



# Close to a breakthrough

Despite a longer than expected gestation period, NFC is nearing wide scale application. By **John Walko**.

Near field communications (NFC) has taken far longer to get established than originally hoped for, but its fervent backers anticipate a breakthrough next year. In this respect, it shares the birth pangs of technologies such as Bluetooth and WiFi, which travelled from hype to hope, then disappointment, before becoming established.

What seems to be a compelling and simple idea – consumers touching their mobiles to pay for coffee, travel on the bus, download coupons or pass information on to friends – is proving unexpectedly difficult to bring to market.

The state of the global economy only partially explains why roll outs may be postponed for a year or, more likely, longer. It is the lack of eye catching devices and realistic business models that is holding things back and determining how everyone in the supply chain can make money from the technology remains another obstacle.

“What we are seeing is two different approaches,” commented Tim Jefferson, managing director of The Human Chain, the wireless technologies consultant. “It is a complex ecosystem and we are trying to bring together a wide range of normally separate and well established systems, with vested interest carriers, service providers and technology players, all working together to get things moving.

“The alternative is what we are seeing in the UK, where Orange and Barclaycard have sealed a commercial deal and are bringing services and products to market later this year, [but] on a one to one basis. This drives their competitors to react, such as O2 and RBS. The reasons for the different

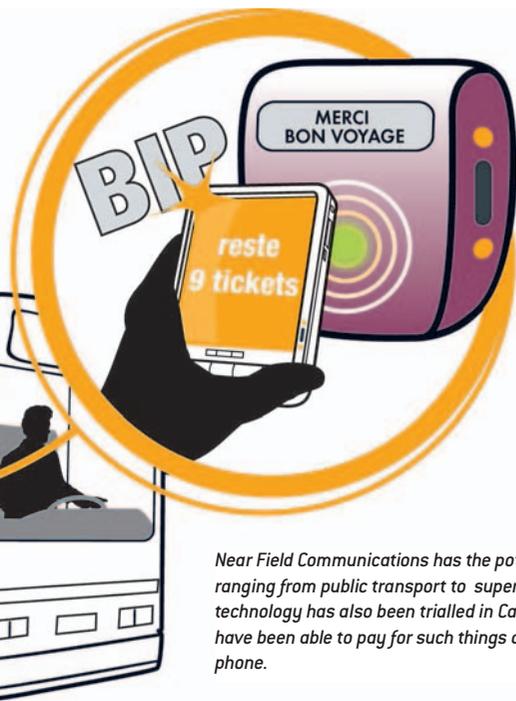
## Near Field Communications

Near field communications (NFC) is an ultra short range, low power radio communications technology and standard. It builds on the one way induction powered Radio Frequency Identification Device (RFID) standard by mandating that NFC devices must have an induction powered tag and a suitable reader that can be used to interact with other tags.

The key difference between NFC and standard rf wireless communications is the way in which the rf signal is propagated. Standard rf communications, such as WiFi, is seen as ‘far field’ – the range is large compared to the size of the antenna. NFC relies on direct magnetic or electrostatic coupling between components inside the communicating devices, rather than free space propagation of radio waves.

The technology, jointly developed by Philips and Sony, is based on the ECMA340 standard that defines communications modes at a centre frequency of 13.56MHz and data rates of 106, 212 and 424kbit/s. A simple link layer protocol addresses link initialisation and collision avoidance, while a transport protocol covers protocol activation, data exchange and deactivation.





*Near Field Communications has the potential to be used in applications ranging from public transport to supermarket transactions. The technology has also been trialled in Caen, in France, where residents have been able to pay for such things as parking using their mobile phone.*



But several companies are looking to another way to incorporate NFC capabilities into phones and other devices. For instance, Innovision Research and Technology, which has a major business providing NFC tags, sees a huge opportunity to sell its NFC related IP to larger chip makers, where it would sit on an SoC with other wireless functionalities – such as Bluetooth, WiFi or GPS – and thus reduce the costs of providing NFC.

“We are talking to several major developers of combo chips and can see this approach taking off within a couple of years,” said Innovision ceo Dave Wollen. He would not name the companies involved, nor the identity of the major SoC supplier which signed a ‘significant design in deal’ last month for its NFC silicon IP. This is potentially worth \$10million over the next few years.

NXP has been a long term licensor of Innovision’s IP for use in its NFC chips, related software and secure elements. “We are working with many others, but handsets, though potentially significant and fast moving, are not the entirety of the NFC business,” said Wollen.

#### Successful suppliers

For the moment, Innovision makes most of its revenues from NFC tags; devices that store small amounts of data and code and which allow users to, for instance, tap smart posters to download tickets and to open Bluetooth connections automatically. The company’s Topaz tags are one of four types standardised by the NFC Forum.

