Intelligent Transport Systems Review and Update

Position Statement and Future Strategy

ITS Review and Update

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Document Control Sheet

Project Title ITS Review and Update

Report Title Intelligent Transport Systems Review and Update

Revision 4

Status Final – Revised to incorporate how ITS helps to meet LTP Goals and identify an implementation strategy

Control Date 07 March 2011

Record of Issue

Issue	Status	Author	Date	Check	Date	Authorised	Date
1	Final Draft	John Morley	20/05/2010	Dave Smallwood	20/05/10	John Morley	20/05/10
2	Final	John Morley	26/07/2010	Dave Smallwood	26/07/10	John Morley	27/07/10
3	Final	John Morley	16/02/2011	Dave Smallwood	18/02/11	John Morley	21/02/11
4	FINAL	John Morley	07/03/11	Dave Smallwood	07/03/11	John Morley	07/03/11

Distribution

Organisation	Contact	Copies
Merseyside LTP Support Unit	Murray Grant Peter Evans	1 1

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1 Background

1.1 Background

The Merseyside ITS Strategy was prepared in February 2006 for the Merseyside Partners by 2020 Liverpool and Mouchel (MouchelParkman at that time). This included an ITS Vision and a proposed memorandum of understanding. The Merseyside UTMC Group's current business plan has been developed with regard to this strategy.

The strategy document proposed a Merseyside wide implementation of an integrated corridor management scheme, MICTM, which would have required DfT major scheme funding to be taken forward as a single project. It was decided that an application for major scheme funding would not be pursued but individual districts would implement elements of the overall project from their individual LTP funding allocation.

The strategy also identified several local projects for Liverpool which were subsequently implemented.

1.2 Purpose of Review

This review was commissioned to assess the current status of ITS implementation in the region, provide an update on the current position and outline the priorities for the short term LTP 3 period 2011 to 2014.

2 Availability of ITS

2.1 Current Position

The proposed MICTM scheme identified the linking of Merseyside's UTMC systems; this is currently being implemented with the installation of COMET in those districts which had not already implemented COMET.

Together with the linking of these systems across the region, funding is being provided from the Congestion Group funding allocation. The UTMC Group is coordinating the integration of these systems, which is now anticipated to be substantially complete by December 2011. The MICTM proposal also importantly indicated a link to the Highways Agency (HA) systems via the NTCC to the HA's North West Regional control room. The report and a subsequent piece of work, funded by the HA identified the then available ITS infrastructure in the region. This included information gathering infrastructure on network conditions, e.g. journey times, traffic flows etc and the locations of installed variable message signs. It also identified ideal locations for expansion of the system to provide coordinated diversions throughout the region. Locations of equipment are presented in the Merseyside ITS strategy Report, which forms Appendix 14 of LTP2.

Some districts and the HA have taken forward the implementation of parts of this infrastructure independently so some of the signs indicated in the initial proposals have now been or are being implemented.

Importantly the latter project identified potential diversions from the HA network on to Local Authority roads and also diversions from LA roads to other LA roads and / or the HA Network. These routes are essentially those which are included in each Authority's DLOA with the HA. This means that they have been identified as potential routes, whereby traffic management and control would benefit from the exchange of information between Authorities.

2.2 ITS Systems in the Region

The following tabulates the systems deployed throughout the region at 3 key times:

1. Prior to the start of LTP2
2. Estimated at the end of LTP2
3. Estimated LTP3 period at 2014

Key

Not implemented

✓ Implemented

2.2.1 ITS Deployment Prior to LTP 2

Area	UTC	CPM	VMS	JTM	ANPR	RTPI	CCTV	Met	CDB	AQ	STW	TIH
St Helens	✓					✓	✓					
Knowsley	✓						✓					
Sefton	✓	✓					✓					
Wirral	✓		✓				✓					
Liverpool	✓				✓	✓	✓			✓		
Warrington	✓	✓	✓			✓	✓		✓			
Halton												

2.2.2 Estimated position at end of LTP 2 prior to LTP 3

Area	UTC	CPM	VMS	JTM	ANPR	RTPI	CCTV	Met	CDB	AQ	STW	TIH
St Helens	✓		✓				✓		✓		✓	
Knowsley	✓			✓	✓		✓		✓		✓	
Sefton	✓	✓	✓	✓	✓		✓		✓	✓	✓	
Wirral	✓		✓				✓		✓		✓	
Liverpool	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
Warrington	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	
Halton			✓	✓	✓		✓				✓	

2.2.3 Planned Position LTP 3 at 2014

Area	UTC	CPM	VMS	JTM	ANPR	RTPI	CCTV	Met	CDB	AQ	STW	TIH
St Helens	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Knowsley	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sefton	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wirral	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Liverpool	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Warrington	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Halton		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

2.2.4 Specific Projects identified in Liverpool

This section summarises the six projects in Liverpool which were specifically referenced in LTP2 and indicates their current status.

