National Strategy for Bus Real Time Information and related technologies

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Executive summary

Background

1 The first RTIG Strategy (RTIGS003) was developed in 2003 at a time when the necessary systems were first beginning to roll out across the UK landscape. Its focus was on the need for operator/LA cooperation, full data capture, and supporting standards to ensure systems would work. By 2007, its successor (RTIGS006) was able to develop a more passenger focussed strategy for all stakeholders from Government to the systems industry. This provided a sound basis for the development of bus real time information (RTI) in the following years.

2 Recent changes make it necessary to review and revise this strategy. The advent of smartphones and social media is a major shift on how RTI can be consumed; and the open data movement has made drastic changes in its production and integration.

3 At the same time, RTI has changed from being a specific, standalone system to just a part of the integrated ICT environment of including public transport journey information. It is now typically delivered from a more complex and modular set of interoperating systems and services. As such, RTI is no longer easily separable from other systems such as ticket machines, journey planners, traffic management and network disruption.

Aims

4 The audience for this document is everyone involved in the practice of improving passenger transport, through information and communication technologies. Specifically, it aims to capture a realistic common view of the following:

- *For local authorities, bus operators and system suppliers*: to identify model policies and strategies for adoption by individual organisations. These model strategies may need to be varied for local relevance, but by having a common, unified approach the overall aims of this Strategy will be more readily achieved.
- *For information intermediaries*: to document the expectations that passengers and providers may reasonably have of their services, and the expectations that intermediaries may reasonably have on the sector.
- *For Government*: to summarise the current expectations of passengers and sector stakeholders; to contextualise the European background; and to indicate outstanding barriers to the efficient operation of the market.

5 Unlike the 2007 Strategy, this document is co-dependent on the actions and evolution of many external factors, because of the vastly greater level of integration. This Strategy does not expect to influence (for example) global vehicle manufacturers, search engines or social media forums directly. Rather, it aims to ensure that the passenger information sector presents a clear, coherent, efficient front to these external parties.

6 Arising from these considerations, this document also declares the policy and strategy for RTIG, in its role as a community organisation. This provides an updated framework for RTIG's work over the coming five years or so, and will be used as the basis of its annual business planning and reporting to members.

Outline of the Strategy

7 The top level strategy for the UK is for stakeholders in public transport technology to work together to clarify what is possible, cost effective and beneficial to the UK as a whole.

8 Under this strategic goal, specific stakeholders have a strategic role which may be categorised as follows:

- *Operations role (generally private operators):* record and distribute reliable base data on routes, services, and schedules; capture reliable real time data on service operation; make effective use of technology for fleet management; capture passenger data to enable efficient service planning; journey bookings for on-demand services; deliver relevant data, subject to reasonable commercial constraints, to LAs, information intermediaries, passengers and Government.

- *Network role (generally LAs/PTEs):* develop and implement coherent network for commercial, scheduled, on-demand and community services; deploy and operate passenger information systems in the public realm; coordinate information across operators and across modes; facilitate external integration with traffic management systems to deliver bus priority; monitor network for disruptions and communicate as appropriate.

- *Information intermediary role (generally independent third parties, but sometimes operators and/or LAs):* collate data feeds from multiple operational sources; combine data into services usable by members of the public, and where appropriate also by transport professionals; deliver, market and support end-user applications; analyse public feedback and, where relevant, advise the data providers.

- *Supplier role (generally commercial technology companies):* deliver practical technical innovation; support the development of standards which reduce project cost, risk or time; implement these in off-the-shelf products; provide technical support to projects, including in resolving multi-party issues related to technical integration.

- *Government role (generally national, sometimes regional):* set a policy direction, consistent with European obligations; support areas where there is a clear national interest, but which community members cannot individually justify; ensure appropriate intra-Government communications; steer the development of national and international standards.

9 The key role of RTIG is to lubricate all of the above processes, in a way that effectively responds to its members' needs. Specifically it needs to:

- interpret and comment on Government policy, on a community-wide basis;

- help the community document its collective plans and decisions;

- support the creation and publication of industry-wide standards and guidance (either itself or through other bodies);

- advise members of the current state of the art, on an impartial basis;

- coordination with external communities, on related issues (eg traffic management, smart ticketing);

- provide the necessary opportunities for members of the community to meet and exchange ideas, experience and solutions;

- understand industry developments and help guide the community in their evolution and adoption.

RTIG operations

10 The strategic role for RTIG implies the need for a series of tasks, including:

- Standards and guidelines
- Workshops and member communications
- Market research
- Technical research
- Ensuring RTI is an effective part of the wider picture
- Framework agreements
- Market regulation
- Operational services
- Lobbying and community representation
- Administrative tasks

11 These generic tasks are consistent with RTIG's historical operations, although the scope of the relevant systems and architectures has evolved with developing policy and technology. Capacity limitations mean that not all of these can be addressed as fully as would be ideal, however, and priority will go to:

- Technical work
- Member engagement
- Collective industry representation

12 RTIG is managed as a professional organisation, on a community-wide basis. This has proved essential to RTIG's ability to serve its members effectively, and will need to be sustained.

13 RTIG will continue to seek to develop its membership and activities in support of the above strategy, both within the UK and beyond its borders – in particular at the level of European institutions.

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1 Introduction

1.1 Purpose of this document

1.1.1 This document is a medium term framework for the development of bus real time information (RTI) and related technologies in the UK. Developed with the assistance of stakeholders from across the industry, it represents a target policy, strategy and action plan for the next five years or so for all participants.

1.2 Validity

1.2.1 This document is a **draft for consideration** at the AGM on 23 March 2016.

1.3 Background and history

1.3.1 In February 2002 RTIG published the first National RTPI Strategy, which was designed to bring together the technical, business and strategic requirements of local authorities and bus/light rail operators across the UK. It sought to enable participants to proceed with the implementation of RTPI, confident that their implementation will conform to a nationally agreed structure.

1.3.2 This strategy was significantly revised in 2007, in particular to recognise RTIG's transition to a formal membership group in 2004, but also to take account of major market developments (such as Transport Direct and the first version of the SIRI standard), and RTIG has operated on that basis ever since.

