UTMC case studies: users' experiences

1 September 2013

Reference: UTMCD042-1.0

Cover + 55 pages

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1 Introduction

1.1 This document

1.1.1 This document has been prepared under the UK's UTMC initiative. The role of UTMC is to facilitate the effective use of modern technology in traffic management: by developing and publishing open industry standards.

1.1.2 This document presents an overview of the activities of some leading local authorities in the UK, as well as the responses of the supply industry and national stakeholders. As well as the benefits of using UTMC, it highlights some of the difficulties that users have experienced, and some thoughts on how they would like to see the initiative develop.

1.1.3 The UTMC Development Group (UDG) and its support company UTMC Ltd are committed to responding to the needs of stakeholders for the benefit of all. Readers are reminded that everyone has an opportunity to influence the direction and publications of the UTMC initiative: please contact us at secretariat@utmc.uk.com.

1.2 Open specifications in Europe: the POSSE project

1.2.1 This report was compiled as part of UTMC's involvement in the INTERREG IVC project 1250R4, Promotion of Open Specifications and Standards in Europe ("POSSE"). POSSE is a knowledge exchange project; it began early in 2012 and runs until December 2014.

1.2.2 The purpose of POSSE is the Promotion of Open Specifications and Standards in Europe, in the area of Intelligent Transport Systems (ITS) and with a particular focus on traffic management authorities. There are two main initiatives focused on this area in Europe. These are UTMC (Urban Traffic Management and Control) in the UK and OCIT/OTS which covers the German-speaking part of Europe.

1.2.3 Both these initiatives have created and maintained an open specifications framework and the overarching aim of POSSE is to bring these experiences, both positive and negative, to other interested European cities and regions.

1.2.4 The project is led by Reading Borough Council. There are 6 "transfer sites" from across Europe: the cities of Klaipeda (Lithuania), Burgos (Spain), Pisa (Italy) and La Spezia (also Italy); the Norwegian Public Roads Administration; and the Czech national Transport Research Centre. The European city network POLIS is also a project partner, focussing on communication and dissemination.

1.2.5 The main outputs of the project will be a set of Good Practice Guidelines relating to the value and use of open specifications. So far, the response from our European project partners – and the wider range of non-UK authorities to whom we have spoken during the course of the project – has been very encouraging: it appears that the approach taken by UTMC over the past decade is providing to be of significant interest.

1.3 Document roadmap

1.3.1 This document is based on a series of case studies, with a summary main text in five sections.

- **Section 2.0 Context** provides a brief history of the UTMC initiative, its technical approach, and the institutions that are involved in its management and operation.
- **Section 3.0 Local authority experiences** collates feedback from six experienced UK local authorities who have used UTMC extensively. This section covers the nature and challenges of each authority, how they have made use of UTMC, what benefits it has provided, and the drawbacks they have experienced.
- **Section 4.0 Industry experiences** presents feedback from suppliers of goods and services who have made use of the UTMC specifications.
- **Section 5.0 National experiences** presents feedback from national bodies with an interest in traffic management: national government, the Highways Agency (responsible for the English interurban network) and the UTMC Development Group as the management body responsible for UTMC.
- **Annexes A-C** present the detailed "case studies" for all of those organisations who have been interviewed for this report.

1.4 Acknowledgements and disclaimer

1.4.1 This report has been made possible through the inclusion of UTMC in the European project POSSE described above. We are grateful for funding provided to the POSSE project by:

- Programme funds from the European Regional Development Fund, under the INTERREG IVC Programme.
- National cofinancing through a grant from the UK Department for Transport. (via Reading Borough Council).

2 Context

2.1 Background and history of UTMC

2.1.1 Traffic managers have wide range of roles and responsibilities, and an increasing range of technology systems to help them to deliver those responsibilities. However, as with any use of technology, there are challenges of getting an effective system for an acceptable cost. Moreover, where different systems need to work together, procurement and engineering issues arise such as:

- How to achieve an effective competitive marketplace, and avoid supplier “lock in”
- How to sustain technical innovation
- How to ensure that different authorities align their demands on systems suppliers where practical
- How to ensure systems can exchange data quickly, simply and cheaply

2.1.2 In the early 1990s, the UK Department for Transport (DfT) initiated the UTMC research programme in order to address these problems. A basic review of extant traffic systems led to the understanding that an open technical standard was required, and the first draft UTMC Technical Specification was published in 1997.

2.1.3 This was well received by both policymakers and practitioners, and DfT was encouraged to invest some £6M to facilitate the deployment of such systems. Between 1997 and 2004, the UTMC research programme worked with many different public and private sector organisations to refine the Technical Specification and prove its practicality in the marketplace.

2.1.4 The 1997 work programme says, in words that are still applicable today:

“The primary goal of UTMC is to deliver better tools which support the pro-active management of the urban traffic mix, essential if wider ranging local transport objectives are to be met. Increasingly, policy aims now include, for example:

- giving priority to public transport;
- improving conditions for vulnerable road users;
- reducing traffic’s impact on air quality;
- improving safety;
- restraining traffic in sensitive areas;
- managing congestion.

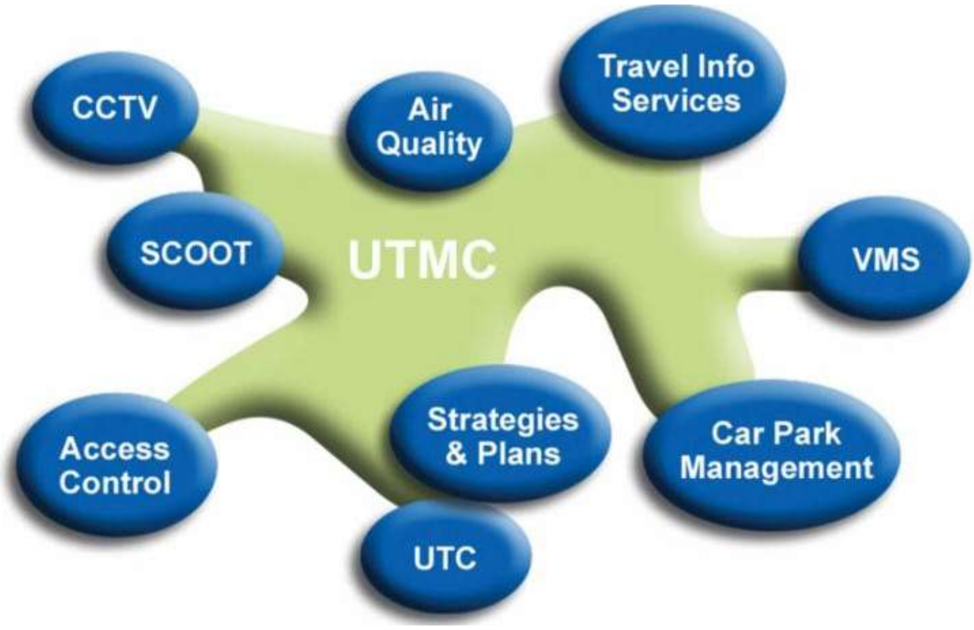


Figure 1: UTMC as a connectivity initiative

The UTMC Research Programme offers a framework for collaboration between users, industry and researchers in the development and implementation of UTMC systems which meet these aims. The approach emphasises... securing the widest and most active involvement of industry, researchers, local authorities and other users in the programme..."

2.1.5 The R&D programme was extremely successful, and since 2004 UTMC has provided the *de facto* framework for the traffic management systems marketplace across the UK.

2.1.6 There remain, of course, legacy systems in many UK local authorities, and new systems are occasionally acquired which (for specific local reasons, or because of limitations in the Specification) are not compliant with the UTMC Technical Specification. However the momentum remains behind a continual accumulation of compliant systems. Because of UTMC, the competitive supply marketplace and the interoperability of systems in the UK has been significantly boosted.

2.2 Technical approach of UTMC

2.2.1 At the core of the UTMC initiative is the UTMC Technical Specification. This is a substantial, complex and evolving library of documentation, but the philosophy behind it is rather simple and straightforward.

- *To make use of mainstream technology as far as practical.* Traffic management is a small market, and cannot hope to compete efficiently with the global ICT industry in terms of efficient system design. For instance, UTMC adopts the Internet Protocol suite (for most purposes) rather than inventing a separate, traffic-specific, data communications standard.

- *To set standards where useful – but only where useful.* The biggest potential problem with standards is that they can unnecessarily constrain design innovation. UTMC actively holds back from setting restrictions unless there is a good reason within the marketplace. For instance, it allows any communication channel to be used, provided only that it has adequate capacity, security, timeliness and reliability for its purpose. It also allows suppliers to innovate on algorithms, on user interface, etc. The primary focus of the specification is on interfaces that enable data exchange between applications and systems.

- *To be created and maintained by consensus.* Centrally developed ICT standards can sometimes be generated by a small group of self-selected people, and engagement with the intended users is not always good. In UTMC, systems companies develop the specifications, usually through some form of industry working group. The function of the secretariat is to ensure that all suppliers (and potential buyers) can participate in the development on an equal basis, and to publish the agreed result.

- *To be open and readily available.* A specification cannot be effective in improving the marketplace if it is difficult and expensive to obtain or to use. Unlike many standards and specifications, UTMC is fully open and available free of charge, through its website. There are no licensing restrictions on its use. However IPRs are retained in order to prevent third parties from seeking to exploit them.

2.2.2 Using this approach, UTMC has evolved specification elements to cover a wide range of traffic management functions, including the following:

Access Control	Detector	Roadworks
Accident	Event	Traffic Signal
Air Quality	Incident	Transport Link
ANPR	Meteorological	Transport Route
Car Park	Prediction	VMS
CCTV	Profile	

2.2.3 These cover both roadside-to-centre communications (eg between a roadside VMS and the VMS management system at the traffic control centre) and centre-to-centre communications (eg between the VMS management system and the traffic signal control system). They are also usable as format for data which is exported to other systems, eg traveller information systems.

2.2.4 Detailed information is available from the UTMC website www.utmc.uk.com, or by request to the UDG Secretariat (secretariat@utmc.uk.com).

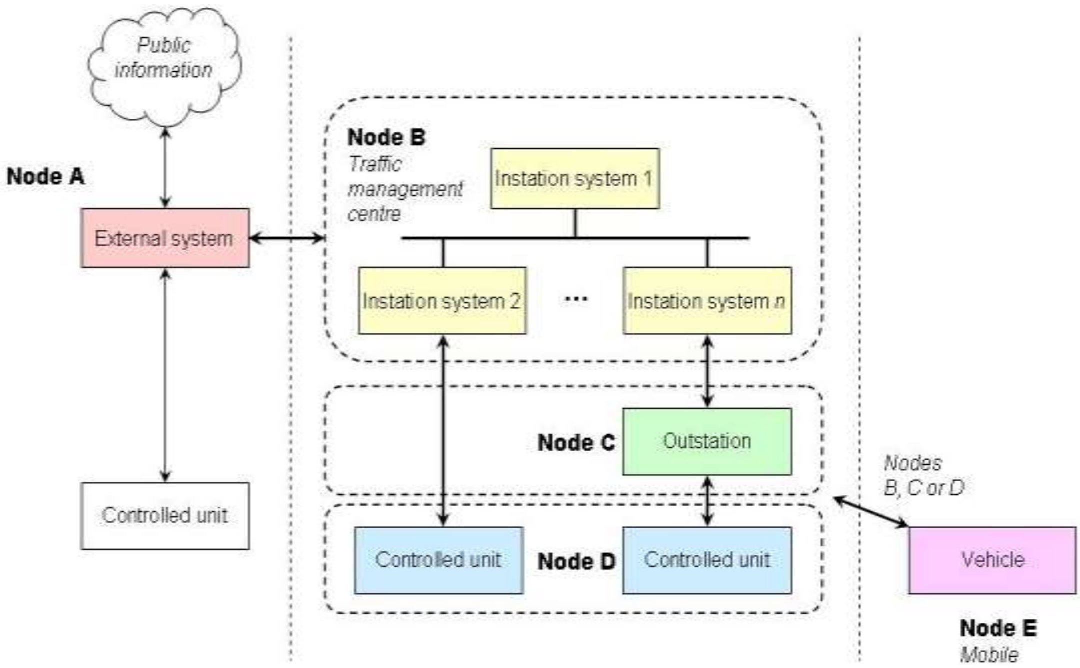


Figure 2: UTMC technical architecture

2.3 Management of UTMC

2.3.1 UTMC is a national activity within the UK, now managed directly by its user community, the UTMC Development Group (UDG). The UK Department for Transport continues to participate and to be actively interested in UTMC developments.

