Brand©

The journal of brand protection
and enhancement

News

Reports

Brand© is published every two weeks. Each issue includes consultancy-level articles that provide independent analysis and exclusive primary market data on a variety of disruptive, emerging technologies that are gradually being incorporated by the world's leading brands. Each issue provides exclusive reporting of latest material and product launches, trials and breakthroughs.

AMCOR FLEXIBLES leading through *i*NNOVATION

Bordeaux châteaux pilot anti-counterfeit bottles

Several leading wine-producing estates in Bordeaux, France, are trialling a three-pronged protection system that includes RFID-based time temperature systems.

The first stage is a semi-active RFID tag attached to cases, which monitors temperature every eight hours. The second approach is where passive RFID tags are attached in the dimple at the bottom of every bottle so that each one has it's own IP number. The third anti-counterfeit device is an invisible marker that verifies where and when a neck seal was put on the bottle.

Boston, US-based start-up eProvenance has developed the technologies in use. Chief executive Eric Vogt says they have pilot programmes with nine estates focussed solely on the time temperature tagging.

The châteaux involved in the pilot, produce wines ranging from e30 to e600 a bottle. Feedback so far suggests an interest in temperature control at pallet level for e30 bottles of wine. For wines above e70 Vogt says there is greater interest in the traceability of the bottle and anti-counterfeit neck seal.

The second stage acts as a verifier. 'This can confirm where and when a bottle was made,' explains Vogt. 'It also acts as an identifier throughout the chain so will help pinpoint where bottles disappear within the distribution process.'

By using this unique number and the eProvenance website consumers can access information to understand a wine's heritage. In the future Vogt says RFID scanning and web-enabled phones could provide automatic provenance.

The third, and main

Active RFID measures temperature in cases

Source: eProvenance

anti-counterfeit device, was developed when they realised early last year, that counterfeiters take fine wine bottles and carefully pull off the capsule so they can sell the wine and then fill it with another with the original cork and capsule.

To preserve the integrity of the capsule eProvenance has developed an invisible ink with an invisible phosphorous code pattern in the gold part of the neck seal, which can only be revealed with a lightweight hand-held authenticator. 'The authenticator can verify that a neck seal that was put on at a particular château has not been violated in the process.

'The number on the neck seal, the number on the bottle tag and the number on the case tag all get referenced on our database,' continues Vogt.

Invisible anti-counterfeit codes are placed on the bottle neack seal

Source: eProvenance

Passive RFID tags are put on the bottom of the bottle

Source: eProvenance

Invisible code reader

Source: eProvenance

As different châteaux use different shaped bottles Vogt says he needs to customise neck seals and epoxy tags. 'But, if a châteaux said next week lets go for the whole 2006 production as we're going to be bottling in June, we are ready to do that.'

Impinj launches Monza 3 chip

RFID chipmaker Impinj has launched a new version of its Monza chip designed for passive UHF, EPC Gen 2 tags.

Monza 3 tag chips are currently being piloted by many RFID solutions providers and will be available in production quantities starting in May 2008.

Designed for both near and distant tagging applications within the pharmaceutical, apparel and food safety sectors, Impinj believes the new Monza 3 chip offers a number of performance benefits over existing technology.

'Two things really mean performance for RFID – tag read sensitivity (how easy it is to read a tag) and tag write sensitivity (how easy it is to encode a tag). Both performance metrics are important for all industries who are adopting RFID to enhance operational efficiency and security. We offer big advances in both areas,' claims Impinj vice president of marketing, Dimitri Desmons.

Impinj say its Monza 3 offers up to a 40% improvement in tag read sensitivity, and greatly increases readability of tags on items and materials such as metals, liquids and products within densely packed cases and pallets, traditionally problem areas for RFID.

It will also improve read reliability in dense RF environments where fluorescent lighting, cordless phones and mobile radios can interfere with tag operation.

Impinj believes the increase in range will make tags with the Monza 3 chip more attractive to end users, who want to apply RFID solutions to optimise supply chain management. 'Previously, read distance has been a major issue with passive UHF tags, but we have overcome that barrier,' says Desmons.

For pharmaceutical applications, he claims that Monza 3 tag chips offer double the tag write sensitivity and will facilitate new item-level applications such as high-speed mass serialization.

As part of METRO Group's Future Store Initiative, Impinj worked directly with inlay vendors to trial the Monza chip at the Galeria Kaufhof department store in Essen, Germany. Following a successful pilot, it will now be rolled out to 200 other METRO stores.