1.3.3 Circumstances have continued to change since then. The economic crisis and subsequent political response has squeezed both local authority and central Government expenditure; so RTIG no longer received Government funding. More positively, new market mechanisms have been enabled by the advent of smartphones and the emergence of the open data culture in the public sector.

1.3.4 This document is a draft revision of the National Strategy, both to reflect those developments and to provide a road map for the next five years. It sets out where the real time information community wishes to be in five years' time, and how it intends to get there. Elements related to specific organisations in the RTI community are highlighted.

1.4 How to read this Strategy

1.4.1 This Strategy is complex in detail, but simple in purpose. The complexity arises because of the range of issues, systems and organisations involved. The simple response, and the top level Strategy for the UK, is:

> ***National Strategy – Top Level***
>
> *Stakeholders in the real time information, and related public transport technology systems, will work together to clarify what is possible, cost effective and beneficial to the UK as a whole. They will pool their expertise and efforts in areas where a national position is advantageous.*

1.4.2 The logical flow of this Strategy is as follows:

- This section gives the **background** to this document.
- Section 2 describes the **"needs vision"** for where we collectively wish to be, in terms of day to day experience. This forms the aim for the collective Strategy. Very little is surprising, but achieving some simple-sounding feats can take hard work.
- Section 3 describes the **stakeholders** involved in the delivery of bus RTI, and their anticipated roles today and over the next few years.
- Section 4 describes the **technical vision** of how things might operate in order to deliver the needs vision. Some of this involves development in current practices but much is familiar.
- Section 5 reviews the **mission of RTIG** in delivering the national coordination that is required to step through this process.
- Section 6 uses this mission, with the vision statements in Sections 2 and 3, to develop a tangible **programme of RTIG activity** for the next five years or so. These activities fulfil RTIG's part of the national endeavour.
- Section 7 describes how the strategy will be **monitored and updated** as time goes by.

1.4.3 The Strategy is also intended to act as a reference source, to any stakeholder in developing their local organisational strategy as regards RTI. Specifically too, it will provide the reference source for RTIG to use when it is developing its annual business plans, and in reporting back to its members.

1.5 Acknowledgements

1.5.1 RTIG would like to record its thanks to those members who have contributed towards this document.

2 Vision: needs

2.1 Introduction

2.1.1 This Strategy aims to support the needs of all stakeholders in UK road-based public transport. These cover:

- public sector agendas (for modal shift, inclusion, environmental protection, security etc);
- private sector agendas, both operator and system supplier (for innovation, competition, growth, profit etc);
- passenger agendas (for travel information, personal safety, ease of use, comfort, etc);

2.1.2 The Strategy is geared to delivering a vision of the future which maximises the opportunity of technical, social and other developments in a cost-effective way. This section, the vision, is the key basis for developing a common approach. It is written as a series of first-person statements of needs and desires.

2.2 The perspective of the passenger

2.2.1 I can find out easily what journey options are available, to help me plan a journey on a regular or one-off basis. I don't need to know any special 'codes' in advance in order to find information about services relevant to me: all I need to know is my starting point, destination, preferred time for departure and/or arrival.

2.2.2 If I have special needs or other personal requirements or preferences, I can find which services can accommodate these factors.

2.2.3 I can get information about my travel service before and during my travel. That includes knowing when my vehicle is going to arrive at my boarding point, as well as when it is planned to arrive, and has arrived, at alighting points.

2.2.4 As I am waiting, I am kept informed of service progress through regular at-stop/platform displays, announcements etc. Once I have boarded, I am kept informed of service progress through regular on-vehicle displays, announcements etc as I approach each stop along my route.

2.2.5 The information is clear and reliable. In particular I am advised clearly and distinctly on scheduled information, real time information and any on-going service disruption.

2.2.6 I can also use my personal technology to find this information (home/office PC, laptop/tablet, smart or non-smart mobile phone, etc). Where it allows, I can set my personal technology to help prompt me (through personal smart cards/media, personal mobile services, entering website preferences etc.)

2.2.7 If I don't have relevant personal technology, I can use technology provided for me (at stops, on vehicles, at significant travel choice points).

2.2.8 I can use the information I get as the basis for booking and cancelling journeys.

2.2.9 Where my journey requires a connection, I know exactly how and where to make that connection before making the journey, and am (if I need it) reminded and guided whilst en route.

2.2.10 I feel comfortable and safe at all times. I know I am being looked after, and how I can call for help if necessary.

2.2.11 The cost of using these facilities is acceptable.

2.2.12 I am informed of changes to the transportation environment in order to react to local or area-wide issues. Specifically, where I have to make a connection I am kept informed on any problems with doing so, and what I can do if there are problems.

2.3 The perspective of the operator

2.3.1 My controllers and drivers work together to fulfil the needs of passengers efficiently and profitably.

2.3.2 My drivers know where they are, and how early/late they are or what their headway is in relation to other vehicles. They are provided with easily understood advice on running changes, and know how to respond.

2.3.3 My drivers can readily operate the systems they have in their cabs, and know what to do at the beginning and end of a shift. The system is easy for them to use; it prompts without intruding.

2.3.4 My drivers feel comfortable and safe at all times. They know they are being looked after, and can call for help if necessary. Emergency service response, if necessary, will be prompt.

2.3.5 In the event that passengers or others cause damage or distress to my drivers or vehicles, I can gather enough evidence to sustain a prosecution.

2.3.6 My controllers know where vehicles are, how early/late they are, and how busy they are in terms of the number of passengers on-board relative to their seating and standing capacity.

2.3.7 My controllers can make reasonable projections about future running, taking into account current traffic conditions along each vehicle's route.

2.3.8 My controllers have a set of tools that make it quick and easy to identify operational problems (actual and potential), and to resolve them quickly and simply, while keeping customers fully informed.

2.3.9 My controllers and drivers work together to maintain efficient utilisation, taking into account both current traffic conditions, and short-term traffic projections as a result of on-going events. They have a good understanding how to respond with 'normal' events (eg bad weather) and 'abnormal' events (eg road accidents).

2.3.10 My schedulers can devise schedules which maintain efficient utilisation, taking into account typical traffic conditions. They have a good understanding of the baseline demands on the service, and how this changes with service development (eg frequency increases) and in response to external events (eg sports occasions).

