Technology directions: Position Paper

1 Introduction

1.1 Information and communications technologies (ICTs) areas are pervasive in public transport as they now are in any part of life. It is RTIG's role to help professional stakeholders – in particular policymakers, operators, local authorities and the systems industry – establish and agree on the best ways of using them. It does this through developing, publishing and supporting technical and process standards, and through knowledge-exchange events.

1.2 The range of ICTs, and the range of ways in which they might be used, is confusing; and this is not likely to change any time soon. While there is increasing understanding, at senior levels, of how ICT works and how it might be useful, this has served to complicate the process of actually choosing a specific path to take.

1.3 At its AGM/Spring Meeting on 20 March 2013, RTIG took a new direction. In the past we have presented examples of creative good practice, and focused on how and where to standardise it. While this is still beneficial, we wanted to go further, and explore matters from a more strategic direction. We therefore arranged for members to participate in a strategic discussion around three specific topics, each of which is "hot" politically, technically and operationally:

- Open data – what it means, how far it has got, where it has proved its worth, how to build on success to date
- Smart ticketing – the technical solutions available, how each is faring in the marketplace, how to deliver them without confusing passengers
- Managing disruption – how to build on systems that are good for "normal" conditions so that passengers get the information they need when conditions are far from normal

1.4 In each case, we were bearing in mind the various technical and investment choices that people are having to make on a day-to-day basis, and whether (and how) RTIG can help.

1.5 This document is distillation of the day's key outcomes. It represents, in equal parts, a checklist of issues for staff involved in implementation projects, a management guide for RTIG as it serves its members through the coming year, and a briefing note for policymakers on where to focus attention to expedite policy delivery.

1.6 RTIG would like to thank Chris Lane (Centro), Tim Rivett (SYPTE) and Russell Gard (Nimbus) for kindly acting as facilitators and rapporteurs of their discussion groups.

2 Context

2.1 While RTIG is an international organisation, its home is in the UK and its considerations are substantially driven by the UK context. The characteristics of this are many and it would be inappropriate to give a full description here, but among the more important are:

- Public sector oversight is driven by national policy, but to a large extent implemented locally, other than those national rail functions delivered through Network Rail and ATOC

- Transport operators are (almost always) private sector companies operating under licence, and within a delicately balanced regulatory system

- The systems industry is diverse, innovative and capable, with a high proportion of SMEs, and operating in an open competitive marketplace

2.2 The considerations below are geared to these circumstances, as they obtain in early 2013. For different contexts – say, where passenger transport is operated within the public sector, or where the supply market is less competitive – these conclusions may need to be amended.

2.3 At a practical level, the context for RTIG is largely bounded by four national initiatives, which were actively considered during (and two of which were presented at) the Spring Meeting.

- The recently published Department for Transport (DfT) paper, *Door to Door: A strategy for improving sustainable transport integration* (March 2013)

- The DfT's Transport Direct project (TD), which both delivers multimodal and door to door journey information, and facilitates wider joining-up of information in the transport sector

- The DfT's Local Sustainable Transport Fund (LSTF) and other mechanisms which, by providing direct funding, enable national policy to be cascaded to local implementations

- The Transport Systems Catapult, currently being established by the Technology Strategy Board to create a more robust foundation for innovation in transport systems, especially on a cross-industry basis

2.4 In particular this paper draws on the *Door to Door* Strategy to provide the foundation for its analysis and conclusions.

3 Open data

Need and policy

3.1 The DfT's *Door to Door* Strategy states (chapter 3) that:

"We want correct, reliable and understandable journey information to be available to people as and when they need it... The Department for Transport has invested £17m in the TS-CC [Transport Systems Catapult Centre]*, and one of its initial priorities is to improve access to real-time information for different modes of transport. In an open data market, where data collection, analysis and dissemination is often fragmented and inconsistent, we will work with the TS-CC to develop methods and systems that will ensure travel information is complete, reliable and compatible with emerging technologies...*