Bollywood looks to Hollywood to beat pirates

From June 2008 over 300 cinema screens in India will use an invisible marker to protect films from piracy.

The films will be tagged with the NexGuard Forensic Watermarking system from US video solutions technology firm Thomson.

Most piracy of Indian films occurs in the cinema itself and so the 300 cinemas equipped to show Qube Cinema films will use the tag to stop illegal recordings.

Invisible to cinema viewers, all recordings will be tagged with the forensic marker. Thomson's VP of software and technology solutions, Jean-Luc Moullet says NexGuard also identifies the date, time and location of illegal camcorder recordings. 'NexGuard provides investigators with forensic elements related to localisation and timing of an act of piracy against a movie projected in a digital cinema environment,' he says. 'This is critically important for investigators who can then narrow their focus on certain theatres.'

Qube Cinema screens are located across India and include E-City, Pyramid Saimira, Cinemeta Entertainment and

Impinj's Monza 3 UHF RFID tag chip
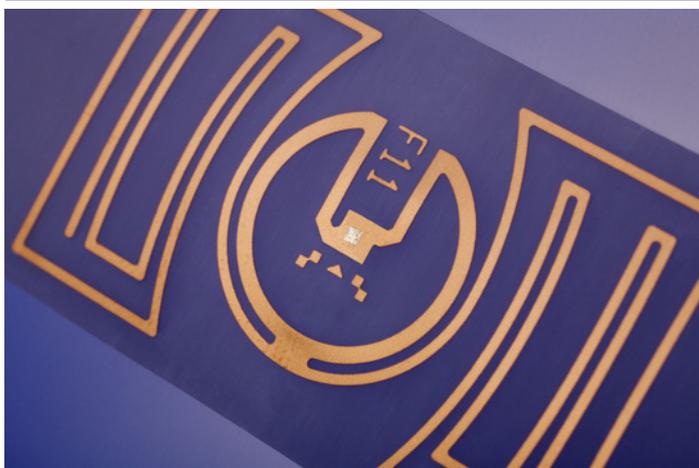
Source: Impinj

NexGuard's invisible watermarks survive compression

Source: NexGuard

Shree Venkatesh Films.

'Once a pirate copy is identified (for instance on the internet or as an illegal DVD), the retrieval of the hidden NexGuard information through a computer assisted process, provides critical forensic elements to investigators: when was this movie pirated and in which theater?'

Currently, Indian film producers and digital cinema players incorporate visible marks into film prints. Thomson says these marks have the major disadvantage of being visible and therefore easy for a pirate to identify and cover up in various ways.

NexGuard embeds invisible information in the movie both in the audio and the video signal. This information is invisible to the naked eye but remains deeply embedded into the content, and even if a pirated version is significantly compressed Thomsons watermarks will, according to Moullet survive compression onto Video CD, DVD and many forms of internet download.

Colour-code and RFID combo launches

Germany's 3S Simons Security Systems has co-joined its counterfeit-proof micro colour-code system SECUTAG with traceability codes such as RFID, datamatrix and barcode, to provide a product that is traceable throughout the whole manufacturing and supply chain.

First presented to a targeted

SecuTag combines with data-matirx code
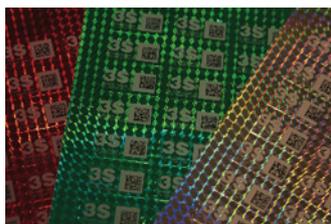
Source: 3S Simons

audience at the Colloquium Pharmaceuticum in Frankfurt, Germany, in late February 2008, SECUTAG has been testing with partners from the traceability sector. 'We've been trying to find out ways of implementing both SECUTAG and the traceability code into one database system, that can be individually adjusted to potential customers' needs,' says marketing and sales manager, Nicole Golomb.

Golomb claims brand owners cannot be sure they have been victims of counterfeiting by relying on traceability codes alone. 'If a branded article is additionally protected with SECUTAG, the originality of the article as well as the traceability code is guaranteed.'

With a 10-year forgery-proof record, Golomb says SECUTAG is accepted as evidence by international courts, supporting the fight against unjustified damage claims.

Furthermore, by offering a one-step solution to attach two devices onto a product, packaging label or seal, she says it also provides cost savings. 'The cost-efficient implementation is one great financial advantage as well as the protection against

unjustified damage claims.'

