Combined Requirements for Co-operative Systems

Annex 4: FRAME User Needs

Issue 2

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Control Sheet

Version History			
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Draft 2	17/12/2007	Richard Bossom	Document with CVIS & SAFESPOT Requirements for review by the Projects
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Issue 1	23 May 2008	Richard Bossom	All projects and sub-project Requirements mapped to the existing FRAME User Needs
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Abbreviations and Definitions

Abbreviation	Definition
EC	European Commission
EVI	Electronic Vehicle Identification
FFM	Freight and Fleet Management
FRAME	The short name for the European ITS Framework Architecture
HOV	High Occupancy Vehicle (used for defining a type of lane in the roadway)
MoU	Memorandum of Understanding
TCC	Traffic Control Centre
VRU	Vulnerable Road User

1. Introduction

1.1 This Annex

This Annex provides a list of all the FRAME User Needs to which the Requirements for the CVIS, SAFESPOT and COOPERS projects have been mapped. They have been downloaded from the FRAME web-site (http://www.frame-online.net/) and are for Version 3 of FRAME (European ITS Framework Architecture).

1.2 Notes about the User Needs

The table of FRAME User Needs in this Annex is a direct copy from the FRAME web-site with some columns removed. These contain information about “Users” and “similar User Needs” which have been ignored as they were not considered relevant to the mapping work.

2. FRAME User Needs

2.1 Introduction

The FRAME User Needs were produced by the EC funded KAREN Project in 2000. They have been written at a high-level in order to cover all the requirements of European road transport telematics, and the interfaces to other modes, until 2010. Their primary purpose is to form the basis of the European ITS Framework Architecture (FRAME).

Since their original publication they have been modified by the EC funded FRAME-S project to create Version 3, which was published in November 2004. It is intended that they will be updated again in 2008-10 by the E-FRAME project to include the results of the work described in this document.

2.2 Overall structure of the FRAME User Needs

The FRAME User Needs are divided into ten Groups. Each Group contains User Needs that relate to similar ITS related activity and are as follows:

1 General – see separate later section;

2 Infrastructure Planning and Maintenance - This group contains the activities associated with long term planning, modelling and reporting as well as the maintenance of the infrastructure;

3 Law Enforcement - This group contains the activities associated with the enforcement of traffic laws and regulations, and the collection of evidence;

4 Financial Transactions - This group contains the activities associated with the payment for traffic or travel services, and includes the manner of the transaction, its enforcement, and the sharing of revenues;

5 Emergency Services - This group contains 'May Day' and stolen vehicle management, the prioritising of emergency vehicles, and hazardous goods incident management;

6 Travel Information and Guidance- This group contains all the activities concerned with the handling of pre-trip and on-trip information, including modal choice and change, and route guidance;

7 Traffic, Incidents and Demand Management - This group contains the activities associated with traffic control, incident management and demand management, including monitoring, planning, flow control, exceptions management, speed management, lane and parking management, High Occupancy Vehicle (HOV) management, road pricing and access control, and Vulnerable Road Users (VRU) facilities;

8 Intelligent Vehicle Systems - This group contains the functions found within a vehicle, including vision enhancement, longitudinal and lateral collision avoidance, lane keeping, platooning, speed control, driver alertness, 'May Day' initiation, etc.;

9 Freight and Fleet Management - This group contains all the activities associated with FFM, including statutory data collection and reporting, orders and document management, planning, scheduling monitoring, reporting and

operations management, vehicle and cargo safety, and management of the inter-modal interface;

10 Public Transport Management - This group contains the activities associated with public transport (PT), demand responsive PT, shared PT, on-trip PT information and traveller security. It includes management, scheduling, monitoring, information handling, communications and PT priority.

These groups were chosen following a Stakeholder consultative process that was carried out by the KAREN project. Whilst they closely related to the top level structure of the Functional Viewpoint], they do not correspond exactly. This is due to the need to provide a List of User Needs that will also meet the following two additional objectives in a readable manner:

- They (or a subset) may be used as a reference by national architecture initiatives to build up their own national reference list of User Needs. These initiatives may produce more detail by expanding on selected entries of the European list.

- They can be used as a check list for those developing a system architecture that is compliant with the European ITS Framework Architecture in order to gain confidence that they have considered the most relevant needs when specifying their system.

2.3 Particular structure of Group 1

Group 1 User Needs cover the general performance, quality requirements, and constraints that are common to a subset or all ITS implementations and that are valid regardless of the individual scope of those implementations. This Group is divided into the following parts:

1. Architectural Properties – properties of the Framework Architecture itself

2. Data Exchange – compatibility of information format, equipment and infrastructure;

3. Adaptability – the capability to conform to the changing patterns of User Needs;

4. Constraints – the rules and regulations to which the systems will have to conform;

5. Continuity – the capability to maintain a service in time and space;

6. Cost/Benefit – the avoidance of unnecessary expenditure;

7. Expandability – the capability to add equipment and functions;

8. Maintainability – the capability to be maintained, repaired, modified or enhanced with minimum disturbance;

9. Quality of Data Content – the information should be fit for its purpose;

10. Robustness – the capability to operate satisfactorily under all expected conditions;

11. Safety – the capability to not cause harm to persons or the environment;

12. Security – the capability to protect the system and data from external attack or interference;

13. User Friendliness – be simple and efficient to use;

14. Special Needs – how the needs of those with disabilities must be addressed.

The above are in effect global statements about what systems developed from the European ITS Framework Architecture should contain. They are also a set of "rules" to which these systems should conform

2.4 Structure of Groups 2 – 10

Each of the other Groups (2 to 10) is divided into "Services" which correspond to those defined by Part 1 of Issue 1 of the ISO Specification 14813. Although this specification has now been updated by ISO, the relationship has not. This is because so far as is known, the existence of the relationship has never been exploited by any of the FRAME users and so it was not considered worthwhile to update the User Needs.

Within each "Service" there are one or more "Topics". These are an attempt to collect related sets of User Needs together. Thus each "Topic" represents a particular aspect of the "Service", where this is relevant.

An attempt has also been made to make the set of User Needs within each service complete. This has usually been done at the Group level so that a particular Group of User Needs can be selected without having to select one User Need from another Group. In order to do this it has been found necessary to duplicate some of them between some Groups.

2.5 Numbering System

In order to make the above structure easier to understand and use a numbering system has been developed with which to identify each User Need. For Group 1, these comprise 3 digits which are as follows:

User Needs Number: X.Y.Z, where:

X – 1

Y - Topics

Z - Unique number for each User Need within the Group.

The identification numbers for User Need in Groups 2 to 10 comprise 4 digits. They are defined as follows:

User Needs Number: N.M.P.Q, where:

N – User Needs Group

M - Service (based on ISO List)

P - Topics

Q - Unique number for each User Need within the Group, Service and Topic.

The identification numbers for User Needs in Group 1 do not follow this convention and use 3 digits. The second digit is used to identify each of the properties listed above.

2.6 User Need Description Format

Each User Need description is written in a formal style using “shall” language. A wording convention has been used which is as follows:

(a) All systems in a Service: “The system shall provide ……”;

(b) Additional features for a Service: either: “The system shall be able to ……”;
or: “The system shall enable ……”.

If more that one feature is mentioned in a User Need then they are all needed at the same time. If features are intended to be optional for ITS implementations then they are defined in separate User Needs;

The new User Needs that will be created by the work described in the document will follow this convention in the wording of their descriptions.

