

ITSO and European Interoperable Fare Management

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Smartcard Advantages

Smartcards provide a significant number of benefits to both the cardholder and the background processes involved. In particular, the threat of fraud is significantly reduced because smartcards are almost impossible to copy, while lost or stolen cards can be easily identified and 'removed' from the system. Once deactivated as a result, they are of no use to anyone. Smartcards can significantly reduce boarding times, particularly when combined with card-readable Point of Service Terminals (POSTs), subsequently reducing driver workload, journey times and removing a potential monetary transaction element from travel.

Scheme operators benefit from the wealth of information made readily available using smartcards. Full smart ticketing

schemes can provide more data on journeys with greater accuracy; this can assist in reimbursement arrangements between operators to ensure that all payments are fairly administered. Travel information can also be shared with operators to identify travel patterns, leading to improvements in vehicle deployment. For operating companies who previously spent large amounts on travel-pattern surveys, this readily available information can remove the need for such surveys and reduce annual expenditure.

Although the above benefits are easily accessed when a smartcard operates within a single 'closed' system, they are harder to achieve when two or more independent schemes operate alongside each other and accept each other's smartcards. This is when Interoperable Fare Management becomes necessary.



Picture of ticket gate with smartcard mechanism

(Merseytravel)

ITSO: Universal UK Interoperability

Formed in 1998 and originally called the Interoperable Smartcard Organisation (ITSO), ITSO Limited is a non-profit sharing or distributing organization, whose members include UK bus and train operators, industry suppliers, the UK Department for Transport, and regional and local authorities. Its objective is to facilitate the development, operation, and management of an interoperable smart media environment. Originally issued in March 2004, the current ITSO Specification is now Version 2.1.3 (April 2008); it is UK Crown Copyright and available free-of-charge to all on the ITSO website at www.itso.org.uk.



ITSO supports interoperability between transport operators (ITSO)

The ITSO 'shell' on a smartcard (similar to the top level directory on a PC) provides the opportunity for a smartcard to store multiple products, meaning that an ITSO card can be compliant with other schemes such as library or identification cards, even banking, as well as holding a variety of tickets for multiple independent transport operators. ITSO embraces a multitude of existing card types, which vary in terms of their suitability for specific schemes. These include Mifare® Classic, DESfire and Ultralite families, Calypso, Infinion Jewel, and the generic microprocessor cards, such as JCOP. The cards are all contactless, a necessity in the transport sector because they are quicker and easier to operate than contact counterparts. The ITSO specification has another significant advantage for the cardholder—its compatibility with other types of services such as library or leisure services means that a single smartcard can be used in many situations.

ITSO Operation Criteria

By using a SIM-card sized ITSO Secure Application Module (ISAM), the ITSO specification provides a wealth of functions, such as secure key distribution and storage for product management and usage, issuing and acceptance of products from a number of providers and retailers, validation of card



ITSO Secure Application Module (ISAM) (ITSO)

and transaction data using 1536-bit encryption, secure data storage, and an assured environment where all data transactions reach their intended recipient without loss or tampering. The ITSO environment supports a Transaction Data Repository, enabling local authorities, banks, and retailers to issue ITSO compliant smartcards to eligible holders regardless of whether they are smart-enabled themselves. They can then migrate to full ITSO as and when economic circumstances allow.

UK Transport Schemes

With 300+ UK Travel Concession Authorities venturing into the world of travel smartcards using the ITSO specification during 2007 and 2008, the pressure was on to ensure that the nearly 10 million membership scheme went to plan. By adopting ITSO to provide the common and proven technical specification behind the nationwide scheme, ITSO is providing a platform for using other products from the same smartcard.

The introduction of concessionary bus travel through England, Wales and Scotland, has given specific groups of people discounted or free travel across their respective countries. In 2000, a statutory half-fare minimum concession was introduced for pensioners and disabled people, and in 2006, the statutory minimum was increased to full free local travel. From April 2008, this has enabled those over 60 and disabled people to travel free on off-peak local buses anywhere in England. Similar arrangements exist for Scotland and Wales, the Scottish scheme having led the way in 2007.

