

## Get Smart: Subway Smartcard Ticketing

Dan Schoenhofen, Strathclyde Partnership for Transport  
ds5@spt.co.uk

---

### INTRODUCTION

#### 1. Background

##### 1.1 Strathclyde Partnership for Transport

Strathclyde Partnership for Transport (SPT) is the Regional Transport Partnership for the west of Scotland. SPT was formed in 2006 as part of the transport framework created by the Scottish Government, which is made up of a national transport agency, Transport Scotland, and seven Regional Transport Partnerships.

The SPT area comprises of the following council areas: East Dunbartonshire, East Ayrshire, East Renfrewshire, Glasgow City, Inverclyde, North Ayrshire, North Lanarkshire, Renfrewshire, South Ayrshire, South Lanarkshire, West Dunbartonshire and the Helensburgh and Lomond area of Argyll and Bute.

As well as owning and operating the Subway, SPT's role involves planning and delivering transport solutions for *all* modes of transport across the region, in conjunction with our member councils and industry partners. SPT is at the centre of the region's transport planning; analysing all travel needs and developing the transport system for now and the future.

SPT plays a key role in strategic planning for the region's future transport system. In 2008, we published *A Catalyst for Change, the Regional Transport Strategy*<sup>1</sup>, which provides the long-term vision for transport in the west of Scotland.

##### 1.2 Initiating Change – Subway Modernisation

Amongst the strategic priorities set out in *A Catalyst for Change* are "Revitalising the Subway network" and "Developing integrated ticketing", both of which feed into SPT's Strategy Outcomes of improved connectivity, access for all, reduced emissions and attractive, seamless, reliable travel. Having secured funding of £300m for the Subway Modernisation programme in 2011, replacement of the Subway's aging ticketing infrastructure became the first deliverable in a series of works to modernise the system.

#### 2. Understanding the Problem

##### 2.1 Life-Expired Magstripe Equipment

During the previous modernisation, in the late 1970s, a turnstile system, utilising magnetic stripe tickets was introduced to the Subway. Turnstile gates validated passengers' tickets on entry and allowed egress (without validation) upon completion of the journey. These gates and validators had reached the end of their useful life and were becoming increasingly unreliable and expensive to repair, with parts and expertise increasingly scarce. The software utilised on the devices was outdated and no longer supported by the supplier, introducing an unacceptable risk to the stability and longevity of the fare collection system.

##### 2.2 Inflexibility of Existing System

The absence of relevant expertise at the supplier also reduced the flexibility of the system, eliminating any potential to make changes to the product set or tailor the ticket offering to meet changing

---

demands. Furthermore, only requiring passengers to validate on entry but not on exit meant that a flat fare system was in force and could not accommodate more flexible fares.

### **2.3 Absence of Data**

Another key issue with a gated system that only validates on entry is the absence of origin-destination data, i.e. records of where passengers board *and alight* the Subway. This gap in Subway usage data resulted in a lack of understanding of passenger flows in the system, making it difficult to plan the provision of resource to the relevant areas. The anonymity of magstripe tickets also removed any possibility of tracing the usage of a ticket, meaning that voided tickets (exposed to magnetic fields or otherwise damaged) could not be assessed for remaining value and any tickets which were lost/stolen could not be traced and blocked and therefore could not be replaced without potential revenue loss to the operator.

## **SMART TICKETING FOR THE SUBWAY**

### **3. Scoping the Solution**

#### **3.1 Consultation**

Significant work was undertaken by the project team to establish the requirements for the new system in order to ensure that the system that was delivered would, as far as was reasonably practicable, meet the needs of those who were expected to use the equipment. This took the form of staff engagement, passenger surveys and user forums with local groups who represent users and prospective users of public transport who are affected by disabilities.

#### **3.2 Research**

In addition to user consultation, research was carried out to investigate other cities' transport ticketing solutions in order to identify good practice in other systems and deliver a high standard of usability in the Subway ticketing proposition. This took the form of online research, discussions with partner organisations in collaborative forums (such as the PTEG<sup>2</sup> in the UK and the European START project<sup>3</sup>) and through reference site visits to similar systems where discussions could be held not only with those who procured the systems, but those who use them on a daily basis.

#### **3.3 Establishing Requirements**

An important element of scoping any new system is the need to detach from existing systems and working practises to ensure that what is delivered is specified to best meet the needs of the users, not to simply act as a replacement for the existing system. In the case of the replacement ticketing project, this had to be balanced against the potential issues of causing confusion amongst the Subway customer base if changes were too drastic and too immediate. A fares structure had to be drawn up which catered for existing users of the Subway but also included innovations that would allow the new system to develop and mature as public understanding of smartcards and their benefits increased.

#### **3.4 Adhering to Standards**

As a public body procuring a ticketing system for public transport, it was required of SPT to ensure that the system being procured was compatible with the ITSO standards, established to provide interoperability between smart ticketing systems in the UK. As an operator of a sub-surface light railway, it was also necessary to adhere to various rail passenger standards (for gate widths, accessibility etc.) and to fire service requirements for speed of evacuation and fire resistance of materials.

### **4. Delivering the Solution**

#### **4.1 Maintaining the service**

One of the key commitments to the travelling public during Subway Modernisation is that SPT will minimise disruption to the daily operation of the Subway. To this end, the vast majority of the physical work to install the new ticketing system was undertaken overnight, outside of normal Subway operating hours. This allowed significant enabling works to be carried out away from the public eye, reducing inconvenience to passengers and eliminating the risk of contractors conflicting with the general public whilst working on the stations. By completing the enabling works in advance, migration from the old gatelines to new in all 15 stations could be delivered in 12 weeks.