Table 1 FRAME User Needs

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
1. General		*This Group contains the properties that either the Framework Architecture should possess, or that systems built in conformance to the Framework Architecture should possess.*
1.1 Architectural Properties	1.1.1	The Framework Architecture description shall include functional, information, physical and communication perspectives.
	1.1.2	The Framework Architecture description shall include a number of reference models to describe the relationships between the services needed within the traffic and transport system.
	1.1.3	The Framework Architecture description shall include a glossary to explain all the main concepts described in the architecture.
	1.1.4	The Framework Architecture shall be provided in a form which enables it to be up-dated after delivery.
	1.1.5	The Framework Architecture shall be technology independent.
	1.1.6	The Framework Architecture shall facilitate the creation of modular and flexible designs, so that manufacturers can produce their own versions of equipment.
	1.1.7	The Framework Architecture shall allow equipment performing the same service to be provided by various suppliers.
	1.1.8	The Framework Architecture shall allow the same service to be provided by various service providers.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	1.1.9	The Framework Architecture shall allow the user to select from one of a number of suppliers of the same service.
	1.1.10	The Framework Architecture shall support interaction between services provided by private and public bodies.
	1.1.11	The Framework Architecture shall allow current organisational responsibilities and legal liabilities to be retained.
	1.1.12	The Framework Architecture shall, where possible, describe migration path(s) that can be followed to enable architectures defined for existing traffic and transport management, as well as other ITS control and information systems, to become compliant.
	1.1.13	The Framework Architecture shall allow the use of existing and emerging communication infrastructures, or describe possible migration paths to explain how they can become compliant.
	1.1.14	The Framework Architecture shall support the integration of Traffic Information Centres and Traffic Control Centres into national and international networks.
	1.1.15	The Framework Architecture description shall identify clearly the relevant interfaces to other modes of transport.
1.2 Data Exchange	1.2.1	The Framework Architecture shall provide a high level description of the message sets and data communication protocols to be used in data transfers.
	1.2.2	The Framework Architecture shall provide a high level description of data stores and data flows, and shall have a single data dictionary.
	1.2.3	Systems that conform to the Framework Architecture shall exchange information in a manner that permits a given geographic location to be understood by all parties.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	1.2.4	Systems that conform to the Framework Architecture shall exchange information in a manner that permits road and traffic conditions to be understood by all parties.
	1.2.5	The Framework Architecture shall provide a high level description of the message sets used to exchange data with external interfaces.
	1.2.6	The Framework Architecture shall support the use of seamless communications. This shall mean that the use of different communication networks is transparent i.e. switches are made without the intervention of the final user.
1.3 Adaptability	1.3.1	Systems that conform to the Framework Architecture shall be able to provide facilities that accommodate the needs of disabled and elderly persons, when relevant.
	1.3.2	Systems that conform to the Framework Architecture shall be able to provide facilities to enable data about the travel network to be entered and updated.
	1.3.3	The Framework Architecture shall not constrain its functionality to be implemented in a single topographical domain, be it urban, inter-urban or rural.
	1.3.4	The Framework Architecture shall not constrain its functionality to be implemented by specific local organisations.
	1.3.5	The Framework Architecture shall not constrain user interfaces to be of a particular type, or from a particular manufacturer.
	1.3.6	The Framework Architecture shall not require that each of its user interfaces must operate on a specific item of equipment, unless it is for safety reasons.
1.4 Constraints	1.4.1	The Framework Architecture shall require all systems developed from it to comply with current European and National laws concerning data security, user anonymity and the protection of individual privacy.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	1.4.2	The Framework Architecture shall require all systems developed from it to comply with the traffic laws and regulations that apply in Europe.
	1.4.3	The Framework Architecture shall conform to relevant MoU, European directives and guidelines, and European (de facto-) standards.
1.5 Continuity	1.5.1	The Framework Architecture shall provide functionality such that the quality of information content is continuous and consistent, both in time and space (i.e. as the traveller moves).
	1.5.2	The Framework Architecture shall provide functionality that can accommodate environmental stress and infrastructure failures.
1.6 Cost/Benefit	1.6.1	Whenever possible and practical, the Framework Architecture shall use the same data as input to several parts of its functionality.
	1.6.2	The Framework Architecture shall avoid the need for unnecessary multiple data sources or redundant data management.
	1.6.3	The Framework Architecture shall require all systems developed from it to be able to use the most cost-effective means of communication available.
	1.6.4	The Framework Architecture shall require all systems developed from it to enable operating costs to be reduced whenever possible, when compared with the systems that they replace.
	1.6.5	The Framework Architecture shall require all systems developed from it that require payment from a user to be able to manage fees/fares.
	1.6.6	The Framework Architecture shall require all systems developed from it that require payment from a user to be able to receive fees/fares.
	1.6.7	Systems upgraded to conform to the Framework Architecture, and providing the same services, shall produce financial benefit to their owners.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
1.7 Expandability	1.7.1	The Framework Architecture shall allow systems developed from it to have an evolutionary development strategy that enables their continuous upgrading.
	1.7.2	The Framework Architecture shall provide services that are not constrained to operate in a particular geographic region.
1.8 Maintainability	1.8.1	The Framework Architecture shall require all systems developed from it to be capable of being repaired.
	1.8.2	The Framework Architecture shall require all systems developed from it to be easily maintainable with minimum disturbance.
1.9 Quality of Data Content	1.9.1	The Framework Architecture shall enable all information systems developed from it to provide data with a stated accuracy, either as additional information or as part of the documentation, at all times.
	1.9.2	The Framework Architecture shall require all systems developed from it to check all input data for validity, whenever possible, and to report failures.
	1.9.3	The Framework Architecture shall enable all systems developed from it to check data values by comparing different sources, when available, so as to ensure high-accuracy and completeness.
	1.9.4	The Framework Architecture shall require all systems developed from it to manage local/regional/national databases in a consistent way.
1.10 Robustness	1.10.1	The Framework Architecture shall allow all systems developed from it to be able to detect errors in operation, when higher integrity is required, e.g. for financial, security or safety reasons.
	1.10.2	Systems that conform to the Framework Architecture shall be able to monitor each safety-related component (including software), warn the user in case of problems, and disable it, or reduce it to a
	1.10.3	The Framework Architecture shall require all safety-related systems developed from it to be fault-tolerant.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	1.10.4	The Framework Architecture shall require all systems developed from it to be reliable with respect to the legal and/or quality requirements necessary for each application.
	1.10.5	The Framework Architecture shall require all systems developed from it to be able to operate in all potential climatic and traffic conditions.
1.11 Safety	1.11.1	The Framework Architecture shall provide functionality that operates in a manner that does not generate a safety hazard for its users.
	1.11.2	The Framework Architecture shall provide functionality that operates in a manner that does not encourage unsafe behaviour.
	1.11.3	The Framework Architecture shall provide functionality that operates in a safe manner during degraded modes of operation.
	1.11.4	The Framework Architecture shall provide functionality that is ultimately under the control of the human operator.
1.12 Security	1.12.1	The Framework Architecture shall require that systems developed from it are capable of surviving accidental and intentional attacks on their integrity.
	1.12.2	The Framework Architecture shall require systems developed from it to provide protection against unauthorised access.
1.13 User Friendliness	1.13.1	The Framework Architecture shall require all systems developed from it to have user interfaces with similar "look and feel" and similar end user assistance.
	1.13.2	The Framework Architecture shall require all systems developed from it to be simple and efficient for travellers to use, and easy to understand.
	1.13.3	The Framework Architecture shall require all interactive systems developed from it to have a user interface syntax that is easy to learn and to remember (especially for users with specific needs).

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	1.13.4	Systems developed from the Framework Architecture shall produce their output within a time that is sufficient to be useful, and within normal expectations,
	1.13.5	The Framework Architecture shall require all systems developed from it to provide facilities that enable their users to control the speed and frequency of information presentation.
	1.13.6	The Framework Architecture shall ensure that the safety and security of systems developed from it are not compromised by their ease of use.
1.14 Special Needs	1.14.1	The Framework Architecture shall require systems developed from it to accommodate those users with one or more impairments (e.g. of upper/lower limbs/body, stature, coordination or power, vision, hearing, speech, cognition, epilepsy, etc.) where relevant.
	1.14.2	The Framework Architecture shall require system developed from it to accommodate those users who travel with baggage and/or extra equipment (e.g. mothers with push-chairs, disabled persons in wheel-chairs, (guide) dogs, etc.) where relevant.
	1.14.3	The Framework Architecture shall require systems developed from it to be able to take their input from a variety of alternative devices (e.g. keys, voice, buttons, touch-screen, smart card, etc.) to suit travellers with special needs, where relevant.
	1.14.4	The Framework Architecture shall require systems developed from it to be able to provide output in a variety of alternative modes (e.g. (enlarged) text, symbols, graphics, speech, tactile, HUD, etc.) to suit travellers with special needs, where relevant.
	1.14.5	The Framework Architecture shall require systems developed from it to be able to repeat information on request, in particular for those with special needs, where relevant.
	1.14.6	The Framework Architecture shall require systems developed from it to be able to recognise the identity of a traveller using a variety of alternative methods, where relevant.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	1.14.7	The Framework Architecture shall require systems developed from it to be able to have adaptable user interfaces that may be customised by the traveller, in particular those with special needs, where relevant.
	1.14.8	The Framework Architecture shall require systems developed from it to be able to be able to read pre-recorded personal details (e.g. impairment and/or medical details), in particular of those with special needs, where relevant.
2 Infrastructure Planning and Maintenance		*This Group contains the activities associated with long term planning, modelling and reporting as well as the maintenance of the infrastructure. These User Needs have links with Groups 6-10.*
2.1 Transport Planning Support		
2.1.0 Objectives	2.1.0.1	The system shall be able to exchange traffic and travel information between adjacent TICs to enhance local information and to improve strategic planning.
	2.1.0.2	The system shall be able to provide facilities to enable co-operation and decision making between all relevant authorities, (e.g. Ministries, local authorities, police forces etc.) to define optimum traffic management strategies.
2.1.1 Information Management	2.1.1.1	The system shall be able to produce information for travellers on the traffic and travel conditions of all transport modes relevant to the geographical area covered.
	2.1.1.2	The system shall be able to provide links to non-transport information systems using "open" communication protocols.
	2.1.1.3	The system shall be able to collect traffic data for road network use analysis and prediction calculations.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
2.1.2 Planning	2.1.2.1	The system shall be able to model the road network for strategic planning calculations.
	2.1.2.2	The system shall be able to develop and implement traffic environmental management strategies based on current and predicted traffic conditions.
	2.1.2.3	The system shall be able to assist in the planning of (inter-modal) routes.
	2.1.2.4	The system shall be able to simulate a demand management strategy on the road network.
	2.1.2.5	The system shall be able to simulate potential capacity reduction, e.g. due to road works.
2.1.3 Evaluation	2.1.3.1	The system shall be able to measure the effect of a strategy, and to modify it when necessary.
2.1.4 Reporting	2.1.4.1	The system shall collect and report data as required by legally appointed authorities.
	2.1.4.2	The system shall be able to archive (a summary of) historical data on transport demand and transport supply for all transport modes.
2.2 Infrastructure Maintenance Management		
2.2.0 Basic Services	2.2.0.1	The system shall provide support for road maintenance and infrastructure management.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	2.2.0.2	The system shall be able to recommend short term road maintenance activities, including winter maintenance, based on data collected from the road infrastructure possibly combined with the current and/or forecast weather conditions.
	2.2.0.3	The system shall be able to recommend maintenance work schedules such that they cause the minimum disruption to traffic.
	2.2.0.4	The system shall be able to support a database of maintenance operations.
	2.2.0.5	The system shall be able to transmit current and future maintenance schedules to TCCs.
	2.2.0.6	The system shall be able to maintain statistics on road usage to evaluate the need for possible maintenance.
2.2.1 Activation	2.2.1.1	The system shall be able to activate fixed de-icing equipment on parts of the road network.
2.2.2 Monitoring	2.2.2.1	The system shall be able to receive infrastructure equipment status data remotely.
	2.2.2.2	The system shall be able to monitor the structural integrity of items of infrastructure, e.g. roads, bridges, tunnels, gantries, etc.
	2.2.2.3	The system shall be able to support a database of the road network, infrastructure and road-side equipment.
2.2.3 Maintenance Units	2.2.3.1	The system shall be able to transfer information to, and between, road maintenance units.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
2.2.4 Contracts	2.2.4.1	The system shall be able to support the management and control of maintenance contracts.
3 Law Enforcement		*This Group contains the activities associated with the enforcement of traffic laws and regulations, and the collection of evidence. These User Needs have links with Groups 6-10.*
3.1 Policing/Enforcing Traffic Regulations		
3.1.0 Objectives	3.1.0.1	The system shall enforce the traffic laws and regulations of the region automatically (where possible).
	3.1.0.2	The system shall be able to collect the evidence of a violation of the traffic laws and regulations in a manner suitable to justify the application of a legal punishment
	3.1.0.3	The system shall be able to provide support for the enforcement of safe driver behaviour and the provision of vehicle priorities.
	3.1.0.4	The system shall not obstruct or slow down traffic in any way, except when it is part of access control.
	3.1.0.5	The system shall be able to communicate with Police Command and Control Systems.
3.1.1 Evidence Collection	3.1.1.1	The system shall be able to collect evidence on vehicles that commit traffic signal violations.
	3.1.1.2	The system shall be able to collect evidence on vehicles that exceed a local (variable) speed limit.
	3.1.1.3	The system shall be able to measure the characteristics (e.g. length, weight etc.) of a vehicle automatically, whilst the vehicle is in motion ("Weigh in Motion").