2.3.2 The UDG was formed in 2003 and took over the management and maintenance of the UTMC Technical Specification in 2004. In addition, the UDG works to spread good practice guidance to local authorities around the UK, and to their suppliers, through a range of events and publications. Commercial work for the UDG is managed through a not-for-profit company, UMTC Ltd.

2.3.3 The UDG is a membership organisation. Its members elect a Management Group consisting of up to seven UK local authorities and up to three supplier representatives. Two standing Working Groups (the Specifications & Standards Group and the Marketing & Member Services Group) deliver the UDG's technical and outreach functions respectively.

3 Summary of Local Authority experiences

3.1 Approach

3.1.1 The UTMC initiative was established with the aim that it would help local authorities manage their traffic more effectively and more efficiently, through a combination of better integration, better and wider supplier engagement, and reduced costs and risks. This section explores how far local authority users have succeeded in achieving these benefits over the eight years since UTMC moved out of the research phase. It also covers the challenges that authorities have faced in using UTMC.

3.1.2 Six UK authorities were contacted: Liverpool, Manchester, Coventry, Reading, Hampshire and Cambridgeshire. All of them are UTMC users and most are UDG members, so they are all well-informed about the local impact. They were selected to provide a broad and representative sample of UK authority parameters:

- Two are medium sized towns/cities, operating essentially urban areas but with close links to neighbouring authorities
- Two are larger metropolitan areas, able to operate more autonomously but on a more substantial scale
- Two are counties, with a mix of several towns and a significant rural region

3.1.3 The authorities selected present a variety of local features. Some are coastal, some inland; their economies have different mixtures of industry, public sector and culture; and their local politics vary.

3.1.4 Annex A documents the specific perspectives of these six authorities, covering their local circumstances, their ITS, and their specific experience of the UTMC framework of open specifications.

3.1.5 These authorities are not a complete model for the European Union. As an Atlantic island country, UK towns and cities do not face, for example, the range of climatic or geographical challenges of other Member States, and rarely have to consider international borders. However many of the issues they face will be common to cities elsewhere.

3.2 Common experiences

3.2.1 Across all of the authorities we spoke to, there was a general agreement on the following:

- The policy goals of traffic management are to reduce congestion/improve flow, to increase road safety, to improve environment quality, to support public transport, etc.
- The financial squeeze is placing huge pressure on the ability of traffic managers to operate their network, and even to maintain existing ITS assets.
- There is an increasing need to guide and inform travellers, so that traffic management is about much more than just optimising traffic signal settings. This includes through mobile devices.

- Modern networked technologies are much easier to develop, install, connect, and operate than they have ever been. However the skills needed to specify them and manage a supply contract are not those that traffic managers have historically had.
- UTMC standards are generally a good thing: they make it easier to specify and procure systems, and they facilitate competition in the supply market. They do make interconnection easier, although it is rarely possible to “plug and play”.

3.3 Variations between authorities

3.3.1 A number of areas of experience were felt by one or more authorities, but not by all of them:

- Some policy areas were local to the context. For example Liverpool is a major port but Cambridgeshire is inland and freight traffic is much less of an issue; on the other hand Cambridgeshire has a much higher density of bicycle traffic than Liverpool.
- There was some variation in management style. For some authorities, reliable technology was worth the cost, while others were more willing to take risks with less expensive systems. Similarly, some focus more on traffic control, while other focus more on monitoring the network and providing information.
- There was inevitably a lot of variation in the specific systems that different authorities have deployed, how old those systems now are, which are currently being replaced, etc. Partly for this reason, there was a lot of variation in which systems had been acquired under a UTMC framework.

3.4 Comments

3.4.1 Above all, local authorities want systems that work efficiently – they are not interested in standards for their own sake. Standards are only helpful if they make systems cheaper to acquire, easier to use or more reliable. Standards which are too technically complex to understand will be counterproductive: the ICT world is full of “technically inferior” solutions that are pervasive because they are easy to use (IP vs X.25, Windows™ vs Unix).

3.4.2 While there is a lot of overlap among local authority needs, there are also differences in detail: London is not the same as Luton or Leicestershire. Standards based on a “one size fits all” philosophy are not going to be efficient for all authorities.

3.4.3 Many of the similarities and variations are contextual, rather than national, and this means that commonalities exist across the continent of Europe. The problems, and viable solutions, for London as a large metropolis are quite similar to those of Paris and Rome; the issues for Liverpool as a port city will mirror those of Genoa and Gdansk; and Cambridge as a university city will share experiences with Leiden and Uppsala. Of course this does not apply to all traffic management challenges: Helsinki has more snow and less air pollution than Athens, because of their difference in latitude.

3.4.4 One of the problems of traffic management is that there is no standard (or set of standards) that has acquired a “critical mass”. Instead, there is a patchwork of relevant standards, which are not compatible. Local authorities find this confusing, and a deterrent.

3.4.5 But local authorities need to know, not merely *what* standards apply to their traffic management systems, but *how* they apply. Many of the problems that people have cited (both with UTMC and with other specifications and standards) have been related to this point. For example, non-technical people struggle to understand how two systems can both be “compliant” with the same standard, and yet cannot interoperate.

4 Summary of industry experiences

4.1 Approach

4.1.1 As previously stated, the UTMC initiative is as important for the supply industry as it is for the local authorities using the framework. As well as the public benefits, it has been an aim of the initiative to support industry by harmonizing and simplifying technical requirements, reducing unnecessary variation and allowing developers to focus more on functional innovation. This section explores how industry users have worked with the UTMC specifications.

4.1.2 Three suppliers have been contacted, all UDG members and long-time UTMC supporters:

- A provider of central systems – Mott Macdonald
- A provider of roadside systems – VMS Ltd
- A provider of professional services – Atkins

4.2 Common experiences

4.2.1 Across all of the suppliers we spoke to, there was a general agreement on the following:

- All of the suppliers found that UTMC has been substantively beneficial to them.
- It is not hard for staff to become familiar with the relevant parts of UTMC.
- Having UTMC as a national framework helps to make the marketplace more aware of the capabilities of ITS, and less worried about the risk of implementation. They see the use of national standards as evidence of supplier quality.
- UTMC helps the dialogue between buyer and supplier: they can "talk the same language" in their procurement specification.
- Integrating products into client systems becomes much easier when UTMC is used. Upgrading existing UTMC products is also easier. However, UTMC is less helpful for a product which needs to integrate with legacy (non-UTMC) systems.

4.3 Variations between companies

4.3.1 The following observations were made by one or more companies, but not by all of them:

- People sometimes place excessive trust in the strength of the UTMC Technical Specification. Buyers can produce poor quality procurement specifications, and suppliers sometimes claim UTMC compliance when this is not justified. The lack of standardised tender documentation is part of the problem.

- The use of “custom extensions” to UTMC, which have not been submitted for adoption, can cause problems. The nature of the scheme means that there is little incentive for suppliers to submit such extensions.

- The costs of developing, deploying and maintaining systems were generally reduced by adopting a common open standard, but the extent of this depends on the nature of the products/services supplied.

- In some cases there is a slight reduction in the flexibility of a supplier’s offering, imposed by the need to be compliant; this has not, however, been a problem.

4.4 Comments

4.4.1 Suppliers are commercial organisations: their aim is to sustain and grow a source of profit. Their participation in UTMC will be conditioned by their expectations of how far it will contribute to this profitability.

4.4.2 Where the ITS buyers (in UK, the local authorities) perceive the benefits of UTMC and specify it within their procurements, companies will aim to supply within this framework. They will then endeavour to position themselves as knowledgeable, innovative and efficient – as well as well-priced – as UTMC suppliers. Automatically, this generates a dynamic marketplace for buyers to select from, and a virtuous circle is established.

4.4.3 The UK has not reached this level of maturity yet, and suppliers are therefore still quite varied in how vigorously they adopt UTMC. No supplier offers fully and only UTMC-compliant equipment, because:

- Some clients have legacy equipment that needs maintaining, or whose systems they need to integrate with.

- Some prospective clients, especially outside the UK, may specify alternative standards.

4.4.4 Nevertheless, it is possible for both large and small companies to justify adopting UTMC within their core services, and to sustain that over the long term.

5 Summary of national perspectives

5.1 The UTMC framework is a UK national initiative. As well as its local impact on highways authorities, or on individual technology companies, it needs to be judged on a holistic basis. (Indeed, some of the perspectives above make the point that it is this consistency and holistic view that has been beneficial.)

5.2 Three key UK national bodies are involved in, and affected by, the UTMC initiative.

- The Department for Transport launched the process with a specific policy goal
- The Highways Agency is the English national operator of motorways and trunk roads, and need to work with local highways authorities
- The UTMC Development Group is responsible for managing the UTMC initiative and sustaining the process

5.3 As with the previous sections, each was approached and asked to give their assessment of the success of UTMC as well as its challenges and problems.

5.4 The national bodies all agree that:

- With the current financial squeeze, it makes sense for LAs to define their needs collectively, and to streamline the procurement process wherever possible. This implies the need for a good, user-led, widely-accepted standards framework such as UTMC.
- UTMC has made significant progress in helping UK local authorities manage their traffic more intelligently, and has improved the responsiveness, cost-effectiveness and cooperation of the supply market.
- UTMC is still a “work in progress”. Not every relevant function is yet included in the Specification.
- The Specification needs to be kept up to date with other activities both within and outside the UK. At present the marketplace is still fragmented, with numerous standards in existence internationally.
- The actual impact of UTMC on local authorities is variable: there are some “leaders” who know exactly what they are doing and drive the market, and some less advanced authorities who maybe still struggle.
- The most significant strategic problem for UTMC is the lack of a coherent supply of resource (people and/or funding). It is very difficult to see how this can be addressed, because the benefits are so dispersed among stakeholders.

A Local authority case studies

A.1 Introduction

A.1.1 This annex provides notes from discussion with representatives of six local highways authorities in the UK:

- Two metropolitan centres, Liverpool and Manchester (represented by Liverpool 2020 and Transport for Greater Manchester)
- Two smaller cities, Coventry and Reading (represented by their unitary authorities)
- Two larger county areas with both urban and rural contexts, Hampshire and Cambridgeshire (represented by their County Councils)

A.1.2 Each began with an in-depth interview, following which the authority provided some information. The note was based on this information combined with publicly available information (eg through Council websites), except for Coventry's which was supplied in full form by the authority itself. The final note was validated with the interviewee.

A.2 Liverpool City Council

About Liverpool

A.2.1 Liverpool is a city and metropolitan borough of Merseyside, England along the eastern side of the Mersey Estuary. It is the eighth most populous British city, and sixth most populous in England. In 2011, the population was 466,400. Liverpool at the centre of a wider urban area, the Liverpool City Region, has a population of around 2 million people.

A.2.2 As a major British city, Liverpool has significant road and rail networks and also an international airport and port. It has a significant underground railway network that serves the city and immediate locality.

A.2.3 In common with most other major cities within the United Kingdom, Liverpool's transport infrastructure is centred on its road and rail networks. Public transport services within the city are controlled and run by the Merseyside Passenger Transport Executive (branded as Merseytravel), with the city's national rail services managed by Network Rail. The road network in and around Liverpool is primarily managed by the relevant local authority in which the roads are located, although, in common with all parts of the United Kingdom outside London, the major trunk roads are the responsibility of the Highways Agency.

A.2.4 Liverpool has direct road links with many other major areas of England. The west to east M62 motorway connects Liverpool with Hull and along the route also provides a link with areas including Manchester, Leeds and Huddersfield, and not far along the M62 from Liverpool is the interchange with the north to south M6 that provides links to more distant areas including Birmingham, Staffordshire, the Lake District and the Scottish border.

A.2.5 Liverpool is served by two separate rail networks. The local urban rail network, which is underground in the centres of Liverpool and Birkenhead, is managed and run by Merseyrail and serves the whole of Merseyside, also providing links beyond. The national mainline network, which is managed by Network Rail, provides Liverpool with connections to major towns and cities across the England.

A.2.6 Liverpool John Lennon Airport connects the city to many major European cities. In 2008, the airport handled over 5.3 million passengers and today offers services to 68 destinations, including Berlin, Rome, Milan, Paris, Barcelona and Zürich. The airport is primarily served by low-cost airlines although it does provide additional charter services in the summer.

A.2.7 Liverpool's position on the River Mersey, close to the mouth into the Irish Sea has contributed to its rise as a major port within the United Kingdom. In addition to the Port of Liverpool's role as a major cargo terminal, the port also provides a base for ferry and cruise services.

