Expiry Date	
3 or 4 digit security number	
Address of Card Holder	
Post/Zip Code	
Signature of Card Holder	
Date	

CONTACT DETAILS

Name	
Position	
Company Name	
Address	
Post/Zip Code	
Country	
Tel No	
Fax No	
email	
Type of Business	

RFID Smart Labels USA 2007 and Active RFID and RTLS is the ideal event to establish and forge new relationships that are essential to the success of your business.

2007 IDTechEx dates for your diary:
Printed Electronics Europe, 17–18 April, Cambridge UK
RFID Smart Labels Europe, 1-3 October, London UK
Printed Electronics Asia, September, Tokyo, Japan
Active RFID Summit, November, USA
Printed Electronics USA, December, Phoenix, USA

Latest IDTechEx research:
RFID Forecasts Players & Opportunities 2007–2017
The RFID Knowledgebase
Printed and Organic Electronics Forecasts, Players & Opportunities 2007–2025
See **www.idtechex.com/research** for full details

IDTechEx

RFID
Forecasts,
Players and
Opportunities
2007–2017

By Raghu Das and Dr Peter Harrop

www.idtechex.com

NEW!

RFID Forecasts, Players & Opportunities 2007 – 2017
 Your complete guide to the RFID markets and opportunities
 Published January 2007
 Available electronically or print
 Over 200 pages, 97 tables, 46 figures
 Normal Price $3,500
 Conference discounted price $2450
 see www.idtechex.com/forecasts for full details

VENUE / ACCOMMODATION

RFID Smart Labels USA 2007 and Active RFID & RTLS will be held at the Boston Marriott Copley in Boston, Massachusetts, USA. This hotel is centrally located in Boston.
110 Huntington Avenue Boston, Massachusetts 02116 USA
Phone: 1-617-236-5800
Book your accommodation online at www.idtechex.com/USA
or call 800-228-9290 and ask for RFID Smart Labels to obtain the special room rate. Book early before rooms run out!

GENERAL ENQUIRIES
Sarah Lee
s.lee@idtechex.com
 UK Tel: +44 (0) 1223 813703
 US Tel: 1 305 572 7831
 US Fax: 1 305 572 7854

Terms & Conditions
 Hotel and travel costs are not included in the price. Substitutions may be allowed at any time, but please let us know. Cancellations must be made in writing up to 28 days before the event with a 15% cancellation fee. Unfortunately after that date the full registration fee applies. IDTechEx Ltd reserves the right to alter the location or content of the event. Only one promotional code may be used per purchase. All prices are correct at the time of print for latest prices please check **www.idtechex.com/USA.** If you do not want to receive information from **IDTechEx** in the future please tick this box and return to the address above ☐

IDTechEx   Register at www.idtechex.com/USA

IDTechEx Event Calendar 2007

Welcome to the IDTechEx Events Calendar. Each month we list events of interest to RFID Analyst readers to keep you updated on the things that are going on in the world of RFID, smart labels and printed electronics. For further information on any of our events please contact us on info@idtechex.com or phone +44 (0)1223 813 703.

The next IDTechEx Event...

February 21-22, 2007
Boston, USA
www.idtechex.com/USA

Event	Details
	February 21-22 2007, Boston USA www.idtechex.com/USA
	April 17-18 2007, Cambridge, UK www.printelec.com
	September 2007 Japan www.idtechex.com
	October, London, UK www.smartlabelseurope.com
	November, USA www.activeRFIDsummit.com
	December, USA www.idtechex.com

IDTechEx Reports

RFID and Smart Label Reports

Brand new for 2007

RFID Forecasts, Players and Opportunities 2007-2017

Using new, unique information researched globally by IDTechEx technical experts, we analyse the RFID market in many different ways, with over 120 tables and figures. They include detailed ten year projections for EPC vs non-EPC, high value niche markets, active vs passive, readers, markets by frequency, markets by geographical region, label vs non label, chip vs chipless, markets by application, tag format and tag location. Cumulative sales of RFID are analyzed as are the major players and unmet opportunities. It covers the emergence of new products, legal and demand pressures and impediments for the years to come.