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	3.1.1.4	The system shall be able to identify the cargo being carried by a heavy goods vehicle automatically.
4 Financial Transactions		*This Group contains the activities associated with the payment for traffic or travel services, and includes the manner of the transaction, its enforcement, and the sharing of revenues. These User Needs have links with Groups 6-10.*
4.1 Electronic Financial Transactions		
4.1.0 Objectives	4.1.0.1	The system shall be able to use a variety of relevant payment methods either electronic or not, including central account and post payment, central account and prepayment, on-board account etc.
	4.1.0.2	The system shall manage customer data, e.g. identification, account, rights of residents, etc.
	4.1.0.3	The system shall give exact details of any financial transaction to the traveller.
	4.1.0.4	The system shall be able to manage tariff policies (define fares/fees according to selected criteria).
	4.1.0.5	The system shall be able to use a variety of payment or receipt means, including contactless "smart cards".
4.1.1 Traffic Management	4.1.1.1	The system shall have a minimum impact on the traffic flow, e.g. a short transaction duration.
	4.1.1.2	The system shall have a minimum impact on the driving task.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	4.1.1.3	The system shall not do anything to reduce the safety of either the travellers in the vehicle, or the staff close to the equipment, e.g. in toll booths.
4.1.2 Revenue Sharing	4.1.2.1	The system shall be able to share revenues between road network operators.
	4.1.2.2	The system shall enable a single payment to be paid for services offered by different related transport systems (e.g. metro, bus, train, road and parking).
4.1.3 Transaction	4.1.3.1	The system shall be able to exchange information between a toll collection unit and a vehicle.
	4.1.3.2	The system shall make "atomic" electronic financial transactions, i.e. that are never partially complete whatever the circumstances, even in degraded system modes.
	4.1.3.3	The system shall have the maximum security necessary for electronic financial transactions.
	4.1.3.4	The system shall have a low number of incorrect transactions (e.g., non-effective transactions < 1 in 10E-6; erroneous transactions < 1 in 10E-8);
4.1.4 Enforcement	4.1.4.1	The system shall be able to collect evidence on the non-payment of tolls, and other illegal financial transactions.
5 Emergency Services		*This Group contains 'May Day' and stolen vehicle management (for any vehicle), the prioritising of emergency vehicles, and hazardous goods (i.e. goods that need to be tracked) incident management. These User Needs have links with Groups 6-10.*
5.1 Emergency Notification and Personal Security		

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
5.1.0 Basic Services	5.1.0.1	The system shall be able to make a 'May Day' call.
	5.1.0.2	The system shall be able to detect that the vehicle has been involved in an accident, identify its location, and initiate a 'May Day' call automatically.
	5.1.0.3	The system shall enable the driver, or any other vehicle occupant, to make a 'May Day' call, and to receive confirmation that the call has been acknowledged, from outside the vehicle, i.e. at the roadside.
	5.1.0.4	The system shall be able to give the driver an immediate acknowledgement to his/her emergency call, i.e. to indicate that assistance is on the way.
	5.1.0.5	The system shall be able to identify the driver / vehicle making an emergency call.
	5.1.0.6	The system shall be able to provide two-way data and/or voice communications between the vehicle and the emergency control centre.
	5.1.0.7	The system shall be able to send a 'May Day' call automatically if a critical vehicle component goes into an unsafe condition, or some other emergency is detected, e.g. driver ill (see 8.5.0.2).
	5.1.0.8	The system shall be able to minimise the response time for rescuing drivers who have requested assistance from the emergency services, e.g. breakdown, medical emergency, accident etc.
5.1.1 Stolen Vehicles	5.1.1.1	The system shall be able to detect when a vehicle is (about to) be driven by an unauthorised person (i.e. stolen)
	5.1.1.2	The system shall be able to detect a vehicle when it has been stolen.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	5.1.1.3	The system shall be able to stop a vehicle when it has been stolen.
	5.1.1.4	The system shall be able to provide the location of a vehicle when it has been stolen and/or to indicate when it passes a certain point.
5.2 Emergency Vehicle Management		
5.2.0 Basic Services	5.2.0.1	The system shall support a green wave for emergency vehicles.
	5.2.0.2	The system shall inform traffic management about the route that is intended for each green wave before it is used.
	5.2.0.3	The system shall provide the identity of each traffic signal at which priority is needed to the traffic management, and the 'timing window' in which priority is to be given.
	5.2.0.4	The system shall receive an indication from the emergency vehicle of its need to be given priority at each set of traffic signals before its arrival in the immediate vicinity.
	5.2.0.5	The system shall enable emergency vehicles to pass through the road network without any priority at signalised junctions, e.g. during a return from an incident.
5.3 Hazardous Materials and Incident Notification		
5.3.0 Basic Services	5.3.0.1	The system shall monitor the movements of hazardous goods, and provide appropriate support in the case of an incident.
	5.3.0.2	The system shall be able to provide the location of hazardous goods.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	5.3.0.3	The system shall be able to receive data on the status, character and quantity of hazardous cargo on vehicles within a pre-defined area of interest, and inform the relevant authorities of any non-compliance.
5.3.1 Incident Management	5.3.1.1	The system shall be able to detect that the vehicle has been involved in an accident, identify its location and cargo, and generate an emergency alert automatically.
	5.3.1.2	The system shall be able to identify its location and cargo, and generate an emergency alert on the command of the vehicle driver.
	5.3.1.3	The system shall be able to advise the emergency services on any hazardous goods that have been involved in an incident.
	5.3.1.4	The system shall be able to provide relevant information to the emergency services on the type of hazardous good(s) involved in an incident.
	5.3.1.5	Systems shall exchange information on hazardous goods in a manner that is understood by all parties.
5.3.2 Planning	5.3.2.1	The system shall be able to support the planning (e.g. routes) and execution (e.g. authorisation) of the movement of hazardous goods.
	5.3.2.2	The system shall be able to support the creation of emergency plans.
6 Travel Information and Guidance		*This Group contains all the activities concerned with the handling of pre-trip and on-trip information, including mode choice and change, and route guidance*
6.1 Pre-trip Information		