Liverpool 6 Projects, (VMS was already being implemented)

Project		**Status**	**Comment**
1	Integrated Platform for Improved Network Management	UTMC infrastructure including COMET installed as part of VMS System implementation.	Work on linking with other districts COMET systems and HA ongoing.
2	Car Park Guidance System	Implemented and operational in Liverpool City Centre.	
3	Traffic and Travel Information Portal	Infrastructure purchased and currently being developed.	This was developed during the LTP2 period and is anticipated to go live by December 2011.
4	Journey Time and Congestion Monitoring	Journey Time and Congestion monitoring implemented on some radial corridors. Planed expansion and links to project 3.	See comment above, work ongoing.
5	Communications Infrastructure Rationalisation	Report prepared identifying possibilities for developing infrastructure.	Infrastructure being provided to support other projects.
6	Integrated Corridor Traffic Management (ICTM or MICTM)	Not pursued as an integrated project.	Individual districts adding infrastructure in their areas as appropriate.

2.3 Explanation of Acronyms

UTC **U**rban **T**raffic **C**ontrol for the management of area-wide traffic signals, the predecessor to **UTMC**, **U**rban **T**raffic **M**anagement and **C**ontrol which puts the emphasis on network and traffic management

CPM **C**ar **P**ark **M**anagement for monitoring of available spaces and posting this information at the roadside

VMS **V**ariable **M**essage **S**igns, usually based on LED display technology

JTM **J**ourney **T**ime **M**onitoring for the measurement of travel times

ANPR **A**utomatic **N**umber **P**late **R**ecognition for the processing of vehicle plates from video images in support of JTM and security applications

RTPI **R**eal **T**ime **P**assenger **I**nformation for the monitoring of public transport journeys using some form of Automatic Vehicle Location (AVL) and informing of the traveling public

CCTV **C**losed **C**ircuit **T**ele**v**ision

Met **Met**eorological devices measuring weather conditions such as wind, temperature and ice

CDB **C**ommon **D**ata**b**ase facilities enabling the management of information from all the above sources and interactions between systems to be implemented

AQ **A**ir **Q**uality devices for measuring air pollution levels

STW **St**reet**w**orks databases

TIH **T**raffic **I**nformation **H**ighway for exchange of data with HA

MOTE low cost air quality monitoring device

2.4 System functions, benefits and planned use

2.4.1 ***2.4.1 UTC*** ***U****rban* ***T****raffic* ***C****ontrol for the management of area-wide traffic signals*

UTC systems have been utilised for the control of traffic signals for a considerable period. It has been available in all districts except Halton prior to the start of LTP2. UTC provides the capability of coordinating traffic signals on a network and benefits are obtained by operating groups of signals with fixed time plans on a common cycle time or utilising SCOOT adaptive control which responds to fluctuations in traffic demands and offers greater benefits. This includes: increased network capacity, reduced congestion, reduced delays and the ability to provide bus priority.

2.4.2 ***CPM*** ***C****ar* ***P****ark* ***M****anagement for monitoring of available spaces and posting this information at the roadside*

Only Warrington had a car parking management system at the start of LTP2. Sefton introduced a system for Southport during the LTP2 period and Liverpool introduced a comprehensive system for the city centre during 2008. All the other districts are planning to introduce car park management systems during the LTP3 period, by 2014.

2.4.3 ***VMS*** ***V****ariable* ***M****essage* ***S****igns*

Wirral and Warrington had variable message signs at the start of LTP2. At that time, the Wirral system was limited to advise motorists of the closure of the cross docks route, or four bridges route as it is known locally, and to advise of closures of the promenade in New Brighton, which occur mainly due to flooding at the spring and autumn high tides.

Liverpool introduced a comprehensive VMS system with over 30 signs early in the LTP2 period. This project also placed a further six signs in Wirral to advise drivers of incidents in Liverpool and closures of the Mersey Tunnels, and also placed some signage in Sefton and Knowsley facing drivers travelling towards Liverpool. This system in Liverpool is currently being extended with the addition of further signs to advise drivers leaving Liverpool.

Sefton has also introduced some VMS at several strategic locations, including A565 and Water Lane. It is planned to introduce VMS into all other areas during the LTP3 period, by 2014.

2.4.4 ***JTM*** ***J****ourney* ***T****ime* ***M****onitoring for the measurement of travel times*

No area had journey time monitoring systems at the start of the LTP2 period. This is primarily because it is a relatively recent technology and was not cost effective at that time. By the end of the LTP2 period, Knowsley, Sefton, Liverpool and Halton had introduced journey time monitoring systems and during the LTP3 period, by 2014, all districts will have journey time monitoring systems available.

Once journey time information is available it may be disseminated in a number of ways. Initially it is proposed to disseminate information relating to delays via the internet. It may also be feasible to utilise strategically placed VMS to provide similar information and possibly send text alerts or similar to subscribers on specific routes.