A main contributor to the success of these schemes has been the ITSO-compliant technical specification, which has been designed to provide secure interoperability through common design features despite a multitude of different schemes and local variations. As a result, local authorities can freely procure all the services required to issue smartcards



Stagecoach bus

(Matthew Silver)

for concessionary travel. This covers aspects such as card production services, card management services (CMS), back-office provision (known as the Host Operator Processing System—HOPS) and in-house smartcard personalization equipment.

With such a high demand for smartcards over such a short time between August 2007 and April 2008, mass production of ITSO cards scaled new heights. With over 5.7 million cards created for rollout on 1 April 2008 alone, the pressure was on to ensure that data was processed quickly and accurately. During peak periods, some 800,000 data frames were being processed per day, equivalent to creating some 106,000 smartcards each day. Over 50 different card supply options have now been certified by ITSO covering all the approved

card types and this has encouraged both the ability to match the right smartcard to the specific local need and procure it at the right competitive price.

With the UK National Concession



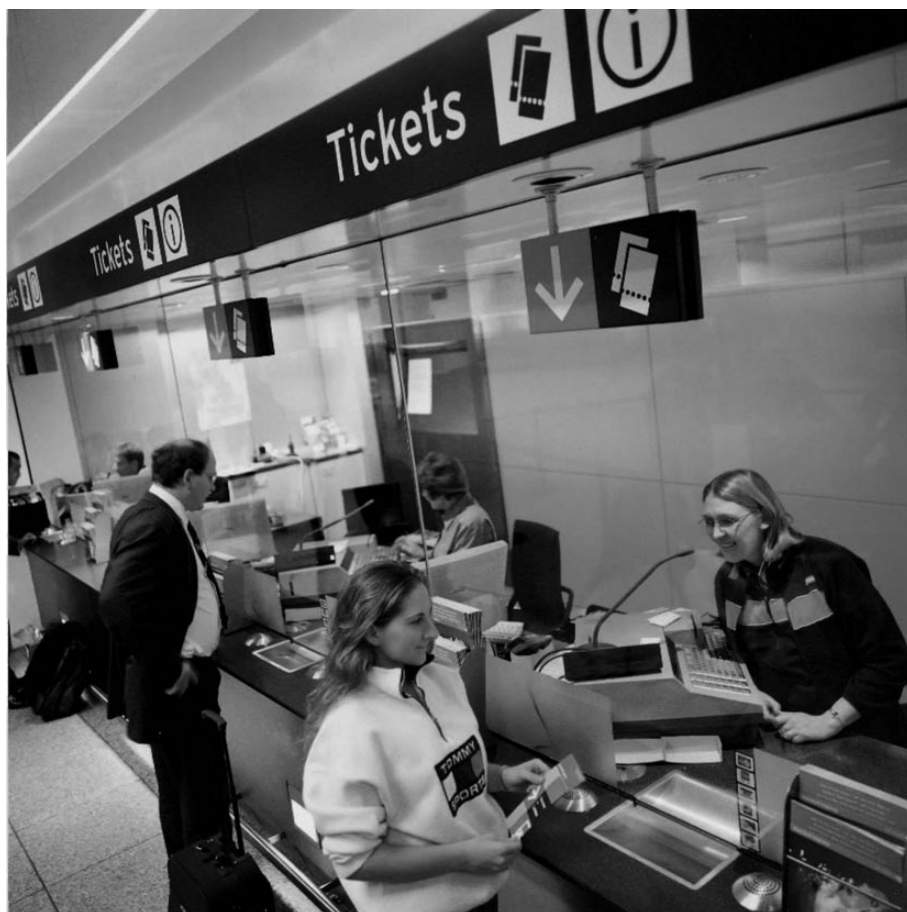
English Concessionary Travel Scheme pass
(Matthew Silver)

Schemes now in full swing, the coming months will show the potential impact smartcards can have on the evolution of public transport smart ticketing. The UK Department for Transport has also mandated ITSO smartcards across the rail network with half the rail franchises due to migrate to ITSO within the next 2 years, and upward of half of rail transactions (up to 2 billion per year) being on ITSO-enabled smartcards by 2015. London, with its current proprietary *Oyster* smartcard scheme is due to become ITSO-compatible by 2010 to accept both rail-issued ITSO smartcards and English Concessionary ITSO smartcards, which are valid for free travel on all London buses.

