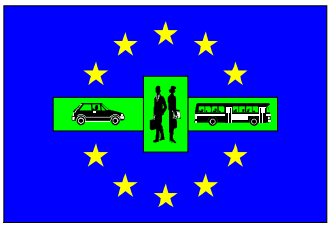

European ITS Framework Architecture

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Overview

Annex 1 – Trace Tables

Annex 1 of D3.6 - Issue 1

August 2000

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Table of Contents

Tables

Executive Summary

This Document is provided as an Annex to the Main Document, D 3.6 European ITS Framework Architecture Overview. The Main Document is designed to act as the "base" Document for the European ITS Framework Architecture Documentation. This Annex provides the Trace Tables that are an aid to the Architecture development process described in the Main Document and in Chapters 4 and 5 of the European ITS Physical Architecture Document (D 3.2).

1. Introduction

1.1. Outline

This Document provides an Annex to the main part of the European ITS Framework Architecture Overview Document (D 3.6). It contains Trace Tables that are to be used in the Architecture development process described in the European ITS Physical Architecture Document (D 3.2).

1.2. Where the document fits in the Architecture Documentation

The document is the only Annex to the main European ITS Framework Architecture Overview Document (D 3.6).

1.3. List of Abbreviations

The abbreviations that are used in this Document will be defined in the Main Document.

2. Trace Table of User Needs against Functions

2.1. Introduction

This Chapter contains the first of the Trace Tables for use in the development of an Architecture or a Physical System. This process is described in Chapters 5 and 4 (respectively) of the Main Document of the European ITS Physical Architecture Document (D 3.2). The Table in this Chapter provides access to the relationship between User Needs and Functions.

2.2. Use of User Needs against Functions Trace Table

The following pages of this Chapter provide the Table that shows the European ITS User Needs and the European ITS Functions that serve them. In some cases there may be more than one Function for a particular User Need. This should be expected and can be for one or more of the following three reasons.

1. It is often easier to understand what is in complex Functions if they are divided into smaller less complex. Functions.
2. Using smaller less complex Functions makes the Functional Architecture more modular thereby promoting the re-use of modules with the same functionality.
3. Physical Systems that are produced from the Architecture can be specified with only the functionality that they require. The amount of additional (and possibly unused) functionality that can be included by default can be reduced to a minimum.

The process of dividing complex Functions into smaller less complex Functions is sometimes called “functional decomposition”. It is often used in Architecture creation work for the reasons that are described above.

To use the Table on the following pages, first select the User Needs for which the functionality needs to be determined. The Number of descriptions of these are listed in the two left hand columns of the Table. For the selected User Need(s), it is then possible to see the Function(s) that serve it(them), i.e. fulfil the requirements that they contain. The numbers and names of these Functions are shown in the right hand columns of the rows in which the User Need(s) was(were) found.

If necessary, the full range of User Needs served by a particular Function can also be determined. This is can be achieved by reference to the Table of Functions and User Needs which is described in Chapter 3.

Table 1 User Needs and the Functions that serve them

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	4.1.1	Estimate Vehicle Indicators
		4.2.1	Plan & Schedule Services
		4.4.1	Optimise Control Action
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.	4.2.1	Plan & Schedule Services
		4.4.1	Optimise Control Action
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.	3.1.1.4	Manage Urban Traffic Data
		3.1.2.4	Manage Inter-urban Traffic Data
		3.3.2	Implement Demand Management Strategy
2.1.1.3	The system shall be able to collect traffic data for road network use analysis and prediction calculations.	3.1.1.1	Collect Urban Traffic Data
		3.1.1.2	Monitor Urban Car Park Occupation

User Need		Function	
Number	**Description**	**Number**	**Name**
2.1.1.3	The system shall be able to collect traffic data for road network use analysis and prediction calculations.	3.1.1.4	Manage Urban Traffic Data
		3.1.2.1	Collect Inter-urban Traffic Data
		3.1.2.2	Monitor Service Area Vehicle Occupation
		3.1.2.4	Manage Inter-urban Traffic Data
		4.1.2	Predict Vehicle Indicators
2.1.2.1	The system shall be able to model the road network for strategic planning calculations.	3.1.1.3	Provide Urban Traffic Forecasts and Strategies
		3.1.2.3	Provide Inter-urban Traffic Forecasts and Strategies
2.1.2.2	The system shall be able to develop and implement traffic environmental management strategies based on current and predicted traffic conditions.	3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.5.1	Provide Inter-urban Traffic Management
2.1.2.3	The system shall be able to assist in the planning of (inter-modal) routes.	3.1.1.3	Provide Urban Traffic Forecasts and Strategies
		3.1.1.4	Manage Urban Traffic Data
		3.1.2.3	Provide Inter-urban Traffic Forecasts and Strategies
		3.1.2.4	Manage Inter-urban Traffic Data
2.1.2.4	The system shall be able to simulate a demand management strategy on the road network.	3.3.3	Develop Demand Management Strategy
2.1.2.5	The system shall be able to simulate potential capacity reduction, e.g. due to road works.	3.3.3	Develop Demand Management Strategy

User Need		Function	
Number	**Description**	**Number**	**Name**
2.1.3.1	The system shall be able to measure the effect of a strategy, and to modify it when necessary.	3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.5.1	Provide Inter-urban Traffic Management
		3.3.3	Develop Demand Management Strategy
		4.4.1	Optimise Control Action
2.1.4.1	The system shall collect and report data as required by legally appointed authorities.	3.1.1.4	Manage Urban Traffic Data
		3.1.2.4	Manage Inter-urban Traffic Data
		3.3.4	Manage Demand Data Store
		3.4.6	Manage Environmental Conditions Data
		4.4.1	Optimise Control Action
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.	3.1.1.4	Manage Urban Traffic Data
		3.1.2.4	Manage Inter-urban Traffic Data
		3.3.4	Manage Demand Data Store
		4.1.1	Estimate Vehicle Indicators
2.2.0.1	The system shall provide support for road maintenance and infrastructure management.	3.5.1	Evaluate Short Term Maintenance Needs
		4.3.2	Provide Maintenance Co-ordination
2.2.0.3	The system shall be able to recommend maintenance work schedules such that they cause the minimum disruption to traffic.	3.5.1	Evaluate Short Term Maintenance Needs
		4.3.2	Provide Maintenance Co-ordination
2.2.0.5	The system shall be able to transmit current and future maintenance schedules to TCCs.	3.5.1	Evaluate Short Term Maintenance Needs
		4.3.2	Provide Maintenance Co-ordination

User Need		Function	
Number	**Description**	**Number**	**Name**
2.2.0.6	The system shall be able to maintain statistics on road usage to evaluate the need for possible maintenance.	3.5.2	Evaluate Long Term Maintenance Needs
		3.5.6	Manage Maintenance Data Store
2.2.1.1	The system shall be able to activate fixed de-icing equipment on parts of the road network.	3.5.4	Evaluate De-icing Need
2.2.2.1	The system shall be able to receive infrastructure equipment status data remotely.	3.5.3	Evaluate Equipment Maintenance Needs
		4.3.5	Monitor Infrastructure
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.	3.1.3.1	Assess Bridge Status
		3.1.3.2	Assess Tunnel Status
		3.5.3	Evaluate Equipment Maintenance Needs
2.2.2.3	The system shall be able to support a database of the road network, infrastructure and road-side equipment.	3.5.6	Manage Maintenance Data Store
		4.3.5	Monitor Infrastructure
2.2.3.1	The system shall be able to transfer information to, and between, road maintenance units.	3.5.1	Evaluate Short Term Maintenance Needs
		3.5.2	Evaluate Long Term Maintenance Needs
2.2.4.1	The system shall be able to support the management and control of maintenance contracts.	3.5.1	Evaluate Short Term Maintenance Needs
		3.5.2	Evaluate Long Term Maintenance Needs

User Need		Function	
Number	**Description**	**Number**	**Name**
3.1.0.1	The system shall enforce the traffic laws and regulations of the region automatically (where possible).	7.1.1	Perform Measure
		7.1.2	Check Compliance
		7.2.1	Analyse Image
		7.2.2	Determine Violator ID
		7.5.1	Manage Rules
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	7.1.1	Perform Measure
		7.1.2	Check Compliance
		7.2.1	Analyse Image
		7.2.2	Determine Violator ID
		7.4	Store Fraud
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.	7.1.1	Perform Measure
		7.2.1	Analyse Image
		7.2.2	Determine Violator ID
		7.4	Store Fraud
3.1.0.4	The system shall not obstruct or slow down traffic in any way, except when it is part of access control.	7.1.1	Perform Measure
3.1.0.5	The system shall be able to communicate with Police Command and Control Systems.	7.3.2	Establish Prosecution File
		7.4	Store Fraud
		7.5.1	Manage Rules
		7.5.2	Manage Users' Registration