2.4.5 ***ANPR*** ***A****utomatic* ***N****umber* ***P****late* ***R****ecognition for the processing of vehicle plates from video images in support of JTM and security applications*

At the start of LTP2, ANPR was only deployed in Liverpool. This was operated by Merseyside Police and was essentially used for enforcement purposes. During LTP2, ANPR was deployed further in the region with Halton, Knowsley, Liverpool, Sefton, and Wirral acquiring ANPR systems. The anticipated position by 2014, is for all Merseyside Authorities to have ANPR systems and the aim is to be able to share information between systems to provide cross district journey time information in real time on key corridors.

2.4.6 ***RTPI*** ***R****eal* ***T****ime* ***P****assenger* ***I****nformation for the monitoring of public transport journeys using some form of Automatic Vehicle Location (AVL) and informing of the traveling public*

At the start of LTP2, some difficulty was experienced with the real time passenger information system for buses and consequently the information provided was limited to a small number of routes in St Helens, Liverpool and Warrington. During the LTP2 period, 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. It is anticipated that comprehensive passenger information systems will be available throughout the region during the LTP3 period for all public transport modes.

2.4.7 ***CCTV*** ***C****losed* ***C****ircuit* ***T****ele****v****ision*

CCTV technology has been available for a considerable period, although costs have been driven down and reliability has greatly improved in recent years, making the installation and operation of CCTV systems much more cost effective. Most areas in the region had some CCTV coverage at the start of LTP2 and this coverage has expanded during the LTP2 period. By 2014, and probably much sooner, it should be possible to share images across the region's systems for traffic observation purposes.

2.4.8 ***Met*** ***Met****eorological devices measuring weather conditions such as wind, temperature and ice*

No meteorological data was available via automatic system linkages at the start of LTP2 period. Liverpool now has a link to the Met Office system and similar system links across the region are anticipated by 2014.

2.4.9 ***CDB*** ***C****ommon* ***D****ata****b****ase facilities enabling the management of information from all the above sources and interactions between systems to be implemented*

At the start of LTP2, Warrington was the only area in the region to operate a UTMC compliant common database. This is primarily because when the UTC systems were installed in other areas, UTMC had not been fully developed, but was available when the Warrington system was installed. However, during LTP2 UTMC common databases have been installed in Liverpool and Sefton and it is anticipated that all Merseyside areas except Halton will have linked common databases by the end of LTP2, with Halton following during the LTP3 period.

2.4.10 ***AQ*** ***A****ir* ***Q****uality devices for measuring air pollution levels*

Only Liverpool was utilising their UTC communication system to collect information on air quality, from a limited number of sites, at the start of the LTP2 period, although this was not influencing traffic control strategies. Sefton are introducing Air Quality monitoring during the LTP2 period and all other districts will have some air quality monitoring installed during the LTP3 period, by 2014. It is proposed to utilise the information from the air quality monitors to influence the operation of traffic signals in areas with exceptional areas of harmful pollutants. This is something that the European project "Message" is currently researching and has developed low cost air quality monitors – "MOTEs".

2.4.11 ***STW*** ***St****reet****w****orks databases*

Streetworks databases were not readily available at the start of LTP2, although some districts may have been using their own systems for maintenance purposes these systems were not available to traffic control operatives in individual areas and certainly not readily available to other areas. However, streetworks database systems with the ability to share information with others are available throughout the region and the automatic sharing of information will be available by the end of 2011 when the UTMC common databases are fully linked. It is proposed to make more use of portable detectors so that SCOOT operation can be maintained during roadworks on key routes.

2.4.12 ***TIH*** ***T****raffic* ***I****nformation* ***H****ighway for exchange of data with HA*

None of the local areas had links to the TIH at the start of LTP2, indeed the TIH was only developed around this period. Sefton have procured a link to the TIH but this is not yet operational. It is now expected that Liverpool will implement an operational link to the TIH by during 2011/12 with all other Merseyside districts exchanging information with the TIH by 2014.

2.5 Key Issues

1. How can systems be best utilised to reduce the affects of congestion.

2. How can systems be developed and utilised to positively influence air quality and noise.

3. How can current systems be best utilised in a coordinated manner and dynamic control elements developed to be responsive to traffic and environmental conditions.

4. How is information best disseminated: signs; mobile phones (text alerts and other messages); radio; other in vehicle devices including SatNavs both dumb (i.e. electronic maps with location and directional advice) and intelligent (i.e. with the ability to take information from traffic control systems evaluate and advise the driver of problems on route and potential diversions).

5. Integration of public transport RTPI systems with traffic control systems to give the ability to provide more accurate information and to enable the traffic control systems to be more responsive to and to better prioritise public transport on key routes.

6. How can we use ITS to influence and accommodate freight traffic on the network and to provide better information to freight operators and perhaps develop mechanisms for automatic exchange/ sharing of information.

2.5.1 Congestion

Traffic congestion, particularly during weekday morning and evening peak periods, and at other times of peak demand, is a continuing problem which will become more problematical as traffic volumes continue to grow. ITS are a key tool in management of congestion.