Consequently, ITSO is now fully operational and interoperable across the UK covering travel by bus, rail, tram and ferry.

Advantages of Interoperable Fare Management (IFM)

Smartcards have been around for a number of years, not least in the transport world, and have been highly successful in schemes such as *Navigo* in Paris and *Oyster* in London. But interoperability—the ability to take your smartcard from one scheme and use it in another—still remains a largely unfulfilled dream, so customers still need incompatible and



Stansted airport ticket windows

(ITSO)

different cards or tickets when moving from one transport system to another. In an area such as the European Community, this can be a daunting task. Some progress has been made in writing national specifications for IFM: ITSO in the UK (described here), VdV-KA in Germany, and Translink in Holland, but although they all meet the same International and European standards, they are still not interoperable across borders.

There are hopes that IFM will significantly lower the barriers to mobility, and encourage social inclusion, particularly among migrant workers and extended families. Smartcards can also be expected to encourage the use of public rather than private transport, contributing to reduced carbon emissions and the reduction or elimination of paper tickets and the environmental impact they create. IFM can be expected to further enhance the impact of smart media on the environment and on the efficiency of public transport. Interoperable smartcards will make it possible to tailor the media to assist specific groups, such as current concessionary travellers, disabled passengers, benefit recipients, part-time and migrant workers, as well as delivering overall improvements to the customer experience and reducing barriers to changing between transport.

European IFM

Within Europe, the European Commission has recently opened its seventh 5-year multi-billion euro framework for funding projects running from 2008. These funding programmes have run since 1984 and normally cover a 5-year period, although this one will run for 7 years. The European Commission Directorate covering Information and Society (DGINFSO) is funding a range of major projects under the Intelligent Transport Systems (ITS) umbrella, focusing particularly on safety, mobility, and social inclusion. Public transport is seen as having an increasing role to play in this arena, not least because of its contribution in helping to address the major problem of global warming.

Two years ago, the French, German, and UK based national interoperable transport organizations, who (with many others across the world) had been working together to write the International Standard on IFM (ISO EN 24014), came together to propose a project to the European Commission relating to IFM. The three organizations, supported by a number of other EU countries, wanted to progress the recently published ISO standard on IFM into real cross-border smartcard operations for transport. Informal approaches to both the Transport and IT Directorates in Brussels were very positive and the proposal was successful at the very first round of

funding towards the end of 2007, despite heavy competition for limited resources. The EU-IFM Project began operating from 1 January 2008. At a practical level, the participants asked me to act as coordinator and prime contact with the European Commission. There are individual work packages in the project managed by ITSO/University of Newcastle (UK); SNCF/RATP/URBA/University of Paris X (France); VdV (Germany); and UITP, the International Association of Public Transport based in Brussels but with membership across the world.

EU-IFM Project

This European project has the primary aim to make public transport more user-friendly by facilitating seamless accessibility to different public transport networks across Europe using smartcards. By 2015, we can expect that payment processes will no longer be a barrier for users of public transport; the objective of the EU-IFM Project is therefore to provide travellers with common contactless media throughout Europe, which can be used for loading multiple transport products in different geographic areas. They can



Microelectronika bus smartcard validator

(J. Verity)

also be seen as potentially and successfully encouraging sustainable modal switching, such as use of Park and Ride facilities—unlike existing smartcards, which are restricted to specific city or regional geographies or operators.