User Need		Function	
Number	**Description**	**Number**	**Name**
3.1.1.1	The system shall be able to collect evidence on vehicles that commit traffic signal violations.	7.2.1	Analyse Image
		7.2.2	Determine Violator ID
		7.3.1	Sort Fraud Notifications
		7.3.2	Establish Prosecution File
3.1.1.2	The system shall be able to collect evidence on vehicles that exceed a local (variable) speed limit.	7.2.1	Analyse Image
		7.2.2	Determine Violator ID
		7.3.1	Sort Fraud Notifications
		7.3.2	Establish Prosecution File
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").	7.1.1	Perform Measure
3.1.1.4	The system shall be able to identify the cargo being carried by a heavy goods vehicle automatically.	7.1.1	Perform Measure

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	1.1.1	Create EP Contract
		1.2.1	Load User's Account
		1.2.2	Debit User's Account
		1.3.3	Check User's Contract
		1.3.5	Compute Service Fee
		1.3.7	Recover Fee
		1.4.1	Distribute Fees Revenue
		1.5.2	Detect Payment Violations
		1.5.3	Detect Access violations
		5.8.9	Provide (EFT) Electronic Financial Transactions

User Need		Function	
Number	**Description**	**Number**	**Name**
4.1.0.2	The system shall manage customer data, e.g. identification, account, rights of residents, etc.	1.1.1	Create EP Contract
		1.1.2	Establish Contract Statistics
		1.2.1	Load User's Account
		1.2.2	Debit User's Account
		1.2.3	Inform Users on Transactions
		1.3.2	Identify User
		1.3.3	Check User's Contract
		1.3.4	Inform and Guide User
		1.3.5	Compute Service Fee
		1.3.6	Check Advanced Payment
		1.3.7	Recover Fee
		1.4.3	Inform Operators on Transactions
		1.5.1	Check User's rights
		1.5.2	Detect Payment Violations
		1.5.3	Detect Access violations
		1.6.2	Manage Access Rights

User Need		Function	
Number	**Description**	**Number**	**Name**
4.1.0.3	The system shall give exact details of any financial transaction to the traveller.	1.1.1	Create EP Contract
		1.2.1	Load User's Account
		1.2.2	Debit User's Account
		1.2.3	Inform Users on Transactions
		1.3.7	Recover Fee
4.1.0.4	The system shall be able to manage tariff policies (define fares/fees according to selected criteria).	1.1.1	Create EP Contract
		1.3.5	Compute Service Fee
		1.3.6	Check Advanced Payment
4.1.0.5	The system shall be able to use a variety of payment or receipt means, including contactless "smart cards".	1.2.2	Debit User's Account
		1.3.5	Compute Service Fee
4.1.1.1	The system shall have a minimum impact on the traffic flow, e.g. a short transaction duration.	1.3.1	Detect User
		1.3.2	Identify User
		1.3.3	Check User's Contract
		1.3.4	Inform and Guide User
		1.3.5	Compute Service Fee
		1.3.7	Recover Fee
		1.5.1	Check User's rights
		1.5.4	Block Access

User Need		Function	
Number	**Description**	**Number**	**Name**
4.1.1.2	The system shall have a minimum impact on the driving task.	1.3.1	Detect User
		1.3.2	Identify User
		1.3.3	Check User's Contract
		1.3.7	Recover Fee
		1.5.1	Check User's rights
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.	1.3.1	Detect User
		1.3.2	Identify User
		1.3.3	Check User's Contract
		1.5.1	Check User's rights
		1.5.2	Detect Payment Violations
		1.5.3	Detect Access violations
		1.5.4	Block Access
4.1.2.1	The system shall be able to share revenues between road network operators.	1.1.1	Create EP Contract
		1.4.1	Distribute Fees Revenue
		1.4.2	Credit Operator's Account

User Need		Function	
Number	**Description**	**Number**	**Name**
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).	1.1.1	Create EP Contract
		1.2.1	Load User's Account
		1.2.2	Debit User's Account
		1.3.3	Check User's Contract
		1.3.4	Inform and Guide User
		1.3.5	Compute Service Fee
		1.3.6	Check Advanced Payment
		1.3.7	Recover Fee
		1.4.1	Distribute Fees Revenue
		1.5.2	Detect Payment Violations
		1.5.3	Detect Access violations
		4.2.3	Manage Fare Schemes
4.1.3.1	The system shall be able to exchange information between a toll collection unit and a vehicle.	1.1.2	Establish Contract Statistics
		1.3.2	Identify User
		1.3.3	Check User's Contract
		1.5.4	Block Access
		5.8.9	Provide (EFT) Electronic Financial Transactions

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	1.1.1	Create EP Contract
		1.1.2	Establish Contract Statistics
		1.2.1	Load User's Account
		1.2.2	Debit User's Account
		1.3.7	Recover Fee
		1.4.1	Distribute Fees Revenue
		1.4.2	Credit Operator's Account

User Need		Function	
Number	**Description**	**Number**	**Name**
4.1.3.3	The system shall have the maximum security necessary for electronic financial transactions.	1.1.1	Create EP Contract
		1.1.2	Establish Contract Statistics
		1.2.1	Load User's Account
		1.2.2	Debit User's Account
		1.2.3	Inform Users on Transactions
		1.3.4	Inform and Guide User
		1.3.5	Compute Service Fee
		1.3.6	Check Advanced Payment
		1.3.7	Recover Fee
		1.4.1	Distribute Fees Revenue
		1.4.2	Credit Operator's Account
		1.5.2	Detect Payment Violations
		1.5.3	Detect Access violations

User Need		Function	
Number	**Description**	**Number**	**Name**
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);	1.1.1	Create EP Contract
		1.1.2	Establish Contract Statistics
		1.2.1	Load User's Account
		1.2.2	Debit User's Account
		1.2.3	Inform Users on Transactions
		1.3.2	Identify User
		1.3.3	Check User's Contract
		1.3.5	Compute Service Fee
		1.3.6	Check Advanced Payment
		1.3.7	Recover Fee
		1.4.1	Distribute Fees Revenue
		1.4.2	Credit Operator's Account
		1.5.2	Detect Payment Violations
		1.5.3	Detect Access violations

User Need		Function	
Number	**Description**	**Number**	**Name**
4.1.4.1	The system shall be able to collect evidence on the non-payment of tolls, and other illegal financial transactions.	1.2.1	Load User's Account
		1.3.7	Recover Fee
		1.5.1	Check User's rights
		1.5.2	Detect Payment Violations
		1.5.3	Detect Access violations
		1.5.4	Block Access
5.1.0.1	The system shall be able to make a 'May Day' call.	2.1.1	Acquire Mayday Call on Roadside
		4.1.4	Confer to Vehicles
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.	2.1.2.1	Identify and Classify Emergencies
		2.1.2.2	Manage Incident and Emergency Information
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.	2.1.2.3	Plan Emergency Intervention
		4.1.4	Confer to Vehicles
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.	2.1.2.1	Identify and Classify Emergencies
		2.1.2.2	Manage Incident and Emergency Information
		2.1.2.3	Plan Emergency Intervention
		3.2.2	Identify and Classify Incidents

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	2.1.2.1	Identify and Classify Emergencies
		2.1.2.4	Process Emergency Progress Reports
		4.1.4	Confer to Vehicles
5.1.0.5	The system shall be able to identify the driver / vehicle making an emergency call.	4.1.4	Confer to Vehicles
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).	2.1.2.2	Manage Incident and Emergency Information
		2.1.2.3	Plan Emergency Intervention
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.	5.8.7	Provide Stolen Vehicle Tracking/Prosecution
5.2.0.1	The system shall support a green wave for emergency vehicles.	2.1.2.3	Plan Emergency Intervention
		2.1.3	Manage Emergency Vehicle
5.2.0.2	The system shall inform traffic management about the route that is intended for each green wave before it is used.	2.1.2.3	Plan Emergency Intervention
		3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.5.1	Provide Inter-urban Traffic Management
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.	2.1.2.3	Plan Emergency Intervention
		3.1.1.5.1	Provide Urban Traffic Management
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.	2.1.3	Manage Emergency Vehicle

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	2.1.2.3	Plan Emergency Intervention
		2.1.3	Manage Emergency Vehicle
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.	4.4.1	Optimise Control Action
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.	4.4.1	Optimise Control Action
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.	4.4.1	Optimise Control Action
		8.2.2.2.2	Manage Incident
5.3.1.5	Systems shall exchange information on hazardous goods in a manner that is understood by all.	8.2.2.2.2	Manage Incident
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.	6.3.3	Inform Traveller
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.	6.2.2	Define Prime Criteria
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.	6.2.1	Define Traveller's ATP
		6.2.2	Define Prime Criteria
		6.4	Evaluate Trip

User Need		Function	
Number	**Description**	**Number**	**Name**
6.1.0.6	The system shall enable travellers to plan their trip according to the needs of their disabilities	6.1	Define Traveller's GTP
		6.2.1	Define Traveller's ATP
		6.2.2	Define Prime Criteria
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 journey.	6.1	Define Traveller's GTP
		6.2.1	Define Traveller's ATP
		6.2.2	Define Prime Criteria
6.1.1.1	The system shall be able to influence modal shifts according to a specified transport policy.	6.2.3	Propose Trip Alternatives
6.1.1.2	The system shall be able to provide trip information on other modes of transport, e.g. for demand-spreading, or when major events occur, or due to weather conditions, strikes, cultural or sports events etc.	6.2.3	Propose Trip Alternatives
6.1.1.3	The system shall be able to provide current and forecast traffic and travel information at local, regional, national and international levels.	6.2.3	Propose Trip Alternatives