Existing UTC and UTMC systems provide the tools to manage congestion within individual areas. For example the introduction of fixed time plans for certain time periods, linking traffic signals on routes or in small regions allows traffic to be “platooned” and can minimise congestion for these time periods. Fixed time plans, however, rely on historical traffic count data and assume a certain level of traffic demand. The introduction of SCOOT provides adaptive signal timings for regions of traffic signals which respond to actual traffic demand. This allows traffic signal timings to be automatically adjusted, within certain predetermined parameters, set by the traffic engineer. It has been recognised for some time that SCOOT provides significant benefits to fixed time plans in the control of traffic signals and can reduce congestion even further than with fixed time plans. Essentially, SCOOT is an on-line traffic model which adjusts traffic signal timings, in real time, according to the current traffic demand. Because of this and to achieve these benefits, the SCOOT traffic

detectors need to be located carefully and the system set up to accurately reflect traffic behaviour. The set up also needs to be reviewed periodically as changing traffic patterns may influence the optimum location for detectors.

The proposed linking of UTMC systems will provide active management of congestion at specific locations on routes which cross boundaries.

2.5.2 Air quality and Noise

Air quality can be substantially affected by traffic, and can be particularly problematic in urban areas where residential buildings and workplaces are often located adjacent to busy and often congested roads. Noise can also be a problem in these areas.

Relatively recent advances in traffic control techniques enable strategies to be implemented which can reduce the effect of vehicle pollutants and noise in localised areas. These are not always implemented as a matter of course but it is proposed that these techniques are more widely used in future where other conditions allow.

2.5.3 Traffic and Environmental Conditions – Coordinated Response

Certain conditions are predictable, i.e. occur at particular times of day, year or when certain events are ongoing e.g. sports events, concerts etc. Other events on the network are unplanned, including accidents and infrastructure failure causing lanes or roads to be closed.

Poor weather; snow, high winds, heavy rain, flooding etc. can also require restrictions to traffic and again some can be planned for in advance.

Coordinating responses to such conditions across boundaries and with the Highways Agency will become more commonplace and the linking of systems will simplify this coordinated approach.

2.5.4 Dissemination of Information

There are now many ways in which information relating to travel, traffic and environmental conditions may be disseminated. Current methods include: signs, variable and fixed; mobile phones (text alerts and other messages); radio; internet; television; other in vehicle devices including SatNavs, both dumb (i.e. electronic maps with location and directional advice) and intelligent (i.e. with the ability to take information from traffic control systems evaluate and advise the driver of problems on route and potential diversions).

2.5.5 Integrate RTPI with Traffic Control Systems

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. It is anticipated that comprehensive passenger information systems will soon be available throughout the region for all public transport modes.

The integration of these systems, particularly those which affect public transport which travels on the road network, has significant advantages in that information can be shared and the traffic control systems give priority to those vehicles which most need the priority. Arrival and journey time information can then be updated in the RTPI systems based on feedback from the traffic control systems. This will provide the ability to provide more accurate information and to enable the traffic control systems to be more responsive to and to better prioritise public transport on key routes. Merseyside's Bus Board Technology Group is overseeing the development of these systems and implementation is expected to commence with a trial within the next two years.

2.5.6 Freight Movement

Merseyside's road freight network has been established for a considerable period and a partnership with the freight industry that is also well established. The road network hierarchy which includes the Strategic Freight Network was defined for LTP2 and has been updated for LTP3.

Work is continuing to manage road freight from a both an efficiency and environmental perspective by giving priority to freight traveling on the freight network. Traffic signal priorities will be implemented to provide this priority and it is also proposed to identify times of maximum use by freight in real time and adjust priorities accordingly. This will also assist with management of air quality on freight routes.

Work with the freight industry will continue to determine the optimum method to exchange information to benefit both operators and network managers.

3 Policy

3.1 European

There are several European organisations which promote ITS, including some which determine strategy. The European Commission published an action plan for ITS in December 2008 which identified the following six priority areas:-

1 Optimal use of road, traffic and travel data

2 Continuity of traffic and freight management ITS services on European transport corridors and in conurbations

3 Road safety and security

4 Integration of the vehicle into the transport infrastructure

5 Data security and protection, and liability issues

6 European ITS cooperation and coordination

Following a workshop held in Brussels in March 2010, where POLIS*, EUROCITIES** and ERTICO*** and others were represented, priorities were reassessed. A new ITS directive was adopted in August 2010 which covers issues relating to standards harmonisation and the establishment of the European Advisory Group. The key ITS applications affected are: travel and traffic information, electronic payment and ticketing, road safety, traffic and access management, and urban logistics including freight.

The new directive is entitled "The ITS directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport". It contains four priority areas:

1 Optimal use of road, traffic and travel data
2 Continuity of traffic and freight management ITS services
3 ITS road safety and security applications
4 Linking the vehicle with transport infrastructure

The directive states that principles for specifications and deployment of ITS shall:

- Be effective
- Be cost efficient

- Be proportionate
- Support continuity of services
- Deliver interoperability
- Support backward compatibility
- Respect existing national infrastructure and network characteristics
- Promote equality of access
- Support maturity
- Deliver quality of timing and positioning
- Facilitate inter-modality
- Respect coherence

***POLIS** POLIS is a network of European cities and regions from across Europe, which promotes, supports, and advocates innovation in local transport.