Updated in December 2006

Contactless Smart Cards and Near Field Communications

This major new report, globally researched in 2006, compares and contrasts contactless smart cards and tickets with NFC and other methods of using the mobile phone to replace the card or ticket. It has over 110 figures and tables and three appendices of further information. It forecasts progress for the next ten years with contactless smart cards, tickets and RFID enabled phones, from technology to applications, numbers and values

Brand new for December 2006

RFID in Australasia

Ten year forecasts of tag numbers, unit prices and value, plus systems projections are presented. The total market by country is given. There is a full analysis of how IDTechEx sees the number of tags sold increasing tenfold over the next ten years and the market rocketing to around US$632 million in 2017. This 185 page report has over 60 tables and figures and more than 50 case studies.

Updated in September 2006

Real Time Locating Systems (RTLS) 2006-2016

This unique report covers the technology and market for what will be a multi-billion dollar market by 2013. It includes active RFID devices based on WiFi, etc, and over 60 case studies. There are also detailed forecasts.

Updated in September 2006

RFID Profit, Fund Raising and Acquisition Strategy

There is a great need for profit optimization and careful product positioning and repositioning in the frenetic but unforgiving RFID market that is increasing ten times to become a $26 billion business in 2016. RFID is entering most sectors of corporate, public and private life so understanding how to create enduring profit from such a choice of designs and applications, software, hardware and services, calls for great care and modern management tools.

Updated in September 2006

Item Level RFID – Forecasts 2006-2016 and 100 Case Studies

Item level RFID will shortly be the largest and most prosperous sector, driven by anticounterfeiting, archiving, standing assets and supply chain efficiency of high priced products. This unique new two part report gives the full picture and ten year forecasts.

To order any of our publications please go to www.idtechex.com/research
For further information about any of our products please contact info@idtechex.com
or telephone +44 (0) 1223 813703 or use the order form the last page of this journal

IDTechEx Reports

Updated in November 2006

Active RFID 2006-2016

Active RFID is little reported, but its use is growing rapidly. Already several applications have been above $100 million. It is responsible for over 20% of all spend on RFID. Learn how to use it and how to sell it. Forecasts to 2016

Updated in September 2006

Chipless RFID Forecasts, Technologies & Players 2006-2016

This report analyzes the prospects of the end game of RFID - ultra low cost tags that do not include a silicon chip. We assess the technologies that are available and emerging, players, challenges, the opportunity and give ten year forecasts.

Technologies compared

Short Range Wireless

Learn the unique benefits of Dynamic Short Range Communications, ZigBee, Bluetooth, WiFi , RFID and Near Field Communication, and explore how they can be used together to great effect.

Over 370 terms defined

The IDTechEx RFID Encyclopedia

This comprehensive handbook explains the plethora of technology choices, applications and terms of Radio Frequency IDentification (RFID).

Assessing the latest technology developments

Near Field UHF RFID vs HF for Item Level Tagging

Everyone agrees that item level tagging is going to be the biggest market for RFID in terms of both spend and number of tags sold. Everyone agrees that item level tagging has its own, special requirements making it different from other categories of RFID such as the tagging of people, animals, pallets, cases and vehicles or RFID in passports, tickets and smart cards. But there the agreement ends...

Printed Electronics Reports

Updated in October 2006

Organic Electronics Forecasts, Players, Opportunities 2006-2025

This report brings you new, unique information researched globally by IDTechEx. 20 year forecasts are given for the full range of organic electronics – including logic, displays, memory, power, electrostatic and RF shielding and sensors.

Updated in October 2006

Printed Electronics

Printed electronics is a term that encompasses much more than the long awaited commercialisation of Thin Film Transistor Circuits (TFTCs) and Organic Light Emitting Diode (OLED) displays. Both will have greatest potential when we can print them on common packaging material. TFTCs will be more robust and lower in cost than silicon chips so they will appear everywhere from singing gift cards to smart medical packaging and moving colour pictures in electronic books.

To order any of our publications please go to www.idtechex.com/research
For further information about any of our products please contact info@idtechex.com
or telephone +44 (0) 1223 813703 or use the order form the last page of this journal

IDTechEx Reports

Over 380 terms defined

The A to Z of Printed and Disposable Electronics

This is the first comprehensive handbook to cover the full range of terms associated with this exciting, fast moving topic

Application Specific Reports

Updated in August 2006

RFID in Airports and Airlines 2006-2016

RFID is an extremely powerful enabling technology in airports and aircraft, serving to improve security against criminal attack, safety against general hazards, efficiency, error prevention and data capture and to remove tedious tasks. It can even create new earning streams where it makes tolling feasible without causing congestion and where new airport "touch and go" cards offer new paid services without delays.