## **4.2 Migrating to Smart**

A key issue faced by SPT when migrating to smart ticketing was the lack of expertise at the incumbent supplier to support the legacy magstripe system. Because of this, the decision was made to forego to traditional 'dual-running' solution for migration and move immediately to a fully-smart, contactless-only ticketing system one station at a time. This introduced an issue due to the existence of undated "multi-journey" (or carnet-type) tickets on magstripe, as it would be necessary to dual-encode tickets in order that they could be processed at both magstripe and smart gatelines while the migration took place. To mitigate against this, SPT made changes to the fares structure in advance of the migration, withdrawing the 10- and 20-journey tickets, re-introducing a previously discontinued 28-day season ticket and reducing the price of a 7-day ticket to reposition these season tickets as alternatives to the now-unavailable multijourney tickets. An 'amnesty' was also held over several weeks, during which time holders of multijourney tickets could swap their tickets for a season product of equal or greater value.

Upon commencement of the migration from magstripe to smart, return tickets were temporarily also withdrawn and, as a limited time promotion during the migration, all-day travel was introduced for the same price as the suspended return ticket. This allowed the encoding of time-limited magstripe and smart products onto dual-interface disposable smartcards carrying a smartcard chip and a magstripe, maintaining SPT's patronage reporting and allowing for revenue control on the system. During this time entry gates validated all entries except stations which were in the middle of migration and therefore had no gateline, in which cases gateline staff manually counted entries into the system. Throughout the migration period the exit gates remained open to allow customers to alight the system freely.

## **4.3 Maintaining Momentum**

Following the completion of the gateline migration in October 2013, a further migration was required to move passengers from traditional, disposable tickets onto new smartcards which were introduced when the last station gateline had been installed and the exit gates were brought into service. To prepare for this, SPT took advance applications for personalised cards and were able to issue 2,000 'Bramble' cards to registered customers. This first tranche of early adopters was quickly supplemented shortly afterwards when the fares were amended in January to introduce a price differential and tailor the product set for the different fare media: season products were withdrawn on disposable cards, longer-term season tickets (6 month and annual) were introduced on registered reusable cards and the prices for smartcard trips were held at the 2013 prices, whilst disposable ticket prices increased. In order to maintain the positive message for smartcards, the gateline migration offer which provided all-day travel for the price of a return was also maintained on smartcards, using a pay as you go purse with a daily cap.

## **5. Enhancing the Solution**

### **5.1 Nevis Technologies Joint Venture**

One of the requirements of an ITSO-compatible smart ticketing solution is a back office system to support the security protocols and data-sharing functions which facilitate interoperable ticketing. In order to provide this, SPT have created a joint venture, Nevis Technologies with local ITSO specialists Ecebs. This joint venture vehicle allows for other operators to take advantage of the benefits of smart ticketing without facing the significant up-front cost of setting up their own instance of the required systems. By making these systems available to other operators it is expected that one of the major

barriers to adoption of smart ticketing, the requirement for separate tickets for each leg of the journey, will be removed, encouraging others to participate in smart ticketing and help to deliver the benefits to the travelling public.

## **5.2 Smart Parking**

As well as delivering smart ticketing for Subway travel, SPT have also successfully delivered upgrades at three park and ride stations on the Subway network, allowing customers to use their Bramble card to park and ride using the same season product or their pay as you go purse – the first scheme of its kind in the UK.

## **5.3 Payzone**

Through Nevis Technologies, passengers are also now able to purchase Subway tickets away from stations for the first time thanks to an agreement with PayZone to provide top-up facilities at convenience stores in Glasgow. The scheme uses Remote Ticket Download (RTD) to connect to a shared system which processes the smartcard transaction and allows the local device to load products or value onto the smartcard. This added convenience opens up new retail channels to public transport operators and provides users with an additional option for loading their travel products, even outside of normal PT operating hours.

## **5.4 Online and Mobile Account Access and Product Retail**

Plans for later this year will involve the roll-out of an account management website for Bramble cardholders to access their card account, make changes to personal details, check usage and purchase travel products for collection at Subway stations. A complementary mobile application is also expected, allowing similar functionality to be accessed on the move.

## **5.5 Integration with Other Modes**

In line with SPT's wider objectives for modal shift, integration is being sought across the region with several operators on various modes. The target of seamless integration across the transport modes is expected to drive modal shift and make public transport more attractive than the current environment where multiple tickets are required for anything more than a simple trip.

## **CONCLUSION**

### **6. Measuring Success**

The aspiration for the smart ticketing project is to deliver tangible benefits to the travelling public in the form of interoperability and integration with other modes, but in the first instance priority is on the migration of existing Subway users from disposable tickets onto reusable smartcards. In the first year of operation, the smart system has already seen a shift of 40% of journeys onto smartcards. Enhancements such as smart car parking, top up facilities in PayZone stores and online account access are all expected to drive this upwards in the coming year.

Longer-term, the number of services accessible using Bramble or compatible smartcards will provide a measure to define the success of the wider ticketing aspirations of Nevis Technologies.

### **Acknowledgements**

---

### **Chart 1a**

[charts to be centred on the page, at about 15cm horizontal,]

---

## References

[Separate pages for references and endnotes]

## Endnotes

---

<sup>1</sup> [http://www.spt.co.uk/wmslib/Documents\\_RTS/catalyst\\_for\\_change.pdf](http://www.spt.co.uk/wmslib/Documents_RTS/catalyst_for_change.pdf)

<sup>2</sup> <http://www.pteg.net/>

<sup>3</sup> <http://www.start-project.eu/en/Home.aspx>