Targeted industries include the pharmaceutical, automotive and electronic sectors.

'With product piracy being a huge problem in the pharmaceutical industry, the system solution is just the right way to guarantee the originality of the pharmaceutical packaging, the product within and the traceability system necessary for logistic purposes,' she says.

'The product is secured by, for example, a label onto which a data-matrix code is printed (to trace the product throughout the supply chain). Onto the same label, the micro-colour code SECUTAG is printed, serving as anti-counterfeit guarantee of both product and traceability token.'

SECUTAG is made up of micro-colour code particles that are invisible to the naked eye. These particles are used to create between five and eleven microscopic colour layers. The layers are then applied in a specific order so that each client has a unique colour code or finger print. The extremely small size of the particles, moreover, means they are impossible to counterfeit.

Blu-ray films no longer secure

Software developers at Carribean-based Slysoft, claim to have cracked Blu-ray DVD's unbreakable BD+ copy protection code.

The company is selling software it says can be used to make back-ups of Blu-ray discs.

Slysoft's software costs $47 (€30), and enables users to decrypt Blu-ray films and make subsequent copies of them.

The Blu-ray DVD format triumphed earlier this year over HD DVD, in the next-generation, high definition, disc format war, because it boasted greater film studio support and the BD+ protection code. Twentieth Century Fox cited BD+ as the main reason for its support. The AACS copy-protection system Blu-ray shared with HD DVD was cracked in 2007, so news that BD+ has been decoded creates grave piracy concerns for the Blu-ray Disc Association (BDA).

Sony says it can't comment until it has had chance to investigate Slysoft claims. While Eric Rodli, the executive vice president and general manager for entertainment at Macrovision (the owner of BD+ cryptology), hints at rolling BD+ encryption plans.

'BD+ is a security response system designed to react to security attacks, not prevent them entirely. As part of this system, updated BD+ security code is continuously developed so that BD+ customers obtain ongoing value from the use of this technology.'

Slysoft, meanwhile, says it is ready for the challenge: 'Blu-ray titles released up to now have not fully exploited the possibilities of BD+,' states Peer van Heuen, head of high-definition technologies at SlySoft. 'Future releases will undoubtedly have a modified and more polished BD+ protection, but we

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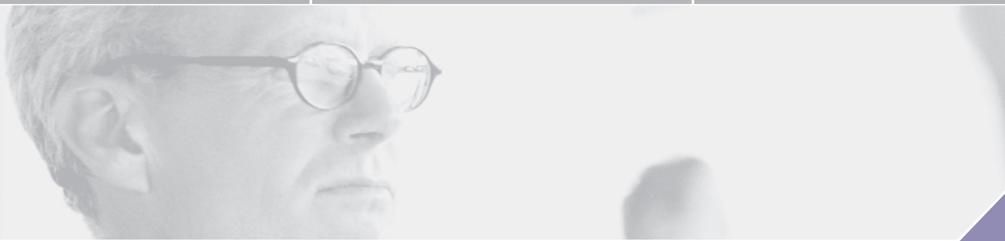
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Will worldwide efforts to marry the cellular and RFID networks turn consumer cellphones into anti-counterfeiting tools?

Cellphones and RFID: a marriage of convenience

A revolutionary technology has arrived – the RFID-enabled cellphone. Its first impact, enabling cashless payments for low price items like transport tickets or coffee, may look trivial. But cashless payments will draw together the previously separate worlds of cellular networks and RFID sensors, and open the door to all kinds of other near field communication (NFC) applications, including definitely non-trivial needs like healthcare and product authentication.

In addition to its cellular application, an RFID enabled cellphone can make very short-range wireless connections, typically from touch to 10cm distance. These connections can be used to read RFID tags, exchange data with another device or act as a payment smart card. The phone then sends data from the NFC connection back over its cellular link to a server or database, for example to verify an RFID tag.

RFID enabled cellphones are among changes forecast to create an 'Internet of Things'. The internet's potential reach will jump from one billion PCs today to also include cellphones (three billion subscribers by end 2008) and RFID tags and sensors (hundreds of billions), not to mention millions of new smart devices including vehicles, white goods and in-building monitors.

However, how and when this revolution might arrive is uncertain. Or, whether one of its impacts will be to enable millions of cellphones as brand protection tools.

But we only need to look to other developments like SMS messaging and the MP3 music format for an indication of what's possible.