A.2.8 The city covers an area of 645 square kilometres and it has 302 signalised junctions and 24 km of dedicated bus lanes. There are numerous car parking facilities available in and around the city centre. The City operates two types of parking facilities in the city centre - Street 'pay and display' bays, and off-street 'pay and display' bays. There are over 1500 on-street parking spaces in the city centre which operate on a 'pay and display' basis. The City Council also operates 13 'pay and display' off-street car parks that have charges payable seven days a week. Finally, large car park operators such as NCP and Q-Park also manage a number of car parks across the city centre.

ITS in Liverpool

A.2.9 Liverpool actively manages its road network and traffic using adaptive Urban Traffic Control (UTC) system, supplemented with variable message signs for displaying journey times on key corridors and for showing car parking spaces status and availability.

A.2.10 UTMC Common Database supplied by Siemens links a number of ITS systems together to provide real time car park guidance, VMS control, roadworks information, and interfaces with UTC, remote monitoring system and the national motorway traffic control system.

A.2.11 The provision of real time information for rail users has become the norm and work has been ongoing to provide real time information throughout the region to bus users.

A.2.12 Liverpool ITS systems include:

- Siemens COMET common database for UTC, remote monitoring and car park management
- Adaptive SCOOT UTMC from Siemens
- Siespace car park management from Siemens
- Car Park Guidance signs from Dambach [Swarco] displaying car park spaces available
- VMS from Siemens for displaying traffic information
- CCTV from Siemens for traffic monitoring
- Automatic Number Plate Recognition (ANPR) from Siemens for journey time measurement
- Air quality monitoring system from Envirowatch
- Access control from ATG
- Street works system from CONFIRM
- Strategy supervisor from Siemens

UTMC in Liverpool

A.2.13 Liverpool UTMC compliant common database allows for easier control room operation, improved management of accidents, events, incidents and roadworks, and improved view of the network status. Other highlights include journey time monitoring of key corridors, car park management covering some 13 car parks across the city as well as enhanced strategic management, providing operators with the ability to implement automatic responses to pre-defined network conditions such as football matches and music concerts.

Future UTMC in Liverpool

A.2.14 UTMC will play a big part in Liverpool's plan to fully exploit the capabilities of its Intelligent Transport Systems (ITS). For the next 5 years or so, the following are expected to be implemented:

- **Collect and store information**: Gather information on traffic patterns and road use for use in real time and for historical analysis. Share information between systems so that data can be interrogated holistically.
- **Network Management**: Use available and shared information to manage traffic through the network. Develop use of environmental triggers, road works information and cross boundary routes.

- **Dissemination of Information**: Provide more information to travellers, initially by using available information to make more use of variable message signs, travel website and text messaging to mobile phones. In the longer term make more use of intelligent in-vehicle devices.

- **Gather, Display and Predict Journey Times**: Utilise journey time management systems to provide and store information on journey times, starting with key strategic corridors to centres. Sharing of information between individual systems will also enable wider route coverage.

- **Passenger Information and Public Transport Priority**: Link RTPI systems, particularly for buses to traffic management systems (Comet) and better control and prioritise road based public transport (buses).

- **Streetworks Information**: Link individual districts street works information systems to provide a holistic view of the region's network. This will assist in the management of cross boundary traffic particularly where there are road works in adjoining districts.

- **"Blue Light" Priorities**: Provide Support for Emergency Vehicles attending emergency "blue light" calls. Provide "green waves" through traffic signals where feasible minimising disruption to other traffic.

- **Car Park Information**: Utilise information held in car park information systems to provide details of historic usage and real time information on car park occupancies on the travel website.

- **Strategy Development**: Continue to develop and implement strategies to cater for both planned and unplanned events on the network.

Drawbacks

A.2.15 The difficulties implementing ITS can be categorised under two main headings:

- Difficulties faced implementing ITS: It is not clear how to proceed when new applications/features, not featured in the original list of UTMC applications, eg, Bluetooth, need to be developed. Local authorities are not sure whether they should approach their suppliers directly or whether the UDG offers a service to co-ordinate activities so that the outcome eg a new UTMC compliant object or system is accepted by industry.

- Difficulties using UTMC: There have been instances of different interpretation by suppliers of some aspects of the specifications eg two suppliers interpreted the specifications for the car park guidance signs dimming parameters differently with one providing 3 levels of dimming and the other 15. This resulted in additional costs to resolve the issue as the former's Common Database is not designed to receive more than 3 levels of dimming.

A.3 Transport for Greater Manchester

About Greater Manchester

A.3.1 Greater Manchester is a metropolitan county in North West England. It covers an area of 1276 km^2 (493 sq miles) with a population of nearly 2.7 million (2011). It encompasses one of the largest metropolitan areas in the United Kingdom and comprises ten metropolitan boroughs of Bolton, Bury, Oldham, Rochdale, Stockport, Tameside, Trafford, Wigan, and the cities of Manchester and Salford.

A.3.2 There is a mix of high-density urban areas, suburbs, semi-rural and rural locations in Greater Manchester, but land use is mostly urban. It has a focused central business district, formed by Manchester city centre and the adjoining parts of Salford and Trafford, but Greater Manchester is also a polycentric county with ten metropolitan districts, each of which has at least one major town centre and outlying suburbs.

A.3.3 Greater Manchester lies at the heart of the North West transport network. Much of the infrastructure converges at Manchester city centre with the Manchester Inner Ring Road, an amalgamation of several major roads, circulating the city centre. The county is the only place in the UK to have a fully orbital motorway, the M60, which passes through all of the boroughs except Bolton and Wigan. Greater Manchester has 174 km (109 miles) of motorway network. Transport for Greater Manchester (TfGM) is responsible for the strategic policies and operation of the road network.

A.3.4 Metrolink is owned by TfGM and is Greater Manchester's light rail system, which began operating in 1992. Principally used for suburban commuting, the 69 km (43 mile) long network consists of six lines which radiate from Manchester city centre. Greater Manchester has a heavy rail network of 229 km (142 miles) with 98 stations, forming a central hub to the North West rail network. Train services are provided by private operators and run on the national rail network which is owned and managed by Network Rail.

A.3.5 Bus travel is by far the most popular form of public transport in Greater Manchester, with eight out of ten public transport journeys being by bus. There are about 40 bus companies operating 70,000,000 miles per year.

A.3.6 An extensive canal network also remains from the Industrial Revolution with the Manchester Ship Canal linked to the Irish Sea remaining a shipping route for freight.

A.3.7 Manchester Airport, which is the fourth busiest in the United Kingdom, serves the county and wider region with flights to more worldwide destinations than any other airport in the UK. Since June 2007, it has served 225 routes and handled 21.06 million passengers in 2008.

A.3.8 The three modes of public surface transport in the area are heavily used - 19.7 million rail journeys were made in the 2005/2006 financial year, there were 19.9 million journeys on Metrolink; and the bus system carried 219.4 million passengers.

ITS in Greater Manchester

A.3.9 Greater Manchester has 2216 sets of signals including 972 pedestrian crossings, and 42 km of dedicated bus lanes. Transport for Greater Manchester (TfGM), on behalf of Manchester City Council, Stockport MBC and Wigan MBC, monitor about 60 car parks which are able to show current occupancies on car park guidance signs. In addition there are 15 VMS signs showing road traffic information.

A.3.10 Greater Manchester has both adaptive and fixed time UTMC compliant Urban Traffic Control (UTC) systems supplied by Siemens. Some of the junctions can be monitored by traffic CCTV cameras. Air quality is monitored at some fixed locations. Automatic access control systems operate in Manchester city centre, Stockport, Bolton and Wigan.

A.3.11 UTMC Common Data Management Facilities (Osprey, formerly CDMF, supplied by Mott MacDonald and COMET supplied by Siemens) link a number of ITS systems together to provide real time car park guidance, VMS control, roadworks information, and interfaces with UTC, remote monitoring system and the national motorway traffic control system.

A.3.12 Currently Greater Manchester does not provide bus priority through its UTC system, though a separate priority system exists for its trams.

A.3.13 Greater Manchester ITS systems include:

- Mott MacDonald Osprey (Common Data Management Facility)
- Siemens COMET common database for UTC, remote monitoring and car park management
- Adaptive SCOOT UTMC from Siemens
- Fixed time UTC from Siemens
- Siespace car park management from Siemens

- VMS from Siemens, VMS Ltd and Swarco respectively
- CCTV from Tyco
- Air quality monitoring system from Envirowatch
- Access control from ATG
- Street works system from CONFIRM, Symology, Mayrise and EXOR
- Strategy supervisor from Siemens and Mott MacDonald respectively

UTMC in Greater Manchester

A.3.14 Greater Manchester UTMC compliant common databases include an enhanced user interface for easier control room operation, and improved management of accidents, events, incidents and roadworks, allowing for an improved shared view of the network. Other highlights include journey time monitoring of local roads and motorways, car park management covering some 60 car parks across Manchester, Stockport and Wigan as well as enhanced strategic management, providing operators with the ability to implement automatic responses to pre-defined network conditions such as abnormal journey times.

A.3.15 The UTMC car park monitoring devices and car park guidance VMS are connected over a GPRS network to the central CDMF system in the centre of Manchester using UTMC compliant protocols. This has delivered full end-to-end UTMC system with support for legacy systems.

A.3.16 1220 of the traffic signals are connected to the PSCOOT UTC system via IP enabled UTMC UG405 Gemini units.

Future UTMC in Greater Manchester

A.3.17 UTMC will play a big part in Greater Manchester’s ambitious plan to fully exploit the capabilities of Intelligent Transport Systems (ITS). In January 2013, TfGM placed a tender for a £15m contract to develop an intelligent transport system, which will ultimately lead to the efficient management of traffic flow on roads in Greater Manchester.

A.3.18 The Dynamic Road Network Efficiency and Travel Information System Solution, which will be developed over a period of three years, will be designed to facilitate the delivery of initiatives to improve the management of transport in Greater Manchester.

A.3.19 The solution will offer real-time updates on road conditions, including travel hotspots, and provide management systems and a control platform.

A.3.20 The contract includes the active traffic management of the highway network, traffic signal priority measures (for the bus network), operational control platform, and service performance management systems.

A.3.21 The multi-modal passenger information system will integrate data from bus, rail, tram and highway services, among others.

A.3.22 Data will be sourced from public transport information, emergency services, road activities data, CCTV and Bluetooth passive sensors, event data, automatic traffic counter data, car park data and transport cost data.

A.3.23 The solution will offer real-time updates on road conditions, including travel hotspots, and provide management systems and a control platform. Both the static and dynamic data will be offered on an open-source information exchange, and will be accessible through mobile apps, SMS, online journey planning tools, internet media and other mobile phone platforms.

A.3.24 The company selected to implement this project will be responsible for system hosting, system design, back-office system and software.

Drawbacks

A.3.25 The difficulties implementing ITS can be categorised under two main headings. The main difficulties faced implementing ITS are as follows:

- There is a range of different solutions to a wide range of problems and users often have to rely upon suppliers to suggest solutions because of the suppliers' detailed knowledge of their products.
- Innovative solutions are difficult to procure as they tend to be very risky.
- Working out the quantitative benefits of ITS schemes is not straight forward and can be costly.
- ITS industry both on the supplier and user side doesn't seem to take advantage of developments in similar industries.

A.3.26 In addition, the specific difficulties involved in using UTMC have been:

- Lack of proof regarding the benefits of UTMC and the cost savings of UTMC schemes compared with non-UTMC compliant schemes. Again rely upon suppliers for guidance.
- Difficult for SMEs outside the ITS 'industry' to get a way in because users tend to rely upon advice from existing suppliers and want to avoid risk as much as possible so SMEs outside the usual suppliers tend not to progress in the procurement processes.
- No active financial support for UTMC from the Department for Transport.

A.4 Coventry City Council

About Coventry

A.4.1 Coventry is a city and metropolitan borough in the county of West Midlands in England. It is the second largest city in the West Midlands, and the 12th largest in the UK, with a population of 316,900 (2011).

A.4.2 Coventry covers an area of 99km^2 and a road network of 868km. Coventry has excellent transport connections with the M6, M69, M45 and M40 bordering the city, and the city centre has both a complete inner ring road and partial outer ring road. Through-traffic is facilitated by the A444 dual carriageway, which runs North/South through the city centre and links to the M6.

A.4.3 The city centre has 20 off street car parks all within the inner ring road, along with two 'park & ride' sites situated at North and South of the city. In 2012 the city's first on-street pay and display parking machines were installed.