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
6.1.0 Objectives	6.1.0.1	The system shall provide emergency, or urgent, information to all road users free of charge.
	6.1.0.2	The system shall be able to require payment for non-emergency, or non-urgent, information.
	6.1.0.3	The system shall be able to provide accurate, credible, timely, and easy to comprehend traffic and travel information where it may be of benefit to the user.
	6.1.0.4	The system shall be able to provide information on alternative routes, e.g. where they are quicker, cheaper, shorter, scenic, etc.
	6.1.0.5	The system shall enable travellers to plan their trip using their own travel criteria, e.g. modes of transport, time of departure/arrival, road selection criteria, etc.
	6.1.0.6	The system shall enable travellers to plan their trip according to the needs of their disabilities
	6.1.0.7	The system shall be able to provide information so that travellers may share a vehicle with others for all or part of a (multi-modal) journey.
6.1.1 Modal Choice	6.1.1.1	The system shall be able to influence modal shifts according to a specified transport policy.
	6.1.1.2	The system shall be able to provide trip information on other modes of transport, e.g. for demand-spreading when major events occur, or when weather conditions, strikes, cultural or sports events etc. cause problems for one mode.
	6.1.1.3	The system shall be able to provide current and forecast traffic and travel information for all modes at local, regional, national and international levels.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	6.1.1.4	The system shall be able to provide extensive multi-modal trip information, e.g. prices, fares, routes, forecast & current traffic situations, traffic control, demand mgt measures, local warnings, special events, weather conditions, hotels etc.
6.1.2 Information Handling	6.1.2.1	The system shall inform the User when changes occur to the criteria upon which the pre trip information had been given.
	6.1.2.2	The system shall be able to provide information on the cancellation of departures from an inter-modal interchange (e.g. railway station, an airport, a port or a coach station) due to the weather; strikes or other reasons.
	6.1.2.3	The system shall be able to provide route information to all drivers, e.g. restrictions, travel times, etc.
	6.1.2.4	The system shall be able to support a database of events with links between events that occur concurrently and at the same or adjacent locations.
	6.1.2.5	The system shall be able to analyse, process and retrieve data from different combinations of sources (including floating car).
	6.1.2.6	The system shall be able to provide road and traffic information adapted to different classes of users, e.g. travellers, radio broadcasters, service operators.
	6.1.2.7	The system shall provide information using graphical representation or text. Graphical form shall include the use of maps as well as text.
	6.1.2.8	The system shall provide information in the native language at the output location, and/or from a user selected choice of other appropriate foreign languages.
	6.1.2.9	The system shall provide Information Management tools for the operator.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	6.1.2.10	The system shall be able to provide access information for those travellers with special needs (e.g. physical access, lifts, escalators, parking & toilets, nappy changing rooms, access for (guide) dogs, etc.) at relevant areas, e.g. transit areas.
	6.1.2.11	The system shall be able to provide information about "Points of Interest", e.g. location, opening times, price of service, nearest transport service points.
	6.1.2.12	The system shall be able to receive information about a point of interest from the providers/owners/managers of that "Point of Interest".
	6.1.2.13	The system shall be able to provide information to travellers so as to influence their choice of destination and/or mode of travel, e.g. to protect the environment of a "Point of Interest", or
	6.1.2.14	The system shall be able to provide information to travellers about the personal support services, e.g. doctor, in a specific locality.
	6.1.2.15	The system shall be able to receive information about a personal support service, e.g. doctor, from the providers/owners/managers of that service.
6.1.3 Traveller Interaction	6.1.3.1	The system shall be able to provide facilities for the necessary user identification when a traveller requests information that may result in the purchase or booking of services.
	6.1.3.2	The system shall be able to require payment for one-off usage of the service.
	6.1.3.3	The system shall enable the traveller to use cash or electronic means to pay for the one-off usage of the service, where appropriate.
	6.1.3.4	The system shall be able to provide access to reservations and pre-payment services.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	6.1.3.5	The system shall be able to provide (multi-modal) booking & pre-payment services from all places that provide (multi-modal) route planning information, e.g. railway stations, airports, ports etc.
	6.1.3.6	The system shall enable a traveller to book a parking space at Park and Ride sites as part of a (multi-modal) trip.
	6.1.3.7	The system shall provide information via (public) terminals located at strategic locations: e.g. home, office, inter-modal interchanges (e.g. bus, railway and metro stations), vehicle, restaurant, etc.
	6.1.3.8	The system shall be able to provide customised pre-trip information to hand-held and in-vehicle devices.
	6.1.3.9	The system shall communicate with other information systems using "open" standard protocols.
	6.1.3.10	The system shall provide information for fixed and mobile terminals using "open" standard communication protocols.
6.2 On-trip Information		
6.2.0 Objectives	6.2.0.1	The system shall provide emergency, or urgent, information to all users free of charge.
	6.2.0.2	The system shall be able to require payment for non-emergency, or non-urgent, information.
	6.2.0.3	The system shall be able to be activated automatically by another system, e.g. traffic management.
	6.2.0.4	The system shall provide traffic information (e.g. travel conditions on roads and other modes, accidents, special events, car park status, etc.) to the traveller during his/her trip in a timely manner. .