"Building on our Open Data Strategy published in June 2012 [available at http://data.gov.uk/sites/default/files/DfT%20Open%20Data%20Strategy.pdf]*, we will work with information owners to remove restrictions on commercial use of data so that it can be more readily shared. We are committed to common standards that can successfully operate across the transport industry so that data, including real-time service information, can be presented consistently. We also support a framework for linking data, so it is properly joined-up and can be re-used as necessary to provide an accurate and complete depiction of journey options."*

RTIG's history and role

3.2 RTIG published a Position Paper on open data in January 2012 (RTIGS009-1.0); we held a workshops on Open Data in June 2010 and January 2013, which have included TD and Ordnance Survey as well as some major authorities (TfGM, TfL) who are publishing data and a variety of suppliers of data services. We have also hosted discussions on open data at our flagship conference Travel 2020.

3.3 RTIG's technical expertise covers many of the points of the *Door to Door* Strategy, notably including "real-time information for different modes of transport" and "common standards that can successfully operate across the transport industry". We have worked alongside TD in sustaining and evolving core standards such as NaPTAN and TransXChange, including in support of the Olympics 2012 Spectator Journey Planner; we work alongside the Rail Safety and Standards Board (RSSB) to align Bus and Rail industry standards; and we have regularly represented UK in international standards meetings.

Discussion and conclusions

3.4 Over the past year or so a gap has opened up, politically (we believe) small but technically very significant, between "open data" and "public data services".

3.5 Open data is defined by the Open Data Institute as "is information that is available for anyone to use, for any purpose, at no cost". The Government's transparency agenda has, for several years now, been based on the principle that all publicly-owned data should be made open, unless there are specific reasons to the contrary (national security, protection of personal data etc).

3.6 The aim was that the private and third sectors would make creative use of the data so released, in ways which would add great value to it; adding innovative approaches that the public sector might not think of, and at no cost to the public purse. Public authorities were not expected, under this policy, to do anything new or clever to their data – merely to make it accessible to anyone who wanted access.

3.7 In the event, the RTIG panel could identify no clear example of a case where transport data has been opened in exactly this way, and new value created as a result. It did, however, identify some strong examples where the intention has been realised by a more nuanced approach: London, Manchester, the Highways Agency, Network Rail, Transport Direct, and Traveline are all large-scale data providers, but a number of smaller public organisations are equally successful (Reading, Brighton & Hove, etc). Equally significant perhaps is the data feed provide by National Rail Enquiries: not a public body, but still very much data of public interest.

3.8 What characterised these cases was that the data was not simply "declared open": it was carefully packaged into a data service, which was made available to external parties under a reasonably relaxed licence – in the case of the public bodies, free of charge. In some cases, there has been active engagement with the developer community, to considerable mutual advantage. This does take some time and effort, of course, both to establish and to maintain. However the provision of data in this form can save a considerable amount of time and effort dealing with Freedom of Information Act requests, and can fast-track the development of high quality new products and services.

3.9 Top-tier public organisations are generally now comfortable with their approach to "open" transport data provision through services. Middle-tier organisations (such as PTEs) are reasonably well advanced but mindful of the need for consistency, and smaller bodies are very variable in their understanding and progress.

4 Smart ticketing

Need and policy

4.1 The DfT's *Door to Door* Strategy states (chapter 4) that:

"We will use smart technology to deliver seamless door-to-door journeys, making it easier to use public transport... We recognise there are a number of challenges in delivering our vision – not least the commercial incentives... [and] *customer service challenges when tickets issued by one operator reside on or are linked to smartcards issued by another company... We see our key role to be setting the core requirements to provide interoperability between schemes...*

As the market evolves over the next few years, we want to learn from successes in transport and in other markets, tackle the challenges that have been highlighted and remain open to new developments in technology as they become available. In particular, contactless bank cards and Near Field Communications-enabled mobile phones offer exciting opportunities in transport... We will consider the impact of new technologies, along with how best to promote integrated ticketing, when we review the residual Bus Service Operator Grant and incentives in 2014.

While the potential benefits of smart, integrated ticketing are significant, so are some of the challenges... We will continue to work with local authorities, operators and ITSO to overcome both technical and commercial barriers to interoperability."