A.4.4 For rail, Coventry's inner city railway station is served by the West Coast Main Line, and has frequent rail services between London and Birmingham. Coventry also has two suburban rail stations.

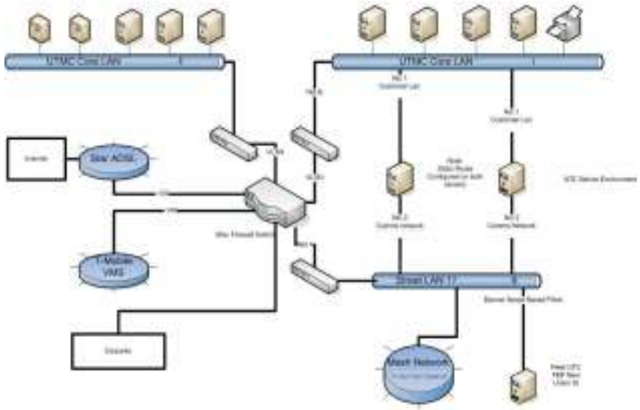
A.4.5 Bus service operators in Coventry include National Express Coventry, Travel de Courcey and Stagecoach (based in Warwickshire). Pool Meadow Bus Station is the main bus and coach interchange within the city centre.

A.4.6 The nearest major airport is Birmingham International Airport, some 18 km to the west of the city. Coventry also has a commercial freight airport at Baginton, 8 km south of the city.

ITS in Coventry

A.4.7 The Coventry City network includes some 230+ traffic signal installations within the city boundary, which are controlled by a mixture of UTC SCOOT and remote monitoring. Many of these junctions can be monitored by traffic CCTV cameras. Bus priority is provided throughout the network. There are 6 strategic Variable Message Signs and a further 12 Car Park Information Signs, and a number of Automatic Number Plate Recognition (ANPR) cameras used to monitor journey time along strategic links. Central support systems include a multi-functional video wall. A Common Database (CDB) links the systems together, and enables integrated fault management.

A.4.8 Coventry City Council's UTMC control desk is situated in the main Council Offices, the Civic Centre, in the city centre. It operates Monday to Saturday and extends over both morning and afternoon peak periods. The UTMC desk allows operation of SCOOT, Bus Priority System, Remote Monitoring System, Fault Management System, Journey Time Monitoring System and CDB. The multi-functional video wall links to traffic CCTV cameras.



A.4.9 Coventry currently operates both Peek and Siemens SCOOT UTC systems, controlling all key corridors into the city. The SCOOT regions incorporate 74 signalized junctions and pedestrian crossings, with 6 junctions operating MOVA with UTC fallback. A further 119 signalized junctions and pedestrian crossings operate either:

- on UTC fixed time plans
- vehicle actuated, monitored via UTC.

A.4.10 The remaining isolated installations are connected to the Siemens Remote Monitoring System.

A.4.11 The Siemens Remote Monitoring System operates on a dial-up basis using either a standard telephone line or GPRS network and allows fault monitoring of isolated signal installations and signs.

A.4.12 Coventry's VIX (formerly ACIS) Real Time Information (RTI) system uses radio transmitters to enable buses to communicate their positions to the centre. This system incorporates the ability for a bus, to request a priority movement at a traffic signal junction. System operation is based on virtual GPS triggers, stored in the on-bus computer, so priority requests can be made at any point on the network. The receiver is connected to the UTC priority inputs. Virtual vehicle detection points or triggers are configured via the trigger management tool.

A.4.13 Coventry's Vysionics Journey Time Monitoring System uses data collected from ANPR cameras installed at strategic points on key corridors into the city.

A.4.14 Coventry's traffic signals communications network historically used expensive Multipoint Private Wire Circuits. In 2007 an innovative approach to communications using Fibre Optic Cable and Now Wireless MESH 4G Radio was introduced to the city. This provided a suitable replacement for the aging circuits, along with lower revenue costs than current technology and in addition provided expansion for all street based equipment requiring connectivity. It was envisaged that by the end of April 2013 the transfer of all sites from Multipoint to MESH 4G will be complete.

A.4.15 Coventry's ITS Systems include:

- Cutlas Common Database
- Siemens PC SCOOT
- Peek TMS SCOOT
- ASTRID / INGRID
- Vix RTIG Bus Priority System
- BusNet Live and Trigger Management Tool
- Siemens Remote Monitoring System
- Tyco Mosaic CCTV System
- Vysionics JTMS
- Siemens In-View Fault Management System
- Now Wireless MESH Manager
- Zenco Systems Bus Lane Enforcement Suite
- VMS Ltd Systems variable message signs
- Techspan Systems variable message signs and car park guidance sign

UTMC in Coventry

A.4.16 Coventry's adoption of the UTMC concept and approach allowed integration of existing traffic management tools, and provided a simple structure for new technology to be easily added. At the heart of Coventry's UTMC is the Cutlas Common Database which receives data from individual systems, pools the relevant information, and sends outputs to the appropriate systems or persons.

A.4.17 Currently Coventry runs CDB adapters for both Siemens and Peek UTC systems, ANPR, VMS, RTI and CCTV. Looking forward and working closely with CDB suppliers Coventry envisages bringing more data sources into the CDB, such as On Street Parking, Street Works, Rising Bollards and Pollution Monitoring. The UTMC open standards to each of these products make this a far more straightforward task.

A.4.18 The Common Database provides Coventry with a strategic approach to the management of the road networks at major events and incidents within the city. Large concerts and football matches at Coventry's Ricoh Arena are managed efficiently with the help of strategies that drive UTC plans and VMS messages. Strategic diversion routes during major road works have been communicated to drivers using VMS and the routes assisted by implementing UTC plan changes.

A.4.19 During 2012 Coventry hosted some of the football events for the London 2012 Olympics, with crowds up to and in excess of 20,000 people at 12 matches over 3 weeks. Some 30,000 people took part in the Olympic Torch Route which passed through Coventry. UTMC was integral to the smooth running of these events, with the implementation of parking strategies, queue management and strategic UTC plans before and after the events. In addition 15 re-deployable CCTV cameras were integrated within Coventry's UTMC MESH network providing additional security within a 1-mile (1.6km) radius of the stadium.

A.4.20 With funding from the West Midlands UTMC project, Coventry has implemented Traffic Light Priority to both the Foleshill Road and Route 13 corridors in Coventry. The scheme provides priority to specifically equipped buses at traffic signals linked by the Vix RTI server to the UTC SCOOT system. The scheme is part of the award-winning Prime Lines project, a joint initiative between Coventry City Council, Centro and National Express Coventry which has reduced journey times and made bus travel more attractive across the city. Buses running along these corridors have already seen an increase in reliability of 26 per cent, with punctuality improving by 40 per cent.

A.4.21 Coventry has been working closely with Telent and Pleydell Technology Consulting Ltd to help develop their Outstation (OTU) on both the Peek and Siemens UTC Systems. The trial is ongoing but has been largely successful to date. Coventry has also worked with the Peek Traffic Project Team and Siemens Engineering team to successfully install a Siemens Gemini OTU within a key Peek UTC corridor. Both projects' success came with minimal effort, and would have not been possible without UTMC protocols.

A.4.22 Bus lane and parking enforcement forms a part of Coventry's overall plan to improve road safety and expeditiously move traffic flow across the city's road network. The early stages of this plan required an operator who would manually capture contraventions on the Zenco/Tyco systems. A more efficient, and more automated, method has now been adopted as the way forward with the installation of ANPR cameras directly linked to the Zenco/Tyco systems through the UTMC network. Again the open UTMC specification adopted by these products has made the process straightforward.

A.4.23 Late in 2012, Coventry rolled out the City Centre Parking Scheme, installing 53 on-street pay and display machines and 16 off-street machines at various sites throughout the city centre. Coventry is now in the process of connecting these machines to the control centre via the UTMC MESH network. This will enable accurate parking data to be obtained in real time, and will facilitate future parking management strategies.

A.4.24 Coventry's first air quality monitoring corridor is currently also being implemented, with 13 pollution monitors and 2 data gateways. The data will be input to the Common Database and be controlled through a queue management strategy within the UTC systems. It is envisaged that more of these corridors will be brought on line in the future.

Future UTMC in Coventry

A.4.25 Coventry is looking to develop further the Car Parking Strategy within the city centre. Data collected from on and off-street parking machines, along with street-side detectors, will be transformed into driver information, via the UTMC Common Database and using additional Variable Message Signs and the internet. Drivers will be guided to available parking, which will reduce congestion on the road network. The existing UTMC MESH network will be used for connectivity to all new on-street equipment.

A.4.26 Data collected from existing ANPR cameras on key corridors will be translated to journey times. Again this information will be communicated to drivers through VMS and a website, and in turn will assist congestion management.

A.4.27 Coventry UTMC is currently developing a process to collect data from remote cycle counters. Historically the data collection has been reliant on third parties, or lost altogether due to equipment failure. The proposal is to use the existing MESH infrastructure and UTC Outstations to communicate the data into the Common Database and ASTRID.

A.4.28 Coventry has a network of several hundred CCTV cameras for separate purposes – some for traffic, others for public realm security – and which are controlled by various departments within the City Council. A project is currently underway to amalgamate the cameras under one common system, linked within the UTMC network.

A.4.29 It is envisaged that Coventry UTMC will have a webpage giving public access to traffic information, journey times, diversion routes, parking information and live traffic camera images. The development of a management tool for the UTMC Common Database on a web-based platform would be integral to this. Further development would see the site available through a mobile phone application.

Drawbacks

A.4.30 Unsurprisingly due to the current financial uncertainties posed by all local authorities in the UK, including Coventry, constraints are imposed on development and maintenance of ITS in both expenditure and resources.

A.4.31 Because of these constraints, the maintenance and renewal of existing and aging equipment, such as damaged SCOOT and VA detectors, obsolete computers and servers, etc poses a problem to the effectiveness and efficiency to the outcome of the UTMC integrated solution.

A.4.32 Compatibility issues, although minor, have proved to be problematic during implementation of equipment and systems. The reluctance of some suppliers to fully embrace the UTMC culture seems to be the principal element. These issues were overcome through the expertise of individuals within the authority and benevolent contacts from suppliers.

A.5 Reading Borough Council

About Reading

A.5.1 Reading is a large town in the south of England. It has a borough population of approximately 155,000 (2011), and a larger urban area population of 370,000 (2011), making it the 17th largest urban area in the UK. To coordinate management, the Borough Council takes a leadership role with surrounding authorities (Wokingham, West Berkshire and south Oxfordshire) through the so-called Reading Urban Area Plan.

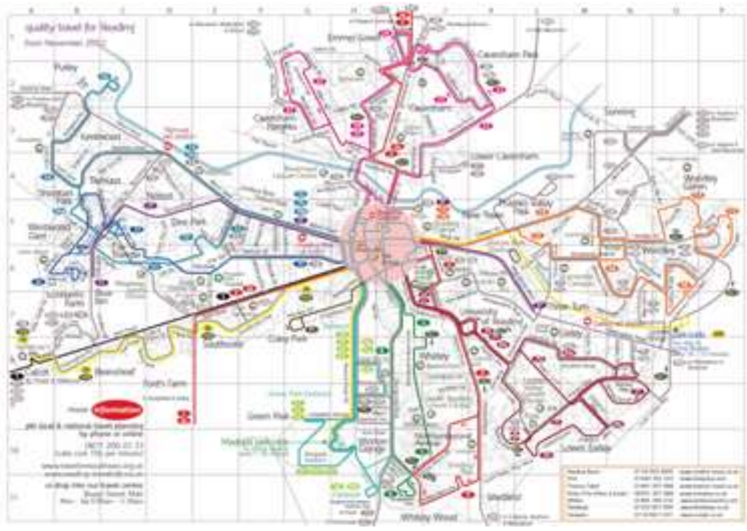
A.5.2 Reading is approximately 60km west of central London, on the main westward road and rail corridor that leads to Bristol and South Wales (as well as on the River Thames). In addition to the traffic centred on Reading itself, therefore, there is considerable movement of people and goods along the east-west corridor. The UK's main airport, London Heathrow, is directly between Reading and London.

A.5.3 Reading is generally a mixed borough, with some highly affluent industry sectors as well as some relatively deprived areas. It is a university town, and a major retail centre; it also houses the UK headquarters of a number of global companies – especially in the technology sector – where its proximity to Heathrow is of particular relevance.

A.5.4 Reading is close to the TERN, being just a few km north of the M4 which runs from London to the West. Access to Reading is possible from three junctions on the M4; because of this, there are opportunities for tactical control and driver information to help minimise congestion both one local roads and on the M4 itself. Other major roads include the A33 and the A4, and there is a fairly standard radial arrangement of local main roads supplemented by an inner ring.