****EUROCITIES** EUROCITIES is the network of major European Cities. It brings together the governance of more than 140 large cities in over 30 European Countries and focuses primarily on: climate; recovery and; inclusion. EUROCITIES provides a platform for its member cities to share knowledge and ideas, to exchange experiences, to analyse common problems and develop innovative solutions, through a wide range of forums, working groups, projects, activities and events.

*****ERTICO** ERTICO – ITS Europe is a multi-sector public/ private partnership pursing the development and deployment of Intelligent Transport Systems and Services (ITS). It represents the interests and expertise of around 100 partners involved in providing Intelligent Transport Systems and Services. It facilitates the safe, secure, clean, efficient and comfortable mobility of people and goods in Europe through widespread deployment of ITS.

3.2 National

The National Guidance Framework issued by the Department for Transport in 2006 identified seven themes for ITS:-

1 Improving the road network

2 Improving road safety

3 Better travel and traveller information

4 Better public transport on roads

5 Supporting the efficiency of the road freight industry

6 Reducing negative environmental impacts

7 Supporting security, crime reduction and energy planning

The Highways Agency (HA) has taken responsibility for the UTMC Development Group (UDG) from the Department for Transport which initiated the UTMC development programme and until this year maintained responsibility for the UDG. This move was to enable the HA to have a direct input into the integration of UTMC with the HA's systems, integrating TIH and UTMC.

ITS UK also continue to promote implementation and development of ITS nationally and have strong links with other national and international ITS organisations.

3.3 Regional

3.3.1 ITS Vision

The ITS vision for Merseyside, now generally referred to as the Liverpool City Region, was developed as part of the earlier work for LTP2. It was included in LTP2 and a review of this document indicates that it is still relevant for LTP3. The original vision statement including the vision and ITS Strategic Goals is included as Appendix 1.

3.3.2 Memorandum of Understanding (MoU)

Also, as part of the work for LTP2, a draft Memorandum of Understanding was prepared specifically for the implementation of the MICTM project. As this was not taken forward as a single project this MoU was not pursued with the partners and is no longer relevant.

3.3.3 MSTEG and UTMC Group

As part of this project we have considered the aims and objectives of the UTMC (Urban Traffic Management and Control) MSTEG (Merseyside Strategic Transportation and Engineers Group), “To develop and maintain traffic management and control systems to maximise safety and minimise congestion and delays for highway users” and the associated business plan. The objectives and targets from this business plan have been aligned with the group’s main business plan.

The proposals for the Merseyside area, the Liverpool City Region, align with the European and National policies and objectives outlined above.

3.4 Local Policy Areas

During the development of this report the stakeholders identified the key policy areas to be addressed in LTP 3.

The available systems and technology, primarily as identified in table 2.2.2 (at end of LTP 2) were assessed against each of the key policy areas identified to evaluate the contributions that each element (system/ function) could make towards the individual policy areas. These were scored on a four point scale for "effectiveness": 0 no effect; 1 low; 2 medium; and 3 high. The contribution of each element (system/ function) to the policy areas was summed to an "effectiveness score". Each element was broken down to appropriate units and the cost of implementation was assessed on a three point scale: low; medium; and high.

Effectiveness was divided by cost to provide an indication of value for money from the implementation of each element. These were then ranked as: low; medium; or high. The results of this assessment are presented in table below.

Policy Areas

- Freight
- Public Transport
- Cycling and walking
- Air Quality and Noise
- Informed Travel Choices
- Smarter Travel Choices
- Integrate systems highways and public transport
- Smart Cards

System Elements

Variable Message Signs (VMS)
Single Variable Message Sign, includes installation, provision of power and communication to control room.

Journey Time Management System (JTMS) /Automatic Number Plate Recognition (ANPR)
Introduction of 2 bespoke CCTV cameras to cover a route in a single direction to link into existing ANPR systems, includes provision of power, appropriate communications and installation.

Car Park Guidance
Variable car park sign associated with existing Siespace system as part of new area covered by car parking guidance or expansion of existing system.

SCOOT /UTMC Comet Network Management
Introduction of SCOOT to a new group (region) of traffic signals, includes installation of SCOOT loops and SCOOT validation, assumes affected traffic signalled junctions are already connected to UTC system.

CCTV
Implementation of new Pan Tilt Zoom CCTV camera for traffic monitoring purposes, includes installation, communications and connection to an established system.

UTMC/Wireless Communications
Installation of UTMC communication system on an individual route or group of junctions to enable SCOOT or other UTMC systems to be enabled on the route utilising UTMC communications.

Traveller Information
Provision of an individual type of information to travellers using web based systems, sms messages or links to the TIH.