Each was created as a minor add-on in the quest to create the Global System for Mobile (GSM) standard and digital image compression, and yet each standard subsequently created completely unforeseen billion dollar industries.

Japan races ahead of Europe and the US

The RFID enabled cell-phone revolution is well underway in Japan. Already, Japan's experience is setting a pattern that Europe, though not the US, has started to follow.

Japan's rechargeable contactless Suica smart card was first launched in as a ticket device for the Tokyo transport network. Then, convenience stores and vending machines at train stations incstalled point of sale (POS) readers to accept low-price contactless payments with the cards.

Next, Japan's dominant mobile operator, NTT DoCoMo, launched cellphones with built-in RFID readers and software to manage Suica transactions. Other Japanese operators have launched similar 'osaifu keitai' or wallet phones.

Raghu Das, CEO of the IDTechEx consultancy that specialises in RFID and smart packaging, says that today, there are now around 47

‘**The internet's potential reach will jump from one billion PCs today to also include cellphones (three billion subscribers by end 2008) and RFID tags and sensors (hundreds of billions)**’

million RFID-enabled cellphones in Japan and over 120 million readers.

So what has America and Europe been doing while Japan raced ahead with contactless payments?

The US has moved some way to contactless card payments for items under $25 (€16). Led by MasterCard PayPass, major card issuers have jumped directly from magnetic stripe card to contactless payments, without going through a chip and pin stage like Europe. US retailers have added contactless terminals in about 80,000 of the six million outlets that take credit cards.

By contrast, Europe has no contactless installed base, with merchant resistance cited as a stumbling block. Home to world leader Nokia, multi-continent mobile operators, massive retail groups - some eagerly embracing RFID - and a vast financial services sector, one might expect Europe to have led the RFID-enabled cellphone market. But, operators have been desperately rolling out 3G infrastructure and services; leading card companies have been bogged down in the migration to chip and pin; then when operators first started looking seriously at this technology, they toyed with the idea of handling the transactions themselves which caused friction with the financial services industry.

A trio of success

However, it's Europe that will gain from a US-based initiative, the Near Field Communication (NFC) Forum, created to arrange the marriage between cellphones, RFID sensors and payment cards.

With 150-plus members, the NFC Forum is where technology companies, financial services players, mobile operators and application developers are thrashing out a road map – specifications and tag formats – to the brave new world of RFID cellphones, seen as key in building the next generation internet.

At the GSM World Forum Congress in Barcelona in February 2008, leading NFC Forum member companies made bullish presentations about the outlook for the

technology. The ability of these powerful commercial interests to work together is now being tested in over 30 NFC trials and early rollouts worldwide involving 19 GSM mobile operators.

In London, UK, Spanish-owned O2 is running a trial that ends in May 2008. Triallists have Nokia's latest 6131 NFC handset preloaded with virtual payment cards for public transport and a Barclaycard (MasterCard PayPass network).

Contactless payments can be made for items under £10 (€12.68) at outlets including Books Etc, Coffee Republic, Krispy Kreme and YO! Sushi.

The company holds a portfolio of patents including those covering the concept of using a cellphone as a universal reader for disposable

Figure 1
Nokia's state-of-the-art NFC handset, the 6131, displaying its virtual wallet in London's O2 NFC trial
Source: Nokia

wireless sensors. Dr. John Peeters, founder and CEO of Gentag, explains that Gentag's patented cellphone-sensor reader technology combined with Gentag's disposable wireless sensor platform, potentially enables a very wide range of applications, with diagnostics and anti-counterfeiting as the first priorities.

Peeters sees counterfeit checking by consumers as a big application for Gentag's technology. 'We believe that product authentication is becoming a critical issue across the board for consumers. Cellphones will allow a consumer to authenticate any product anywhere, prior to purchase.'

He continues: 'Adoption of the technology will first occur in some key vertical markets such as diagnostics (allowing consumers to read disposable wireless diagnostic skin patches) and specialised markets such as wines.'

The first anti-counterfeiting deal that Gentag has made public involves upmarket wines, although details are currently confidential.

Counterfeit drugs are obviously a key market for product authentication, but Peeters thinks food represents another opportunity: 'No market is probably as large and immediate as foods. Tainted pet foods, contaminated meat products and mislabelled produce like "wild salmon" are classic examples,' he says.