A.5.5 Public transport consists of an extensive local bus service (see schema left); a series of coach services, including to Heathrow; and train services, which provide both commuter and intercity functions.

A.5.6 Reading is unusual in the UK, in that it operates its own bus company (Reading Buses). Although this is an arm's-length enterprise, it ownership by the Council mean that it is wholly tied to serving Reading and its citizens.



A.5.7 Reading has several Park and Ride sites along its southern side, to provide rapid bus-based services from the M4 into the town centre, reliving both traffic congestion and parking pressure.

A.5.8 The Reading Station area is currently undergoing a major redevelopment programme (worth approximately €1bn), scheduled to complete in 2015. This development involves a major upgrade of the rail capacity at a point where two major routes cross one another. The station development incorporates significant upgrades for taxi and cycle facilities.

A.5.9 Integration with bus services will not be through a traditional multimodal interchange; the town centre is too cramped for this to be realistic. Instead, modal interchange options are being developed organically – using integration by live signage and re-organisation of the bus stops.

A.5.10 In earlier years, Reading Borough Council managed a number of large car parks directly. Today, all the major public car parks in the Borough are managed by private sector operators. This means that the Council's traffic responsibility (ie to guide drivers to car parks with available spaces) is much more straightforward.

Existing ITS

A.5.11 The Reading road network has around 80 signalised junctions and a further 80 pedestrian crossings under control. The system that controls these is a complex interlinked system, making heavy use of UTMC in its interfaces, and containing the following components from a range of suppliers:

- An urban traffic control system, PC SCOOT (provided by Siemens) using both fixed line and IP communications
- A "common database", COMET (Siemens) that provides a lot of the UTMC integration facilities including car park guidance, VMS sign control and journey time monitoring

- Variable message signs for traffic information – there are around 10 around the borough, provided by VMS Ltd and communicating over the non-IP Paknet service
- A car park guidance/information system
- A CCTV system for traffic monitoring, involving some 20 cameras and in instation monitoring facility, provided by Tyco; this is partly integrated with other Council and police CCTV systems
- A real time passenger information system for public transport, Centurion (Nimbus, formerly Connexionz UK)
- A “Reading Voice Service” system which provides an automated telephony interface for travel information for non-computer users (developed specifically for Reading by local SME Interglossa, making use of the available UTMC-format data)

A.5.12 The UTMC facility provides for automatic control of the policies applied to traffic junction and street signage, in the absence of an operator.

A.5.13 Also linked to this architecture, Reading provides traffic and travel information via two externally-accessible systems:

- The Reading Open Data Server (ODS), which provides raw data services to public app developers in support of the UK Government’s “open data” policy; this uses data from the RTPI and COMET systems
- The Reading Web Server, which provides live traffic and travel data, real time CCTV feeds and journey planner functionality through Reading’s main council web presence; this uses data not only from the RTPI system and the ODS, but also from external systems (in particular national rail data)

A.5.14 As well as rail data, Reading pulls in data from the Highways Agency (for the M4 in particular), and from Heathrow (for coach travel). Both are through open APIs, the HA data being based on DATEX II formatting and the rail data on National Rail’s own data service.

A.5.15 Reading’s systems are currently being audited in a number of areas and there is a significant programme underway to improve, strengthen and streamline the architecture. New functions are likely to be important over the coming few years, such as air quality management. Road pricing is not currently being planned.

A.5.16 Reading has been a long standing user of UTMC, being one of the original four demonstrator sites (its project ran from 2000-2004). Because of this, the Council has had time to adapt to the UTMC approach, in its staffing, procurement and operations. Many – but not all – of Reading’s ITS therefore use the UTMC specifications.

Benefits and drawbacks

A.5.17 The UTMC approach to system engineering, and the elements of the Technical Specification, are now well embedded into Reading's strategy for transport. Officers say that "*UTMC is key to Reading Borough Council's ambitions for a step change in monitoring the [network] situation and informing road users*".

A.5.18 The key benefits, from Reading's perspective, of the UTMC approach are as follows:

- Ease of integration. By having an impartial specification readily accessible, Reading can not only create a network of ITS which makes use of the best available products, but can also link them together at much lower cost and lower risk than would otherwise be the case. This enables the Council to create holistic management strategies much more easily: the big early success was combining car park data, traffic flow data and variable message signage to reduce town centre circulation, just before Christmas

- Flexibility. Reading understands that UTMC is a tool to help make things easier, not a dogma to be followed blindly. Because of this, it is always free to use a non-UTMC solution where it makes sense to do so (for example in stand-alone, experimental or innovative systems)

- Simplicity. System integration is not dependent on UTMC, but where non-UTMC legacy systems are involved, integration involves commissioning one or more suppliers to undertake special (and often expensive) software development. This can result in a network of proprietary systems, interconnected by an equally large network of proprietary adapters. As well as the expense, this creates considerable complication for both IT managers and contract managers

- Control. Adherence to open interface specification gives Reading the confidence that it understands how its systems work together, so that if problems arise, it can resolve them relatively easily. With open specifications, it can – if necessary – replace one supplier's products with another's. Reading is "*embarrassed*" that there are still some operational non-UTMC interfaces, where it does not know how its systems exchange data

A.5.19 As well as these direct benefits to the authority, Reading believes that the UTMC initiative has wider benefits by bringing together the traffic manager community and the systems industry. Both are better informed, and better able to work together in a market context:

- Traffic managers know better what is technically reasonable and available, and are better able to ask the industry for solutions. Moreover, by acting together, local authorities can create enough "market pull" to drive industry developments, in a way that individual authorities cannot (except for the very largest authorities, such as London)

- Industry has a better understanding about how traffic authorities wish to manage their networks and can respond in a practical, competitive, way. There will be more incentive to persuade new customers, and less effective ways to "lock in" existing customers

A.5.20 The key UTMC challenges are as follows:

- Political. It can be difficult to persuade institutions to collaborate, and it is currently very difficult to persuade the National Government of its necessary leadership role
- Legacy migration. Where an operational system works on proprietary technology, it can be hard work to upgrade it to integrate into a UTMC architecture
- People. The necessary skills and approach of traffic professionals changes under an integrated system. Reading has been lucky in finding people, both within the Council and in its advisers, that were able to make this change – but not all local authorities are as fortunate
- Freight. Data exchange with GPS navigation services is not currently easy. In particular, when the M4 has an emergency closure, it is difficult to manage the freight congestion and emissions from vehicles that should not be in Reading at all.

A.6 Hampshire County Council (HCC)

About Hampshire

A.6.1 Hampshire is a medium-large coastal county in the south of England. It has an area of 3679 km^2 and a population of approximately 1,320,000 (2011). In 1997 the port cities of Portsmouth and Southampton were part of Hampshire; although they are now self-administered, they still exert a big influence on Hampshire's traffic.

A.6.2 Hampshire has several substantial population centres, including Basingstoke, Havant, Fareham, Eastleigh, and the county town Winchester, which all have urban area populations of over 100,000. The outskirts of Southampton and Portsmouth are also located within Hampshire and constitute large, dense populations. Between these urban areas (and the many smaller towns) there are substantial regions of agricultural land, as well as the New Forest National Park.

A.6.3 Hampshire is generally an affluent county with a mixed economy. The southern cities are major ports for both goods and people; there is a thriving tourism and leisure industry; and there is a substantial military/naval presence.

A.6.4 Hampshire has a road network of total length around 7,500km. The principal roads are the M3 from London to Southampton, and the M27 coastal motorway which extends and distributes the M3; the A3 from London to Portsmouth; the A303 which extends from the M3 to the south-west of England; and the A34 which runs north from Southampton into the heart of the country.

A.6.5 Public transport is predominantly bus, centred on the various large towns, and train, principally on the South-West Network from London. There are also a number of ferry services both international (principally to northern France) and local (for instance to the Isle of Wight, a few miles offshore). In the early 2000s, a light-rail South Hampshire Rapid Transit scheme was proposed, running along the southern corridor; this has been suspended, but a bus rapid transit system has now been implemented as a partial substitute.

A.6.6 Car park management is under the control of District Councils. However the county has a role in providing road users with car park information and guidance.

A.6.7 Southampton has its own international airport. In addition London's main airport, Heathrow, is easily accessible about 40km north-east of the county.

Existing ITS

A.6.8 The Hampshire road network has around 200 signalised junctions. There is an adaptive UTC system (SCOOT) covering signals in number of urban areas. Fixed-time signals are also used, where adaptive UTC is either unnecessary (eg in isolated rural contexts) or inappropriate (eg on signalised roundabouts).

A.6.9 UTC data is brought into a Common Database, based on the Siemens COMET system. As the SCOOT system is also provided by Siemens, integration risks are kept low.

A.6.10 In addition the county has the following systems:

- Variable message signs for traffic information – there are approximately 23 for traffic information and 37 for car park information around the county, provided by either Siemens or Swarco
- Car park guidance/information – available in most towns, through both on-street VMS and web-accessible services
- CCTV – this is widely used and very valuable. There are approximately 63 HCC cameras around the county, provided by Tyco; a further 150 or so are owned by others
- ANPR – a small number of these exist for specific local purposes, for example to monitor heavy goods traffic from a major distribution centre or around household waste centres (21 cameras on the Winchester system and 12 cameras for Andover Business Park)

- Access control – there are a few barriers and rising bollards in the county, but these have proved very unpopular, especially with the emergency services, and work is currently underway to see if an ANPR-based solution would be more practical

- Streetworks – the Council has just moved to a new asset management system, CONFIRM, with data published both through ROMANSE (see below) and through the national ELGIN site (www.roadworks.org)

- Public transport – formerly provided by French company SLE, now largely replaced by a system from Vix/ACIS, with bus priority a high priority alongside passenger information; currently focused on major towns, but intended to expand county-wide. Bus priority is also provided by Siemens SieTag and Tagmaster systems.

A.6.11 The Council's ROMANSE Online service – built on the back of the European ROMANSE project, and for some years the mainstay of Hampshire's traffic/transport information – continues to be developed. Typically there are around 500 hits/day, rising to many thousand per day when disruption is serious (for example, in snow conditions). In addition there are some 5,500 ROMANSE followers on Twitter (compared to around 10,000 for Hampshire County Council as a whole).

A.6.12 There is little air quality management in Hampshire, partly for institutional reasons: districts are responsible for monitoring air quality but have few mechanisms to manage it, while the County does not have access to sufficient live data. This is recognised as a shortfall in current operations, but it is too complex to agree a response to. There is also a political challenge. For a number of years the principal emission of interest to politicians has been CO_2, while NOX and particulates – much more significant for health – have been rather downplayed.

A.6.13 There is no current ambition within the County Council for road pricing.

A.6.14 Hampshire has a long history in ITS, and benefits from an unusually large and stable team of staff, with strong technical skills. This enables it to do more in-house than other authorities of its size. It also happens to have a relatively small number of suppliers. As a consequence it is less reliant on suppliers to deliver connectable solutions.

A.6.15 Hampshire has few external system links. However, it does make full use of information services; for example, the ELGIN service provides valuable information about roadworks on the networks of neighbouring counties. Links with Southampton and

Portsmouth used to be quite close but are now fragmented, in part because of staff turnover in the cities. For example, while ROMANSE Online is still in principle a joint Hampshire/Portsmouth/ Southampton initiative, in practice the three authorities are only joined on the front page.

A.6.16 For the future, Hampshire's experience has taught it to be cautious: "*things today are not at all how we used to think they would be*". Key considerations are as follows:

- Finances are not going to get any easier. This is not helped by the structure of public finances, which have often resulted in more equipment installation but reduced maintenance budgets and operational staff. This will eventually have a significant impact on system reliability

- The future role of traffic management is much more focussed on the collation and provision of information than it used to be. Network control is still important too; new skills and knowledge will be required in this new environment

- Connecting systems is much easier than it used to be, as more suppliers adopt mainstream IT platforms. This is true both within an organisation and between organisations

- Third party innovation will continue apace, supported by the publication of free-to-use public data. Some of these could not reasonably be done within the Council context – for example, Park At My House (https://www.parkatmyhouse.com)

Benefits and drawbacks

A.6.17 UTMC "*has been helpful*", although for the reasons mentioned Hampshire has not needed to connect very many systems. The connections that it has undertaken – between Tyco, Swarco and Siemens systems – have not been completely trouble-free, even with UTMC. It is important not to regard UTMC compliance as being the whole solution.