Air Quality monitoring and action
Installation of low cost air quality monitors and connection to UTMC communications network.

Traffic Data Collection
Installation of traffic counting loops and connection to UTMC communications network, includes installation of appropriate adapter and data repository in the control room.

RTPI
Provision of Passenger Information on an individual vehicle and connection, wirelessly to a central system.

	Policy Areas													
	Freight	Public Transport	Cycling and walking	Air Quality Noise	Informed Travel Choices	Smarter Travel Choices	Integrate systems highways and public trans	Smart Cards	Effectiveness Score	Estimated Unit Cost £000s	Estimated Overall Quantity	Units	Effectiveness x 100/Cost	Priority / Rank
System/ Function														
Variable Message Signs (VMS)	✔	-	-	✔	✔	✔	✔	-	5	£££	20	Sign	2	L
Journey Time Management System (JTMS) /Automatic Number Plate Recognition (ANPR)	✔	✔	-	✔	✔✔✔	✔✔✔	✔	-	10	££	24	Route	5	L
Car Park Guidance	-	-	-	✔	✔✔✔	✔✔✔	✔	-	8	£	50	Sign	8	H
SCOOT /UTMC Comet Network Management	✔✔	✔✔✔	✔✔	✔✔✔	✔✔✔	✔✔✔	✔✔✔	-	19	££	38	Region	10	H
CCTV	✔	✔	-	-	✔✔	✔	✔	-	6	£	10	Camera	6	M
UTMC/Wireless Communications	✔	✔✔	-	✔✔✔	✔✔✔	✔✔✔	✔✔✔	-	15	££	20	Route	8	H
Traveller Information	✔	✔	✔	✔	✔✔✔	✔✔✔	✔	✔	12	£	17	Info type	12	H
Air Quality monitoring and action	-	-	✔	✔✔✔	✔✔	✔✔	✔	-	9	££	25	Site	5	M
Traffic Data Collection	✔	✔	-	✔	✔	✔	✔	✔	7	£	30	Site	7	M
RTPI	-	✔✔✔	✔✔	✔	✔✔✔	✔✔✔	✔✔	✔	15	£££	200	Vehicle	5	M
	8	12	6	15	24	23	15	3						

Effectiveness Scores		
-	0	No Effect
✔	1	Low
✔✔	2	Medium
✔✔✔	3	High

Cost	
£	Low
££	Medium
£££	High

Priority / Rank	
H	High
M	Medium
L	Low

This evaluation was undertaken to identify the benefits each system element can provide in the identified policy areas. The ranking simply provides an indication of how effective the expansion or implementation of each system element is in addressing individual policy areas.

The final scoring is an indication only and should not be used as a simple mechanism for establishing overall priorities. There are other reasons for implementing and developing some systems which are outside the scope of this report. For example, smart cards score low against those policy areas but there are other compelling reasons for their introduction, which include:

- Encouraging modal shift
- Improving passenger choice
- Delivering value for money
- Improved data collection to help enhance and target the public transport offer
- Integration of tickets across all modes
- Integration with other non-transport applications
- Better use of technology to meet and exceed the expectations of passengers and potential passengers

4 Meeting LTP Goals

The LTP Goals have been defined as follows:

Goal One Supporting the priorities of the Liverpool City Region and its Local Strategic Partnerships.

Goal Two Provide and promote a clean and low carbon transport system.

Goal Three Ensure the transport system promotes and enables improved health and wellbeing.

Goal Four Ensure the transport system allows people to connect easily with employment, services and social activities.

Goal Five Ensure the transport network supports the economic success of the Liverpool City Region by supporting the efficient movement of people and goods.

Goal Six Maintain our assets to a high standard.

Each of these goals are discussed briefly below and the role of ITS in helping achieve these goals is outlined**.**

Goal One

Supporting the priorities of the Liverpool City Region and its Local Strategic Partnerships.

This goal is the most general, particularly in terms of ITS and in many respects achievement of the remaining goals will contribute to this. However, the key Liverpool City Region priorities are shown below.

City region partners have identified four strategic priorities where it can be shown that focused action will deliver the greatest benefit and bring the most added value to the policies and programmes of local authorities and partner organisations. These are:

- More and Better Jobs
- Reducing Worklessness and Improving Skills
- Healthier Safer Communities
- Efficiency

The city region pledges to realise this vision by developing strategies and plans that deliver the following key objectives.

(i) *Maximise potential*

(ii) *Develop our cultural offer*

(iii) *Tackle deprivation*

(iv) *Maximise connectivity*

(v) *Become a low carbon economy*

In general terms ITS can contribute to this goal by supporting the strategic priorities. In practice this will be achieved by specific contributions to other goals.

Goal Two

Provide and promote a clean and low carbon transport system.

- ITS to monitor air quality
- Control strategies to improve air quality in key areas
- Reduce congestion and reduce harmful emissions
- Traffic and air quality modelling

The linking together of the COMET systems will provide a variety of traffic related information for the whole area. Therefore ITS monitoring of air quality is a huge opportunity, particularly with the new MOTE sensors. However, control strategies currently being developed will displace the pollutant by delaying traffic input into affected areas using only the highest levels of NO2 as a trigger. This will be more effective in some areas than others and strategies will need to be developed carefully to ensure the problem is not just being moved.