User Need		Function	
Number	**Description**	**Number**	**Name**
6.1.1.4	The system shall be able to provide extensive trip information, e.g. prices, fares, routes, incidents, roadworks, forecast & current traffic situations, traffic control, demand mgt measures, local warnings, special events, weather conditions, hotels etc.	3.1.1.5.1	Provide Urban Traffic Management
		3.1.1.5.5	Provide Urban Output Actuation
		3.1.2.5.1	Provide Inter-urban Traffic Management
		3.1.2.5.5	Provide Inter-urban Output Actuation
		3.4.6	Manage Environmental Conditions Data
		6.2.3	Propose Trip Alternatives
		6.2.4	Select and Define Bookings
		6.3.2	Assess Perturbations
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.	6.3.2	Assess Perturbations
6.1.2.2	The system shall be able to provide information on the cancellation of departures from a railway station, an airport , a port or a coach station (due to the weather; strikes or other reasons).	6.3.2	Assess Perturbations
6.1.2.3	The system shall be able to provide route information to all drivers, e.g. restrictions, travel times, etc.	6.2.4	Select and Define Bookings
		6.3.3	Inform Traveller
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.	6.2.7	Produce Itinerary and Trip File

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	1.1.1	Create EP Contract
		1.2.1	Load User's Account
		1.2.3	Inform Users on Transactions
		1.3.4	Inform and Guide User
		6.1	Define Traveller's GTP
6.1.2.9	The system shall provide Information Management tools for the operator.	6.2.8	Provide GTP Store Operator Interface
		6.3.5	Provide Tip File Management Operator Interface
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.	6.2.4	Select and Define Bookings
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.	6.2.4	Select and Define Bookings
		6.2.6	Perform Bookings and Payments
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	Define Traveller's GTP
6.1.3.4	The system shall be able to provide access to reservations and pre-payment services.	6.2.4	Select and Define Bookings
		6.2.6	Perform Bookings and Payments

User Need		Function	
Number	**Description**	**Number**	**Name**
6.1.3.6	The system shall enable a traveller to book a parking space at Park and Ride sites as part of a trip.	6.2.4	Select and Define Bookings
		6.2.5	Plan Road Trip(s)
		6.2.6	Perform Bookings and Payments
6.1.3.8	The system shall be able to provide customised pre-trip information to hand-held and in-vehicle devices.	6.1	Define Traveller's GTP
		6.2.1	Define Traveller's ATP
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. .	6.2.5	Plan Road Trip(s)
		6.3.3	Inform Traveller
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.	6.3.3	Inform Traveller
6.2.0.6	The system shall inform the User when changes occur to the criteria upon which the trip information had been given.	6.3.2	Assess Perturbations
		6.3.3	Inform Traveller
6.2.1.1	The system shall be able to provide alternative routes or mode-switch recommendations when it detects, or is informed, that road network problems have occurred.	6.2.3	Propose Trip Alternatives
		6.3.4	Provide Route Guidance
6.2.1.3	The system shall be able to provide information about other transport modes: e.g. location of P&R, PT timetable, etc.	6.2.3	Propose Trip Alternatives
6.2.2.1	The system shall be able to inform travellers on the current average travel time between fixed points.	6.2.4	Select and Define Bookings
		6.3.3	Inform Traveller

User Need		Function	
Number	**Description**	**Number**	**Name**
6.2.2.2	The system shall be able to provide real-time P&R and PT information to vehicle drivers.	6.2.3	Propose Trip Alternatives
		6.3.3	Inform Traveller
6.2.2.3	The system shall be able to provide cyclists and pedestrians with information about suitable routes.	6.2.4	Select and Define Bookings
		6.3.3	Inform Traveller
6.2.2.4	The system shall provide road and traffic safety advice based on current weather and traffic conditions.	6.3.3	Inform Traveller
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.	6.3.3	Inform Traveller
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.	6.3.2	Assess Perturbations
		6.3.3	Inform Traveller
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.	6.2.2	Define Prime Criteria
		6.2.5	Plan Road Trip(s)
		6.2.6	Perform Bookings and Payments

User Need		Function	
Number	**Description**	**Number**	**Name**
6.2.3.2	The system shall normally provide messages from a finite set of well defined message texts.	6.1	Define Traveller's GTP
		6.2.1	Define Traveller's ATP
		6.2.2	Define Prime Criteria
		6.2.3	Propose Trip Alternatives
		6.2.4	Select and Define Bookings
		6.2.5	Plan Road Trip(s)
		6.2.6	Perform Bookings and Payments
		6.2.7	Produce Itinerary and Trip File
		6.3.4	Provide Route Guidance
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.	6.1	Define Traveller's GTP
		6.2.1	Define Traveller's ATP
		6.2.2	Define Prime Criteria
		6.2.3	Propose Trip Alternatives
		6.2.4	Select and Define Bookings
		6.2.5	Plan Road Trip(s)
		6.2.6	Perform Bookings and Payments
		6.2.7	Produce Itinerary and Trip File
		6.3.4	Provide Route Guidance

User Need		Function	
Number	**Description**	**Number**	**Name**
6.2.3.4	The system shall provide information using "open" standard communication protocols.	6.1	Define Traveller's GTP
		6.2.1	Define Traveller's ATP
		6.2.2	Define Prime Criteria
		6.2.3	Propose Trip Alternatives
		6.2.4	Select and Define Bookings
		6.2.5	Plan Road Trip(s)
		6.2.6	Perform Bookings and Payments
		6.2.7	Produce Itinerary and Trip File
		6.3.4	Provide Route Guidance
6.2.3.5	The system shall be able to provide customised on-trip information to hand-held and in-vehicle devices.	6.1	Define Traveller's GTP
		6.2.1	Define Traveller's ATP
		6.2.2	Define Prime Criteria
		6.2.3	Propose Trip Alternatives
		6.2.4	Select and Define Bookings
		6.2.5	Plan Road Trip(s)
		6.2.6	Perform Bookings and Payments
		6.2.7	Produce Itinerary and Trip File
		6.3.4	Provide Route Guidance

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	6.1	Define Traveller's GTP
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.	6.1	Define Traveller's GTP
6.4.0.1	The system shall provide travellers with recommended routes to specified destinations.	6.2.5	Plan Road Trip(s)
		6.2.7	Produce Itinerary and Trip File
		6.3.4	Provide Route Guidance
6.4.0.3	The system shall know where it is within the road network.	6.3.1	Track Traveller and Implement Trip Plan
6.4.1.1	The system shall be able to provide guidance to Car Parks (with parking spaces).	6.2.4	Select and Define Bookings
		6.2.5	Plan Road Trip(s)
		6.3.4	Provide Route Guidance
6.4.1.2	The system shall be able to use real-time information to compute the recommended route.	6.3.1	Track Traveller and Implement Trip Plan
		6.3.4	Provide Route Guidance
6.4.1.3	The system shall be able to compute the total predicted journey time over the route selected.	6.2.3	Propose Trip Alternatives
		6.2.5	Plan Road Trip(s)
		6.2.7	Produce Itinerary and Trip File

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	6.1	Define Traveller's GTP
		6.2.1	Define Traveller's ATP
		6.2.2	Define Prime Criteria
		6.2.3	Propose Trip Alternatives
		6.2.5	Plan Road Trip(s)
6.4.1.5	The system shall be able to provide guidance to "Points of Interest".	6.2.3	Propose Trip Alternatives
		6.3.4	Provide Route Guidance
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	Evaluate Trip
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).	6.1	Define Traveller's GTP
6.4.2.4	The system shall enable the use of portable equipment to provide route guidance.	6.3.4	Provide Route Guidance
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).	3.1.1.3	Provide Urban Traffic Forecasts and Strategies
		3.1.2.3	Provide Inter-urban Traffic Forecasts and Strategies
		3.1.3.1	Assess Bridge Status
		3.1.3.2	Assess Tunnel Status

User Need		Function	
Number	**Description**	**Number**	**Name**
7.1.0.2	The system shall be able to implement identified control strategies that conform with specified policy.	3.1.1.3	Provide Urban Traffic Forecasts and Strategies
		3.1.1.5.1	Provide Urban Traffic Management
		3.1.1.5.5	Provide Urban Output Actuation
		3.1.2.3	Provide Inter-urban Traffic Forecasts and Strategies
		3.1.2.5.1	Provide Inter-urban Traffic Management
		3.1.2.5.5	Provide Inter-urban Output Actuation
		4.4.1	Optimise Control Action
7.1.0.3	The system shall not do anything to reduce road safety.	3.1.1.5.5	Provide Urban Output Actuation
		3.1.2.5.5	Provide Inter-urban Output Actuation
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.	3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.5.1	Provide Inter-urban Traffic Management
		3.4.6	Manage Environmental Conditions Data
7.1.0.5	The system shall manage road traffic in such a way that congestion (travel time) may be reduced.	3.1.1.5.1	Provide Urban Traffic Management
		3.1.1.5.5	Provide Urban Output Actuation
		3.1.2.5.1	Provide Inter-urban Traffic Management
		3.1.2.5.5	Provide Inter-urban Output Actuation