Updated in September 2006

RFID in Healthcare 2006-2016

The RFID business is growing so fast that few applicational sectors can beat that scorching rate of growth. Healthcare is one of them thanks to the new tagging of drugs, real time location of staff and patients and other developments including automated error prevention. This unique report gives a full technical and market analysis illustrated by over 70 case studies. It is a vital resource for the healthcare profession and all who wish to support it.

Updated in October 2006

RFID for Postal and Courier Services 2006-2016

Detailed ten year forecasts are given plus a full explanation of the technologies. In detail, there are 30 new case studies of RFID in action in the postal and courier service in North America, Europe, the Middle East and East Asia. The major breakthroughs that will provide future success are discussed. Postal services ignoring this accelerating change will become uncompetitive and suppliers missing out will regret it.

Updated in July 2006

Food and Livestock Traceability – Forecasts, Needs, Best Practices

Strict new legislation on food traceability is largely driven by recent outbreaks of diseases such as mad-cow disease, foot-and-mouth disease and avian flu and accidental contamination. However, consumers also demand more information, as do the police and customs. This report analyses the use of DNA, RFID and other technologies, with a profusion of case studies from across the world.

Detailed case studies

Thirty RFID Case Studies in Retail

This covers retail and the Consumer Packaged Goods (CPG) supply chain. Introduction. Thirty detailed studies from across the world. Jargon buster appendix

To order any of our publications please go to www.idtechex.com/research
For further information about any of our products please contact info@idtechex.com
or telephone +44 (0) 1223 813703 or use the order form the last page of this journal

IDTechEx Reports

Detailed case studies

Thirty RFID Case Studies in Logistics

This has an introduction and thirty detailed case studies on RFID in the logistics industry, e.g. freight tagging, driver access, condition monitoring, tachometer card. Jargon buster appendix

Updated in February 2006
RFID Food and Livestock Case Studies
A major new report from IDTechEx provides, for the first time, no less than forty detailed case studies of RFID in action in food and livestock.

Over 440 terms defined
Food and Livestock Traceability Encyclopedia
It is tough to learn one's way into the subject of food and livestock traceability nowadays. It has expanded to include the disciplines of medicine, biology, chemistry, electronics, computer science and more. We have therefore prepared this encyclopedia to give an unusually broad introduction to the acronyms and terms.

IDTechEx Subscription Services

RFID Case Studies Knowledgebase

Over 2,500 case studies, over 2,750 organisations, 93 countries and growing rapidly. The variety of case studies in this Knowledgebase is a salutary reminder that, although the supply chain is seen as ultimately the biggest application for RFID, the less hyped applications such as Libraries & Archiving, Passenger & Personal Transportation, and Healthcare, are moving ahead extremely rapidly. This is a searchable electronic database, with many links and slide presentations, by far the largest available.

Smart Labels Analyst

In depth analysis on emerging RFID and Smart Label technologies from this leading independent journal. We invest tens of thousands of dollars to send our technical experts to conferences and organisations you might not visit. We travel intensively from New Zealand to China, the USA, Europe and the Middle East. Read new forecasts, technology assessments and more. This is not another newsletter full of misleading press releases. It is serious analysis with numbers, figures and graphs.

Smart Packaging Reports

Introductory report

Smart Packaging

Introductory report on the whole subject. Needs, applications and technologies for smart packaging whether consumer, postal, military, healthcare or other. 350 organisations are covered.

To order any of our publications please go to www.idtechex.com/research
For further information about any of our products please contact info@idtechex.com
or telephone +44 (0) 1223 813703 or use the order form the last page of this journal

IDTechEx Reports

Hottest sector

Electronic Smart Packaging

This report is an in-depth study of electronic smart packaging, the hottest sector. Including ten year forecasts. Already over 50 billion packages have been fitted with electronic smart packaging devices - and now the market is really taking off. This report exclusively analyses this extraordinary situation based on the imminent commercialization of the toolkit of technologies which will open up the industry.