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	6.2.0.5	The system shall be able to provide urban and inter-urban traffic and travel information to drivers about the domain they are not currently in.
	6.2.0.6	The system shall inform the User when changes occur to the criteria upon which the trip information had been given.
	6.2.0.7	The system shall be able to know where it is in the transport network, and hence provide the position of vehicle or person carrying it.
6.2.1 Mode Change	6.2.1.1	The system shall be able to provide alternative routes or mode-switch recommendations when it detects, or is informed, that problems have occurred on a mode.
	6.2.1.2	The system shall be able to display alternative routes or modes at inter-modal interchanges, or at places where tourism information is available.
	6.2.1.3	The system shall be able to provide information about other transport modes: e.g. location of P+R areas, PT timetable, etc.
6.2.2 Information Handling	6.2.2.1	The system shall be able to inform travellers on the current average travel time between fixed points.
	6.2.2.2	The system shall be able to provide real-time P+R and PT information to vehicle drivers.
	6.2.2.3	The system shall be able to provide cyclists and pedestrians with information about suitable routes.
	6.2.2.4	The system shall provide road and traffic safety advice based on current weather and traffic conditions.
	6.2.2.5	The system shall be able to provide all drivers with information on current road travel conditions, e.g. route restrictions, travel times, etc.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	6.2.2.6	The system shall be able to provide routing information for Commercial traffic to/from a (cargo) modal interchange.
	6.2.2.7	The system shall be able to support a database of events with links between events that occur concurrently and at the same or adjacent locations.
	6.2.2.8	The system shall be able to provide road information according to different geographic scales, e.g. local, regional, national, and international.
	6.2.2.9	The system shall be able to adapt the information to different classes of users, e.g. travellers, radio broadcasters, service operators.
	6.2.2.10	The system shall be able to collect data from a variety of different sources, e.g. road/traffic management, police, weather services, floating car etc.
	6.2.2.11	The system shall be able to provide operators with an overall view of all active events in an area.
	6.2.2.12	The system shall provide Information Management tools for the operator.
	6.2.2.13	The system shall be able to provide information to vehicle drivers in case of medical emergency, e.g. location of rest areas, medical assistance, etc.
	6.2.2.14	The system shall be able to modify a travel plan if the traveller does not follow the original travel plan.
6.2.3 Traveller Interaction	6.2.3.1	The system within the vehicle, or in the centre, shall support various types of presentation to the user, e.g. text, graphics, symbols, speech, etc.
	6.2.3.2	The system shall normally provide messages from a finite set of well defined message texts.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	6.2.3.3	The system shall provide information in the native language at the output location, and/or from a user selected choice of other appropriate foreign languages, when applicable.
	6.2.3.4	The system shall provide information using "open" standard communication protocols.
	6.2.3.5	The system shall be able to provide customised on-trip information to hand-held and in-vehicle devices.
	6.2.3.6	The system shall enable drivers to customise the style and content of the information that they receive from hand-held and in-vehicle devices.
	6.2.3.7	The system shall be able to retain the customisation details in a manner that is independent of any physical output device.
	6.2.3.8	The system shall be able to provide road and traffic information using road-side equipment, e.g. VMS.
	6.2.3.9	The system shall be able to provide in-vehicle road, traffic, route guidance and parking information via locally sited equipment, e.g. beacon.
6.3 Personal Information Services		This is a special case of Groups 6.1, 6.2, 6.4 and 10.4 (ISO Services 1, 2, 3 and 5)
6.4 Route Guidance and Navigation		
6.4.0 Objectives	6.4.0.1	The system shall provide travellers with recommended routes to specified destinations.
	6.4.0.2	The system shall not base its decisions on a restricted sub-set of the road network, e.g. motorways only.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	6.4.0.3	The system shall know where it is within the road network.
	6.4.0.4	The system shall be able to modify its navigation instructions if an incorrect turn is made.
	6.4.0.5	The system shall be able to provide a driver with a suitable alternative route, when the original planned route becomes unavailable.
6.4.1 Information Handling	6.4.1.1	The system shall be able to provide guidance to Car Parks (with parking spaces).
	6.4.1.2	The system shall be able to use real-time information to compute the recommended route.
	6.4.1.3	The system shall be able to compute the total predicted journey time over the route selected.
	6.4.1.4	The system shall be able provide customised navigation information to the destination using a variety of selection criteria, including use by a traveller with special needs.
	6.4.1.5	The system shall be able to provide guidance to "Points of Interest".
	6.4.1.6	The system shall provide information which is consistent with any other information being presented about the road.
	6.4.1.7	The system shall be able to provide reports on the effectiveness of the navigation instructions that have been provided.
6.4.2 Traveller Interaction	6.4.2.1	The system shall provide route guidance using visual and voice instructions.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	6.4.2.2	The system shall contain menus which are structured in a logical manner and oriented towards the requirements of the driver (e.g. the most frequently used function shall be the easiest to select).
	6.4.2.3	The system shall enable bi-directional voice and data communication with the vehicle.
	6.4.2.4	The system shall enable the use of portable equipment to provide route guidance.
7 Traffic, Incidents and Demand Management		*The activities associated with traffic control, incident management and demand management, including monitoring, planning, flow control, exceptions management, speed management, lane and parking management, HOV, road pricing and zoning, and VRUs*
7.1 Traffic Control		
7.1.0 Objectives	7.1.0.1	The system shall support the existing and new traffic management needs of authorities by providing a flexible yet comprehensive approach to determine traffic management strategies (including bridge and tunnel control).
	7.1.0.2	The system shall be able to implement identified control strategies that conform with specified policy.
	7.1.0.3	The system shall not do anything to reduce road safety.
	7.1.0.4	The system shall manage road traffic in such a way that levels of environmental (i.e. atmospheric and noise) pollution may be reduced.
	7.1.0.5	The system shall manage road traffic in such a way that congestion (travel time) may be reduced.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	7.1.0.6	The system shall be able to help co-ordinate the activities of TICs and TCCs.
	7.1.0.7	The system shall be able to exchange information between TICs and TCCs, including across national boundaries.
	7.1.0.8	The system shall enable the data that it stores to be extracted by an operator onto a variety of media and used for other purposes, or by other organisations.
	7.1.0.9	The system shall ensure that traveller information service providers are aware of the traffic management strategy, so that they can provide information that conforms to it.
	7.1.0.10	The system shall be able to control urban roads and traffic.
	7.1.0.11	The system shall be able to control inter-urban roads and traffic.
	7.1.0.12	The system shall be able to use different traffic management techniques to control separate areas of the road network.
	7.1.0.13	The system shall be able to manage the urban/inter-urban interface.
7.1.1 Monitoring	7.1.1.1	The system shall be able to monitor sections of the road network to provide the current traffic conditions (e.g. flows, occupancies, speed and travel times etc.) as real time data.
	7.1.1.2	The system shall monitor urban roads and traffic.
	7.1.1.3	The system shall monitor inter-urban roads and traffic.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	7.1.1.4	The system shall be able to monitor traffic flow at, and the operation of, the road intersections of the network over which it has the control.
	7.1.1.5	The system shall be able to monitor the entire road network (network state surveillance tool).
	7.1.1.6	The system shall be able to monitor and record weather conditions, e.g. wind, fog, rain level, ice, etc.
	7.1.1.7	The system shall be able to monitor and record environmental (atmospheric and noise) pollution conditions, and provide an alarm when a certain threshold is exceeded.
	7.1.1.8	The system shall be able to measure the range of visibility and detect reductions caused by adverse weather and pollution conditions (but not darkness).
7.1.2 Planning	7.1.2.1	The system shall be able to use consistent historical data to complement real-time data, when necessary.
	7.1.2.2	The system shall be able to predict short, medium, and long-term traffic conditions, e.g. for minutes, hours and days ahead.
	7.1.2.3	The system shall be able to use historical data to complement predicted data, when necessary.
	7.1.2.4	The system shall be able to analyse road and traffic data to predict possible critical situations.
	7.1.2.5	The system shall be able to predict weather conditions, in particular the formation of fog and/or ice.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	7.1.2.6	The system shall be able to predict short, medium and long-term (e.g. for minutes, hours and days ahead) road travel produced environmental (atmospheric and noise) pollution conditions based on traffic and weather conditions.
	7.1.2.7	The system shall be able to provide historical and predicted data.
7.1.3 Traffic Control Centres	7.1.3.1	The system shall enable a TCC operator to control, possibly remotely, infrastructure elements (e.g. traffic lights, VMS).
	7.1.3.2	The system shall enable a TCC operator to log all significant events and to record free text messages prior to their output to travellers.
	7.1.3.3	The system shall be able to provide a graphical representation of the road network which includes relevant features (e.g. equipment, events, traffic condition etc.) to TCC operators.
	7.1.3.4	The system shall be able to activate control devices (e.g. traffic lights, VMS), either individually or in groups.
	7.1.3.5	The system shall enable TCC operators to make temporary changes to the normal control strategy in real-time.
	7.1.3.6	The system shall be able to implement planned control strategies for planned events, e.g. sport, cultural, etc.
	7.1.3.7	The system shall be able to support a database of all known (future) events.
7.1.4 Traffic Flow Control	7.1.4.1	The system shall be able to control the entries and exits to motorways.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	7.1.4.2	The system shall be able to provide ramp metering (e.g. using traffic signals or barriers) at selected locations (e.g. slip road entrances to high speed roads).
	7.1.4.3	The system shall provide Tidal Flow Control (reservation of lanes for exclusive use in one direction for a period, then the other direction for another period, on parts of the road network).
	7.1.4.4	The system shall be able to provide advice to drivers as they approach car parks (on-street and off-street, as well as motorway service area parking).
	7.1.4.5	The system shall be able to provide priority to selected travellers (e.g. cyclists, pedestrians) and/or vehicles (e.g. PT, emergency) through the road network, including on motorways (when applicable).
	7.1.4.6	The system shall be able to provide control measures for bridges so that warnings of weather conditions, vehicle restrictions and closure can be provided.
	7.1.4.7	The system shall be able to provide control measures for "tunnel" environments i.e. vehicle restrictions, fire detection, atmospheric pollution and closure.
	7.1.4.8	The system shall be able to provide co-ordinated traffic management operations during periods of mass movement across (many) regions.
	7.1.4.9	The system shall be able to provide specific traffic management for exceptional vehicles (e.g. very dangerous cargo, wide loads, etc.) when requested.
7.1.5 Exceptions Management	7.1.5.1	The system shall be able to provide control measures to protect road maintenance work and workers.
	7.1.5.2	The system shall be able to command drivers to change lanes on multi-lane roads.
	7.1.5.3	The system shall be able to change the direction of traffic flow on a carriageway in an orderly manner so that it does not create a safety hazard to any road user.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	7.1.5.4	The system shall be able to reverse the direction of traffic flow on parts of the urban network.
	7.1.5.5	The system shall be able to close roads and advise drivers of a suitable diversionary route for a period of time.
	7.1.5.6	The system shall be able to command certain classes of vehicle (e.g. heavy vehicles or tourist traffic) to take an alternative route for a period of time.
	7.1.5.7	The system shall be able to recommend re-routing strategies to reduce congestion or atmospheric pollution.
	7.1.5.8	The system shall request confirmation of all exceptional measures before they are executed.
7.1.6 O/D Computations	7.1.6.1	The system shall be able to provide Origin/Destination computations, and route assignment estimations, for the road network.
7.1.7 Speed Management	7.1.7.1	The system shall be able to show the maximum authorised speed of vehicles on selected carriageways to be shown to drivers, and to detect violators.
	7.1.7.2	The system shall be able to set variable speed limits on parts of the road network.
	7.1.7.3	The system shall be able to calculate recommended speed limits for given traffic and weather conditions, and road network characteristics.
	7.1.7.4	The system shall be able to transmit recommended speed limits to equipped vehicles.
	7.1.7.5	The system shall be able to support a database of all speed limits on the road network.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	7.1.7.6	The system shall be able to provide vehicles with information about the road network, e.g. speed limits, road hazards, junctions etc.
7.1.8 Roadside-Vehicle Communications	7.1.8.1	The system shall be able to transmit information to a vehicle to update its on-board database.
7.1.9 Adaptive Traffic Control	7.1.9.1	The system shall be able to provide green wave management for all vehicles.
	7.1.9.2	The system shall be able to minimise delays of all vehicles using adaptive signal control
	7.1.9.3	The system shall be able to override the current method of traffic control to grant priority to selected vehicles, e.g. PT, emergency vehicles.
	7.1.9.4	The system shall be able to give priority to PT vehicles in a manner that minimises the impact on other road users.
7.1.10 Lane Management	7.1.10.1	The system shall be able to reserve certain traffic lanes exclusively to specific classes of vehicles (e.g. high occupancy vehicles, or buses) and to detect violators.
7.1.11 Parking Management	7.1.11.1	The system shall be able to monitor the current usage of the parking facilities.
	7.1.11.2	The system shall be able to forecast the need for parking slots.
	7.1.11.3	The system shall be able to identify those vehicles, or their drivers, which violate the parking regulations, e.g. fail to pay, stay too long, etc.
7.1.12 Vulnerable Road Users	7.1.12.1	The system shall be able to control pedestrian and cycle crossings.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	7.1.12.2	The system shall be able to monitor and control pedestrian and cycle crossings in order to optimise their use.
7.2 Incident Management		
7.2.0 Objectives	7.2.0.1	The system shall detect and respond to various incidents on the road network.
	7.2.0.2	The system shall not do anything to reduce road safety.
	7.2.0.3	The system shall not do anything that might aggravate, or cause, an incident.
	7.2.0.4	The system shall assist the emergency services to provide an effective response to road traffic incidents.
	7.2.0.5	The system shall collect and filter emergency calls from travellers in the road network using a variety of types of communication, e.g. road-side telephones, mobile phones, (automatic) on-board 'MayDay' etc.
	7.2.0.6	The system shall minimise the time between the occurrence of an incident and its detection.
	7.2.0.7	The system shall be able to validate that an incident has occurred in order to avoid false alarms.
	7.2.0.8	The system shall be able to suggest one or more responses for dealing with an incident.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	7.2.0.9	The system shall be able to run (pre-) defined incident mitigation strategies automatically.
7.2.1 Emergency Services	7.2.1.1	The system shall be able to locate and identify emergency vehicles on the road network.
	7.2.1.2	The system shall be able to co-ordinate the emergency and rescue services once an incident has been detected, and until the situation has returned to normal.
	7.2.1.3	The system shall provide communications between the emergency services, hospitals and TCCs for the provision of incident information.
7.2.2 Information Management	7.2.2.1	The system shall be able to collect and store data on each incident, e.g. location, type, severity, number & type of vehicles involved, the emergency/rescue vehicles needed etc.
	7.2.2.2	The system shall be able to identify and classify all incidents on the road network.
	7.2.2.3	The system shall be able to provide information on each incident to TICs for onward transmission to travellers.
7.2.3 Reporting	7.2.3.1	The system shall be able to produce incident data statistics, e.g. frequencies of occurrence, by time, type and location; identification of "high risk" locations on the road network; performance of the incident detection system.
7.2.4 Post-Incident Management	7.2.4.1	The system shall be able to minimise the consequences of an incident on the road network for those travellers who are not involved.
	7.2.4.2	The system shall be able to monitor the aftermath of an incident.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
7.2.5 Pre-Incident Management	7.2.5.1	The system shall be able to detect "non-vehicle" incidents before they can escalate into traffic accidents, e.g. bad weather conditions, objects on the road, ghost drivers, etc.
	7.2.5.2	The system shall be able to provide local warnings on dangerous sections of the road network.
7.2.6 Hazardous Goods	7.2.6.1	The system shall be able to advise the emergency services on any hazardous goods that have been involved in an incident.
7.3 Demand Management		
7.3.0 Objectives	7.3.0.1	The system shall provide information that will influence travellers' decisions regarding aspects of their journey, e.g. destinations, time, mode of travel, route etc.
	7.3.0.2	The system shall receive up-to-date information on those factors that will influence the demand management strategy, e.g. traffic levels, car park usage, other modes usage, fares, tolls, etc.
	7.3.0.3	The system shall be able to recommend a strategy to reduce demand.
	7.3.0.4	The system shall be able to simulate a demand management strategy on the road network.
	7.3.0.5	The system shall be able to simulate potential capacity reduction, e.g. due to road works.
7.3.1 Zoning	7.3.1.1	The system shall be able to create a "traffic collar" and limit the entry of all vehicles into a defined area according to (a set of) criteria.
	7.3.1.2	The system shall be able to recommend alternative routes (e.g. that take into account the needs of heavy vehicles (and hazardous goods)) when required.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	7.3.1.3	The system shall be able to control the access of vehicles into a zone using a form of identification, e.g. electronic tags, number plate readers, etc.
	7.3.1.4	The system shall be able to use physical barriers to control the access of vehicles into a zone.
7.3.2 Pricing Management	7.3.2.1	The system shall be able charge for the use of a section of road, or facility (e.g. bridge, tunnel etc.), based on given policy decisions, e.g. duration, distance, congestion etc.
	7.3.2.2	The system shall be able to adjust toll fees according to a given pricing strategy.
	7.3.2.3	The system shall be able to adjust parking fees according to a given pricing strategy.
	7.3.2.4	The system shall be able to adjust public transport fares according to a given pricing strategy.
7.3.3 Parking Management	7.3.3.1	The system shall be able to implement parking strategies in specific areas, including P+R strategies.
7.3.4 Vulnerable Road Users	7.3.4.1	The system shall be able to provide information to promote the use of cycles and walking.
7.3.5 Car Sharing	7.3.5.1	**Deleted and moved to 6.1.0.7**
7.4 Safety Enhancements for Vulnerable Road Users		These are covered in Group 7.1 (ISO Service 7)
7.5 Intelligent Junctions and Links		No EU User Need identified