User Need		Function	
Number	**Description**	**Number**	**Name**
7.1.0.6	The system shall be able to help co-ordinate the activities of TICs and TCCs.	3.1.1.4	Manage Urban Traffic Data
		3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.4	Manage Inter-urban Traffic Data
		3.1.2.5.1	Provide Inter-urban Traffic Management
7.1.0.7	The system shall be able to exchange information between TICs and TCCs, including across national boundaries.	3.1.1.4	Manage Urban Traffic Data
		3.1.2.4	Manage Inter-urban Traffic Data
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.	3.1.1.4	Manage Urban Traffic Data
		3.1.2.4	Manage Inter-urban Traffic Data
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.	3.1.1.4	Manage Urban Traffic Data
		3.1.2.4	Manage Inter-urban Traffic Data

User Need		Function	
Number	**Description**	**Number**	**Name**
7.1.0.10	The system shall be able to control urban roads and traffic.	3.1.1.1	Collect Urban Traffic Data
		3.1.1.2	Monitor Urban Car Park Occupation
		3.1.1.3	Provide Urban Traffic Forecasts and Strategies
		3.1.1.5.1	Provide Urban Traffic Management
		3.1.1.5.2	Provide Planned Urban Traffic Management Facilities
		3.1.1.5.3	Provide Urban Car Park States
		3.1.1.5.4	Provide Urban Traffic Speed Management
		3.1.1.5.5	Provide Urban Output Actuation
		3.1.1.5.6	Provide Urban Traffic Lane Management
		3.1.1.5.7	Provide Operator Urban Traffic Management Facilities
		3.1.1.5.8	Detect Urban Traffic Violations
		3.1.1.5.9	Manage Urban Static Traffic Data
7.1.0.11	The system shall be able to control inter-urban roads and traffic.	3.1.1.4	Manage Urban Traffic Data
		3.1.2.1	Collect Inter-urban Traffic Data
		3.1.2.2	Monitor Service Area Vehicle Occupation
		3.1.2.3	Provide Inter-urban Traffic Forecasts and Strategies
		3.1.2.4	Manage Inter-urban Traffic Data
		3.1.2.5.1	Provide Inter-urban Traffic Management

User Need		Function	
Number	**Description**	**Number**	**Name**
		3.1.2.5.2	Provide Planned Inter-urban Traffic Management Facilities
		3.1.2.5.3	Provide Service Area Vehicle Occupancy States
		3.1.2.5.4	Provide Inter-urban Traffic Speed Management
		3.1.2.5.5	Provide Inter-urban Output Actuation
		3.1.2.5.6	Provide Inter-urban Lane Management
		3.1.2.5.7	Provide Operator Inter-urban Traffic Management Facilities
		3.1.2.5.8	Detect Inter-urban Traffic Violations
		3.1.2.5.9	Manage Inter-urban Static Traffic Data

User Need		Function	
Number	**Description**	**Number**	**Name**
7.1.0.12	The system shall be able to use different traffic management techniques to control separate areas of the road network.	3.1.1.3	Provide Urban Traffic Forecasts and Strategies
		3.1.1.4	Manage Urban Traffic Data
		3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.3	Provide Inter-urban Traffic Forecasts and Strategies
		3.1.2.4	Manage Inter-urban Traffic Data
		3.1.2.5.1	Provide Inter-urban Traffic Management
7.1.0.13	The system shall be able to manage the urban/inter-urban interface.	3.1.1.3	Provide Urban Traffic Forecasts and Strategies
		3.1.1.4	Manage Urban Traffic Data
		3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.3	Provide Inter-urban Traffic Forecasts and Strategies
		3.1.2.4	Manage Inter-urban Traffic Data
		3.1.2.5.1	Provide Inter-urban Traffic Management
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.	3.1.1.1	Collect Urban Traffic Data
		3.1.2.1	Collect Inter-urban Traffic Data
7.1.1.2	The system shall monitor urban roads and traffic.	3.1.1.1	Collect Urban Traffic Data
7.1.1.3	The system shall monitor inter-urban roads and traffic.	3.1.2.1	Collect Inter-urban Traffic Data
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.	3.1.1.1	Collect Urban Traffic Data

User Need		Function	
Number	**Description**	**Number**	**Name**
7.1.1.5	The system shall be able to monitor the entire road network (network state surveillance tool).	3.1.1.1	Collect Urban Traffic Data
		3.1.1.2	Monitor Urban Car Park Occupation
		3.1.2.1	Collect Inter-urban Traffic Data
7.1.1.6	The system shall be able to monitor and record weather conditions, e.g. wind, fog, rain level, ice, etc.	3.4.1	Monitor Weather Conditions
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.	3.4.3	Monitor Noise Pollution
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).	3.4.2	Monitor Atmospheric Pollution
7.1.2.1	The system shall be able to use consistent historical data to complement real-time data, when necessary.	3.1.1.4	Manage Urban Traffic Data
		3.1.2.4	Manage Inter-urban Traffic Data
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.	3.1.1.3	Provide Urban Traffic Forecasts and Strategies
		3.1.2.3	Provide Inter-urban Traffic Forecasts and Strategies
7.1.2.3	The system shall be able to use historical data to complement predicted data, when necessary.	3.1.1.4	Manage Urban Traffic Data
		3.1.2.4	Manage Inter-urban Traffic Data
7.1.2.4	The system shall be able to analyse road and traffic data to predict possible critical situations.	3.1.1.3	Provide Urban Traffic Forecasts and Strategies
		3.1.2.3	Provide Inter-urban Traffic Forecasts and Strategies
7.1.2.5	The system shall be able to predict weather conditions, in particular the formation of fog and/or ice.	3.4.4	Predict Environmental Conditions

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	3.4.4	Predict Environmental Conditions
7.1.2.7	The system shall be able to provide historical and predicted data.	3.1.1.4	Manage Urban Traffic Data
		3.1.2.4	Manage Inter-urban Traffic Data
7.1.3.1	The system shall enable a TCC operator to control, possibly remotely, infrastructure elements (e.g. traffic lights, VMS).	3.1.1.5.7	Provide Operator Urban Traffic Management Facilities
		3.1.2.5.7	Provide Operator Inter-urban Traffic Management Facilities
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.	3.1.1.5.7	Provide Operator Urban Traffic Management Facilities
		3.1.2.5.7	Provide Operator Inter-urban Traffic Management Facilities
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.	3.1.1.5.7	Provide Operator Urban Traffic Management Facilities
		3.1.2.5.7	Provide Operator Inter-urban Traffic Management Facilities
7.1.3.4	The system shall be able to activate control devices (e.g. traffic lights, VMS), either individually or in groups.	3.1.1.5.5	Provide Urban Output Actuation
		3.1.2.5.5	Provide Inter-urban Output Actuation

User Need		Function	
Number	**Description**	**Number**	**Name**
7.1.3.5	The system shall enable TCC operators to make temporary changes to the normal control strategy in real-time.	3.1.1.5.7	Provide Operator Urban Traffic Management Facilities
		3.1.2.5.7	Provide Operator Inter-urban Traffic Management Facilities
7.1.3.6	The system shall be able to implement planned control strategies for planned events, e.g. sport, cultural, etc.	3.1.1.5.2	Provide Planned Urban Traffic Management Facilities
		3.1.2.5.2	Provide Planned Inter-urban Traffic Management Facilities
		3.2.1	Detect Incidents
		3.2.2	Identify and Classify Incidents
		3.2.3	Assess Incidents and Determine Responses
7.1.3.7	The system shall be able to support a database of all known (future) events.	3.1.1.5.2	Provide Planned Urban Traffic Management Facilities
		3.1.2.5.2	Provide Planned Inter-urban Traffic Management Facilities
7.1.4.1	The system shall be able to control the entries and exits to motorways.	3.1.2.5.1	Provide Inter-urban Traffic Management
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).	3.1.2.5.1	Provide Inter-urban Traffic Management
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).	3.1.1.5.6	Provide Urban Traffic Lane Management
		3.1.2.5.6	Provide Inter-urban Lane Management

User Need		Function	
Number	**Description**	**Number**	**Name**
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).	3.1.1.5.3	Provide Urban Car Park States
		3.1.2.5.3	Provide Service Area Vehicle Occupancy States
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).	3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.5.1	Provide Inter-urban Traffic Management
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.	3.1.3.1	Assess Bridge Status
		3.1.3.3	Provide Bridge and Tunnel Operator Interface
		3.1.3.4	Output Bridge Information
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.	3.1.3.2	Assess Tunnel Status
		3.1.3.3	Provide Bridge and Tunnel Operator Interface
		3.1.3.5	Output Tunnel Information
7.1.4.8	The system shall be able to provide co-ordinated traffic management operations during periods of mass movement across (many) regions.	3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.5.1	Provide Inter-urban Traffic Management
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.	3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.5.1	Provide Inter-urban Traffic Management
7.1.5.1	The system shall be able to provide control measures to protect road maintenance work and workers.	3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.5.1	Provide Inter-urban Traffic Management