Consumer Smart Packaging

Smart packaging brings additional useful and valuable benefits to the consumer. This book focuses on documenting, understanding and describing how unmet consumer needs can be satisfied by smarter consumer packaging, with specific chapters of the food, beverage, household products and health, beauty and personal care market sectors.

To order any of our publications please go to www.idtechex.com/research
For further information about any of our products please contact info@idtechex.com
or telephone +44 (0) 1223 813703 or use the order form the last page of this journal

IDTechEx Reports Price List

RFID Forecasts, Players and Opportunities 2007-2017

	Electronic	Hardcopy & Electronic
GBP (£)	£1,750	£1,900
Eur (€)	€2,650	€2,875
USD ($)	$3,500	$3,800

Item Level RFID – Forecasts 2006-2016 and 100 Case studies

	Hardcopy	Electronic	Hardcopy & Electronic
GBP (£)	£1,350	£1,500	£1,750
Eur (€)	€2,000	€2,250	€2,500
USD ($)	$2,500	$2,800	$3,300

RFID in Healthcare 2006-2016

	Hardcopy	Electronic	Hardcopy & Electronic
GBP (£)	£1,000	£1,250	£1,350
Eur (€)	€1,500	€1,850	€2,000
USD ($)	$1,800	$2,250	$2,500

Active RFID 2006-2016
Real Time Locating Systems 2006-2016
Chipless RFID Forecasts, Technologies & Players 2006-2016

	Hardcopy	Electronic	Hardcopy & Electronic
GBP (£)	£800	£1,000	£1,200
Eur (€)	€1,200	€1,500	€1,800
USD ($)	$1,500	$1,800	$2,200

RFID in Australasia 2007-2017
Contactless Smart Cards and Near Field Communications
RFID Profit, Fund Raising and Acquisition Strategy
Printed Electronics
Electronic Smart Packaging
RFID for Postal and Courier Services
RFID in Airports and Airlines

	Hardcopy	Electronic	Hardcopy & Electronic
GBP (£)	£1,000	£1,250	£1,350
Eur (€)	€1,500	€1,850	€2,000
USD ($)	$2,000	$2,500	$2,750

To order any of our publications please go to www.idtechex.com/research
For further information about any of our products please contact info@idtechex.com
or telephone +44 (0) 1223 813703 or use the order form the last page of this journal

IDTechEx Reports Price List

Organic Electronics Forecasts, Players and Opportunities 2006-2025

Smart Packaging

Food and Livestock Traceability

Electric Vehicle Forecasts, Players, Opportunities 2005-2015

	Hardcopy	Electronic	Hardcopy & Electronic
GBP (£)	£1,200	£1,500	£1,600
Eur (€)	€1,800	€2,250	€2,400
USD ($)	$2,400	$2,800	$3,200

Near Field UHF RFID vs HF for Item Level Tagging

		Electronic only	
GBP (£)		£99	
Eur (€)		€149	
USD ($)		$189	

Short Range Wireless – Ebook only

		Electronic only	
GBP (£)		£500	
Eur (€)		€750	
USD ($)		$1,000	

Consumer Smart Packaging

	Hardcopy	Electronic	Hardcopy & Electronic
GBP (£)	£650	£650	£800
Eur (€)	€1,000	€1,000	€1,200
USD ($)	$1,250	$1,250	$1,500

The A to Z of Printed and Disposable Electronics

The IDTechEx RFID Encyclopedia

Food and Livestock Traceability Encyclopedia

		Electronic only	
GBP (£)		£250	
Eur (€)		€375	
USD ($)		$500	

To order any of our publications please go to www.idtechex.com/research
For further information about any of our products please contact info@idtechex.com
or telephone +44 (0) 1223 813703 or use the order form the last page of this journal

IDTechEx Reports Price List

RFID Food and Livestock Case Studies

30 RFID Retail Case Studies

30 RFID Logistics Case Studies

	Hardcopy	Electronic	Hardcopy & Electronic
GBP (£)	£400	£300	£450
Eur (€)	€600	€450	€675
USD ($)	$750	$600	$850

Subscription Services – all prices for 12 months access

	Smart Labels Analyst	Knowledgebase
GBP (£)	£625	£1,500
Eur (€)	€950	€2,250
USD ($)	$1250	$2,800

RFID Knowledgebase sections – Electronic only

		Electronic	
GBP (£)		£400	
Eur (€)		€600	
USD ($)		$750	

To order any of our publications please go to www.idtechex.com/research

For further information about any of our products please contact info@idtechex.com

or telephone +44 (0) 1223 813703 or use the order form the last page of this journal

IDTechEx Consultancy

Introduction

At IDTechEx we aim to help everyone in the RFID smart labels and smart packaging value chains from inventors and venture capitalists to value added suppliers, system integrators, major users and facilities managers. We do not compete with these businesses.