A.6.18 Procurement is a challenge for local authorities. Sometimes this is for technical reasons: for example, it is hard to get procurement officers to understand concepts like "Mean Time Before Failure" as a measure of reliability. Sometimes it is structural: it is hard to explain that a cheaper *purchase* may involve a lot more maintenance or (particularly) officer time, and end up with a much higher whole-life cost to the authority.

A.6.19 Standards which are too complicated tend to be ignored. This is challenging enough in a UK context, even with the relatively simple and "lightweight" approach that UTMC has taken. A formal standards approach at a European level will be much harder to make work, not because it is hard to define the standards, but because the marketplace may choose not to use them.

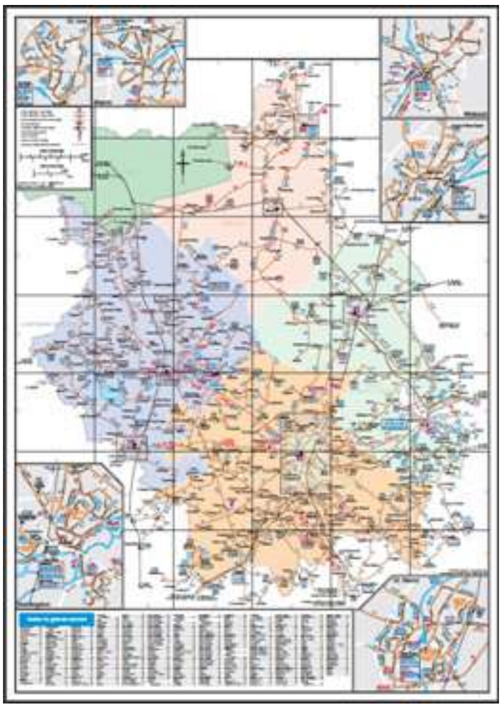
A.7 Cambridgeshire County Council

About Cambridgeshire

A.7.1 Cambridgeshire is a medium-sized inland county in the east of England. It has an area of 3389 km^2 and a population of approximately 612,000. The principal city is the county town, Cambridge, with a population of 122,000; there are several other towns with populations of around 20,000 (Ely, Huntingdon, St Ives, Wisbech etc). Peterborough, to the north, has overspill development into the county. London is around 70km to the south.

A.7.2 Cambridge itself is a historic city with prestigious university and a lively business environment, in particular in innovative areas such as ICT and biotechnology. It also has a highly congested road network.

A.7.3 Cambridgeshire has a road network of total length 4,342km. The principal roads are the M11 coming north from London to Cambridge, the A1(M) north from London to Peterborough (and on to the north of England), and the A14 running eastwards through the county from the industrial West Midlands to the east coast port of Felixstowe.



A.7.4 Cambridgeshire has a comprehensive network of public transport services: the bus route map shows route density. Cambridge is especially notable for its Guided Busway scheme, which has a total length of around 40km including 25km of dedicated track.

A.7.5 The County operates five Park & Ride sites around Cambridge and a further 2 located along the Guided Busway. Other car park management is under the control of District Councils: the county role is limited to monitoring five of the large Cambridge car parks for their traffic impact.

A.7.6 For trains the primary service provider is Greater Anglia, from London (Liverpool Street) through Cambridge and on to Norfolk and Suffolk. The main East Coast line from London to Scotland travels through the county but consists primarily of transit traffic.

A.7.7 The nearest airport is London Stansted, about 25 km outside the county and about 50 km south of the City of Cambridge.

Existing ITS

A.7.8 The Cambridgeshire road network includes some 200 signalised junctions. There is an adaptive UTC system (SCOOT) covering signals in Cambridge and two other towns, St Neots and Huntingdon.

A.7.9 UTC data is brought into a Common Database, based on the Argonaut system from UK company Cloud Amber. Journey time data acquired from TomTom is also fed into Argonaut. The system contains a strategy manager and provides an export of data for public use, via the Voyager (web), Mobile Voyager (mobile web) services and, in time, Social Media.

A.7.10 In addition the county has the following systems:

- Variable message signs for traffic information – there will be around 25 on street by end by March 2013, provided by Swarco
- Car park management – in Cambridge, also provided by Swarco
- CCTV for traffic monitoring – the Council has access to CCTV from Highways Agency and Cambridge City Council; it is currently installing its own facilities as well
- ANPR for journey times – 12 cameras covering 2 roads in Cambridge, provided by Vysionics
- Access control – 12 sets of rising bollards throughout Cambridgeshire, provided by ATG Access Ltd
- Street works – these are recorded and monitored through the Insight system, from Symology
- Public transport management – there is an extensive RTPI system with on-street equipment and bus priority at key traffic signal junctions, provided by Vix

A.7.11 A number of these companies are specialist suppliers.

A.7.12 External links include:

- A link to the Cambridgeshire Police command and control system for incident information
- A UTMC link to Peterborough City for traffic signals bordering Cambridgeshire

Benefits

A.7.13 Cambridgeshire County Council has seen significant benefits from adopting a UTMC policy, in two specific areas.

A.7.14 A key benefit appears during **procurement**. For example, UTMC allowed the Council, in its recent procurement process for VMS, to develop a simplified specification, as suppliers who adhere to UTMC protocols know what is expected of their product.

A.7.15 Their original VMS System was converted into UTMC standards. This meant that further additions of VMS did not have to be from a sole supplier, which opened up the market place, for greater competition in costs and performance.

A.7.16 The Council is now in the comfortable position that, whether purchasing 1 or 21 VMS, competition exists, which is expected to drive down costs.

A.7.17 As well as the procurement benefits, there are a number of areas where the easy integration provided by UTMC allows **operations** to be delivered more effectively, more intelligently, and at less cost than would otherwise be the case. For instance:

- The Council can quickly assess the road network conditions, whether that is for congestion monitoring, managing incidents or planned events.
- It is possible to initiate automated strategies that can act independently of operators, providing a more responsive service at lower cost. (This does depend on the capability of the ITS available in any specific road context – rural areas are much less instrumented than Cambridge City Centre.) For example the Council displays VMS messages when car parks are full, to suggest alternatives or when an incident occurs; emails are sent out to an extensive mailing list, as well as 'Tweets', to notify road users of potential disruptions on their journeys.
- The Council uses its UTMC integration to combine real time traffic information with real time bus information, on its website, to encourage and suggest alternative travel approaches.
- The Common Database, Argonaut, is used as a tool to monitor traffic signal performance and to plan and prompt maintenance. Strategies can be set up to alert operators to faults, enabling speed in reacting and repairing non-functioning devices.
- Road works can be identified as causing delays on the road network and road users can be encouraged to use a better method, such as altering temporary traffic signal timings.

Drawbacks

A.7.18 The principal challenge to Cambridgeshire has been psychological. UTMC is a technical tool, and experience (or lack of it) can make UTMC daunting. However, once this hurdle is overcome, it isn't too difficult to work with. In reality it is simply combining all the other tools that are well used into one easily obtainable package.

A.7.19 Using UTMC can be as complex or as basic as the user chooses. "*It is merely glue which holds ITS together; it is not the answer but just a piece of the puzzle. That is important to remember*."

B Industry case studies

B.1 Introduction

B.1.1 This annex provides notes from discussions with representatives of three private sector organisations which are stakeholders of UTMC:

- Atkins, a global engineering consultancy and professional service provider, whose services include assisting local highways authorities procure and implement traffic management systems
- Mott Macdonald, also a global company, provides systems solutions in a range of industry, including system integration and applications
- Variable Message Signs Limited, a UK based manufacturer and installer of VMS, primarily for highways but also in the rail sector

B.1.2 Each response was initially drafted by the supplier, edited by UTMC Ltd, and the edited version once again validated with the supplier.

B.2 Atkins

About Atkins

B.2.1 Atkins[1] is a very large company with global operations: established in 1938, it now has around 18,000 employees worldwide and an annual revenue of £1.71 billion (year ended 31 March 2012). It offers a broad range of services within and outside transport, in areas as diverse as nuclear safety, urban design and waste management; its skills base includes architecture, business strategy, information systems, mechanical engineering, and security.

B.2.2 "Intelligent transport systems" is listed explicitly as one of the 77 "services" that Atkins offers.

ITS product base

B.2.3 Atkins has been involved in the development and provision of ITS services and solutions for over 20 years.

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[1] This note includes data and an image from Atkins' website, www.atkinsglobal.com.

B.2.4 During this time Atkins has assisted many local authorities across the UK with scoping, specifying, procuring, installing, commissioning and managing a wide range of ITS.

B.2.5 Atkins works with local authorities to:

- Specify and procure UTMC based solutions
- Develop strategies to maximise the benefits of having a Common Database
- Pro-actively and reactively manage and optimise traffic flows on the highway network
- Monitor and report on relevant KPIs, including those related to recent legislation
- Deliver information to the public through web services to promote modal shift

B.2.6 Atkins considers its multidisciplinary offer to be very important. Because of this philosophy, it is central to the Atkins approach to involve as many different parts of the client authority as possible – to maximise benefits and identify relevant areas of synergy.

Benefits and drawbacks of UTMC

B.2.7 UTMC has significantly assisted Atkins as it helps local authorities to deploy and integrate solutions. Having the UTMC specification in place provides the following benefits (quotes refer to Atkins' UK ITS team):

- Access to potential customers. "*UTMC is core to meeting our clients' requirements. Having this national banner has enabled us to offer clearly defined services*."
- Clarity of technical requirements: "*UTMC has helped considerably with specifying open solutions. This also gives tenderers a clear set of standards to develop solutions against*."
- Cost efficiency and risk mitigation of deployment/integration: "*For our clients, we can specify integration required and allocate risk within the project. This enables us to manage clients' projects effectively*."
- Flexibility of supply offer: "*A clearer set of products in the marketplace has enabled us to develop services to support these*."
- Staff skilling: "*All staff are suitably trained and are aware of what UTMC is, what it stands for and can assist customers with their requirements*."
- System Maintenance: "*Integrated and web-based fault management tools have made it easier to maintain systems when working for clients*."

B.3 Mott Macdonald

About Mott Macdonald

B.3.1 Mott Macdonald[2] is "*a diverse management, engineering and development consultancy delivering solutions for public and private clients world-wid*e"; it has 150 offices in 120 countries across Africa, Asia Pacific, Asia Subcontinent, Central and South America, Europe, the Middle East and North America.

B.3.2 With a heritage stretching back into the late 19th century, it now has around 14,000 employees worldwide and an annual revenue of just over £1 billion (year ended 31 December 2011). It offers a broad range of services in markets including education, environment, healthcare, oil and gas, and water, as well as transport. Within this, the intelligent transport services business accounts for around £10M annual turnover.

ITS product base

B.3.3 Mott Macdonald is a leading provider of both ITS products and services.

B.3.4 Its software products include Osprey and Merlin. **Osprey** is the latest version of Mott Macdonald's UTMC Common Database (building on the earlier Common Data Management Facility, which has gained a significant market share among UK local authorities). Osprey is designed to be "*an end-to-end offering to help Local Authorities deliver their Local Transport Plan (LTP) objectives*" ,through three main modules:

- **Osprey: Control** delivers an effective Integrated Transport System (ITS) integration platform, compliant with UTMC standards, for Local Authority ITS equipment.
- **Osprey: Analyse** allows users to assess the impact that changes in traffic management and improvements in ITS have on the traffic flows and the environment.
- **Osprey: Inform** provides the tools to support outreach to the public and enable cross-organisation data sharing.

B.3.5 **Merlin** provides "*technology support for tactical and strategic command in times of crisis, as well as business as usual*". It allows strategic decision makers to easily share critical information. Intra- and inter-organisational collaboration provides "*a shared information picture, helping decisions to be made and the outcomes disseminated more quickly and effectively*".

B.3.6 Mott Macdonald's professional services include:

- ITS studies, strategies and specifications
- Stakeholder engagement

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[2] This note includes data from Mott Macdonald's website, www.mottmac.com.