User Need		Function	
Number	**Description**	**Number**	**Name**
7.1.5.2	The system shall be able to command drivers to change lanes on multi-lane roads.	3.1.1.5.6	Provide Urban Traffic Lane Management
		3.1.2.5.6	Provide Inter-urban Lane Management
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.	3.1.1.5.6	Provide Urban Traffic Lane Management
		3.1.2.5.6	Provide Inter-urban Lane Management
7.1.5.4	The system shall be able to reverse the direction of traffic flow on parts of the urban network.	3.1.1.5.6	Provide Urban Traffic Lane Management
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.	3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.5.1	Provide Inter-urban Traffic Management
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.	3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.5.1	Provide Inter-urban Traffic Management
7.1.5.7	The system shall be able to recommend re-routing strategies to reduce congestion or atmospheric pollution.	3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.5.1	Provide Inter-urban Traffic Management
7.1.5.8	The system shall request confirmation of all exceptional measures before they are executed.	3.1.1.5.1	Provide Urban Traffic Management
		3.1.2.5.1	Provide Inter-urban Traffic Management
7.1.6.1	The system shall be able to provide Origin/Destination computations, and route assignment estimations, for the road network.	3.1.1.3	Provide Urban Traffic Forecasts and Strategies
		3.1.2.3	Provide Inter-urban Traffic Forecasts and Strategies

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	3.1.1.5.4	Provide Urban Traffic Speed Management
		3.1.2.5.4	Provide Inter-urban Traffic Speed Management
7.1.7.2	The system shall be able to set variable speed limits on parts of the road network.	3.1.1.5.4	Provide Urban Traffic Speed Management
		3.1.2.5.4	Provide Inter-urban Traffic Speed Management
7.1.7.3	The system shall be able to calculate recommended speed limits for given traffic and weather conditions, and road network characteristics.	3.1.1.5.4	Provide Urban Traffic Speed Management
		3.1.2.5.4	Provide Inter-urban Traffic Speed Management
7.1.7.4	The system shall be able to transmit recommended speed limits to equipped vehicles.	3.1.1.3	Provide Urban Traffic Forecasts and Strategies
		3.1.2.3	Provide Inter-urban Traffic Forecasts and Strategies
7.1.7.5	The system shall be able to support a database of all speed limits on the road network.	3.1.1.5.4	Provide Urban Traffic Speed Management
		3.1.2.5.4	Provide Inter-urban Traffic Speed Management
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.	3.1.1.5.4	Provide Urban Traffic Speed Management
		3.1.2.5.4	Provide Inter-urban Traffic Speed Management
7.1.8.1	The system shall be able to transmit information to a vehicle to update its on-board database.	3.1.1.3	Provide Urban Traffic Forecasts and Strategies
		3.1.1.4	Manage Urban Traffic Data
		3.1.2.3	Provide Inter-urban Traffic Forecasts and Strategies
		3.1.2.4	Manage Inter-urban Traffic Data
7.1.9.2	The system shall be able to minimise delays of all vehicles using adaptive signal control	3.1.1.5.1	Provide Urban Traffic Management

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	3.1.1.5.1	Provide Urban Traffic Management
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.	3.1.1.5.1	Provide Urban Traffic 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.	3.1.1.5.6	Provide Urban Traffic Lane Management
		3.1.2.5.6	Provide Inter-urban Lane Management
7.1.11.1	The system shall be able to monitor the current usage of the parking facilities.	3.1.1.2	Monitor Urban Car Park Occupation
7.1.11.2	The system shall be able to forecast the need for parking slots.	3.1.1.3	Provide Urban Traffic Forecasts and Strategies
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.	3.1.1.1	Collect Urban Traffic Data
		3.1.1.5.8	Detect Urban Traffic Violations
7.1.12.1	The system shall be able to control pedestrian and cycle crossings.	3.1.1.5.1	Provide Urban Traffic Management
7.1.12.2	The system shall be able to monitor and control pedestrian and cycle crossings in order to optimise their use.	3.1.1.5.1	Provide Urban Traffic Management
7.2.0.1	The system shall detect and respond to various incidents on the road network.	3.2.1	Detect Incidents
		3.2.2	Identify and Classify Incidents
		3.2.3	Assess Incidents and Determine Responses
7.2.0.2	The system shall not do anything to reduce road safety.	3.2.3	Assess Incidents and Determine Responses

User Need		Function	
Number	**Description**	**Number**	**Name**
7.2.0.3	The system shall not do anything that might aggravate, or cause, an incident.	3.2.3	Assess Incidents and Determine Responses
7.2.0.4	The system shall assist the emergency services to provide an effective response to road traffic incidents.	3.2.3	Assess Incidents and Determine Responses
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.	2.1.2.1	Identify and Classify Emergencies
		2.1.2.2	Manage Incident and Emergency Information
		2.1.5	Provide Access and Maintain Data for Emergency
7.2.0.6	The system shall minimise the time between the occurrence of an incident and its detection.	3.2.1	Detect Incidents
		3.2.2	Identify and Classify Incidents
7.2.0.7	The system shall be able to validate that an incident has occurred in order to avoid false alarms.	2.1.2.1	Identify and Classify Emergencies
		2.1.2.2	Manage Incident and Emergency Information
		2.1.5	Provide Access and Maintain Data for Emergency
		3.2.2	Identify and Classify Incidents
7.2.0.8	The system shall be able to suggest one or more responses for dealing with an incident.	2.1.2.3	Plan Emergency Intervention
		3.2.3	Assess Incidents and Determine Responses
7.2.0.9	The system shall be able to run (pre-)defined incident mitigation strategies automatically.	3.2.3	Assess Incidents and Determine Responses
7.2.1.1	The system shall be able to locate and identify emergency vehicles on the road network.	2.1.3	Manage Emergency Vehicle

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	2.1.2.2	Manage Incident and Emergency Information
		2.1.2.3	Plan Emergency Intervention
		2.1.2.4	Process Emergency Progress Reports
		2.1.4	Provide Emergency Control to the Operator
		2.1.5	Provide Access and Maintain Data for Emergency
7.2.1.3	The system shall provide communications between the emergency services, hospitals and TCCs for the provision of incident information.	2.1.2.3	Plan Emergency Intervention
		2.1.2.4	Process Emergency Progress Reports
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.	2.1.2.1	Identify and Classify Emergencies
		2.1.2.2	Manage Incident and Emergency Information
		2.1.2.3	Plan Emergency Intervention
		3.2.2	Identify and Classify Incidents
		3.2.4	Manage Incident Data
7.2.2.2	The system shall be able to identify and classify all incidents on the road network.	2.1.2.1	Identify and Classify Emergencies
		3.2.2	Identify and Classify Incidents
7.2.2.3	The system shall be able to provide information on each incident to TICs for onward transmission to travellers.	2.1.2.1	Identify and Classify Emergencies
		3.2.3	Assess Incidents and Determine Responses
		3.2.4	Manage Incident Data

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	2.1.2.2	Manage Incident and Emergency Information
		3.2.4	Manage Incident Data
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.	3.2.3	Assess Incidents and Determine Responses
7.2.4.2	The system shall be able to monitor the aftermath of an incident.	3.2.3	Assess Incidents and Determine Responses
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.	3.2.1	Detect Incidents
		3.2.2	Identify and Classify Incidents
7.2.5.2	The system shall be able to provide local warnings on dangerous sections of the road network.	3.2.3	Assess Incidents and Determine Responses
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.	3.2.3	Assess Incidents and Determine Responses
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.	6.2.3	Propose Trip Alternatives
		6.2.4	Select and Define Bookings
		6.2.5	Plan Road Trip(s)
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, PT usage, fares, tolls, etc.	3.3.1	Receive Information on Travel Factors
		3.3.5	Provide Demand Management Operator Interface
7.3.0.3	The system shall be able to recommend a strategy to reduce demand.	3.3.2	Implement Demand Management Strategy

User Need		Function	
Number	**Description**	**Number**	**Name**
7.3.0.4	The system shall be able to simulate a demand management strategy on the road network.	3.3.3	Develop Demand Management Strategy
7.3.0.5	The system shall be able to simulate potential capacity reduction, e.g. due to road works..	3.3.3	Develop Demand Management Strategy
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.	3.3.2	Implement Demand Management Strategy
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.	3.3.2	Implement Demand Management Strategy
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.	3.1.1.5.1	Provide Urban Traffic Management
		3.1.1.5.5	Provide Urban Output Actuation
		3.3.2	Implement Demand Management Strategy
7.3.1.4	The system shall be able to use physical barriers to control the access of vehicles into a zone.	3.1.1.5.1	Provide Urban Traffic Management
		3.1.1.5.5	Provide Urban Output Actuation
		3.3.2	Implement Demand Management Strategy
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.	1.6.1	Manage Tariffs
		1.6.2	Manage Access Rights
		3.3.2	Implement Demand Management Strategy
7.3.2.2	The system shall be able to adjust toll fees according to a given pricing strategy.	1.6.1	Manage Tariffs