The improved connectivity through linked systems will enable an accurate picture of pollution across Merseyside to be built up as individual Local Authorities add MOTEs or other pollution monitoring devices to their systems and present the data through COMET.

This information can be relayed to the public, initially by displaying air quality information on VMS when they are not being used for other purposes.

Section 278 agreements for new retail or industrial parks could require monitors to be installed to confirm impact assessment studies submitted for the development. Specific problem areas, buses parking and leaving engines running, multi bus/coach

parking during events, football matches etc. can also be monitored. COMET can send alerts by email or SMS in addition to triggering VMS or other display types which could also include on-street interactive pods and trigger appropriate response strategies.

Goal Three

Ensure the transport system promotes and enables improved health and wellbeing.

- Provision of information, journey times, parking information, air quality etc.
- Public transport information

Emerge, which is a web-based mapping solution, developed by Siemens is currently being implemented and is anticipated to be on-line in 2011. Selective information held in the UTMC database can then be provided to the general public over the internet. This will include: journey time; car park occupancy and availability; and air quality information.

Public transport information will be provided by the new RTPI system which is currently being implemented. Information will be compared to timetable until due in less than "x" minutes when actual expected arrival time will be shown more accurately. The actual value of "x" will be chosen as the system is implemented and may be varied for different locations.

Goal Four

Ensure the transport system allows people to connect easily with employment, services and social activities.

- Use of systems to reduce congestion
- Signing of events – real time and availability of parking

This is currently being implemented to varying degrees in different Authorities. Information relating to congestion and parking is expected to become available by internet or subscription service to mobiles and other devices during 2012.

Goal Five

Ensure the transport network supports the economic success of the Liverpool City Region by supporting the efficient movement of people and goods.

- Implementation of public transport priority on key public transport routes, buses
- Relieve congestion on strategic corridors
- Expansion of areas covered by SCOOT
- Revalidation and refinement of SCOOT operation
- Development of COMET strategies in conjunction with SCOOT to enable regular patterns or trends to be identified and appropriate strategies triggered automatically

A comprehensive bus priority and RTPI system is currently being implemented. When this is operational, information regarding how buses relate to their timetables, gathered by GPS tracking, will be obtained direct from the servers that hold this information and fed directly into the UTMC systems. This information will be used to influence traffic signals for buses running late. This will not be restricted to simply the immediate junction, route based priority will also be provided.

Congestion has been greatly reduced on strategic corridors in the Liverpool City Region and more is currently being done to reduce congestion further on these and other key corridors.

The expansion of SCOOT relates more to areas outside of the Liverpool city boundary since SCOOT is now operational for the vast majority of traffic signal installations in Liverpool. Revalidation and refinement [customisation] of SCOOT operation is crucial. In Liverpool and Sefton, this has been underway for some time and is an ongoing process.

COMET strategies are complex and the skills to create these along with the necessary vision, must also be developed. Initially, simply making others aware of the uses this system can be put to would encourage further work. This has started to be addressed within the scope of the new strategic traffic management group [STMG] which had its first meeting in Liverpool in October 2010. This included the 5 Merseyside districts, Halton, Manchester and Warrington. The purpose was to inform other users of the work being done currently by Liverpool, some of which is new but very likely to be requested in other areas by partners such as the fire service, ambulance and environmental departments.

Goal Six

Maintain our assets to a high standard.

All authorities are developing their Asset Management Plans which will identify how assets will be maintained throughout their lifecycle. This process will include:

- The collection and updating of assets registers and condition data
- The identification of all sources of funding that can contribute to effective maintenance
- The prioritisation and planning of maintenance requirements for individual asset groups
- Automatic monitoring and fault management systems e.g. UTC, RMS and PREFECT – real time monitoring and identification of faults
- Assess and invest in more cost effective technology as equipment needs replacing.
- Consider possibility of sharing system infrastructure and resources – improve resilience to hardware or system failures

5 Implementation

Essentially implementation of the ITS Strategy is simply how we can get from the position at the end of LTP2 (ref 2.2.2) to the planned position at 2014 (ref 2.2.3).

Systems and functions which support the various policy areas are tabulated and given a priority ranking in section 3.4. These were further detailed in an indicative implementation programme which is now included as Appendix 2. This detailed review is summarised below into short term (to 2014/15) and long term (2015/16 and beyond).

Long term implementation of ITS is difficult to forecast since the technology is changing rapidly. Recent advances in bluetooth and radio technologies mean that system to vehicle and vehicle to vehicle communications will likely be the norm much sooner than originally envisaged.