- Analysis of networks and needs, and requirements capture
- Research trials
- Traffic data analysis
- Procurement support

Benefits and drawbacks of UTMC

B.3.7 Mott Macdonald is very positive about the benefits of UTMC. In terms of procurement, it highlights the following:

- Access to potential customers. "*While Mott MacDonald has independent links to potential customers… it seems highly likely that the UTMC initiative has increased awareness of the possibilities and benefits of ITS integration and led to an increase in the size of the market*."
- Clarity of technical requirements: "*Areas directly covered by the UTMC technical specifications are well understood. Further areas are sometimes influenced by UTMC guidance and it is likely that this has helped clarity*."
- Cost efficiency and risk mitigation of deployment/integration: "*Our costs of tendering and especially of development of ITS products have significantly decreased over the last 12 years, as we developed increasingly more functionality and interfaces and improved our processes for delivering customised products from a common platform. UTMC has contributed to this through standardisation of integration with third party systems and also by stimulating the market. However, because costs of delivery have reduced more than costs of tendering, tendering now takes a larger proportion of our costs*"
- Cost and risk of deployment/integration: "*Risks in deployment and integration have reduced (though not disappeared) as UTMC has supported widespread integration of equipment from different suppliers – many deployments now use integrations already proven in other places. UTMC standardisation has reduced the risks that would come with a fresh bespoke integration, although there is still room in the specifications for differences in interpretation and detail, which we assess for every deployment*."
- Use of outsourced components: "*We do not often outsource UTMC components… [however] specialised third party applications are often in place already and the UTMC project merely requires integration… UTMC has supported creation of a small private-sector market in adaptors, where we create an adaptor to allow a third party to achieve UTMC compliance*."

B.3.8 There are also benefits for system operations:

- Staff skilling: "*UTMC standardisation means that we use a common set of technologies for interfacing to third parties, which has led to more depth and flexibility in our pool of skilled resources*."

- System maintenance: "*The main impact is that we are using a common product base and common integration technologies, so systems maintenance skills are common*."

- Upgrade: "*UTMC means that adding a new interface is a well-understood process. The large installed product base means that upgrades to the UTMC specifications require more effort to plan and deploy, but the UTMC specifications have been very stable*."

B.3.9 In terms of functionality, Mott Macdonald comments that "UTMC standardisation has actually not significantly affected flexibility as we can customise user interfaces to suit business needs of our customers and add UTMC extensions to our products where required. Due to the large installed product base it requires more effort to plan and deploy any significant upgrades to the underlying UTMC communications when the UTMC specifications are changed – but the UTMC specifications have been very stable."

B.3.10 There are some drawbacks with UTMC, at least in its current form.

- Cost efficiency and risk mitigation of deployment/integration: "*There is still no standardisation of the form of tender documentation*."

- Clarity of technical requirements: "*There is still a range of quality of specifications, which are sometimes produced by people with little familiarity of UTMC, resulting in poorer clarity*."

- Difficulties using UTMC: "*We encounter cases where different suppliers have implemented custom extensions to UTMC standards in different ways, without submitting those extensions to UDG for adoption into the standards. This causes extra development effort. There has been little or no funding for suppliers to contribute to UTMC specification upgrades, so it is difficult for suppliers to take the time to make a submission*."

B.4 Variable Message Signs Limited (VMSL)

About VSML

B.4.1 Variable Message Signs Limited (VSML) is an SME operating from the UK but with increasing overseas interests in mainland Europe, Australia and New Zealand. Its main office is in the North-East of England, in Tyne & Wear; its website is http://www.vmslimited.co.uk/.

B.4.2 VMSL is an established business, which has been operating for some 25 years. It has a staff complement of 65, and an annual turnover of around £6M (€7M).

ITS product base

B.4.3 VMSL's core business activity is the provision, installation and support of LED-based variable message signs for roadside and railway usage; it also works with ports and airports. It has an evolving range of products, in particular both "traditional" VMS (displaying rows of text) and newer full-screen VMS capable of displaying imagery.

B.4.4 VMSL has been involved in the development of UTMC from around 2002 and now has a considerable track record of UTMC-compliant systems implementations. In 2005, because of the important part that the UTMC sector played in its business activities, it formed a dedicated Urban Business Unit; this focus has resulted in a number of significant contract awards.

B.4.5 While VMSL is primarily a hardware business, it also provides its own proprietary control room software, TRAMS, to drive its signs, and the professional services required to design and manage the architecture of signing solutions. Within its area of expertise, VMSL has significant market presence: "*we are considered in the top 2 suppliers of this equipment within the UK and number 5 worldwide*".

Benefits and drawbacks of UTMC

B.4.6 VMSL considers that UTMC has been significantly beneficial to both it and its customers. Creating the capability to use and support UTMC products has not been a major challenge. Problems still arise, but they are much greater where old, non-UTMC architectures are in place – or where the UTMC approach is not properly followed.

- Access to potential customers. "*We deal with all types of customers so UTMC is a great help with local authorities and companies, institutions that rely on local authority assistance. Other companies / customers may only require a standalone system where we would use our TRAMS In-station etc*."
- Clarity of technical requirements: "*UTMC has helped considerably with customers' expectations and requirements and it has helped with the clarity of specifications. However, this is always assuming other suppliers tell the truth and do not try to pass off their equipment as UTMC compliant when it is not*."

- Cost of development and tendering: "*Development costs for standard UTMC equipment is lower… Tendering costs have not changed*."

- Cost and risk of deployment/integration: "*There is always a risk with the deployment of equipment. UTMC has not reduced these costs. UTMC has helped with the integration of equipment as the specification provides good guidelines. Costs can still be uncertain depending upon legacy equipment which the local authority also requires to be integrated into the system*."

- Flexibility of supply offer: "*The flexibility has diminished slightly, but as a professional company within the UTMC arena we can offer a system to suit the customers' requirements*."

- Staff skilling: "*All staff are suitably trained and are aware of what UTMC is, what it stands for and can assist customers with their requirements*."

- System Maintenance: "*This part of the business has not changed*..."

- Upgrade: "*To upgrade from standalone (ie non-UTMC) equipment to UTMC, depending upon whose equipment is to be upgraded, can be very difficult and would normally result in VMS units being changed as the existing equipment was not up to standard or in a serviceable condition. To upgrade a UTMC system with extra VMS etc is relatively straightforward and is certainly easier and less expensive than non-UTMC systems*."

B.4.7 The largest difficulty VMSL currently faces is "*the customer's reliance on the cheapest price*". VMSL cites "*rogue suppliers who claim the earth and deliver nothing*", providing systems that claim UTMC compliance where it is not really justified. This can give UTMC as a whole a bad reputation.

C National authority perspectives

C.1 Introduction

C.1.1 This annex provides notes from discussion with representatives of three national organisations which are stakeholders of UTMC:

- The Department for Transport, which initiated UTMC as a research programme in the 1990s, but has now handed over its maintenance to local authorities and the systems industry
- The Highways Agency, which manages the strategic road network in England, and which is interested in UTMC both as a potential user and because it needs to work with many local highways authorities
- The UTMC Development Group, which currently oversees the management of the UTMC initiative

C.1.2 The first two were collated from interviews with specific individuals whose portfolio role covers many aspects of UTMC policy and use. Both were validated by the interviewee. The last was drafted and revised by the UDG Secretariat and approved collectively by the UDG Management Group.

C.2 Department for Transport

About the DfT

C.2.1 The UK Department for Transport (DfT) is the national policy authority for transport in England. Its role in roads management is twofold:

- The strategic road network (which includes motorways and English components of the TERN) is operated directly by the Highways Agency (HA), which is an executive agency of the DfT. DfT therefore has direct responsibility for how this (almost all interurban) network operates.
- Other roads are managed locally by Local Highways Authorities (LHAs), of which there are well over 100. There is some legislation/regulation applicable, and DfT is responsible for ensuring that this is followed. In addition, DfT issues a considerable amount of non-mandatory guidance.

C.2.2 Relevant legislation/regulation includes:

- The Traffic Signals Regulations and General Directions (TSRGD) 2002 (and updates)
- The Highways Act 1980
- Road Traffic Regulation Act 1984
- The Zebra, Pelican and Puffin Pedestrian Crossings reguilations and General Directions 1997
- The Traffic Management Act (TMA) 2004

- The European ITS Directive 2010

C.2.3 All except the last apply directly to all roads. The ITS Directive principally effects the TERN.

C.2.4 Non-mandatory guidance includes a substantial library of Traffic Advisory Leaflets (TALs) and Local Transport Notes, focussing on good practice in specific areas of traffic management.

C.2.5 DfT considers that standards can be set in a number of ways, ranging from formal development and publication through bodies such as CEN, through to consensus specifications developed by application-specific fora. The key is to ensure that those who are affected by standards have control over their development. However DfT still needs to ensure that there is a sufficient degree of uniformity in how roads are managed, both for safety and for other policy objectives (promoting sustainability through environmentally modes of transport, such as walking and cycling).

Roads ITS

C.2.6 The UK does not have a “national ITS strategy” as such, although it does support application-specific developments in a number of areas – UTMC and ITSO are examples. Historically it has taken the lead in much of this, although with the increasing breadth and maturity of the marketplace, it believes that a self-governing industry is now generally more appropriate.

C.2.7 On behalf of DfT, the Highways Agency determines specifications for the devices that are deployed on its network, taking due account of – and contributing to the development of – available standards to align them with the emerging European Commission requirements for mutual recognition. Historically local authorities have adopted these for their road network too, but there is likely to be significant change in this role in the near future (see below).

C.2.8 In the past HA has undertaken technical type approval on many products. Increasingly, this is regarded as unnecessarily onerous on both HA and supplier, and the process has been made much more flexible. The self-certification mechanism requires suppliers to demonstrate to HA that they comply with the necessary requirements of type approvals.

C.2.9 Most LHAs have traditionally relied on the HA’s specification and testing process to determine the suitability of equipment for use on the road. There are very few exceptions (Transport for London, which is many times larger than other LHAs, is possibly the only one that has consistently determined and used its own specification).

C.2.10 The level to which specifications are produced and regulated/monitored depends on the context. For example, with variable message signs, there are stringent restrictions on moving images, because this has a direct safety impact. The legends for use on VMS are prescribed in schedule 15 of TSRGD, as well as those that have been granted approval by the DfT.

C.2.11 Generally DfT exercises no special control over the ITS market, though of course it is subject to normal business conditions such as public procurement regulations and competition law. However DfT will have a responsibility to ensure that, as and when regulation emerges under the ITS Directive – for instance on mandated specifications – these are adopted by all UK roads operators. Initially this is expected to affect the TERN although it may be extended to urban areas in due course.

C.2.12 DfT believes that the market approach to ITS generally works well. The UK has a mature competitive marketplace for ITS products and services, enabling users to choose robust and effective products at a reasonable price. The existence of the UTMC initiative is a positive aspect to this (as described below).

About UTMC

C.2.13 DfT believes that UTMC has the potential to play a very significant part in roads operation. In particular it could make it much easier for local highways authorities to select suitable and cost-effective products "off the shelf" to achieve policy goals.

C.2.14 It is concerning that many systems in the marketplace are not fully UTMC-compliant. This has the effect of confusing LA buyers and reducing the benefits that they can gain from their ITS, as they spend excessive time and effort in post-procurement work to integrate systems which really ought to work together from the beginning (for example, paying for "adapters" to be designed and implemented). Most LAs have lean operations and cannot be expected to be technical experts, and there is a limit to how well consultants and contractors can fill the gap left by products not being interoperable at installation.

C.2.15 UTMC has a lot of scope for flexibility and evolution, so is able in principle to keep up with technology and policy developments. However this does rely on there being sufficient resource available from the community to advance. It is sometimes difficult to see where the marketplace provides an incentive to deliver this.

C.2.16 A similar restriction applies to project links. In principle UTMC has a lot to offer ITS deployment projects, and can learn from them – but this takes resource, and it is not clear that this is currently available.

C.2.17 This is a common problem with innovation industries. Generally, the UK is good at research and proof-of-concept work, but struggles to move innovations into the mainstream. The UK Government is aware of this in the ITS sector and has recently announced an initiative to address this, the Transport Systems Catapult. It would be very welcome if UTMC could find a space within the Catapult, in order to:

- Support demonstrators for new UTMC functions (ie beyond those in the initial 1997-2004 programme)
- Prove equipment interoperability within the marketplace, rather than be restricted to developing standards
- Take a wider responsibility for future-proofing against new systems approaches

- Evaluating and promoting the technical benefits of UTMC usage – there is still rather little actual hard evaluation data on the benefits of integrated ITS

- Offering a stronger and more transparent channel for outreach and engagement with the community – both within the UK and internationally

C.2.18 DfT recognises that UTMC is still a "work in progress". UK LAs have some way to go before their traffic management systems are fully seamless, even in authorities where there are excellent technical skills (such as Transport for London).

The future

C.2.19 Over the next couple of years DfT expects some major changes in its operational role. Many powers currently exercised centrally will be devolved to the local level, and statutory mechanisms such as TSRGD will be radically streamlined.