User Need		Function	
Number	**Description**	**Number**	**Name**
7.3.2.3	The system shall be able to adjust parking fees according to a given pricing strategy.	1.6.1	Manage Tariffs
7.3.2.4	The system shall be able to adjust public transport fares according to a given pricing strategy.	1.6.1	Manage Tariffs
		4.2.3	Manage Fare Schemes
7.3.3.1	The system shall be able to implement parking strategies in specific areas, including P&R strategies.	3.3.2	Implement Demand Management Strategy
7.3.4.1	The system shall be able to provide information to promote the use of cycles and walking.	3.3.2	Implement Demand Management Strategy
		6.2.5	Plan Road Trip(s)
8.1.0.1	The system shall be able to measure the visibility distance and detect reductions caused by adverse weather and pollution conditions (but not darkness) of the view seen by the driver.	5.1.1	Monitor Visibility Range
8.1.0.2	The system shall be able to enhance the vision of the driver in adverse visibility conditions, e.g. in fog, darkness etc.	5.1.2	Generate Enhanced Vision of Driving Area
		5.1.3	Provide Enhanced Lighting
		5.1.4	Provide Anti-glaring (Co-operative) Facilities
8.2.0.1	The system shall provide direct or indirect assistance for the driving task.	5.2.1	Provide Longitudinal Dynamic Control
8.2.1.2	The system shall be able to keep the host vehicle a certain distance behind the vehicle in front (autonomous cruise control).	5.3.6	Provide Facilities for Adaptive Cruise Control
8.2.1.3	The system shall be able to control the longitudinal dynamic behaviour of the host vehicle automatically	5.2.1	Provide Longitudinal Dynamic Control

User Need		Function	
Number	**Description**	**Number**	**Name**
8.2.2.1	The system shall be able to control the lateral dynamic behaviour of the vehicle automatically, and keep the vehicle within its current lane of the carriageway.	5.2.2	Provide Lateral Dynamic Control
		5.4.4	Provide Facilities for Lane/Road Keeping
8.2.2.2	The system shall be able to provide the driver with information, or active steering support, to assist him/her to keep within the current lane of the carriageway.	5.4.4	Provide Facilities for Lane/Road Keeping
8.2.3.1	The system shall be able to create a platoon of vehicles, in particular trucks ("Electronic Towbar" or "Road Train").	5.3.9	Provide Facilities for Vehicle Platooning
8.2.3.2	The system shall enable the leading vehicle of a platoon to supervise and manage the operation and tracking of the following vehicle(s).	5.3.2	Provide Longitudinal Dynamic Control of the Vehicle
		5.3.4	Provide Facilities for Intelligent Speed Adaptation
		5.3.6	Provide Facilities for Adaptive Cruise Control
		5.3.8	Provide Facilities for Anti-collision Emergency Braking
		5.3.9	Provide Facilities for Vehicle Platooning
		5.4.2	Provide Lateral Dynamic Control of the Vehicle
		5.4.4	Provide Facilities for Lane/Road Keeping
		5.4.5	Provide Facilities for Lane Change

User Need		Function	
Number	**Description**	**Number**	**Name**
8.2.3.3	The system shall enable the following vehicle(s) in a platoon to perform all normal driving manoeuvres without any host driver intervention.	5.3.2	Provide Longitudinal Dynamic Control of the Vehicle
		5.3.4	Provide Facilities for Intelligent Speed Adaptation
		5.3.6	Provide Facilities for Adaptive Cruise Control
		5.3.9	Provide Facilities for Vehicle Platooning
		5.4.2	Provide Lateral Dynamic Control of the Vehicle
		5.4.4	Provide Facilities for Lane/Road Keeping
		5.4.5	Provide Facilities for Lane Change
8.2.3.4	The system shall enable equipped vehicles to leave or join the back of the platoon at any speed.	5.3.2	Provide Longitudinal Dynamic Control of the Vehicle
		5.3.4	Provide Facilities for Intelligent Speed Adaptation
		5.3.6	Provide Facilities for Adaptive Cruise Control
		5.3.8	Provide Facilities for Anti-collision Emergency Braking
		5.3.9	Provide Facilities for Vehicle Platooning
		5.4.2	Provide Lateral Dynamic Control of the Vehicle
		5.4.4	Provide Facilities for Lane/Road Keeping
		5.4.5	Provide Facilities for Lane Change

User Need		Function	
Number	**Description**	**Number**	**Name**
8.2.3.5	The system shall allow the following vehicles to perform conventional operations that do not interfere with their tracking of the leading vehicle.	5.3.2	Provide Longitudinal Dynamic Control of the Vehicle
		5.3.4	Provide Facilities for Intelligent Speed Adaptation
		5.3.6	Provide Facilities for Adaptive Cruise Control
		5.3.8	Provide Facilities for Anti-collision Emergency Braking
		5.3.9	Provide Facilities for Vehicle Platooning
		5.4.2	Provide Lateral Dynamic Control of the Vehicle
		5.4.4	Provide Facilities for Lane/Road Keeping
		5.4.5	Provide Facilities for Lane Change
8.2.3.6	The system shall enable the following vehicles in a platoon to monitor their surroundings and to take independent action in an emergency.	5.3.8	Provide Facilities for Anti-collision Emergency Braking
		5.3.9	Provide Facilities for Vehicle Platooning
8.2.3.7	The system shall enable the vehicles in a platoon to be closer together than when manually controlled.	5.3.9	Provide Facilities for Vehicle Platooning
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.	5.7.1	Provide Vehicle-Infrastructure Communication
		5.7.2	Provide Vehicle-Vehicle Communication
8.2.5.1	The system shall be able to limit the speed of a vehicle automatically to the a given, but variable, maximum (intelligent speed adaptation)	5.3.4	Provide Facilities for Intelligent Speed Adaptation

User Need		Function	
Number	**Description**	**Number**	**Name**
8.2.5.2	The system shall be able to receive (variable) mandatory speed limits from outside the vehicle.	5.3.7	Provide Facilities for Speed Enforcement
8.2.5.3	The system shall be able to provide information about various aspects of the road network, e.g. default speed limits, road hazards, junctions etc.	3.1.1.5.9	Manage Urban Static Traffic Data
		3.1.2.5.9	Manage Inter-urban Static Traffic Data
8.2.5.4	The system shall be able to display continuously to the driver the current mandatory speed limit.	5.6	Provide Driver-Vehicle Interaction
8.2.5.5	The system shall be able to offer the driver the ability to keep the vehicle below a new mandatory speed limit automatically (manual intelligent speed control).	5.3.4	Provide Facilities for Intelligent Speed Adaptation
		5.3.6	Provide Facilities for Adaptive Cruise Control
8.2.6.1	The system shall be able to control the brakes of the vehicle automatically.	5.2.1	Provide Longitudinal Dynamic Control
8.2.6.2	The system shall be able to control the engine of the vehicle automatically.	5.2.1	Provide Longitudinal Dynamic Control
8.2.6.7	The system shall be able to control the steering of the vehicle automatically.	5.2.2	Provide Lateral Dynamic Control
8.3.0.2	The system shall be able to monitor the conflict zone and predict the trajectory of other vehicles relative to the host vehicle, or the vehicle's movement relative to adjacent stationary objects.	5.3.1	Provide Dynamic Scenario Intelligence
8.3.0.3	The system shall be able to support a database of safety margins for distances between the vehicle and all other adjacent objects.	5.2.1	Provide Longitudinal Dynamic Control
		5.2.2	Provide Lateral Dynamic Control

User Need		Function	
Number	**Description**	**Number**	**Name**
8.3.1.1	The system shall be able to keep the host vehicle a certain distance behind the vehicle in front (autonomous cruise control).	5.3.2	Provide Longitudinal Dynamic Control of the Vehicle
		5.3.6	Provide Facilities for Adaptive Cruise Control
		5.3.9	Provide Facilities for Vehicle Platooning
8.3.1.2	The system shall be able to warn the driver when the vehicle in front is too close.	5.3.2	Provide Longitudinal Dynamic Control of the Vehicle
		5.6	Provide Driver-Vehicle Interaction
8.3.1.3	The system shall be able to determine a safe vehicle trajectory relative to the lane/road boundaries.	5.3.1	Provide Dynamic Scenario Intelligence
		5.4.4	Provide Facilities for Lane/Road Keeping
		5.4.5	Provide Facilities for Lane Change
		5.4.6	Provide Facilities for Reserved Lanes I/O
8.3.1.4	The system shall be able to warn the driver of possible critical situations using audible, visual or haptic (physical feedback to the driver) methods.	5.6	Provide Driver-Vehicle Interaction
8.3.1.5	The system shall be able to control the vehicle automatically for a short period of time when an impending collision has been detected.	5.3.8	Provide Facilities for Anti-collision Emergency Braking
8.3.1.7	The system shall be able to keep the host vehicle a certain distance behind the vehicle in front in a queue of traffic (stop and go).	5.3.5	Provide Facilities for Stop & Go
		5.4.9	Provide Facilities for Stop & Go ++
8.3.2.1	The system shall be able to detect the position of neighbouring vehicles (and objects).	5.3.1	Provide Dynamic Scenario Intelligence