By far the most successful suppliers of NFC silicon to handset makers are NXP and Inside Contactless. The former has supply deals with Nokia and Samsung, with the Korean group’s first NFC model, the S5230, currently undergoing trials in several countries. There have been suggestions that several fixes have been necessary to the phone to improve communications with PoS and transit terminals.

Inside, meanwhile, has supplied chips for most trials involving apps on SIM cards with SWP connection and its parts are incorporated in all Sagem models.

Both companies have conceded that, while a great deal has been achieved on the standardisation front and with SWP based SIMs, there is much more to be done. “The whole industry has clearly underestimated the time and complexity of bringing solutions to market,” noted Charles Dachs, head of marketing and product management at NXP. “Interoperability between chip and card solutions has been a major concern. Everybody



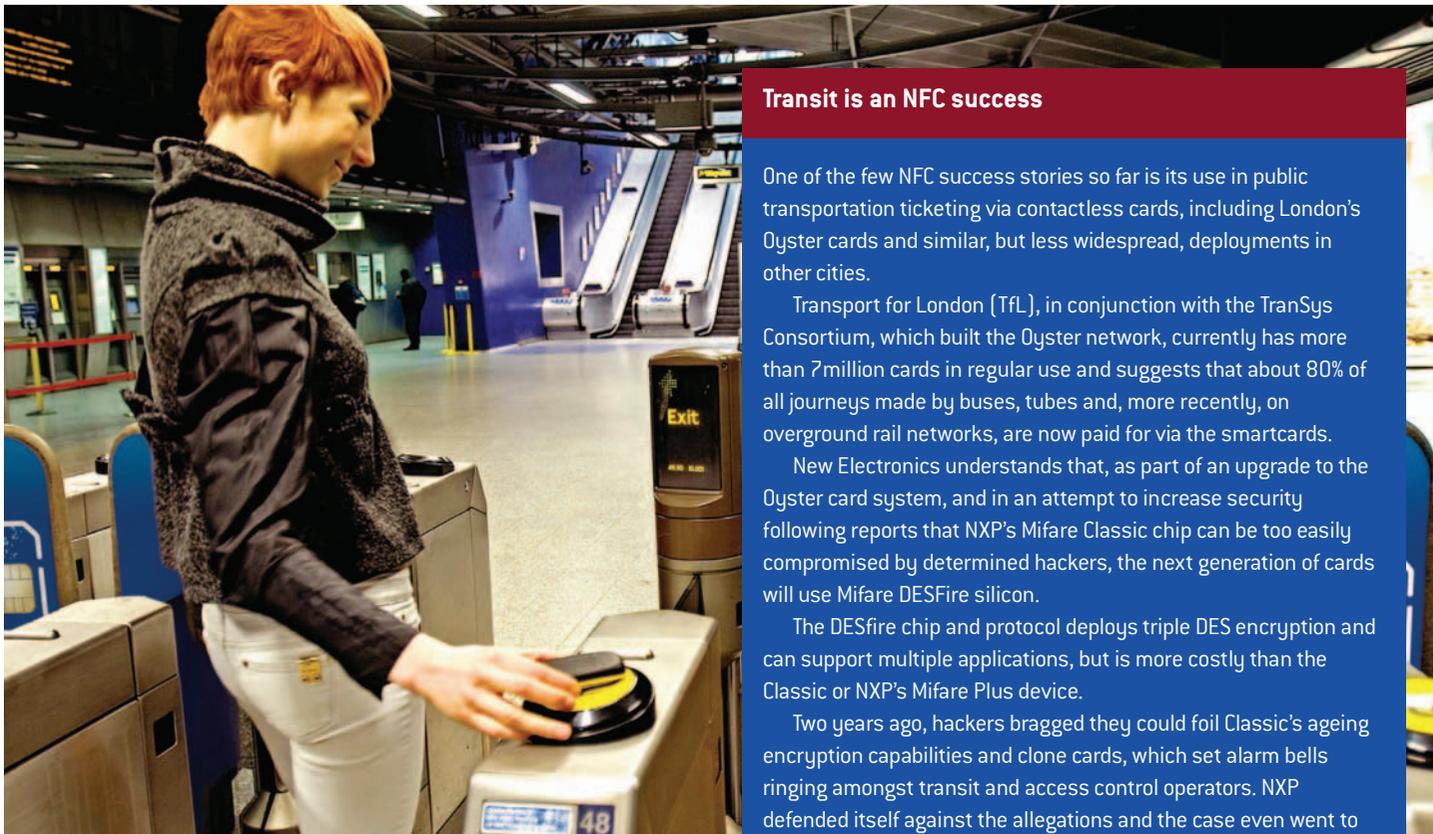
approaches are complex and include competition, government support (including seed funding in France, for example) and differing business models for service providers and carriers.”