2.3.11 I understand where technology provides a positive cost-benefit balance to my business and am clear on how to make a business case for it.

2.3.12 My engineers know what condition my vehicles are in, can diagnose problems promptly, and effectively schedule maintenance activities.

2.3.13 Where vehicles in my fleet may be moved around the UK to different depots, equipment is either already compatible with, or is easily swappable between, vehicles; on-board equipment is also compatible with the infrastructure systems in other areas.

2.3.14 I know which technology systems I need to procure and/or operate to conduct my business efficiently. My technical staff know how to specify, procure and accept the relevant systems, so that they work efficiently with each other and with relevant external systems. There is a healthy, active supply market offering competitive and innovative products and services, which operate to effective industry-wide open standards.

2.3.15 I am confident that the local authorities with whom I work have a robust set of processes that support the technology deployed in public transport. I am fully involved where I need to be – specifically in the specifications for any systems that my fleet will be expected to work with.

2.3.16 I am confident that the information about my timetables, vehicle movements, projected arrival times at stops, etc is maintained and exchanged accurately. I am confident that the information that is made available externally does not put my commercial interests at risk.

2.4 The perspective of the local authority

2.4.1 My citizens are well provided with high quality public transport services, and information about them. The information provided is timely, accurate and relevant.

2.4.2 I understand how to obtain, manage and provide both static information (eg network and route descriptions) and real time information (eg live arrivals/departures and disruptions).

2.4.3 The needs of public transport passengers and prospective passengers (section 2.2) are fully met, with respect to all services that operate from and/or pass through my area.

2.4.4 I have communications links with neighbouring authorities and all relevant operators to ensure the relevant information is collected and exchanged. It is clear to me who owns and is responsible for what data, processing and dissemination.

2.4.5 Vulnerable groups have the special support they need: mobility-impaired travellers, young people, those from deprived communities, those with poor cognitive or English language skills, etc.

2.4.6 I monitor the effectiveness of services in meeting local needs, and know where and how they need to be improved.

2.4.7 My infrastructure (stops and interchanges and the surrounding area) is welcoming, informative and secure, and is provided with suitable technology installations for information and monitoring.

2.4.8 I use real time information from public transport vehicles to help me monitor and manage local traffic conditions. I help operators make efficient use of the roadspace.

2.4.9 I can use available real time information to monitor bus service performance, particularly issues important to travellers such as service punctuality.

2.4.10 Where bus services are provided under contract to the local authority by competitive tender, I have effective means of using such performance monitoring for contract management.

2.4.11 I have access to statistical information which I can use to monitor and improve the transport infrastructure, both for public and private transportation. Such information helps me understand the impact of prevailing traffic conditions on bus service operations and where investment in traffic management measures may be beneficial to improve bus service delivery.

2.4.12 I know which technology systems I need to procure and/or operate to conduct my business efficiently. My technical staff know how to specify, procure and accept the relevant systems, so that they work efficiently with each other and with relevant external systems. There is a healthy, active supply market offering competitive and innovative products and services, which operate to effective industry-wide open standards.

2.4.13 I am confident that the operators with whom I work have a robust set of processes that support the technology deployed in public transport. I am fully involved where I need to be – specifically in the specifications for any operator systems that expect to integrate with my infrastructure.

2.4.14 I am aware of the standards and guidelines that are available, and consult the relevant documents where applicable.

2.5 The perspective of the information intermediary

2.5.1 I understand the information needs of public transport passengers and prospective passengers (section 2.2), and provide services that fulfil them simply, reliably, and consistently.

2.5.2 I have effective links with my service users that ensure they are getting what they need, and that any improvements are taken into account.

2.5.3 I understand how to obtain, manage and provide both static information (eg network and route descriptions) and real time information (eg live arrivals/departures and disruptions).

2.5.4 I have reliable and effective arrangements with data owners/providers to ensure the relevant information is collected and exchanged. With respect to this data, it is clear to me what I can expect and what my responsibilities and obligations are.

2.5.5 I can easily integrate the static and real time information I receive into the services I aim to provide, preserving the necessary timeliness and integrity.

2.5.6 I am aware of the standards and guidelines that are available, and consult the relevant documents where applicable.

2.6 The perspective of the system supplier

2.6.1 I understand the needs of the buyer market and my position with it.

2.6.2 I have a set of products and/or services which fit the needs of the market. I can produce and sell them profitably.

2.6.3 I conduct market research and technical prototyping in response to evident future market needs. I can design and produce new (or upgraded) products/services quickly and simply.

2.6.4 My staff have the necessary understanding and skills to do their job.

2.6.5 I make full use of pre-existing work (including system architectures, technical standards, commercial agreements etc) to keep my costs and risks down, focussing my company's ability to sell its unique/exceptional capabilities.

2.6.6 I have a clear common understanding with my clients that enables problems and issues to be readily identified, diagnosed and resolved.

2.6.7 I have the ability to be innovative and develop new market areas to provide new and unique systems and services.

2.6.8 I recognise that increasingly clients expect my products operate to open standards so that they are compatible and useable with other technology provided for the bus sector.

2.7 The perspective of central government

2.7.1 The UK operates[1] "a transport network that [meets] the challenges of a growing economy and the increasing demand for travel, but can also achieve our environmental objectives. This means coherent transport networks, with the road network providing a more reliable and freer-flowing service for both personal travel and freight, with people able to make informed choices about how and when they travel; [and] bus services that are reliable, flexible, convenient and tailored to local needs".

2.7.2 The use of technology within the bus industry is fit for purpose: it enables bus services to operate at maximum efficiency, and provides high quality services to all travellers and potential travellers, encouraging them to shift modes where at all practical.

2.7.3 Across the country, scheduled bus services are planned electronically and tracked in real time by their operators. The information necessary for passengers (as described in section 2.2.) and local transport authorities (as described in section 2.4) is made easily available, with minimal restrictions.

2.7.4 UK stakeholders work in effective partnership to deliver such services smoothly, cost-effectively and to the benefit of the travelling public. Investment is coordinated to achieve a common vision that is in line with national policy; operations enable bus services to achieve their full potential in all parts of the community and for all journey and passenger types.