RTIG's history and role

4.2 RTIG we held a workshop on Smart and Integrated Ticketing in September 2009 and September 2012, which have included ITSO, some major authorities (SYPTE, TfL, Scotland) who are operating smart ticketing schemes and some key supply industry companies (Barclaycard, Parkeon). We have also hosted discussions on smart ticketing at Travel 2020 and its predecessor events.

4.3 To date, RTIG has not published a *formal* document on smart ticketing, to avoid further confusion in an environment where there are already many able spokespeople and we have no ready answers. However we have expressed our position informally on the subject (for instance through consultation responses). We have also published a Position Paper on door-to-door journeys (RTIGS008-1.0, August 2011), which covers the smart and integrated ticketing issue.

4.4 Technically, RTIG's remit includes smart ticketing as an ICT application, and the RTIG technical architecture covers both ticket machines and back-office systems. For instance we have developed a number of specifications (including RTIGT018, T022, T024 and T030) for the standardised exchange of (non-ticket) data to/from ticket machines, to enable the full integration of ticketing within vehicle systems.

Discussion and conclusions

4.5 Smart ticketing is not new: London, in particular, has had it with Oyster for over a decade on a large scale, and very successfully. It is, however, still not a trivial challenge to deliver a smart ticketing system which is technically robust, let alone user-friendly, cost-effective and operationally flexible.

4.6 In a fragmented and deregulated market like the UK, the challenge is enormously compounded. The creation and support of the ITSO initiative has been a powerful force to help bring parts of the UK together, and through a mix of carrot (eg BSOG incentives) and stick (eg TOC franchise licence conditions), it is now possible to glimpse a future of fully-interoperable smart ticketing across the UK.

4.7 That doesn't mean it is going to happen any time soon, though. There are still major challenges in bridging the gap between ITSO as a (now more or less robust) standard, and ITSO schemes that work seamlessly together in a way that is not only smart but also integrated. Some of these are policy issues (how is revenue allocation to be handled? what ticket types are available?); some are operational (at what point does payment get taken for part one of a two-part journey? who handles payment queries?); some are technical, commercial or industrial (how can we make sure that all POSTs can read all cards?).

4.8 The problem of how to respond to the challenge of multiple smart ticketing technologies is also now very real and pressing. Each of the three broad solutions – ITSO-like cards, EMV bank cards, mobile – has particular benefits, but none is perfect; and workable hybrid systems have not yet been architected (though many are watching to see how London's Oyster/ITSO/EMV mix works out).

4.9 Furthermore, there are many potential opportunities for integrating ticketing into other systems, such as RTI, which smart ticketing enables but which we are not yet in a position to deploy.

4.10 It has been said that integrated smart ticketing is easy: all you have to do is nationalise all public transport and have central Government issue the cards, then the UK could work just like London. In effect, the approach taken by Scotland and Wales has been quite close to this. A number of public authorities believe that the only practical way would be for DfT to implement a single national HOPS and, if not actually to act as a card issuer, at least to control the procurement of systems used locally to issue cards.

4.11 Of course there are practical challenges with this approach, and the way ahead may well be that which is reflected in the "connected islands" thinking in the *Door to Door* Strategy. This would allow, too, multiple technology architectures to be trialled in different ways. However it will mean that the UK is a smart-ticketing patchwork for a long while to come, unless the technical and procedural approaches to integration can be lubricated.

5 Managing disruptions

Need and policy

5.1 The DfT's *Door to Door* Strategy states (chapter 5) that:

"When planning a door-to-door journey, people need to be confident that the different steps will work together, and connections can be relied upon. Currently, many people build in longer than necessary 'change' times, as they think that public transport can be unreliable or that services may be disrupted. This longer journey time can then deter them from using public transport at all...

One strand of our work through the [Catapult] will see improvements in the availability of real-time information about the entire network. This is particularly helpful where services are disrupted as passengers will be able to get clear and consistent information about the disruption, allowing them to re-arrange their journey or inform others thereby reducing the impact of their delay."

RTIG's history and role

5.2 RTIG we held a workshop on Managing Disruptions in June 2012, which brought together bus and rail specialists from both operational and systems perspectives (Traveline, ATOC, SYPTE, Jeppesen, Nexus Alpha), and also included international speakers from Oslo and the European project SaveMe.