The EU-IFM Project is based on delivering a wide-ranging ITS-based environment, not just the smart media that supports these nomadic passengers. There will be five main work packages in the Project that cover trust modelling, privacy modelling, common applications and interoperable media, a standard model for IFM organizations, and the necessary supporting back-office ITS system interfaces. It is being managed by the coordinator with assistance from TUV Rheinland. Looking outwards, the UITP will ensure effective and efficient consensus and dissemination of best practice among all stakeholders, particularly transport operators who are already involved in smartcard ticketing, or those with interests in interoperability, modal switching, and supporting ever-changing and ever more mobile populations.

The intention of all the participants is to link existing European expertise with other leading IFM schemes across the world to provide leadership in this segment and to deliver results that can be transferred to areas outside the transport sector and to as wide a worldwide market as possible. In particular, the project is expected to help manufacturers and suppliers offer the end-to-end, lossless nature of IFM, the platform and transactions in other fields such as leisure, event management and social services, thereby reducing time to market and lowering the cost of implementing other comparable and compatible schemes.

The key deliverables over the next 2 years are a formal roadmap towards EU-wide implementation of IFM, together with a tool set for national transport authorities to use when building fare and distribution agreements including how their back offices will interact. Trust and privacy will be key to gaining customer and operator acceptance alike, as will the availability and acceptability of suitable media of the widest possible range. This is all expected to deliver material cost benefits over and above the benefits to mobility and social inclusion. The www.ifm-project.eu website has been set up for the EU-IFM Project to disseminate its findings.

The EU-IFM Project is in its first 2-year phase. There is good hope that requests will be made to the European Commission for further funding covering the formation of an EU-wide IFM organization with the ability to support cross-border security systems, both for the security keys and the Secure Application Module (SAM—the equivalent of a mobile-phone SIM) using them to verify transactions and media. Actual pilots will be needed to prove the concept and gain widespread support. As already suggested, the work on interoperability in public transport is likely to prove valuable in other sectors, such as road tolls and encouraging a modal switch to public transport.

IFM Forum and International Cooperation

An EU-IFM Forum has been set up by the UITP to support the EU-IFM Project, with membership extended to all EU transport operators and other players; more UITP-sponsored IFM-Forums may follow elsewhere across the globe as other areas embrace cross-border interoperability of smartcards for transport. Such meetings are expected to encourage discussion towards consensus building and sharing best practice. The UITP has already issued a focus paper entitled *Everybody Local Everywhere—Electronic Ticketing Interoperability and Fare Management Cooperation* and the EU-IFM Forum has already held two successful meetings. As Manfred Novy, its Austrian chairman said, 'this Forum will ensure effective and efficient consensus and dissemination across ALL stakeholders.' Launch support came from Germany, France, the UK, Holland, Finland, Belgium, Italy and Hungary, and the number of countries involved has grown substantially since then. The EU-IFM Forum URL is www.ifm-forum.eu.

The EU-IFM Project and the EU-IFM Forum are expected to push these new technology boundaries whilst jumping over geographic boundaries working against open, accessible public transport. The vision is not one ticket covering all transport modes and carrying customers across national borders. However, there is a major reward if a customer can use one smart media to buy and hold a range of tickets. This is achievable. This article aims to help gain widespread recognition for the benefits of IFM and smartcard ticketing in mobility, and social inclusion agendas, and as a contributor to reducing barriers to modal switching. ITSO and others are already delivering IFM solutions at the national level; the EU-IFM Project aims to raise the game and deliver pan-European IFM. ■



IFM Forum logomark



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Mr Verity is Head of Security and Compliance for ITSO Limited and Coordinator for the EU IFM Project. A graduate in Chemistry from Imperial College, London, he has had a wide ranging career spanning 5 decades. He spent over 30 years working for BP in a range of roles covering Health and Safety, Planning, Marketing, Logistics and Supply. Before joining ITSO, he was Operations and Compliance Manager for Rail Settlement Plan, the organization managing the UK's National Rail ticketing and settlement agreement.