2.7.5 There is no 'postcode lottery' effect: whoever is responsible for policy and operations, travellers can expect the same high level of service from round the country. Moreover, there is sufficient commonality in which services are delivered and how, that passengers familiar with one area can readily use services from other areas.

2.7.6 Traveller assistance and payment facilities are able to be used across the country without penalty or hindrance.

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1 Secretary of State for Transport, *The Future of Transport – White Paper*, CM 6234, 20 July 2004. The quote is from Executive Summary, part of clause 6. Similar policy statements apply in devolved administrations; cf eg *Scotland's Transport Future 2004*.

3 Stakeholder roles

3.1 Introduction

3.1.1 No single body or coherent group of organisations is in a position to deliver the vision outlined above. It will require the coordinated actions of all of the various stakeholders, working together, to deliver all of their needs.

3.1.2 All stakeholders will benefit if there is some degree of national coordination and standardisation for systems with external interfaces. The benefit will be of (one or more of) the following kinds:

- simpler integration with systems operated by others – greatly facilitating roaming and fleet redeployment;
- reduced system cost (there is less need for interfaces to be developed from scratch where common standards exist);
- reduced cost/risk of setting requirements (if several participants help refine them);
- opportunity to share problems and issues to get a common resolution.

3.2 Roles and responsibilities

3.2.1 The function of ITS within public transport will continue to deepen and broaden over the medium term. The better planned and coordinated the nation's public transport ITS is, the more effectively and efficiently it will operate. This requires a significant degree of standardisation of technology, of process and of timetable.

3.2.2 Different parts of the community have different roles, and different responsibilities. The key roles in public transport ITS are as follows:

- *Operations role (generally private operators):* record and distribute reliable base data on routes, services, and schedules; capture reliable real time data on service operation; make effective use of technology for fleet management; capture passenger data to enable efficient service planning; journey bookings for on-demand services; deliver relevant data, subject to reasonable commercial constraints, to LAs, information intermediaries, passengers and Government.
- *Network role (generally LAs/PTEs):* develop and implement coherent network for commercial, scheduled, on-demand and community services; deploy and operate passenger information systems in the public realm; coordinate information across operators and across modes; facilitate external integration with traffic management systems to deliver bus priority; monitor network for disruptions and communicate as appropriate.
- *Information intermediary role (generally independent third parties, but sometimes operators and/or LAs):* collate data feeds from multiple operational sources; combine data into services usable by members of the public, and where appropriate also by transport professionals; deliver, market and support end-user applications; analyse public feedback and, where relevant, advise the data providers.

- *Supplier role (generally commercial technology companies):* deliver practical technical innovation; support the development of standards which reduce project cost, risk or time; implement these in off-the-shelf products; provide technical support to projects, including in resolving multi-party issues related to technical integration.

- *Government role (generally national, sometimes regional):* set a policy direction, consistent with European obligations; support areas where there is a clear national interest, but which community members cannot individually justify; ensure appropriate intra-Government communications; steer the development of national and international standards.

3.2.3 The key role of RTIG is to lubricate all of the above processes, in a way that effectively responds to its members' needs.

4 Vision: technology and usage

4.1 Introduction

4.1.1 For this National Strategy to be robust, it must be based on more than idealised wishes; it must be technically and commercially feasible, and identify (and set standards for) the exchange of data between multiple organisations involved in the data chain. Without the necessary 'pieces', a long to medium term strategic vision will either fall short of what is expected or will fail to include all of the key elements of a public transport technology system.

4.1.2 This section helps to achieve this by outlining the technical vision that underpins the needs vision of the previous section. It will also outline the key functions, components, interfaces and data requirements of current and future RTI systems, taking into account the wishes and visions of all three stakeholders.

4.1.3 Local authorities, system suppliers, information intermediaries and data suppliers (bus operators in the main) will all play important roles in this technology vision; and increasingly, passengers themselves have a part to play.

4.2 Technology architecture

4.2.1 End-to-end RTI systems are reliant on the integration of multiple systems, built and maintained by more than one system supplier. Ownership and operation of different functional components lies partly with local authorities, partly local bus operators, and partly (increasingly) with information distributors like Traveline or Google.

4.2.2 Any RTI system has a complex and multi-faceted architecture, some of which is key to the accuracy of the information it provides. Location, communications and data distribution technology lie at the heart of an RTI system, with equipment (typically from several different suppliers) being installed on buses, at stops and at control centres. Enabling all of this technology to work in harmony is paramount to providing the passenger with the most accurate RTPI possible.

4.2.3 Generally it is advantageous to make use of as wide a variety of information dissemination channels as can be achieved, though careful thought is needed on which channels are likely to be most effective (in cost, practicality and life before obsolescence). For example, a project might conclude that public display screens are most applicable in interchanges; or that digital channels are best for specific corridors, or high-frequency service locations. Such decisions need to take into account the end user profile and expectations.

4.3 Technology components

4.3.1 There are a number of core components that need to be implemented and coordinated in order for an RTI system to be fully realised. Some are key (such as vehicle AVL units and central systems); others are chosen according to the strategy and outlook of the implementer (such as digital media outputs at-stop signs) and scope for UTC integration (such as links to traffic control centres).

4.3.2 The different components of the system will use over-air and/or fixed communications networks to provide system connectivity. The core components likely to be involved in an RTI system are:

- Vehicle unit (typically the ticket machine) providing AVL, data collection, and driver interface;
- Vehicle communications unit;
- Data communications network(s);
- RTI central system comprising data management, real time engine, reporting and distribution elements;
- Operator fleet management system (AVMS);
- Public transport/traffic management interface;
- Fixed passenger information displays – both in vehicle and across the transport network;
- Information feeds to digital media.

4.3.3 RTI systems are beginning to incorporate new requirements for integration. Again, this will depend on the strategy of the implementer and the functionality required to fulfil certain policy objectives (such as improved security on buses) or operational requirements. These may include:

- Bus priority;
- Links to UTMC systems and control centres;
- Links to other bus fleet management systems;
- Links to other RTI systems;
- Smartcard ticketing systems;
- Transmission of on-bus CCTV images;
- Engine management systems;
- Air quality management;
- On-bus wireless LAN;
- Enforcement systems;
- Crash data recorders;
- Passenger counting;
- Third party digital media streams (apps, web).