Bluetooth provides local wireless connectivity and is now supplied as standard on many mobile phones and other portable devices. Bluetooth devices emit a unique signature which can be detected and mapped to a location. Approximately 30% of people have their bluetooth on their mobile phones active, many without being aware of this. This rapid development in bluetooth technology and also RFID (Radio Frequency IDentification) is expected to play a significant role in medium to long term developments of ITS.

Short Term (0 to 5 Years)

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).

Street works 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.

Long Term (5 Years plus)

Links to Vehicles
Implement system to vehicle links that will allow a two way exchange of information and provide truly up to date and interactive information to drivers.

Improved Network Management
Long term aspirations for network management will utilise system to system and system to car connectivity that will allow management of traffic through the network based on varying levels of priority i.e. type of vehicle, how many people in it, when it needs to arrive.

Emerging Technology
Accommodate new technologies as they become available, and improve, or replace current technologies in their use and capabilities.

6 Conclusions

This review and update has considered the deployment of ITS throughout the region at the start of LTP2, the current position, and identified the priorities for LTP3. The tables in section 2.2 provide a summary of anticipated overall deployment and the likely implementation timescales are identified in Appendix 2.

The areas where benefits of ITS can be exploited in the coming years are identified in the European, National, and Regional priorities. These include: traveller information, network management, information coordination and dissemination, and a focus on the urban/ interurban interface. Section 4 shows how ITS helps to meet the LTP goals and section 5 categorises implementation areas.

Individual systems will be integrated to better manage the network, particularly across districts, and to provide better, more reliable and timely information to travellers. It is proposed to continue to develop, implement, and optimise the use of these systems into, throughout the LTP3 period and beyond.

Appendices

Appendix 1

ITS Vision Statement

ITS Vision Statement

Merseyside local authority Partners, the Highways Agency and other stakeholders will use Intelligent Transport Systems (ITS) to help them fulfil their duties and improve conditions for the transport of people and goods in the Greater Merseyside* Region.

More specifically, ITS will be used in the delivery of safe, efficient, reliable, accessible and environmentally friendly transport services to all road users.

ITS Vision

Through the use of ITS, the people and road users of Greater Merseyside* will:

- Be able to plan their journeys in advance,or whilst travelling, and be fully informed of traffic and travel conditions so that they have a choice of the time and the routes for their journeys
- Enjoy a safer and more environmentally friendly road network which provides easy access to all major destinations of the Region for work, education, health, commercial and leisure activities

ITS Strategic Goals

The realisation of the ITS Vision will enable Greater Merseyside* to:

- Maintain and enhance the vitality and prosperity of the Region as a retail, commercial, employment and leisure centre
- Improve the quality and reliability of traffic and travel information to stakeholders, the public and media
- Improve the safety of all road users
- Reduce delays to road users generally and during planned and unplanned events
- Reduce the impact of road based transport on the environment

*Greater Merseyside was used in the original Vision statement, to include the areas outside the boundaries of the Merseyside districts. The general area is now more commonly referred to at the Liverpool City Region.

Appendix 2

Indicative Implementation Programme

Infrastructure/ Systems		In Place Now	Short term to 2014/15	Long term 2015/16 on
Collect and Store Information				
COMET in all Merseyside Districts		√		
Link all systems			√	
Link/ interface Merseyside Systems to/ with HA Systems			√	
Link legacy systems and or upgrade to UTMC	Particularly ANPR		√	
Predict Journey Times				
Link ANPR Systems			√	
Identify and install future ANPR			√	
Establish system to system links			√	
Network Management				
Wider use of SCOOT			√	
Linking across boundaries			√	√**
Congestion management			√	
Environmental triggers			√	
Link roadworks databases			√	
Dissemination of Information				
Variable Message Signs		√	√*	
Mobile Phones			√	
In car devices			√	
Intelligent Sat Navs			√	√**
Website	One website showing accurate timely information - publicity of website		√	

Infrastructure/ Systems		In Place Now	Short term to 2014/15	Long term 2015/16 on
Gather, display, utilise Journey Time Information				
ANPR systems - SCOOT		√	√*	
Disseminate via VMS, in car			√	
Develop ability to predict journey times for a given set of conditions			√	
Passenger Information				
Traveller information			√	
RTPI			√	
Link RTPI to COMET to better control and prioritise public transport			√	
Streetworks information				
Exchange of Information			√	
Linking of Systems			√	
Affects of cross boundary roadworks			√	
Priorities				
Freight			√	
Emergency Services (Blue Light)	Ambulance Fire Police Predetermined routes		√	
Buses	Knowledge of bus		√	
Prioritise the priorities				
System to system			√	
system to vehicle			√	
vehicle to system			√	
Vehicle to system to vehicle			√	√**
vehicle to vehicle direct				√

Infrastructure/ Systems	In Place Now	Short term to 2014/15	Long term 2015/16 on
Car Parking Information			
Systems in Liverpool and Southport	√	√*	
Publish predicted availability of spaces		√	
Publish accurate real time occupancy/ availability		√	
Strategy Development			
Event management	√	√**	
Planned/ unplanned events	√	√**	

* Continue to expand coverage

** Further development