C.2.20 In line with this development, LHAs will in future be responsible for the standards they use (including for ITS). Rather than deferring to HA standards, they will look to a new body with specifically LHA interests and remit. DfT is currently in discussion with a number of sector bodies about this, including the Traffic Systems Group (TSG) and the Association for Road Traffic Safety and Management (ARTSM).

C.2.21 DfT is very supportive of the POSSE project, and indeed is providing the national co-funding for the involvement of UTMC Ltd. On the one hand it underlines the UK's commitment to European harmonisation by sharing the work we have done in the UK, and on the other hand allows UTMC to benefit from exposure to the requirements and challenges of the wider European context.

C.3 Highways Agency

About the Agency

C.3.1 The Highways Agency (HA) is an Executive Agency of the Department for Transport (DfT), and is responsible for operating, maintaining and improving the strategic road network in England on behalf of the Secretary of State for Transport.

C.3.2 The strategic road network comprises motorways and trunk roads. Its total length is around 6900km — about 2% of the total road length in England, but it carries a third of all traffic by mileage, and two thirds of all heavy goods vehicle mileage.

C.3.3 HA operates the network through a National Traffic Information Service, which supports our National Traffic Operations Centre and seven regional control centres. Information management is therefore a key part of the HA.

C.3.4 By its nature, the HA's network must be joined up with the local roads networks managed by the 100+ Local Highways Authorities in England, as well as with the strategic networks in Scotland and Wales.

C.3.5 The following position has been drafted following an interview with Ivan Wells, Enterprise Architect and does not necessarily represent HA policy.

Roads ITS

C.3.6 HA has undertaken extensive work on an "enterprise architecture" which takes into account current and future ITS business requirements within the HA together with external ITS best practice. HA aims to provide a practical and efficient framework to integrate them. It makes strong use of open specifications and standards, in line with the UK Government's ICT Strategy – any other approach would be difficult to justify both technically and politically.

C.3.7 A key benefit from generally accepted open specifications is reuse and choice within the supply marketplace, especially in the current economic climate. The fact that it supports coordination of operations both within the HA and with other road operators is a welcome bonus.

C.3.8 In practice this is challenging to achieve: it is easy to write a strategy, but the complexity lies in the detail. There are many organisations involved and their ITS implementation and replacement programmes happen at different rates over a number of years. The process of going from standards to procurement specification, acquisition, implementation and operation can be demanding.

C.3.9 Historically, HA has tended to lead ITS standards development. However recent policy (and the constrained economic climate) has changed this position, and HA's current approach is to be more passive: it will watch to see where useful standards emerge and adopt them. While HA remains willing to share its technical work for the general good, it no longer has the money and expertise to take a leading role.

C.3.10 This does give rise to some concerns, particularly as other major road operators may take a similar policy decision. For instance, HA's operations are currently dependent on systems acquired some time ago under its own open specifications, NMCS2 – but these specifications are now quite old, and it is far from clear where effective, modern replacements for these specifications will come from.

C.3.11 In principle there are many functional overlaps between HA and local highways authority needs for ITS, and indeed with other European Members States. Unless a way is found to exploit these similarities and create a coherent supply market, development effort will continue to be fragmented.

C.3.12 Unfortunately this coordination appears difficult to achieve. There appears to be a general view at political level that "the community will deliver" – but experience suggests that this requires leadership, governance and management, and that a specific organisation has to provide these.

C.3.13 In principle such an organisation could exist at European level, but there is no single appropriate organisation at European level today – or perhaps too many with conflicting agendas. The DATEX community is probably the nearest, but it is far from ideal in its current form. Any such body would need to be coupled properly into implementation projects, which would be relatively easy with centrally-driven initiatives like EETS but a lot harder with more market-based services like UTC.

C.3.14 Any such approach would need to be for the long term – it is not possible to provide this kind of framework as a project (one of the lessons from DATEX). However, projects can provide an effective means to advance the framework, though targeted research.

UTMC

C.3.15 UTMC has made significant progress in helping to align these: it is not yet a complete solution, but it needs to be seen as a journey.

C.3.16 In the mainstream local authority marketplace, the impact of UTMC is variable. Where a critical mass emerges, this begins its own momentum: authorities require a UTMC solution, so suppliers develop and market UTMC solutions, so there is a good supply market for authorities to choose from.

C.3.17 Where this doesn't happen, market fragmentation is still a significant problem. Moreover, there are still some large road network operators that continue to work parallel to, rather than with, the UTMC framework. This includes the HA, as well as Transport for London, both of which have historically had the market power and technical skills to operate unilaterally. A kind of "vicious circle" has emerged: UTMC doesn't fulfil our needs, so we won't help it develop, so it won't fulfil our needs.

C.3.18 There is also a fragmentation among open standards frameworks. It is not clear how UTMC aligns with DATEX, and neither is technically compatible with EToN (the UK's specification for streetworks data). This leaves both authorities and their systems suppliers confused, and means that (expensive) *ad hoc* system integration effort is still required.

C.3.19 Engagement with projects, and with the supply industry, has worked to a degree. There are still challenges: coordination activities tend to be resource-hungry and, because the direct technical benefit to the individual project is limited, tend to be regarded as a low priority.

The future

C.3.20 ITS specifications are a "red queen's race": as the mainstream ICT industry develops, we have to keep running forward just to stay in the same place.

C.3.21 For practical reasons, it is important to build on the frameworks that already exist. Not only do they represent where current market investments are happening, but they are tend to represent the right skill sets and are likely to have a good understanding of practical future developments.

C.3.22 What is needed in future is a consolidation of the current technical frameworks. It would be good, for instance, if the joint HA/Rijkswaterstat initiative CHARM could build on a UTMC foundation, and if UTMC could forge better technical links with the ELGIN/EToN community on streetworks.

C.3.23 Having a purely UK forum, in the way that UTMC currently does, is automatically limiting – especially for HA, whose natural counterparts are non-UK national authorities in other Member States. For example commercial service providers responsible for in-vehicle systems and mobile devices are seeking traffic services that operate at a European, rather than a national, level.

C.3.24 Unfortunately there is little evidence that this is happening in a coordinated way. Where open specifications are being developed this is too often in competing silos. The risk, therefore, is that the work that has been done to bring the ITS marketplace into some kind of coherence will degrade over time without further effort. It would be particularly positive to see some of the major European suppliers take a strong stance on this as there is a significant resource to support many competing specifications.

C.4 UTMC Development Group

About the UDG

C.4.1 The UTMC Development Group (UDG) is the national body responsible for managing the UTMC Technical Specification. It is an independent association of stakeholders from public and private sectors, and thereby brings together:

- Local authorities, who can compare, collate and elaborate their requirements for interoperable local traffic management systems;
- The Highways Agency, which can do the same for the systems that manage the strategic road network, and in particular address the urban/interurban boundary;
- Systems suppliers, who can develop a consensus approach to meeting those requirements;
- Consultants and advisors, who can ensure that UTMC supports the practical processes of specifying and delivering traffic management solutions;
- Representatives from National Government, as well as the devolved administrations of Scotland, Wales and Northern Ireland, who can advise on policy directions and seek technical advice on their practicality.

C.4.2 The UDG was established in 2003 and is governed by an elected Management Group, supported by two specialist subcommittees:

- A Specifications and Standards Group, with delegated responsibility for UTMC technical developments;
- A Marketing and Member Services Group, with delegated responsibility for communication with stakeholders.

C.4.3 A professional Secretariat supports these Committees and manages the day to day work of the UDG. The great majority of its work is done, however, by the voluntary input of members and other stakeholders, either individually or through a series of Working Groups (also supported by the Secretariat).

C.4.4 At its foundation, funding for the UDG activities came from the Department for Transport (originally centrally, and briefly via the Highways Agency). However since February 2010 central funding has been withdrawn, because of the tight public finance environment. Funding is now drawn from:

- Membership subscriptions;
- Income from events, in particular the UTMC Conference (held approximately annually).

C.4.5 The UDG seeks to have working relationships with many other bodies involved in the creation and management of open ITS specifications, both in UK and internationally, to ensure that UTMC is aligned as far as possible with best practice elsewhere.

About UTMC

C.4.6 The UTMC Technical Specification is published free of charge on the UTMC website, www.utmc.uk.com. It is available in English only. There are two principle components:

- The Framework Specification (UTMC-TS003) which defines the general architecture for UTMC systems (for example, its basis on IP standards);
- The Objects Register (UTMC-TS004) which defines data modules applicable to specific applications, in several forms – notably, in a UML data model and an associated XML schema.

C.4.7 Changes to the Specification – and in particular amendments and additions to the Objects Register – can be proposed by anyone. The secretariat administers the process and manages public consultation on proposed changes; once approved by the Specifications and Standards Group, the revision is put into effect.

C.4.8 This basis in open publication, community contribution based on real needs, and independently managed consensus has proved generally effective. The process, while formal, is less time consuming and more flexible than the standards processes of (for example) CEN or ETSI; it can therefore adapt more rapidly to evolving industry needs. It is, however, less rigorous and less binding than a formal standards approach.

C.4.9 Through this approach, UTMC has created a framework which is generally credible and recognised, by both local authorities and their first-tier supply chain.

C.4.10 The scope of UTMC has evolved over time as more activities have come into the area of integrated traffic management. Originally working around functions such as traffic signals, variable message signs and access barriers, it has been enhanced over the years to include services such as automatic number plate recognition. Its current programme of development includes:

- New or revised data elements for airborne pollutants, weather, tunnels and bridges etc;
- Integration with standards sets for public transport management, interurban highway management, emergency services, travel information services, cooperative vehicle systems etc;
- Review against high level needs such as the efficient management of network incidents and the network-wide optimization of emissions;
- Ongoing review of new technology opportunities, for example through consumer devices such as smartphones, next-generation internet and cloud computing.

C.4.11 There are three principal challenges at present, all of which are caused by the current serious limitations on funding:

- There is still a substantial amount of industry activity that is not well coupled into UTMC. A much stronger engagement process would help to consolidate the effectiveness of UTMC as an interoperability framework. This applies both to traffic authorities (who frequently lack the technical skills to use UTMC effectively) and to their suppliers (who often still offer non-UTMC products more cheaply, but without the opportunity to connect effectively).
- There is also a considerable amount of research activity that is "on hold". The early years of UTMC (particularly 1997-2003) were supported by a generous Government research programme, not only enabling much of the Specification framework to be put in place, but also mobilizing the supply market and giving proof-of-concept demonstrators to local authorities.
- There is no independent conformance authority: suppliers self-certify their products and services. While this is commercially efficient, and can work well where it is followed diligently, there is the risk that poorly-educated suppliers can mislead poorly-educated traffic authorities – and there is no process that catches these problems.

The future

C.4.12 For the near term, the UDG will continue to focus on the known shortcomings, and bringing to fruition the work already underway (on emissions, tunnels/bridges etc). The financial constraints on UTMC are likely to remain tight: DfT has made it clear that central funding is simply not available in the way that it used to be. The UDG expects, therefore, that the short term future of UTMC will be quite narrowly focussed.

C.4.13 One of the key focus areas is the poor alignment between UTMC and other initiatives, including both within the UK (eg with the UK's specification for streetworks data, EToN) and at European level (notably with the TMC-to-TMC specification DATEX II). The UDG believes that this is damaging to all ITS standards, and will continue to work to achieve harmonisation between UTMC and related areas.

C.4.14 For this reason the UDG supports policy initiatives such as the UK's Transport Systems Catapult, which is being established now to undertake pre-commercial research across ITS relevant to all modes, and European programmes such as POSSE which enable a level of common understanding to be achieved across European Member States.

C.4.15 Over the next 5-10 years, the UDG believes that the ITS market will develop as follows – in line with the rest of the world:

- Financial constraints will limit investment, by both traffic managers and their supply chains, but will also heighten the incentive to develop innovative new approaches. People will avoid paying for things they can do without.
- Networked mobile devices will become of the essence to traffic management, both as infrastructure (eg used as, or as part of, sensors/detectors) and as a channel for engagement with the travelling public.
- Processing will become much more decentralised, with as-needed linkages between data sets. This will happen within the public sector (eg between neighbouring authorities) but also with the private sector (eg with freight operators). The public sector will increasingly focus on providing information and support services to transport users.

C.4.16 This new approach will depend on having good, widely-accepted standards in place. These will need to be broader than traffic management, as linkage with other data (for instance, mapping information) or other services (for instance, leisure or healthcare) become part of the essence. However there will still be specific traffic management aspects that need to be understood and deployed.

C.4.17 In an ideal world, UTMC would be sufficiently well resourced to participate fully in this broadening.