4.4 Key functions

4.4.1 These core components will, collectively, enable the following key system functions:

- Bus location;
- System management;
- Information presentation;
- Service and fleet management;
- Operational communications;
- Mechanism to request bus priority;
- Fleet and driver security.

4.4.2 Five years in the future, it is highly likely that these underlying functions and core components will remain essentially the same, even if the providers of the various elements will be different organisations – that is, buses will have AVL equipment and on-board computers (within their ETMs or otherwise) that will communicate with an RTI central computer, and via that to at-stop signs and other dissemination mechanisms.

4.4.3 However, the operational and logistical perspectives of RTI may have to change in order to allow successful business cases to be developed and further investment to be made and, in addition, to accommodate new methods of information distribution. This will depend on the perspectives of each stakeholder, be it bus operator, local authority or systems supplier, but to

be successful the National Strategy must consider them carefully. It is, however, highly likely that the distribution of public information will become a more and more important element of the system as the costs and technical difficulty of source data provision reduces and end user expectations rise. It is therefore important that standards (and therefore, because of its role, RTIG involvement) in these areas are clearly defined.

4.4.4 What is changing most rapidly are the methods of data/information dissemination, and the stakeholders involved in this process. Third party information dissemination, especially in digital media, is becoming more and more common. National or international services offered by data aggregators are becoming predominant. The use of local 'apps' for a single LA customer provided by the RTI supplier is no longer the only digital channel available.

4.4.5 What has been slow to emerge, but is likely to accelerate, is the aggregation of public transport data for multiple public transport modes so as to manage costs in multiple budgets. The integration between UTMC and RTI systems, in order to aid general traffic and network management, is also likely to accelerate, because of the mutual benefits that may be achieved thereby.

4.4.6 Operators and system managers are now under obligation to adhere to the Equalities Act 2010, and have explicit requirements to enable access to transport by passengers with impairments, and any future developments must recognize accessibility requirements and obligations. RTIG holds a guidance document for RTI project managers which should be consulted in the first instance. This document will be need to be regularly reviewed.

4.5 Data requirements

4.5.1 RTI systems will continue to rely on 'clean' data (both network and schedule) in order to achieve acceptable levels of accuracy for the travelling public. Some of this is likely to come from systems which are not primarily there to provide RTI – in particular ETMs and scheduling systems. This is a risk, and requires careful management and monitoring, clear standards and simple guidance to non-technical system owners.

4.5.2 The development of quality standards for data transfers from one system to another, and the implementation and development of data transfer protocols and standard interfaces between systems, is key to this and will be a key task for RTIG.

4.5.3 The management of schedules by the application of historic data has also become more important and accessible, with bus operators using data mining techniques to analyse the performance of their bus fleet. This is likely to require integration with other systems (scheduling, for example) but will allow:

- Adjustments to network;
- Adjustments to schedules;
- Operational changes to network;
- Operational changes to schedules.

4.5.4 The requirement for this functionality is likely to increase as the people involved in scheduling become more technically accepting.

4.5.5 The use of RTI data to manage networks and buses in real-time is also becoming more important and will continue to increase. Tools are available to allow dynamic changes to routing, calling patterns etc.

4.6 The future of RTI delivery

4.6.1 The skills, tasks, processes and organisation of both operators and local authorities in RTI delivery is changing, in response to these technical and social evolutions.

4.6.2 The use of a single on-bus system to feed multiple back office functions has become the norm. This saves money, but comes with risks. The use of ticket machines as AVL devices, for example, may (if poorly executed) compromise the granularity of data to the RTI system, as the provider is not necessarily focussed in the provision of RTI to passengers or management systems. Good architectural and product design is needed to mitigate this risk.

4.6.3 Understanding of the changed system landscape – in particular, an architecture perspective of data feeds and exchanges rather than hardware and system devices – will accelerate. Clear, simple and easily applied standards for the completeness and accuracy of feeds from one system to another will become more and more important.

4.6.4 Associated with this trend, the management of open data and third party data channels will become more important. Dependent on the policy applied, an authority may take a number of directions:

- Leave applications deliver it to the market (but monitor outcomes to ensure passengers have adequate information available);
- Aim to control outputs through active licensing and memoranda of understanding;
- Deliver outputs, through the acquisition and operation of suitable distribution channels themselves.

The first is in line with the growing open data agenda, and it may be that the management of RTI systems by transport professionals becomes more part of IT or data service roles within local authorities. But it is not a black-and-white choice, especially where the market fails to deliver, and a more active involvement may still be appropriate in some cases.

4.6.5 The requirement, therefore, for an operator to manage and monitor the accuracy and completeness of the data feeds between systems has replaced the need to maintain and supply equipment as their key role. This may not be fully recognised yet, but the skill sets required to monitor data rather than hardware performance are significantly different. Operators will increasingly need to recognise and make resources available for this.

5 RTIG's status

5.1 Introduction

5.1.1 RTIG's mission, as stated in its current Constitution, is as follows:

> *"RTIG-INFORM is an independent, non-political organisation. It exists to develop and promote a widespread understanding of, and capability in, technology in passenger transport operations and travel information. RTIG-INFORM shall act at all times in the interests of its members."*

5.1.2 The previous sections have outlined a vision of the future, and some of the challenges on all stakeholders in bringing this about. This section outlines RTIG's proposed strategy. It represents an evolutionary, rather than revolutionary, change from current operations. This makes it deliverable at relatively low risk; but it also takes into account the fact that things might suddenly change at a number of points.