We endeavour to be particularly well informed about smart labels and appropriate enabling technologies and unusually rapid in our response to customer's requirements and work hard to "see the future". IDTechEx sponsor relevant academic and not-for-profit organisations to support the industry and this also enables us to provide our clients with the latest knowledge which they may not have access to. For example, we are sponsors of EPCglobal, SAL-C (Smart Active Labels Consortium), Ubiquitous Computing (Japan) and active members of EuroTag. IDTechEx is also a member of AIM, IEE and the Institute of Packaging. This support does not, however, conflict with our strict independence.

We are unusually global in our reach. Our staff includes native foreign speakers and we regularly visit companies and conferences across the whole world, as well as holding our own conferences in the US, Europe and Japan. . In the last six months, we have provided consultancy services in Europe, the USA, Japan and Korea.

Recent successes

- Investigation of potential investment for Cazenove Private Equity

- RFID acquisition strategy for a global electronics giant*

- Teach-ins and brainstorming of smart packaging and RFID strategy at packaging companies in Ireland, the US, etc; at a major food manufacturer, clothing retailers and a microchip manufacturer*

- Internal training courses on RFID and smart packaging in the US and UK for Rexam, one of the largest packaging companies in the world

- Assessing optimal technologies and materials for ultra low-cost smart labels of various types and business plans for such products for various companies*

- Business due diligence of a planned acquisition for a US multinational* and similar work for two venture capitalists* planning certain investments. Recent work includes business due diligence for PolyTechnos of Munich, Germany for investment in Plastic Logic, UK

- Helping start-ups* in France, UK and the US

Contact us

Should you require advice on RFID or smart packaging, please contact us. We will sign an NDA (Non-Disclosure-Agreement) as necessary in order to help you and your company.
Please email consultancy@idtechex.com

* Much of the consultancy carried out by IDTechEx is under Non-Disclosure-Agreements (NDA), therefore names of many of our clients cannot be revealed. However, it includes many of the famous names in Japan, the US and Europe.

RFID Analyst   January 2007   Issue 72

IDTechEx Report Order Form

To order an IDTechEx market report online please visit our website **www.idtechex.com**.

Alternatively, fill in the form below and fax the completed order to +44 (0)1223 812400.

For electronic reports only
For companies based in the EU, VAT will be charged on the electronic report at the UK rate of 17.5% *UNLESS* an EC VAT number is provided. If this number is provided then VAT will not be charged.

Title of Report(s)	
Hardcopy/Electronic/Both formats	
Price (please indicate which currency)	
Quantity	
Total	
EC VAT Number (if applicable)	

Payment Method ☐ Cheque, made payable to **IDTechEx Ltd**

☐ Direct bank transfer to: HSBC, International Branch, PO Box 181, 27-32 Poultry Lane, London EC2P 2BX.
IBAN: GB82 MIDL 4005 1558 8606 28   Bank BIC No: MIDLGB22

☐ VISA   ☐ MasterCard   ☐ Delta   ☐ Switch   ☐ Amex

Card Number: ....

Name of Card Holder: .... Expiry Date: ....

Address of Card Holder: ....

.... Post/Zip Code: ....

Email Address of Card Holder: ....

Signature of Card Holder: .... Date: ....

Name: .... Position: ....

Company: .... Email: ....

Delivery Address: ....

.... Post/Zip Code: .... Country: ....

Tel No: .... Fax No: ....

Please fax the completed form to **+44 (0) 1223 812 400** or **+44 (0) 1223 810 280**, or
send it to IDTechEx, Downing Park, Swaffham Bulbeck, Cambridge CB25 0NW, UK
For more information call IDTechEx on +44 (0) 1223 813 703