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
8 Intelligent Vehicle Systems		*This Group contains the functions found within a vehicle, including vision enhancement, longitudinal and lateral collision avoidance, lane keeping, platooning, speed control, driver alertness, 'May Day' initiation, etc.*
8.1 Vision Enhancement		*This service does not require communications with any other vehicle or infrastructure and is therefore outside the scope of the European ITS Framework Architecture.*
8.1 Basic Services	8.1.0.1	**Deleted - outside new system boundary**
	8.1.0.2	**Deleted - outside new system boundary**
	8.1.0.3	**Deleted - outside new system boundary**
	8.1.0.4	**Deleted - outside new system boundary**
8.2 Automated Vehicle Operation		
8.2.0 Objectives	8.2.0.1	The system shall provide support for direct or indirect assistance for the driving task.G372
8.2.1 Collision Avoidance	8.2.1.1	The system shall be able to inform another vehicle when the host vehicle has detected that a collision is imminent.
	8.2.1.2	**Deleted - outside new system boundary**

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	8.2.1.3	**Deleted - outside new system boundary**
8.2.2 Lane Keeping	8.2.2.1	The system shall be able to provide support to control the lateral dynamic behaviour of the vehicle automatically, and keep the vehicle within its current lane of the carriageway.
	8.2.2.2	The system shall be able to provide support to provide the driver with information, or active steering support, to assist him/her to keep within the current lane of the carriageway.
8.2.3 Platooning	8.2.3.1	The system shall provide support to create a platoon of vehicles, in particular trucks ("Electronic Towbar" or "Road Train").
	8.2.3.2	**Deleted - outside new system boundary**
	8.2.3.3	**Deleted - outside new system boundary**
	8.2.3.4	**Deleted - outside new system boundary**
	8.2.3.5	**Deleted - outside new system boundary**
	8.2.3.6	**Deleted - outside new system boundary**
	8.2.3.7	**Deleted - outside new system boundary**
8.2.4 Short Range Communications	8.2.4.1	The system shall be able to communicate with other equipped vehicles, and/or the infrastructure, to exchange data for automatic vehicle control.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
8.2.5 Speed Control	8.2.5.1	The system shall be able to provide support to limit the speed of a vehicle automatically to the a given, but variable, maximum (intelligent speed adaptation)
	8.2.5.2	The system shall be able to receive (variable) mandatory speed limits from outside the vehicle.
	8.2.5.3	**Moved to 8.5.5.1**
	8.2.5.4	The system shall be able to display continuously to the driver the current mandatory speed limit.
	8.2.5.5	**Deleted - outside new system boundary**
	8.2.5.6	**Deleted - identical to 8.2.5.2**
8.2.6 Supporting Tasks	8.2.6.1	**Deleted - outside new system boundary**
	8.2.6.2	**Deleted - outside new system boundary**
	8.2.6.3	**Deleted - outside new system boundary**
	8.2.6.4	**Deleted - outside new system boundary**
	8.2.6.5	**Deleted - outside new system boundary**

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	8.2.6.6	**Deleted - outside new system boundary**
	8.2.6.7	**Deleted - outside new system boundary**
8.3 Longitudinal Collision Avoidance		
8.3.0 Objectives	8.3.0.1	The system shall be able to provide the driver with assistance in longitudinal separation from other vehicles in, or entering, the host vehicle's lane.
	8.3.0.2	**Deleted - outside new system boundary**
	8.3.0.3	**Deleted - outside new system boundary**
8.3.1 Collision Avoidance	8.3.1.1	**Deleted - outside new system boundary**
	8.3.1.2	The system shall be able to provide support to warn the driver when the vehicle in front is too close.
	8.3.1.3	The system shall be able to provide support to determine a safe vehicle trajectory relative to the lane/road boundaries.
	8.3.1.4	**Deleted - outside new system boundary**
	8.3.1.5	**Deleted - outside new system boundary**

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	8.3.1.6	**Deleted - outside new system boundary**
	8.3.1.7	**Deleted - outside new system boundary**
8.3.2 Supporting Tasks	8.3.2.1	**Deleted - outside new system boundary**
	8.3.2.2	**Deleted - outside new system boundary**
	8.3.2.3	**Deleted - outside new system boundary**
	8.3.2.4	**Deleted - outside new system boundary**
	8.3.2.5	**Deleted - outside new system boundary**
8.4 Lateral Collision Avoidance		
8.4.0 Objectives	8.4.0.1	The system shall provide support to monitor for hazards involved in lane keeping, lane changing, entering and leaving high speed roads, and overtaking.
	8.4.0.2	**Deleted - outside new system boundary**
8.4.1 Collision Avoidance	8.4.1.1	The system shall be able to provide support to warn the driver if the host vehicle moves towards a volume of road space that is about to be occupied, or already occupied, by another road user.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	8.4.1.2	**Deleted - outside new system boundary**
	8.4.1.3	The system shall be able to provide support to determine a safe vehicle trajectory relative to the lane/road boundaries.
	8.4.1.4	**Deleted - outside new system boundary**
8.4.2 Lane Keeping	8.4.2.1	The system shall be able to provide support to detect the position of the vehicle relative to lane boundaries and/or roadway shoulders.
	8.4.2.2	The system shall be able to provide support to warn the driver when the vehicle approaches or exceeds the lane boundaries.
8.4.3 Supporting Tasks	8.4.3.1	**Deleted - outside new system boundary**
	8.4.3.2	**Deleted - outside new system boundary**
	8.4.3.3	**Deleted - outside new system boundary**
	8.4.3.4	**Deleted - outside new system boundary**
	8.4.3.5	**Deleted - outside new system boundary**
8.5 Safety Readiness		

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
8.5.0 Basic Services	8.5.0.1	The system shall minimise the risk of an accident due to the impaired alertness of the driver.
	8.5.0.2	The system shall be able to detect impairment of the driver, e.g. alcohol/drug abuse, drowsiness, sudden health problems, prolonged inattention, etc.
	8.5.0.3	The system shall be able to warn the driver when a lack of alertness is detected.
	8.5.0.4	The system shall be able to warn surrounding drivers that this driver has a problem.
8.5.1 May Day	8.5.1.1	The system shall be able to make a 'May Day' call.
	8.5.1.2	The system shall be able to detect that the vehicle has been involved in an accident, identify its location, and initiate a 'May Day' call automatically.
	8.5.1.3	The system shall be able to identify the vehicle's location, and make a 'May Day' call on the command of a vehicle occupant.
	8.5.1.4	The system shall be able to detect that the driver is impaired, identify its position, and initiate a 'May Day' call automatically.
8.5.2 Automatic Parking	8.5.2.1	The system shall be able to manoeuvre the vehicle to the roadside automatically, when the driver does not respond.
	8.5.2.2	**Deleted - outside new system boundary**
8.5.3 Environmental Monitoring	8.5.3.1	**Deleted - outside new system boundary**

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	8.5.3.2	**Deleted - outside new system boundary**
	8.5.3.3	**Deleted - outside new system boundary**
	8.5.3.4	The system shall be able to collect information about the vehicle and its environment for other organisations to use, i.e. probe or floating car data.
8.5.4 Accident Data Recording	8.5.4.1	The system shall be able to record data about an accident and the journey immediately before (black box).
	8.5.4.2	The system shall be able to provide data about an accident or a journey to an authorised person, e.g. the police.
8.5.5 Traffic Information & Signs	8.5.5.1	The system shall provide "copies" of the traffic signs that are relevant to the current section of the road (e.g. speed limit, road hazards, and junctions) to the driver at all times.
	8.5.5.2	The system shall be able to send to following vehicles "copies" of the traffic signs, or information about the local traffic (e.g. sudden congestion), that it may be useful to receive in advance
8.5.6 Vehicle Information	8.5.6.1	The system shall be able to provide a unique ID to an authorised authority on request (i.e. electronic vehicle identification EVI)).
8.5.7 Improper Use	8.5.7.1	The system shall be able to provide support for detecting that the vehicle is not being used properly, e.g. being stolen.
8.6 Pre-crash Restraint Deployment		*This service does not require communications with any other vehicle or infrastructure and is therefore outside the scope of the European ITS Framework Architecture.*
8.6.0 Basic Services	8.6.0.1	**Deleted - outside new system boundary**