5.2 Constitutional position

5.2.1 RTIG's aims are expanded in its Constitution:

> *The specific aims of RTIG-INFORM are:*
>
> - *to enable technology to deliver better passenger transport services, cost-effectively;*
> - *to enable technology to deliver better information to the public about such services, at an affordable price;*
> - *to promote the development of operational partnerships to deliver effective projects;*
> - *to support the production of specifications, standards and guidelines which facilitate the efficient use of technology in passenger transport;*
> - *to promote professional liaison and exchange of knowledge relating to the design, implementation and use of such technology;*
> - *to provide a representative body of opinion for the passenger transport systems and information community;*
> - *to co-operate with other bodies as necessary in the fulfilment of its goals.*

5.2.2 Of these, the first two have, historically, primarily defined the scope of RTIG's work, while the remaining five outline the mechanisms it will use to achieve this scope. However in addition to the functions of promotion, specification, knowledge exchange and representation, RTIG has occasionally undertaken activities closer to system delivery where necessary and appropriate – for example, the national framework agreement for mobile communications services.

5.2.3 Furthermore, RTIG has also exploited its unique structure to engage with UK Government and with the European Commission. As well as strengthening RTIG's capability and capacity to serve its members, the achievement of a good working relationship with Governments helps with many of our objectives.

5.2.4 RTIG also responds to other pressures on its members. Local authority transport technology will increasingly be centred on UTMC systems, and RTI systems will need to integrate in order to enable effective management of roadspace and public transport. Bus operators will have to handle electronic ticketing and electronic bus service registration, and these raise both challenges and opportunities for RTI. They imply a sustained need for RTIG to work cooperatively, at technical and policy level, with other organisations including the UTMC Development Group and ITSO in particular.

5.3 Scope and focus

5.3.1 RTIG began life focussed very specifically on 'real time information' – itself an area of unclear boundaries, but which has been interpreted over the past five years as composed of two elements:

- Real time *passenger* information, ie information to passengers and prospective passengers which provides a more informed prediction about the actual running of buses;
- Real time *operational* information, ie information to service managers and other relevant authorities about the current state of service operation, in order to facilitate operational decision making.

5.3.2 In addition RTIG has taken an active involvement in the information structures that support these services, including timetabling systems; journey planners; traffic management systems; area-wide communications networks; disability technologies; civil engineering of shelters; and so forth. In reality, these simply reflect the tasks facing RTIG's members.

5.3.3 The significant majority of this mission remains in the real-time arena. However this move does position RTIG as a community body also capable of addressing, for example, the electronic bus service registration (EBSR) agenda.

5.4 Structure, governance and membership

5.4.1 RTIG currently operates as a subscription-funded 'club' for members[2]. It formalised in 2004 after three years or so of a loose, informal existence. It is currently run by an elected Committee, with delivery through a mixture of volunteer and contract effort coordinated by a (paid) Managing Director.

5.4.2 This operational structure has been widely praised and there seems little reason at present to change it fundamentally. However as RTIG expands its operational scope, it will need to expand its membership too – as it has done with shelter suppliers in 2005, and with scheduling systems providers and bus manufacturers in 2006.

5.4.3 RTIG Ltd is currently owned by Merseytravel as a sole shareholder. This is a historical accident but the ownership has enabled a degree of impartiality and legitimacy that have proven sustainable, and it is not recommended that these be disrupted.

5.4.4 Of relevance is the operational and structural (governance) relationship with other key stakeholder bodies. Such bodies have sustained their own roles and profiles over the years;

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2 Formerly it received income from central Government, but this ceased in 2010.

some that were identified in the previous Strategy have not survived (eg including INFORM, absorbed into RTIG in 2009), while others have changed significantly (eg ITSO).

5.4.5 Current sustained cooperation is as follows:

- With the UTMC Development Group on specific topic areas such as bus priority protocols, and on wider discussions like smart cities.
- With ATCO and Traveline on standardisation, through the Passenger Transport Information Coordination Group (PTIC).
- With the RSSB on cross-modal issues, through the Bus-Rail Technology Alignment Group (BRTAG)

5.4.6 A stand-alone RTIG, with targeted operational arrangements, therefore still looks a fairly stable organisation at present and there is no immediate need to consider wider merger.

6 Coordinating RTI strategies: RTIG's Five Year Plan

6.1 Introduction

6.1.1 This section provides some details about how RTIG currently envisages delivering strategic goals over the next five years or so, in fulfilment of the strategy outlined in the previous section. Once adopted, this will provide the basis for RTIG's annual planning and budgeting.

6.1.2 The assumptions made here are that:

- existing projections of investment, known challenges of implementation and operation, and market practices remain valid guides;
- there are no changes to technology or regulation that make it essential to change course;
- the resources will be available to undertake relevant and useful activities for the foreseeable future.

6.1.3 If, of course, things change dramatically it will be necessary for RTIG to re-evaluate its goals and activities.

6.1.4 The activities described here are all oriented to national coordination of one kind or another, and are presented under the following headings (corresponding to those in the 2007 Strategy):

Standards and guidelines

Workshops and member communications

Market research

Technical research

Ensuring RTI is an effective part of the wider picture

Framework agreements

Market regulation

Operational services

Lobbying and community representation

Administrative tasks

6.2 Capacity

6.2.1 RTIG has always operated substantially as a "self-help" community, in which members contribute actively to the collective output. This has the triple benefit of keeping costs down, ensuring practical experience is fully recognised and brought to bear, and accelerating the "buy-in" of RTIG outputs in the community.

6.2.2 Nevertheless RTIG does depend on good central coordination, for which it has used independent professional services. In its early years (2000-2004), RTIG benefited from

significant support from central Government to fulfil this resource; later, subscription income took up some of the resource burden. However Government income ceased a few years ago, and subscriptions have been kept at or below inflation.

6.2.3 Effective cost control has minimised the burden on central resources but, with a real income of about one-third of the level it enjoyed during its first decade, RTIG needs to be much more selective on what it can realistically aim to deliver over the coming period. What follows is therefore a superset of ambitions, which will be managed tightly by the Committee on a day-by-day (and year-by-year) basis.

6.3 Standards and guidelines

6.3.1 This function is the key means of delivering the objective "to support the production of specifications and guidelines for systems with a view to unifying the public transport information industry, facilitating the interoperability of public transport information systems, and promoting innovation and competition in the supply market".