Indeed, Gentag is thinking big. Peeters says: 'We plan to roll out in parallel in North America, Europe and Asia since our technology is platform independent and will allow a given consumer to adopt it directly, anywhere. Therefore we are not limited in any way by the adoption of a given cellphone or the use of a given network.'

Asian companies (which Gentag cannot name) are already reported as showing strong interest in Gentag's medical applications, and Peeters refuses to reveal whether any of the European NFC triallists have checked to see if they've contravened Gentag's patents.

However, as Raghu Das at IDTechEx warns:

'Effective RFID-based anti-counterfeiting needs item-level tagging. Even by 2018 only about 10% of items supplied will be tagged.'

A key challenge for privately held Gentag is how fast it can sign up brand and retail partners in key vertical markets who've already actively embraced RFID.

Counterfeit authentication and the consumer

But while counterfeiting continues to grow, empowering the consumer to authenticate the products themselves will prove attractive.

Increasingly, counterfeiting's impact on consumers is moving from luxury goods to more routine items such as prescription drugs, automobile brake pads, airline parts, batteries, extension cords, health and beauty products, wine and computer software. Indeed, Gentag's hit list of possible categories for its anti-counterfeiting system ranges from perfumes to washing powder.

But are consumers bothered enough to demand the power to authenticate products themselves?

Louis Bianchin, senior analyst & program manager RFID, at consultants Venture Development Corp. in Massachusetts, US, which also advises on anti-counterfeiting, says there are two key counterfeit markets.

In the primary market consumers are ripped off, buying counterfeit and pirated products believing they have purchased genuine articles. Then there's the secondary market, where consumers deliberately hunt out what they believe to be bargains and knowingly buy counterfeit/pirated products.

Recent research by Ledbury Research and Davenport Lyons shows the shocking scale of the secondary market among UK consumers (see Figure 2, overleaf).

Then there is the issue of consumer trust in major retail chains. A simple Google search throws up plenty of media-fuelled scepticism about big retailers' business practices, but little
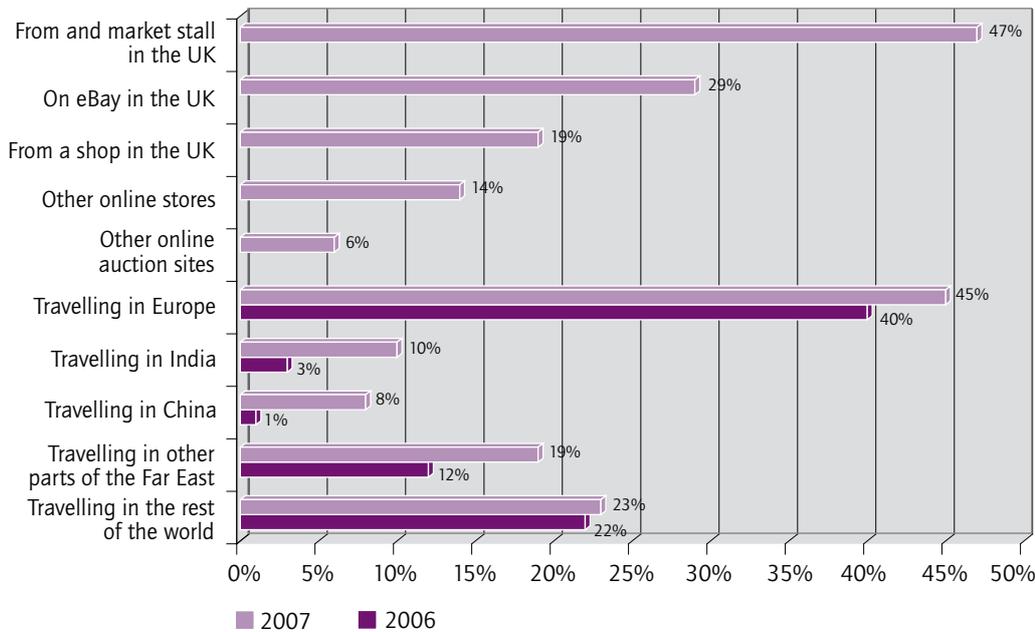
Figure 2
Where have you bought
a fake from?
*Source: Counterfeiting
Luxury: Exposing the
Myths, Ledbury Research &
Davenport Lyons, 2007*

Chart data:

Category	2007	2006
From and market stall in the UK	47%	
On eBay in the UK	29%	
From a shop in the UK	19%	
Other online stores	14%	
Other online auction sites	6%	
Travelling in Europe	45%	40%
Travelling in India	10%	3%
Travelling in China	8%	1%
Travelling in other parts of the Far East	19%	12%
Travelling in the rest of the world	23%	22%

sign of fear that branded goods on their shelves could be fakes.