5.3 RTIG has produced a number of publications in this area. Strategically we have "Managing disruptions: the issues involved" (RTIG-PR016-D001). At an operational level, we have a Position Paper on "Short term timetable changes" (RTIGT025), as well as guidelines on "Managing buses during civil contingencies" (RTIG-PR006-D003). At a more technical level we have supported the UK's participation in international standards development, notably on the SIRI standard.

Discussion and conclusions

5.4 Like open data and smart ticketing, the issue of managing disruptions has many facets, technical, operational, economic and political. In this case, though, the institutional challenges are even further magnified. While open data is essentially controlled within a single organisation (although working with others), and smart ticketing involves many transport organisations, disruption management can entail organisations outside the transport sector altogether, most obviously the emergency services.

5.5 RTIG's previous work on disruptions has done much to analyse the issues related to using ICTs in this context, building on the experiences of those operating live services:

- The nature of incidents: whether they were expected, how broad and long lasting the impact is likely to be, etc;
- The messages that need to be conveyed, and to whom: passengers, the wider public, the operator, the police, etc;
- The channels which are likely to be available and effective in each case: paper, electronic displays, public address announcements, electronic messaging (email, text, social media posting, etc), or direct human contact;
- The nature of the message content: making it proportionate to the context, ensuring that it is understood clearly, getting it out in good time for action to be taken (wherever possible), maintaining accuracy, etc.

5.6 However, while there is a general understanding of the issues, there is no common approach to handling them, or to designing and operating information systems that will be relied upon in disrupted circumstances. This makes it difficult to coordinate messages between public authority, transport operator, third parties, and neighbouring communities. Linking with open data, it also makes it impossible for third party developers to make effective use of incident information – a potentially significant brake on public communications.

6 Summary, actions and recommendations

6.1 It is pleasing to note that the three issues on RTIG's radar, and that RTIG addressed at its AGM, are covered by the three substantive chapters in the DfT's *Door to Door* Strategy. The two lines of enquiry serve to mutually corroborate the importance of these three strands of activity.

6.2 As noted above, RTIG has been tracking these areas for some time, and has over the past few years done considerable work to bring consensus, pragmatics and efficiency to how ICTs are deployed to help address these issues. Our draft Business Plan for 2013-14 takes this to the next level, and indeed raises RTIG's sights to focus a little less on the technology and more on the outcomes.

6.3 DfT is investing heavily in the Transport Systems Catapult as a way of providing impetus to UK innovation, and RTIG has been in contact with the Catapult in preparing its Business Plan. There is scope here for a very positive alignment of effort.

6.4 In delivering its Business Plan, RTIG should be mindful of the issues raised in this paper, and should:

- Develop guidelines on how to define and deliver data services that will be of use to the developer community, building on the experience of the top-tier organisations.
- Monitor the progress of smart ticketing systems and schemes that use them, and develop guidelines on how to deploy systems effectively.
- Develop guidelines on control room operations, service management processes, and presenting information to customers during disruptions.
- Supporting the continued development of technical standards where agreed to be necessary, for the above.
- Developing cost-benefit framework and outline business cases for the above.
- Work within the emerging institutional context – especially with the Transport Systems Catapult – to deliver the above.

6.5 RTIG will need to work with others to ensure that these actions take account of all requirements, are aligned with the activities of other organisations and group, and make full use of available channels to effective implementation. Specifically this should include:

- Policymakers, to ensure that RTIG research and guidance is kept aligned with national policy (and that policy is fully informed by market practicalities). DfT is obviously the most critical; other relevant bodies might be devolved administrations, European institutions, other UK departments of state, and non-UK Governments.
- Organisations involved in delivering public transport services, and their community groups. RTIG's own (public sector and operator) members will provide the bulk of this linkage but it may also benefit from direct links to bodies like PTEG, CPT and RSSB.
- Organisations involved in delivering technology and innovation. Again much will be gained from RTIG's own (supplier) members, but to get real traction we will also need to work closely with the Catapult, as the key publicly-funded driver of innovation. Other potentially relevant channels include standards bodies and European R&D projects.