6.3.2 Historically a significant part of RTIG's resource has been devoted to standardisation, either technical or operational (the latter through 'guidelines' documents). The development timeline has followed member's critical requirements and has included such topics as:

- Communications architecture;
- Server to server (back office) exchange: initially for RTIG-XML, since 2004 for SIRI;
- Disabled traveller guidelines: 2004-present
- Architecture for stops/shelters and displays: 2004-present;
- Data supply, including NaPTAN/TransXChange (now largely through PTIC);
- On bus architecture: 2006-present (now including European links through CEN);
- Air interface: 2008-present;
- Traffic management interface, eg for bus priority: 2008-present.

6.3.3 RTIG's strategy over the coming period is to sustain this programme of standardisation, as far as practical, within the limits of our capacity. Existing standards are kept under continual review and as-needed revision; also, individual standards areas are not closed and new opportunities/requirements may arise.

6.3.4 RTIG has historically been fairly low-key about promoting, encouraging or supporting the standards and guidelines it is involved in. While the principle of this is sound – RTIG is not an enforcement body – there may be ways in which additional encouragement can be given. Some of this will be through other general activities, such as member communications (section 5.3), market research (section 5.4) or market regulation (section 5.8).

6.3.5 RTIG's general strategy on financing standards involvement is that it will pay for coordination, management and editorial functions but not for technical contributions (that is, working group members are expected to contribute time freely). This will hold whether the work is undertaken within RTIG or externally, for example for CEN.

6.3.6 The cost of standards and guidelines was historically around £100k per annum, with significant financial contribution from central Government. This is no longer supportable, as RTIG's total income now hovers around this level. Nevertheless this area is seen as core RTIG business and will be kept as a high-priority work area.

6.4 Workshops and member communications

6.4.1 RTIG workshops and member communications are a key part of the objective "to promote professional liaison and exchange of knowledge".

6.4.2 RTIG's workshops have proven to be very popular over its lifetime. The agenda changes from event to event, and there is a continual review to ensure that they are kept fresh and relevant; nevertheless there appears to be plenty to sustain interest for the foreseeable future.

6.4.3 Apart from workshops, which are fairly intensive, require room and catering, and take time to attend (and contribute to), RTIG engages with its members in two main ways:

- via electronic publications, such as the RTIG website and emailed newsletters;
- discussions around specific issues, often as part of a review or case study exercise around which there is topical interest.

6.4.4 Engagement with members is crucial for RTIG to remain relevant. RTIG's strategy is therefore to continue to provide an effective communications service to its members by this range of mechanisms.

6.4.5 Notwithstanding the above, there has been a tapering off of workshop attendance in recent years (in particular as local authority members find it harder to justify days away from the desk). We will therefore aim to reduce this area and increase the proportion of work we do electronically, commensurate with demand.

6.4.6 The cost of workshops has been around £15k per annum. Website maintenance and newsletter publication cost somewhat less; we are aiming currently to keep the total for this area down to around £25kper annum.

6.5 Market research

6.5.1 This function helps fulfil the objectives "to promote professional liaison and exchange of knowledge".

6.5.2 RTIG has established a widely respected and supported track record of annual surveys, which have evolved slowly over the years. These have been conducted under contract to Government and it is proposed that this work will continue indefinitely.

6.5.3 It has also undertaken more specific deployment studies, on areas such as the prevalence of, and the variety of approaches to, traffic light priority. These are more *ad hoc*, being conducted as specific issues become topical. RTIG market studies (or "case study" reviews) have been useful to both policymakers and practitioners.

6.5.4 Historically this work area was funded largely by Government; in particular Annual Surveys were ceased in 2012. In line with the comments at 6.2, we need to be cautious about sustaining involvement in this area, and do not foresee this as being a high-priority item unless external funding once again becomes available.

6.6 Technical research

6.6.1 This function supports the objectives "to enable technology to deliver better public transport services, cost-effectively" and "to enable technology to deliver better information to the public about such services, at an affordable price".

6.6.2 RTIG is not a primary research organisation but there may be occasions where it is best placed to coordinate, steer or direct research conducted by others. It may also become involved in a project management role to large, multi-site or multi-organisation research projects. It has undertaken this role to an extent in the past, and would be credible and well placed.

6.6.3 There are two independent facets to this work.

- Externally funded programmes. Where (full or part) funding is available through organisations such as DfT, the European Commission, universities or research councils, RTIG's role would be to pull together a suitable project grouping among its members. In this type of work RTIG would seek to be fully funded from the external income.

- Collaborative research among members. It may occasionally happen that a group of members (say display manufacturers or PTEs) would like to establish the potential value of a new approach on a collaborative basis. RTIG would be a natural independent facilitator of this work. This kind of project may or may not require separate funding, depending on how much input is required from RTIG corporately (as opposed to being provided by the interested members).

6.6.4 In each case, the structure of the project would reflect the nature of the research. Some projects might involve just desk-based research; others may involve a demonstration element. Likely areas of review are the feasibility of new communications services or the operational acceptability of new display technologies.

6.6.5 It is difficult to project the likely scale of this area of work; however it would be financially self-supporting.

6.7 Ensuring RTI is an effective part of the wider picture

6.7.1 This function supports the objective "to co-operate with other bodies as necessary".

6.7.2 RTIG's technical work helps to ensure that systems are built to genuine, common requirements and interoperate as simply as practicable. However, RTI is not a standalone function; increasingly there is a need for systems within the RTI function to require connections to those outside it.

6.7.3 There is a complex task to ensure that the bus systems and information community is kept aware of such developments, and has an effective way of inputting its requirements and (where relevant) contributing to technical solutions.

6.7.4 The costs are of two kinds: representation of the RTI community in external programmes, and delivery of tasks generated by such programmes that fall within RTIG's scope. The first is generally modest and will be maintained, in order to sustain the community voice and relevance of RTIG; the second will be dependent on other prioritisation factors, such as whether external funds are available, and how willing members are to make *pro bono* contributions.

6.8 Framework agreements

6.8.1 This function supports the objective "to promote the role of technology in achieving these goals".

6.8.2 At present RTIG holds one set of framework agreements, with mobile comms service providers. This took a significant amount of setting up but has been used in procurement negotiations in several places. Other frameworks have been discussed but not taken forward, for various reasons.

6.8.3 Individual opportunities will be kept under review, and may lead to frameworks if and when appropriate. Other options will also be sought where 'procurement' at a national level could save members money, time or risk.