It seems that without more consumer education, the notion of the cellphone as 'fake detector' might be a hard sell to the general public in Europe.

A matter of when not if

Clearly, at least if analysts are to be believed, the arranged marriage of cellphones and RFID is not a matter of if, but when.

Jonathan Collins, principal analyst, RFID & Contactless Group, ABI Research, predicts NFC-enabled mobile phones will reach 292 million units in 2012, roughly 20% of handsets sold that year.

Frost and Sullivan anticipates NFC-enabled handsets capturing around 13–15% by the year 2010. While, Jupiter Research estimates that worldwide payments by mobile phone may reach $22 billion (€14.15 billion) by 2011.

Collins at ABI stresses that NFC for contactless payment is an application not limited to one market, which means there is great potential for units and tags to be made in high volumes at low prices.

His company forecasts 419 million NFC chipsets will shipped in 2012 at a per unit price then of $0.97 (€0.63).

Indeed, Louis Bianchin, senior analyst at US consultants VDC, says NFC standards agreed in February 2008 will unleash chips from several volume chipmakers by year end.

However, there are a number of factors which might delay the arrival en masse of RFID enabled cellphones. For example NFC readers mean additional costs, transaction fees and more clutter in the point-of-sale for retailers. In Europe, retailers are just putting behind them the costs and disruption of the changeover to chip and pin. It's believed too, that high processing fees have been a point of discussion among companies in London's O2 trial.

Indeed, Collins warns about phones as anti-counterfeiting tools. 'When we move from using a cellphone to make a contactless payment to using it to read RFID tags on products we hit a snag.' He says: 'The payment application uses high frequency RFID tags, while the RFID reader application uses UHF tags. So we need a more expensive dual mode phone with two chips and different antennas.'

In time advances in chips and tags may remove the problem, but until then any advances in using RFID-enabled cellphones as an authentication device may be limited to specialist phones for users with a clear interest in having that added functionality □

Once dubbed the barcode of the future, RFID tagging is yet to fulfill the hype – but there are signs that suppliers and users are beginning to reap the benefits. *Brand* investigates

From tags to riches

For a relatively unobtrusive and straightforward technology, RFID has certainly attracted its fair share of superlatives. But while it was once hailed as the cornerstone of a retail revolution, and miracle cure for inefficient supply chains, there's a strong feeling amongst suppliers and users alike that the technology hasn't quite lived up to its early billing.

Nevertheless, while it might not be as ubiquitous as its most vocal champions once claimed it would be, the market for the technology is growing, and growing fast. In both supply chain logistics and item-level tagging for high-value goods the retail sector is expected to grab an ever-increasing share of a global RFID market predicted to hit $3.5 billion (€2.24 billion) by 2012.

Pallet- and case-level tagging

Leading the charge is Germany's Metro Group – the undisputed technophile of the world of supermarket retail. According to company spokeswoman Antonia Voerste, the Metro Group continues to see great benefit in the use of RFID technology, for pallet- and case-level tagging within its supply chain. Following its deployment of over 100 systems last year, Voerste says the company is now planning to roll-out RFID systems in 200 of its Real Hypermarkets across Germany as well as Metro Cash & Carry France.

'Metro cash and carry has already installed RFID gates at all stores in Germany and about 40% of things they sell come in on RFID-tagged pallets,' she says. The portals, which are being developed by Metro's long-term partner Checkpoint Systems, will be used to track pallets as they arrive to improve supply-chain efficiency.

Addressing inventory problems

Meanwhile, on the other side of the Atlantic, Wal-Mart, generally regarded as one of the world's biggest drivers of RFID technology, is also pushing ahead with plans to roll-out the technology across its supply chain. The company currently uses RFID for case- and pallet-level tagging at 975 of its 4,000 US stores, but is looking to rollout the technology across its entire operations. Talking late last year at the Taiwan International RFID applications show, WalMart's head of RFID Ron Moser suggested that if RFID was used to address just 10% of the company's inventory problems it could save $287 million (€183m) per year.

Wal-Mart has also just released the results of a study into the technology, conducted by researchers from the RFID Research Centre at the University of Arkansas, US, in which RFID was shown to reduce inventory inaccuracy – a problem costing millions of dollars a year – by 13%.