User Need		Function	
Number	**Description**	**Number**	**Name**
8.3.2.3	The system shall be able to control the brakes of the vehicle automatically.	5.2.3	Provide Driver-(Automatic Controls) Interactivity
8.4.0.1	The system shall monitor for hazards involved in lane keeping, lane changing, entering and leaving high speed roads, and overtaking.	5.4.5	Provide Facilities for Lane Change
		5.4.6	Provide Facilities for Reserved Lanes I/O
		5.4.8	Provide Facilities for Overtaking
8.4.0.2	The system shall be able to monitor the conflict zone and predict the trajectory of other vehicles relative to the host vehicle, or the vehicle's movement relative to adjacent stationary objects.	5.4.1	Provide Dynamic Scenario Intelligence
8.4.3.2	The system shall be able to control the steering of the vehicle automatically.	5.2.2	Provide Lateral Dynamic Control
8.4.3.3	The system shall be able to control the brakes of the vehicle automatically.	5.2.1	Provide Longitudinal Dynamic Control
8.4.3.4	The system shall be able to control the engine of the vehicle automatically.	5.2.1	Provide Longitudinal Dynamic Control
8.4.3.5	The system shall be able to control the vehicle dynamics automatically.	5.4.2	Provide Lateral Dynamic Control of the Vehicle
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.	5.5.1	Monitor Driver Status
8.5.0.3	The system shall be able to warn the driver when a lack of alertness is detected.	5.5.2	Enhance Driver Alertness
8.5.0.4	The system shall be able to warn surrounding drivers that this driver has a problem.	5.5.6	Provide Warnings to Surrounding Traffic

User Need		Function	
Number	**Description**	**Number**	**Name**
8.5.1.1	The system shall be able to make a 'May Day' call.	5.5.7	Provide Mayday Call
		5.8.4	Provide Road Assistance
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.	5.5.3	Monitor Vehicle Status
		5.5.5	Provide Automatic Take-over of Controls
		5.5.7	Provide Mayday Call
		5.8.4	Provide Road Assistance
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.	5.5.7	Provide Mayday Call
		5.8.4	Provide Road Assistance
8.5.2.1	The system shall be able to manoeuvre the vehicle to the roadside automatically, when the driver does not respond.	5.3.3	Provide Facilities for Parking
		5.4.3	Provide Facilities for Parking
8.5.2.2	The system shall be able to provide information to assist in the task of parking, e.g. short range front/rear collision warning/avoidance.	5.3.3	Provide Facilities for Parking
		5.4.3	Provide Facilities for Parking
8.6.0.1	The system shall be able to detect the imminence of a longitudinal collision.	5.2.5	Provide Pre-Crash Restraints Deployment
8.6.0.2	The system shall be able to detect the imminence of a lateral collision.	5.2.5	Provide Pre-Crash Restraints Deployment
9.1.0.1	The system shall enable the device storing the information recorded by the tachograph to be physically removed from the vehicle.	8.3.3	Comply with Regulation

User Need		Function	
Number	**Description**	**Number**	**Name**
9.1.0.2	The system shall enable all electronically recorded information stored on-board the vehicle to be interrogated whenever required.	8.2.2.2.1	Prepare/Process information to/from board
9.2.0.1	The system shall be able to store all necessary statutory (i.e. required by law) information on-board the vehicle.	8.2.2.3.2	Manage Vehicle and Equipment
		8.3.1.3	Monitor Transport Order
		8.3.1.4	Monitor Operational Task
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.	8.2.2.3.2	Manage Vehicle and Equipment
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.	8.3.3	Comply with Regulation
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).	8.3.2.2	Monitor Vehicle
		8.3.2.4	Monitor Equipment
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).	8.2.2.2.5	Evaluate and Record Safety Status
		8.3.2.1	Monitor Driver
		8.3.2.2	Monitor Vehicle
		8.3.2.3	Monitor Cargo
		8.3.2.4	Monitor Equipment

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	8.2.2.2.5	Evaluate and Record Safety Status
		8.3.2.1	Monitor Driver
		8.3.2.2	Monitor Vehicle
		8.3.2.3	Monitor Cargo
		8.3.2.4	Monitor Equipment
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.	2.1.2.1	Identify and Classify Emergencies
		2.1.2.2	Manage Incident and Emergency Information
		2.1.2.3	Plan Emergency Intervention
		8.3.2.3	Monitor Cargo
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.	2.1.2.1	Identify and Classify Emergencies
		2.1.2.2	Manage Incident and Emergency Information
		2.1.2.3	Plan Emergency Intervention
		8.2.2.2.2	Manage Incident
9.5.0.2	The system shall be able to incorporate additional regulations as and when required, and provide an indication of compliance.	8.2.2.2.4	Evaluate Transport Conditions
		8.2.2.3.2	Manage Vehicle and Equipment

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	8.1.1.1	Negotiate Principal Requests
		8.1.1.2	Choose a Fleet Supplier
		8.1.1.3	Administrate Freight Transactions
		8.2.1.1	Negotiate Freight Operator Requests
		8.2.1.2	Administrate Fleet Transactions
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.	8.3.1.3	Monitor Transport Order
		8.3.1.4	Monitor Operational Task
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.	8.1.1.1	Negotiate Principal Requests
		8.1.1.2	Choose a Fleet Supplier
		8.1.1.3	Administrate Freight Transactions
		8.1.2.1	Handle Customs Declaration
		8.1.2.2	Handle Hazardous Goods Transport Declaration
		8.1.2.3	Prepare and Deliver Official Transport Documents
		8.2.1.1	Negotiate Freight Operator Requests
		8.2.1.2	Administrate Fleet Transactions

User Need		Function	
Number	**Description**	**Number**	**Name**
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	8.1.1.1	Negotiate Principal Requests
		8.1.1.2	Choose a Fleet Supplier
		8.1.1.3	Administrate Freight Transactions
		8.1.2.1	Handle Customs Declaration
		8.1.2.2	Handle Hazardous Goods Transport Declaration
		8.1.2.3	Prepare and Deliver Official Transport Documents
		8.2.1.1	Negotiate Freight Operator Requests
		8.2.1.2	Administrate Fleet Transactions
		8.3.1.3	Monitor Transport Order
		8.3.1.4	Monitor Operational Task
		8.3.3	Comply with Regulation
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.	8.2.2.1.1	Elaborate and Store Operational trip and load plan
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.	8.1.3	Control Freight/Cargo Operations
		8.2.2.2.1	Prepare/Process information to/from board
9.5.1.7	The system shall enable the consignee to receive information, (e.g. delivery note, invoice etc.) directly from the vehicle.	8.3.1.3	Monitor Transport Order

User Need		Function	
Number	**Description**	**Number**	**Name**
9.5.1.8	The system shall enable the shipper to receive information (e.g. destination, contractual data etc.) directly from the vehicle.	8.3.1.3	Monitor Transport Order
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).	8.1.4	Evaluate Freight Operations Performance
		8.2.3	Evaluate Fleet Operations Performance
9.5.1.11	The system shall be able to analyse the costs and performance of the FFM operations.	8.1.4	Evaluate Freight Operations Performance
		8.2.3	Evaluate Fleet Operations Performance
9.5.2.2	The system shall be able to assign tasks to vehicles and drivers, e.g. pick-up and delivery instructions.	8.2.2.1.2	Determine Compliant Resources
		8.2.2.1.3	Prepare and Deliver Operational Transport Document
9.5.2.3	The system shall be to optimise the scheduling of vehicles.	8.2.2.1.2	Determine Compliant Resources
		8.2.2.1.3	Prepare and Deliver Operational Transport Document
9.5.2.4	The system shall be to optimise the scheduling of drivers.	8.2.2.1.2	Determine Compliant Resources
		8.2.2.1.3	Prepare and Deliver Operational Transport Document
9.5.2.5	The system shall be able to optimise the assignment of loads.	8.2.2.1.2	Determine Compliant Resources
		8.2.2.1.3	Prepare and Deliver Operational Transport Document
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.	8.3.2.2	Monitor Vehicle
		8.3.2.4	Monitor Equipment
		8.3.3	Comply with Regulation