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	8.6.0.2	**Deleted - outside new system boundary**
9 Freight and Fleet Management		*This Group contains all the activities associated with FFM, including statutory data collection and reporting; orders and document mgt; planning, scheduling, monitoring, reporting & operations mgt; vehicle and cargo safety; mgt of inter-modal interfaces.*
9.1 Commercial Vehicle Pre-Clearance		
9.1.0 Basic Services	9.1.0.1	The system shall enable the device storing the information recorded by the tachograph to be physically removed from the vehicle.
	9.1.0.2	The system shall enable all electronically recorded information stored on-board the vehicle to be interrogated whenever required.
	9.1.0.3	The system shall be able to communicate with road-side equipment whilst the vehicle is travelling.
	9.1.0.4	The system shall protect the tachograph against fraud, and from being accessed by unauthorised persons.
9.2 Commercial Vehicle Administrative Processes		
9.2.0 Basic Services	9.2.0.1	The system shall be able to store all necessary statutory (i.e. required by law) information on-board the vehicle.
	9.2.0.2	The system shall be able to provide communications between fleet operators and the relevant authorities for the transfer of registration data (e.g. vehicle identity, load, etc.) plus payments.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
9.3 Automated Roadside Safety Inspection		
9.3.0 Basic Services	9.3.0.1	The system shall be able to transfer safety-related information (e.g. brakes status, driving time etc.) from the vehicle to the road-side whilst the vehicle is travelling.
	9.3.0.2	The system shall enable the weight of a commercial vehicle to be measured whilst the vehicle is travelling (weigh-in-motion).
	9.3.0.3	The system shall be able to collect evidence automatically about a vehicle that has violated the regulations.
9.4 Commercial Vehicle On-Board Safety Monitoring		
9.4.0 Basic Services	9.4.0.1	The system shall be able to monitor the vehicle and cargo safety status, and the behaviour of the driver (e.g. duration of driving time, excess speed).
	9.4.0.2	The system shall issue a warning to the driver whenever a threshold for a vehicle or cargo safety status, or driver behaviour, has been exceeded, and the relevant data shall be recorded.
	9.4.0.3	The system shall be able to identify the vehicle's location, and make a 'May Day' call to the emergency services on the command of a vehicle occupant.
	9.4.0.4	The system shall be able to detect that the vehicle has been involved in an incident, identify its location, and initiate a 'May Day' call to the emergency services automatically.
	9.4.0.5	The system shall be able to report to the home base when incorrect driver behaviour persists (e.g. driver is ill, or an unskilled driver is in control).
9.5 Commercial Fleet Management		

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
9.5.0 Objectives	9.5.0.1	The system shall support fleet and freight operations for all sizes of operator, including single vehicle companies.
	9.5.0.2	The system shall be able to incorporate additional regulations as and when required, and provide an indication of compliance.
9.5.1 Road Freight Management	9.5.1.1	The system shall enable the exchange of information, e.g. market enquiries, offer and supplier evaluation data, contracts, invoices, payments etc. between parties, e.g. consignors, consignees etc.
	9.5.1.2	The system shall be able to provide information about a cargo, (e.g. loading status, contents, delays, delivery status, disputes etc.) to the fleet management centre in real time.
	9.5.1.3	The system shall be able to prepare and update official documents, e.g. transport orders, customs declarations, hazardous goods declarations, notices of dispatch etc. in a controlled manner, and assist the process of checking them.
	9.5.1.4	The system shall be able to exchange official documents (e.g. transport orders, customs declarations, hazardous goods declarations, notices of dispatch etc.) between vehicles, the fleet management centre and the relevant authorities in a controlled manner
	9.5.1.5	The system shall be able to transfer any information about a journey (e.g. route, (hazardous or oversize) cargo, etc.) to the relevant authorities (e.g. TCCs, TICs etc.) when required.
	9.5.1.6	The system shall be able to track the physical (e.g. temperature) and administrative status (e.g. shipment status, delivery status, etc.) of a cargo throughout its journey.
	9.5.1.7	The system shall enable the consignee to receive information, (e.g. delivery note, invoice etc.) directly from the vehicle.
	9.5.1.8	The system shall enable the shipper to receive information (e.g. destination, contractual data etc.) directly from the vehicle.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	9.5.1.9	The system shall be able to confirm electronic documents with electronic signatures.
	9.5.1.10	The system shall be able to reconstitute the route taken by any item, and the contracts that have been fulfilled (tracing function).
	9.5.1.11	The system shall be able to analyse the costs and performance of the FFM operations.
	9.5.1.12	The system shall be able to transfer any data that has been recorded on a vehicle to the home base and/or any other authorised third party.
9.5.2 Road Freight Fleet Management	9.5.2.1	The system shall be able to support some aspects of the planning, monitoring, controlling and evaluation of vehicle fleet operations (see below).
	9.5.2.2	The system shall be able to assign tasks to vehicles and drivers, e.g. pick-up and delivery instructions.
	9.5.2.3	The system shall be to optimise the scheduling of vehicles.
	9.5.2.4	The system shall be to optimise the scheduling of drivers.
	9.5.2.5	The system shall be able to optimise the assignment of loads.
	9.5.2.6	The system shall be able to weigh the vehicle, compare it with the expected weight and report on any discrepancies or overweight.
	9.5.2.7	The system shall be able to transfer all information relating to a cargo (e.g. task assignment, load planning etc.) to the vehicle.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	9.5.2.8	The system shall be able to provide an optimal route for each 'normal' vehicle.
	9.5.2.9	The system shall be able to provide suitable routes for 'abnormal' vehicles (e.g. oversized, overweight, hazardous cargo etc.) when requested.
	9.5.2.10	The system shall be able to predict a time of arrival.
	9.5.2.11	The system shall be able to communicate with other systems, e.g. workshop, customs, road operator, police, etc.
	9.5.2.12	The system shall be able to provide a driver with a suitable alternative route, when the original planned route becomes unavailable.
	9.5.2.13	The system shall be able to locate, identify and monitor the status of a vehicle, equipment or cargo at any time.
	9.5.2.14	The system shall be able to inform the driver about a change of task, e.g. change of pick-up, delivery, route etc.
	9.5.2.15	The system shall be able to schedule the maintenance of vehicles, equipment and cargo units.
	9.5.2.16	The system shall be able to monitor and analyse the vehicle fleet and drivers' staff costs and performance.
9.5.3 Road Vehicle, Driver, Equipment and Cargo Management	9.5.3.1	The system shall support the activities associated with the management of individual vehicles, i.e. not related to the vehicle fleet as a whole.
	9.5.3.2	The system shall be able to store all necessary commercial and statutory vehicle, driver, trip and freight information on-board the vehicle.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	9.5.3.3	The system shall be able to receive all necessary commercial and statutory vehicle, driver, trip and freight information from the fleet management centre at any time.
	9.5.3.4	The system shall be able to transfer official documents (e.g. transport orders, customs declarations, hazardous goods declarations, notices of dispatch etc.) between vehicles and relevant parties in a controlled manner.
	9.5.3.5	The system shall enable the driver to receive traffic information.
	9.5.3.6	The system shall enable the driver to receive weather information.
	9.5.3.7	The system shall enable voice communication between the vehicle and the fleet management centre.
	9.5.3.8	The system shall be able to assist the process of checking the vehicle, equipment and cargo documents.
	9.5.3.9	The system shall be able to record data (e.g. from vehicle, equipment, cargo unit sensors, and driver input etc.) for later processing.
	9.5.3.10	The system shall be able to record driver's hours, and report on available hours, deviations and disturbances.
	9.5.3.11	The system shall enable the driver to receive a change (e.g. to the route, task, etc.) at any time.
	9.5.3.12	The system shall be able to record the actual route taken.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	9.5.3.13	The system shall be able to report when a substantial deviation from the intended route has been used (e.g. to detect a possible theft of the vehicle).
	9.5.3.14	The system shall be able to determine a delay in the planned time of arrival, and communicate this to the fleet management centre.
	9.5.3.15	The system shall enable automatic payment, e.g. of tolls etc.
	9.5.3.16	The system shall be able to detect when the status of the cargo (e.g. changes in temperature or humidity) exceeds a given limit during the transport cycle, and trigger an alarm.
	9.5.3.17	The system shall be able to adjust the temperature and humidity of a freight unit remotely, during the transport cycle.
	9.5.3.18	The system shall be able to monitor the vehicle and cargo unit for erroneous procedures (e.g. doors being opened incorrectly) and trigger an anti-theft alarm message to the home base and/or any relevant body.
	9.5.3.19	The system shall be able to provide communications between the vehicle and local breakdown support, e.g. for repair of punctured tyres.
	9.5.3.20	The system shall enable automatic remote vehicle diagnostics.
	9.5.3.21	The system shall be able to monitor and analyse the vehicle and driver's staff costs and performance.
	9.5.3.22	The system shall be able to provide the driver with a route to a destination