A tag-makers view

Another of the key factors that could give momentum to the uptake of the technology over the coming months, is the fact that as the performance of the technology improves, it also appears to be coming down in cost.

> ❛ **WalMart's head of RFID Ron Moser suggests that if RFID was used to address just 10% of the company's inventory problems it could save $287 million per year** ❜

A notable example of this phenomenon is the passive Ultra High Frequency (UHF) technology produced by Alien Technology, one of the largest suppliers of tags and readers to the retail industry. Scot Stelter, director of product marketing for Alien Technology, explains: 'Passive technology is differentiated from active and WiFi RFID in that the tags are up to 100 times less expensive. So, when a large number of items are to be tagged, passive technology is ideal.

'In recent years passive technology has improved significantly so that ranges of several meters are possible, enabling passive systems to replace more expensive active systems in many applications,' he adds.

The cost of Alien's technology has been reduced further, claims Stelter, through a highly innovative manufacturing process: 'Our tags are less expensive and of higher quality than our competitors, due to our patented fluidic self-assembly (FSA) manufacturing technology, which enables the parallel manufacture of tags at costs that decline as the ICs get smaller and the volumes get larger.'

Stelter adds that retail market is very important to Alien and one of their key market targets: 'We believe that retail is one of the application areas that stand to benefit the most from RFID over time, especially in inventory management and supply chain applications.'

Cost and performance

RFID technology is also becoming more attractive thanks to the fact that solutions are now being found to some of the technical problems which have dogged the technology in the past.

For instance, one of the big issues has been the fact RFID hasn't typically worked well with products containing fluids or metals, which can either absorb or reflect the signal. In some of the early roll-outs of the technology this led to read rates of around 30%. And in the cases of Gillette and Philip Morris – mandated to fit the technology by Wal-Mart – it even prompted a redesign of the packaging in order to get a better read rate.

Thankfully, such issues are becoming a thing of the past. According to Antonia Voerste, the efforts of Metro-Group's engineers have brought read rates up to a regular 100%. 'With our long-running tag tests in combination with our case-level trial we are able to gather scientific experience in placing tags on difficult materials,' she says. 'Due to our close working relationship with tag manufacturers, these results are introduced in the relevant R&D processes and have contributed to the impressive progress in terms of tag capabilities that the industry currently enjoys.'

She continues: 'We also contributed to the review of the applicable European radio frequency regulations by hosting a field test in one of our distribution centres. Seen from today, this test has come to be regarded as instrumental in developing an improved approach to using the relevant frequency standard for UHF RFID technology in Europe.'

A return on investment

Retailers are also working increasingly hard to convince their suppliers that they too can enjoy a return on their investment. In the past, suppliers mandated to apply tags have tended to adopt a so-called 'slap and ship' approach: paying for tags, attaching them to pallets and never really seeing much of a payback.

Voerste thinks that although this is an ongoing concern, there are signs that the climate is changing and Metro Group is keen to work closely with its suppliers on the issue, making sure they're awake to the potential of the technology.

Figure 1
A strong sign of hope for the RFID industry is that people are continuing to find innovative new applications for the technology, like MediaCart's 'smart' RFID-enabled shopping trolley
Source: MediaCart

'RFID hasn't typically worked well with products containing fluids or metals, which can either absorb or reflect the signal, but that's becoming a thing of the past'

Figure 2

Metro Group – behind some of the biggest RFID applications for pallet and case level tagging – is also trialling the technology on item level applications at it's Galeria Kaufhof department store in Essen, Germany
Source: MetroGroup

'We have a yearly RFID conference for our suppliers, where we explain the benefits to them,' she says. 'We're trying to educate them on how they can use the technology to get benefits themselves and find ways of integrating it into their systems that make sense to them. I think it's going to take some time before the real business cases show up.'

Item-level tagging

Clearly, it's going to be a while before these concerns go away. But one area where the business case for RFID is really compelling, is item-level tagging for high-value goods where the low cost of a RFID tag – around 0.07 cents – is a negligible percentage of a product's value.

One company that has really thrown its weight behind item-level tagging is Marks & Spencer (M&S), which now uses tags to carry out stock control on its clothing ranges in 120 of its UK stores.