Jefferson notes it is not exactly a good time to be bringing industry changing business models to market. “Handset replacement has slowed in much of the developed world. Payment acceptance networks are hardly uniform, with a wide range of standards, regulations and charges. The likes of Visa and MasterCard and the other big players in EMV like to make people think there is a universal payment infrastructure, but look ‘under the bonnet’ and the reality is different.”

Applications such as ticketing, access, coupons and service discovery have fewer barriers to entry, in terms of regulations and rigid business models, and could provide new and innovative user experiences and opportunities, suggests Jefferson.

At the semiconductor level, the market is fragmented between those companies that focus on silicon for mobile phones: either standalone ‘secure element’ parts or NFC chips supporting the Single Wire Protocol (SWP) that enables payment and other secure applications to run on SIM cards with a standard single wire connection to the NFC chip.

Many of the largest mobile operators are insisting that any NFC phones they buy must support SWP to enable the SIMs they issue to store NFC payment and other secure applications. This would give them influence over how revenue is shared for the applications.



### Transit is an NFC success

One of the few NFC success stories so far is its use in public transportation ticketing via contactless cards, including London's Oyster cards and similar, but less widespread, deployments in other cities.

Transport for London (TfL), in conjunction with the TranSys Consortium, which built the Oyster network, currently has more than 7 million cards in regular use and suggests that about 80% of all journeys made by buses, tubes and, more recently, on overground rail networks, are now paid for via the smartcards.

New Electronics understands that, as part of an upgrade to the Oyster card system, and in an attempt to increase security following reports that NXP's Mifare Classic chip can be too easily compromised by determined hackers, the next generation of cards will use Mifare DESFire silicon.

The DESFire chip and protocol deploys triple DES encryption and can support multiple applications, but is more costly than the Classic or NXP's Mifare Plus device.

Two years ago, hackers bragged they could foil Classic's ageing encryption capabilities and clone cards, which set alarm bells ringing amongst transit and access control operators. NXP defended itself against the allegations and the case even went to court in the Netherlands.

In a note to New Electronics, TfL said 'there has only been one isolated attack on the Mifare Oyster card' and added the upgrade and ongoing development 'will help ensure the long term security of the system'.

As part of the upgrade, all card readers have had new software installed to allow them to read the higher level of encryption associated with DESFire enabled cards.

One of the main reasons for the success of TfL's Oyster project is that it still deploys – despite numerous upgrades and extensions over the years – closed loop technology in a gated in and out community. It has also benefited from some generous local government subsidies; for instance, the DESFire upgrade to some 23,000 contactless card readers is being partly paid for by the UK's Integrated Transport Smartcard Organisation (ITSO) project.

TfL is also one of the keenest to use its Oyster application and technology in NFC enabled phones for secure contactless fare collection. In 2008, the organisation was amongst the first to trial NFC enabled mobile phones, in collaboration with O2 and Barclaycard. But no decision has yet been taken on whether this will be extended on a commercial basis.

At a recent conference, Brian Dobson, TfL's Future Ticketing Project System Manager, is reported to have said TfL will 'likely push ahead' as soon as handsets with SIMs that can work to the DESFire protocols are available.

sees the value in this, but getting it together is proving difficult. But it's a question of when, not if."

Loic Hamon, vp of products and marketing at Inside Contactless, concurs. He expects to see a wide range of NFC enabled phones working on the Android OS by 2011. "We are working with several major players, phone suppliers and ODMs. There is still, perhaps, a year of design work before trials and commercial phone availability, but it promises to be a huge opportunity."

Both NXP and Inside late last month revealed further support for development of Android based NFC devices and made their respective application programming interfaces (APIs) available as open source. Inside's Open NFC protocol stack can be downloaded free of charge from Sourceforge.net, while NXP, working with Trusted Logic, has released its API under the popular Apache license.

Not surprisingly, both feel their solution is the most likely to succeed and, to complicate matters, both have put their technology forward as a potential standard to the Open Handset Alliance.

Earlier this month, Inside bought Atmel's smart chip card unit which, Hamon suggests, offers 'great synergy and opportunities in all aspects of the payments business'. Among other things, the deal will give Inside designs for dual interface chips for EMV banking cards.

One other major trend in the NFC sector is the emergence of different form factors, such as TazTag, contactless stickers and microSD cards that could turn mobiles into payment devices. Such peripherals – in particular, the microSD concept – could provide a means for banks, retailers, transit operators and network operators to offer mobile contactless services without them having to wait for full NFC.