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	9.5.3.23	The system shall be able to record the payment of tolls.
	9.5.3.24	The system shall be able to monitor the weight of the cargo, check conformance with the documentation and report any variations.
	9.5.3.25	The system shall be able to record the details of any relevant legal offence committed by the driver, vehicle or cargo that has been registered with the authorities and provide them to authorised personnel.
	9.5.3.26	The system shall be able to record supplementary information about events recorded by the tachograph, e.g. reason for waiting time.
	9.5.3.27	The system shall be able to provide the driver with relevant information about client sites (consignors & consignees), e.g. location, pick-up/delivery times, average waiting time.
	9.5.3.28	The system shall be able to collect and record information about collection/delivery operations, e.g. arrival & waiting times, additional work, incidents.
	9.5.3.29	The system shall be able to time-stamp data recorded during a trip, e.g. current location.
	9.5.3.30	The system shall be able to produce a message about a new collection of cargo that has been made.
	9.5.3.31	The system shall be able to provide a list of all the servicing and repair actions that have been done, and any special accessories that have been installed, for confirmation by the driver prior to departure.
	9.5.3.32	The system shall be able to identify cargo, e.g. during loading and unloading, compare it for compliance with a manifest, and issue a warning in case of non-compliance.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	9.5.3.33	The system shall be able to identify the vehicle and/or equipment, e.g. to gain access to a controlled site.
	9.5.3.34	The system shall be able to locate an item of cargo within the vehicle and/or equipment.
	9.5.3.35	The system shall be able to record the location of operational points, e.g. pick up, delivery, home base.
	9.5.3.36	The system shall be able to transfer site access details to the driver from the home base.
	9.5.3.37	The system shall be able to record guidance details of regular and/or frequent trips so that they do not have to be re-calculated.
	9.5.3.38	The system shall be able to report automatically the receipt and/or reading of incoming messages to the sender.
	9.5.3.39	The system shall be able to add a time stamp and/or vehicle position to any message sent from the vehicle; this data to be added at the time the message was formulated and/or the time it was sent.
	9.5.3.40	The system shall be able to record details about pallets, and provide this information to the home base when required.
	9.5.3.41	The system shall be able to assist the process of confirming that the driver is suitable qualified to take a given cargo, e.g. dangerous goods.
	9.5.3.42	The system shall provide information in the native language of the driver.
9.5.4 Freight Distribution	9.5.4.1	The system shall manage freight and fleets in such a way that the impact of commercial vehicles on the urban environment is minimised.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	9.5.4.2	The system shall be able to manage freight and fleets in such a way that the distribution of goods in an urban area will be made in the most efficient manner.
	9.5.4.3	The system shall be able to manage the use of (un-)loading zones to aid the distribution of goods in an urban area.
	9.5.4.4	The system shall be able to book places in an equipment/container storage area.
	9.5.4.5	The system shall be able to forecast the use of an equipment/container storage area
9.5.5 Inter-Modal Interface	9.5.5.1	The system shall be able to manage the use of the interface between freight transport modes in an effective manner.
	9.5.5.2	The system shall be able to support a combined transport interface management function.
	9.5.5.3	The system shall be able to support a freight transport order processing function that is common to all modes of transport.
	9.5.5.4	The system shall ensure that the information associated with a vehicle, equipment or container is available when that vehicle, equipment or container arrives at a modal interchange.
	9.5.5.5	The system shall enable the matching of demand for, and supply of, (multi-modal) freight transport resources.
10 Public Transport Management		*This Group contains the activities associated with public transport (PT), demand responsive PT, Shared PT, on-trip PT Information and Traveller Security. It includes management, scheduling, monitoring, information handling, communications and PT priority.*

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
10.1 Public Transport Management		
10.1.0 Objectives	10.1.0.1	The system shall provide effective and attractive PT.
	10.1.0.2	The system shall be able to manage one or more modes of PT.
	10.1.0.3	The system shall be able to assist PT operators in planning for the optimum use of existing resources to meet the demand.
	10.1.0.4	The system shall be able to analyse records of usage and operational data, and passenger surveys, to assist in the planning process.
10.1.1 Scheduling	10.1.1.1	The system shall be able to produce optimum vehicle schedules that consider many issues, e.g. links, points, day types, vehicle types, demand types, time bands, limits based on demand etc.
	10.1.1.2	The system shall be able to produce optimum driver schedules.
10.1.2 Monitoring	10.1.2.1	The system shall be able to receive information about the identity, location, status and occupancy all vehicles in the fleet in real time.
	10.1.2.2	The system shall be able to monitor the number of travellers waiting at a pick-up point, e.g. Park and Ride site.
10.1.3 Incident Management	10.1.3.1	The system shall be able to identify an incident and to revise its services so that passengers may complete their journeys.
	10.1.3.2	The system shall be able to schedule PT operations dynamically so that incidents or unexpected events can be handled with the minimum disruption.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
10.1.4 Information Handling	10.1.4.1	The system shall be able to inform travellers about PT operations for a mode of transport, e.g. travel times, delays, fares etc.
	10.1.4.2	The system shall be able to provide information about a PT service to the travellers before and during the journey.
	10.1.4.3	The system shall be able to provide an update of arrival/departure information in real-time and present it to travellers of that mode before and during the journey.
	10.1.4.4	The system shall be able to provide information that is relevant to travellers with special needs, e.g. obstacles, manually operated doors, manual payment systems, restrictions for guide dogs, etc.
10.1.5 Communications	10.1.5.1	The system shall be able to provide two-way data and voice communication between PT vehicles and a central location.
10.1.6 Priority	10.1.6.1	The system shall be able to select those vehicles that need to be given priority and communicate the requests to the TCC.
10.2 Demand Responsive Public Transport		
10.2.0 Objectives	10.2.0.1	The system shall be able to provide both planned and spontaneous trips.
	10.2.0.2	The system shall be able to satisfy a variety of booking types, e.g. last minute, return trip (including weeks/months ahead), being able to take advantage of late opening hours, special facilities etc.
	10.2.0.3	The system shall be able to provide access to a wide variety of destinations over a large geographic area.
	10.2.0.4	The system shall be able to obtain service information so that other journeys may include other modes of transport.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	10.2.0.5	The system shall provide the traveller with an easy to use user interface that minimises the amount of data to be provided by the traveller.
10.2.1 Information Handling	10.2.1.1	The system shall provide all the information necessary to prepare a journey.
	10.2.1.2	The system shall enable the user to book a trip from a variety of access points, e.g. internet, "on-street" terminals, etc.
	10.2.1.3	The system shall be able to predict the time that will be taken to make a particular trip.
	10.2.1.4	The system shall be able to provide a service in which travellers wait a minimum period of time for a Demand Responsive PT vehicle to arrive.
	10.2.1.5	**Deleted and moved to 10.2.4.2 with changes**
	10.2.1.6	The system shall be able to locate and identify the Demand Responsive PT vehicles.
	10.2.1.7	The system shall be able to schedule the Demand Responsive PT vehicles in real-time.
	10.2.1.8	The system shall be able to plan the Demand Responsive PT vehicle trips in the most efficient manner.
	10.2.1.9	The system shall enable the traveller to specify any special needs that he or she may have, e.g. disability, young children, etc.
10.2.2 Communications	10.2.2.1	The system shall be able to provide two-way data communications between the Demand Responsive PT vehicles and a control centre.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	10.2.2.2	The system shall be able to provide two-way voice communications between the Demand Responsive PT vehicles and a control centre for non-routine use.
10.2.3 Route Guidance	10.2.3.1	The system shall be able to inform the driver about the optimum route, according to specified criteria, that he or she should take for one or more trips.
10.2.4 Reporting	10.2.4.1	The system shall be able to provide statistics of usage for reporting to managers, and use in day-to-day operations.
	10.2.4.2	The system shall be able to provide statistics on how well it actually satisfies its customers, e.g. response times, for reporting to its users.
10.3 Shared Transport Management		
10.3.0 Basic Services	10.3.0.1	The system shall support car pooling, i.e. the sharing of a small number of cars between a larger set of people; normally the cars are the property of the system owner.
	10.3.0.2	The system shall support car sharing, i.e. the allocation of a single car to a number of people for a single journey; normally one of them owns the car.
	10.3.0.3	The system shall be able to register people either as a driver and/or a (paying) passenger.
	10.3.0.4	The system shall enable drivers and passengers to input pooling or sharing requests from a variety of access points, using the minimum amount of data
	10.3.0.5	The system shall support an interactive database of car sharers that will permit them to find suitable partners.
	10.3.0.6	The system shall be able to record each trip made, both for statistical purposes and to levy a possible charge.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
	10.3.0.7	The system shall provide the cost of the journey to the traveller before he or she accepts the service that is being offered, unless the service is free.
	10.3.0.8	The system shall support a database containing the prices being charged by drivers for carrying passengers; this shall be available to drivers and passengers before they accept the service being offered.
	10.3.0.9	The system must provide a positive indication to the drivers if the service being offered is free, and what additional charges (if any) they can levy on the passengers.
10.4 On-Trip Public Transport Information		
10.4.0 Objectives	10.4.0.1	The system shall be able to inform travellers about all PT operations, e.g. bus, rail, metro, air, taxi, car pooling etc.
10.4.1 Information Handling	10.4.1.1	The system shall be able to provide in-vehicle general (dynamic) PT information, as well as the arrival time at, and name of, the next stop for this vehicle.
	10.4.1.2	The system shall be able to provide general (dynamic) PT information, personal safety information, as well as the arrival times of next vehicles, delays, etc. at mode interchanges, e.g. bus stops, in metro, railway or bus stations, etc.
	10.4.1.3	The system shall be able to provide information that is relevant to travellers with special needs, e.g. obstacles, manually operated doors, restrictions for guide dogs and/or push chairs, etc.
10.4.2 Traveller Interaction	10.4.2.1	The system shall provide service information which is legible, understandable and capable of being assimilated very quickly by all travellers, including those with special needs.
	10.4.2.2	The system shall provide information in the native language at the output location, and/or from a user selected choice of other appropriate foreign languages, when applicable.

User Need Group, Service and Topic Numbers	User Need Number	User Need Description
10.5 Public Travel Security		
10.5.0 Basic Services	10.5.0.1	The system shall monitor for, and collect evidence on, illegal activities in various locations, e.g. car parks, PT facilities, PT vehicles, etc.
	10.5.0.2	The system shall be able to provide two-way data and voice communication between PT vehicles and a central location.
	10.5.0.3	The system shall summon assistance when requested by drivers, or other travellers, e.g. after disorderly behaviour amongst certain passengers.