The company is thought to use more item-level tags than any other retailer in the world. It has deployed around 100 million to date and is expected to use a further 100 million this year. Because it sees it as a competitive advantage in an increasingly cut-throat world, Marks & Spencer is tight-lipped over the benefits of these rollouts,

but according to some estimates the company has seen a sales uplift of between 15–20%.

Alongside its pallet- and case-level mandates, Metro Group is also excited about the possibilities offered by item-level tagging, and like M&S, is beginning to roll-out the technology on clothing.

'Item-level tagging is particularly useful for clothes,' says Voerste. 'The business case is quite obvious where every single item is expensive.'

Voerste says the company's most significant activity in this area is its item-level pilot at its Galeria Kaufhof department store in Essen, Germany.

'At the Kaufhof department store we have tagged 80,000 articles, and as well installed a number of customer devices such as the intelligent mirror. For example if you show the mirror a pair of trousers, it will show you matching items and display information on how to wash it and which other sizes and colours are available.'

RFID's holy grail

But perhaps the holy grail of item-level tagging is the tag that is so inexpensive it can be put on a food item. When that happens, the gulf between pallet level and item-level tagging will

be bridged – and the financial benefits won't just be felt by purveyors of luxury goods.

One possible glimpse of the future is offered by Siemens spin-off PolyIC which has developed printable RFID chips made entirely of semi-conducting plastic. 'PolyID transponders are produced in a roll-to-roll printing process with soluble polymers,' explains company spokeswoman Bettina Bergbauer.

'Conventional RFID transponders are produced in a clean-room process with silicon. By contrast, the potential advantages of printed transponders are that they can be produced in a high-volume printing process quickly and cheaply.'

Though non-disclosure agreements prevent Bergbauer from revealing the specific details of any trials, she says the company sees great potential for the technology in the retail sector. 'This is what the vision about printed RFID is all about,' she says. 'The ultimate aim is to produce an RFID tag so low-cost that it can be put on a yoghurt cup. The difference between conventional RFID and printed RFID is that printed RFID will open up new markets. Printed RFID could open up the market of item-level tagging in the supermarket which is not possible with conventional RFID due to cost restrictions.'

Climate of innovation

Another strong sign of hope for the RFID business is that people are continuing to find innovative new applications for the technology.

One particularly imaginative example is the Mediacart, a 'smart' RFID-enabled shopping trolley jointly developed by US firm MediaCart and Microsoft. The system enables users to upload their shopping lists, locate products, carry out price comparisons as well as view nutritional information and even recipe suggestions. It also provides an opportunity for advertisers, who can use information obtained through loyalty card programmes to send relevant ads and promotional information to shoppers.
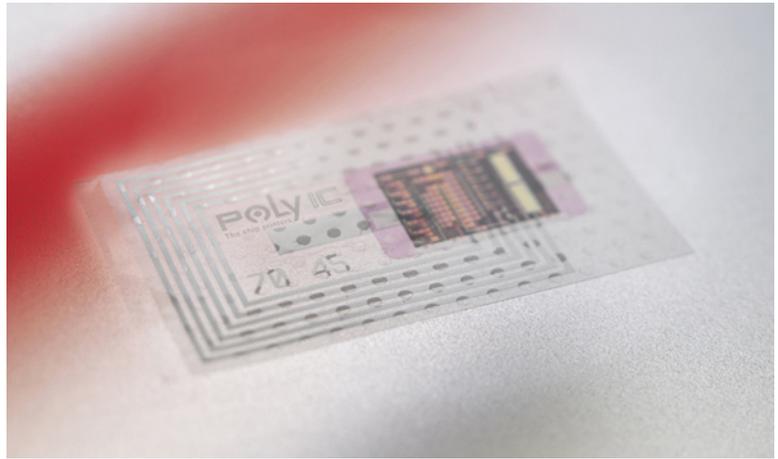
The intelligent trolley is due to be rolled out this year by Wakefern Foods in the US and the Cold Storage supermarket chain in Singapore. And although official trials are yet to be announced, the manufacturer has suggested that the trolley may find its way into UK stores within the next year.

Against this background of innovation, growing acceptance, proven business cases and affordability, it appears that the prophets were right. The RFID tag is the barcode of the future. We're just going to have to wait a little longer to see what that future looks like.

Figure 3
Siemens spin-off PolyIC has developed a technique which uses a roll-to-roll printing process to produce large volumes of plastic tags at very low cost. The company sees potential applications on the tagging of individual food and drink items
Source: PolyIC