6.8.4 The costs of these activities may be significant and will need to be justified on a case by case basis.

6.9 Market regulation

6.9.1 This function supports the objectives "to enable technology to deliver better public transport services, cost-effectively" and "to enable technology to deliver better information to the public about such services, at an affordable price".

6.9.2 To date RTIG has concentrated on moving forward on a community-wide basis, involving LAs, operators and suppliers as equal partners. This has proved very valuable, and is part of the reason that standardisation has been the main technical focus for RTIG. It has, however, kept RTIG at arm's length from actual implementations.

6.9.3 The next step would be to get RTIG standards adopted in products, and then into operational systems. This function could not begin until there were sufficient credible standards available.

6.9.4 During 2007-08 RTIG undertook a project to review the potential for conformance testing. The conclusion was that it was financially demanding and risky and we did not proceed. The validity of this decision was further strengthened with the economic downturn a few years later. We therefore do not see any role in the short/medium term for this activity.

6.9.5 However where technical regulation functions do emerge (for example, under the Traffic Commissioners in the UK or under a body like the EC or UITP internationally), RTIG will work to ensure that UK stakeholder perspectives are represented and respected as fully as possible.

6.10 Operational services

6.10.1 This function supports the objectives "to enable technology to deliver better public transport services, cost-effectively" and "to enable technology to deliver better information to the public about such services, at an affordable price".

6.10.2 At present RTIG does not provide any operational services, in the way that (for example) ITSO provides the unique national security system to protect and validate ITSO-standard e-ticketing. The reason is simple – no such service is currently necessary. There is no reason to anticipate any change, and RTIG's strategy is not to seek an operational role.

6.10.3 It is just barely possible that this will change over the coming five years. However we are not planning for this, and would expect any opportunity to cover its costs.

6.11 Lobbying and community representation

6.11.1 This function supports the objectives "to provide a representative body of opinion for the public transport information community" and "to promote the role of technology in achieving these goals". It also helps "to co-operate with other bodies as necessary".

6.11.2 At present RTIG does little lobbying, and indeed it owes its success to the fact that it is not a partisan organisation: we don't 'take sides'. This is unlikely to change. We do, however, act as community representatives for the bus systems and information world.

6.11.3 The costs of this are modest at present, and are largely absorbed into general management costs. The role is sometimes fulfilled by volunteer members, acting with an RTIG 'hat' on.

6.12 Administrative tasks

6.12.1 This function supports the objective "to provide a representative body of opinion for the public transport information community".

6.12.2 RTIG established itself as a professional organisation in early 2004, and has sustained itself since then on this basis. The pattern of work outlined above will continue to require effective, transparent and accountable management, and the administrative aspects of RTIG will therefore continue to be important. This includes fulfilling statutory reporting obligations.

6.12.3 The associated costs are of two kinds:

- costs of management and administrator resource (currently around £25k per annum), which is likely to be fairly stable;
- direct costs of operation: everything from filing fees through stationery to audit, insurance etc. These are currently modest (a few £k per annum).

6.12.4 The 2007 Strategy envisaged the possibility of developing RTIG further as an organisation, for example through employing staff, establishing office premises etc, although the challenges and risks were clearly identified at the time. With a significantly reduced budget, this opportunity seems considerably less practical now and it is not intended to pursue such a development.

6.13 Summary

6.13.1 The suite of activities identified above implies a largely stable future for RTIG, with many of its current functions continuing over the next 5 years as they have in the last few years. The costs of these are known to varying degrees, but in general the items for which costs are least certain are designed to be responsive – that is, we will do these things if we can find the resource or a client to back them.

6.13.2 There are a few areas where we might take a step change in what we deliver; for example we might begin actively to seek funding under the scope of a European Commission R&D project.

These steps will be dependent on members being happy, RTIG being capable of delivering safely, and the opportunity presenting itself.

6.13.3 Broadly speaking:

- At least half of our income is aimed at technical developments such as standards;
- A further quarter is aimed at workshops, website, newsletters and other member communications;
- Much of the remainder is on collective operations and representation: RTIG management, feedback to Government, response to consultations etc.

7 Evolution of the Strategy

7.1 Introduction

7.1.1 This Strategy is an agreement on how to deliver a particular vision of information and communications technology in public transport, over the course of the coming five years. It acts as the basis to guide year-by-year, and day-to-day, planning by RTIG and its members.

7.1.2 However, the basic assumptions are unlikely to remain fixed over the coming five years. The Strategy cannot, therefore, be fixed, but must respond in a managed fashion. This brief final section outlines how this is intended to occur.

7.2 Monitoring the Strategy

7.2.1 It is RTIG's intention formally to review the status of the Strategy, and the progress made to the delivery of its vision, on an annual basis. This will be achieved through an Annual Report developed by the Chair and Committee and brought before the AGM. Members will be able to comment at that time.

7.2.2 The monitoring will cover:

- whether the 'user vision' is still accurate, complete, valid and achievable;
- whether the overall business model for public transport technology needs updating;
- whether the optimum role of RTIG has changed because of technical or organisational developments during the year;
- how effective RTIG's activities have been at delivering specific aspects of the vision.

7.2.3 The annual (draft) Business Plan brought before the AGM will reflect the Strategy then in force, together with the Executive Committee's priorities for the coming year. This may be changed following AGM review.

7.3 Strategy targets

7.3.1 The challenges identified in this document are not trivial, and achieving them will require the active participation of all UK stakeholders. In many cases this will require local decisions, commitment and investment. There will inevitably be further difficulties en route.

7.3.2 The purpose of this Strategy is to explain how the UK plans to work collectively to resolve such challenges as far as possible. Specific targets for RTIG's own delivery (eg when specific specifications, studies or documents will become available) will be set within its Business Plans on an annual basis.

7.4 Reviewing and updating the Strategy

7.4.1 When the AGM has allowed the Strategy monitoring to be fully completed, the Committee will consider how the Strategy needs to be updated.

7.4.2 The default is that the document will be updated for a new five-year period, so that the Strategy is updated annually on a rolling five-year basis. The Committee may, exceptionally, alter this plan if it is considered necessary to do so – for example, if it begins to look as if RTIG will cease to be required in less than five years.