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	8.2.2.1.3	Prepare and Deliver Operational Transport Document
9.5.2.8	The system shall be able to provide an optimal route for each 'normal' vehicle.	8.2.2.1.1	Elaborate and Store Operational trip and load plan
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.	8.2.2.1.1	Elaborate and Store Operational trip and load plan
9.5.2.10	The system shall be able to predict a time of arrival.	8.1.1.2	Choose a Fleet Supplier
		8.2.1.1	Negotiate Freight Operator Requests
		8.2.2.1.1	Elaborate and Store Operational trip and load plan
		8.2.2.2.1	Prepare/Process information to/from board
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.	8.3.1.4	Monitor Operational Task
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.	8.2.2.2.1	Prepare/Process information to/from board
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.	8.1.1.1	Negotiate Principal Requests
		8.1.1.2	Choose a Fleet Supplier
		8.2.1.1	Negotiate Freight Operator Requests
		8.2.2.1.2	Determine Compliant Resources
		8.2.2.1.3	Prepare and Deliver Operational Transport Document

User Need		Function	
Number	**Description**	**Number**	**Name**
9.5.2.15	The system shall be able to schedule the maintenance of vehicles, equipment and cargo units.	8.2.2.3.1	Manage and Schedule Maintenance Activities
9.5.2.16	The system shall be able to monitor and analyse the vehicle fleet and drivers' staff costs and performance.	8.2.3	Evaluate Fleet Operations Performance
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.	8.3.1.2	Create New Transport Unit
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.	8.3.1.3	Monitor Transport Order
		8.3.1.4	Monitor Operational Task
		8.3.2.1	Monitor Driver
		8.3.2.2	Monitor Vehicle
		8.3.2.3	Monitor Cargo
		8.3.2.4	Monitor Equipment
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.	8.2.2.3.2	Manage Vehicle and Equipment
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.	8.3.1.3	Monitor Transport Order
		8.3.1.4	Monitor Operational Task
		8.3.3	Comply with Regulation
9.5.3.5	The system shall enable the driver to receive traffic information.	8.3.1.4	Monitor Operational Task
9.5.3.6	The system shall enable the driver to receive weather information.	8.3.1.4	Monitor Operational Task

User Need		Function	
Number	**Description**	**Number**	**Name**
9.5.3.8	The system shall be able to assist the process of checking the vehicle, equipment and cargo documents.	8.3.1.1	Check Transport Order
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.	8.3.2.1	Monitor Driver
		8.3.2.2	Monitor Vehicle
		8.3.2.3	Monitor Cargo
		8.3.2.4	Monitor Equipment
9.5.3.10	The system shall be able to record driver's hours, and report on available hours, deviations and disturbances.	8.2.2.2.4	Evaluate Transport Conditions
		8.2.2.2.5	Evaluate and Record Safety Status
9.5.3.11	The system shall enable the driver to receive a change (e.g. to the route, task, etc.) at any time.	8.3.1.2	Create New Transport Unit
		8.3.1.4	Monitor Operational Task
9.5.3.12	The system shall be able to record the actual route taken.	8.2.2.2.1	Prepare/Process information to/from board
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).	8.2.2.2.4	Evaluate Transport Conditions
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.	8.2.2.2.4	Evaluate Transport Conditions
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.	8.3.2.3	Monitor Cargo
9.5.3.17	The system shall be able to adjust the temperature and humidity of a freight unit remotely, during the transport cycle.	8.3.2.3	Monitor Cargo

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	8.2.2.2.5	Evaluate and Record Safety Status
9.5.3.20	The system shall enable automatic remote vehicle diagnostics.	8.3.2.2	Monitor Vehicle
9.5.3.21	The system shall be able to monitor and analyse the vehicle and driver's staff costs and performance.	8.2.3	Evaluate Fleet Operations Performance
9.5.3.22	The system shall be able to provide the driver with a route to a destination	8.2.2.1.3	Prepare and Deliver Operational Transport Document
9.5.3.23	The system shall be able to record the payment of tolls.	8.2.2.2.3	Process On-board Payments
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.	8.2.2.3.3	Manage Driver Employment
9.5.4.4	The system shall be able to book places in an equipment/container storage area.	8.1.5.2	Book Storage Places
9.5.4.5	The system shall be able to forecast the use of an equipment/container storage area	8.1.5.2	Book Storage Places
9.5.5.1	The system shall be able to manage the use of the interface between freight transport modes in an effective manner.	8.1.5.1	Identify Possible Transport Optimisations
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.	8.1.5.1	Identify Possible Transport Optimisations

User Need		Function	
Number	**Description**	**Number**	**Name**
9.5.5.5	The system shall enable the matching of demand for, and supply of, (multi-modal) freight transport resources.	8.1.5.1	Identify Possible Transport Optimisations
10.1.0.1	The system shall provide effective and attractive PT.	4.2.1	Plan & Schedule Services
		4.2.2	Plan Vehicle Pooling Services
		4.4.1	Optimise Control Action
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.	4.2.1	Plan & Schedule Services
		4.2.2	Plan Vehicle Pooling Services
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.	4.1.1	Estimate Vehicle Indicators
		4.1.3	Calculate Service Performance
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.	4.2.1	Plan & Schedule Services
10.1.1.2	The system shall be able to produce optimum driver schedules.	4.3.3	Manage PT Drivers
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.	4.1.1	Estimate Vehicle Indicators
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.	4.1.1	Estimate Vehicle Indicators
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.	4.4.1	Optimise Control Action
		4.4.4	Manage Additional Vehicles

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	4.4.1	Optimise Control Action
		4.4.4	Manage Additional Vehicles
10.1.4.1	The system shall be able to inform travellers about PT operations, e.g. travel times, delays, fares etc.	4.1.2	Predict Vehicle Indicators
		4.2.3	Manage Fare Schemes
10.1.4.2	The system shall be able to provide information about PT services to the travellers either on-board the PT vehicle, or before the journey.	4.1.2	Predict Vehicle Indicators
		4.2.3	Manage Fare Schemes
		6.2.3	Propose Trip Alternatives
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 at PT stops and/or on-board PT vehicles.	4.1.2	Predict Vehicle Indicators
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.	4.2.1	Plan & Schedule Services
		4.2.3	Manage Fare Schemes
		6.2.3	Propose Trip Alternatives
10.1.5.1	The system shall be able to provide two-way data and voice communication between PT vehicles and a central location.	4.1.1	Estimate Vehicle Indicators
		4.1.4	Confer to Vehicles
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.	4.4.2	Require Vehicle Priority
10.2.0.1	The system shall be able to provide both planned and spontaneous trips.	4.3.1	Provide Service on Demand

User Need		Function	
Number	**Description**	**Number**	**Name**
10.2.0.3	The system shall be able to provide access to a wide variety of destinations over a large geographic area.	4.3.1	Provide Service on Demand
10.2.0.4	The system shall be able to obtain service information so that other journeys may include other modes of transport.	4.2.2	Plan Vehicle Pooling Services
		4.3.4	Manage Vehicle Sharing
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.	4.3.4	Manage Vehicle Sharing
10.2.1.6	The system shall be able to locate and identify the Demand Responsive PT vehicles.	4.1.1	Estimate Vehicle Indicators
10.2.1.7	The system shall be able to schedule the Demand Responsive PT vehicles in real-time.	4.3.1	Provide Service on Demand
		4.3.4	Manage Vehicle Sharing
10.2.1.8	The system shall be able to plan the Demand Responsive PT vehicle trips in the most efficient manner.	4.3.1	Provide Service on Demand
		4.3.4	Manage Vehicle Sharing
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.	4.2.4	Manage PT Route Stores and Operator Interface
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.	4.1.1	Estimate Vehicle Indicators
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.	4.1.4	Confer to Vehicles

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	6.3.4	Provide Route Guidance
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.	4.1.3	Calculate Service Performance
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.	4.1.3	Calculate Service Performance
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.	4.2.2	Plan Vehicle Pooling Services
		4.3.1	Provide Service on Demand
		4.3.4	Manage Vehicle Sharing
		4.3.5	Monitor Infrastructure
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.	4.3.1	Provide Service on Demand
		4.3.4	Manage Vehicle Sharing
		4.3.5	Monitor Infrastructure
10.3.0.3	The system shall be able to register people either as a driver and/or a (paying) passenger.	4.2.2	Plan Vehicle Pooling Services
		4.3.4	Manage Vehicle Sharing
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	4.2.2	Plan Vehicle Pooling Services
		4.3.4	Manage Vehicle Sharing

User Need		Function	
Number	**Description**	**Number**	**Name**
10.3.0.5	The system shall support an interactive database of car sharers that will permit them to find suitable partners.	4.3.4	Manage Vehicle Sharing
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.	4.3.4	Manage Vehicle Sharing
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.	4.1.2	Predict Vehicle Indicators
		4.2.1	Plan & Schedule Services
		4.3.4	Manage Vehicle Sharing
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, next stop for this vehicle.	4.1.2	Predict Vehicle Indicators
		4.4.3	Control Vehicle Driving
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.	4.1.2	Predict Vehicle Indicators
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.	4.1.2	Predict Vehicle Indicators
		4.2.1	Plan & Schedule Services
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.	4.1.2	Predict Vehicle Indicators
		4.2.1	Plan & Schedule Services
		6.2.3	Propose Trip Alternatives

User Need		Function	
Number	**Description**	**Number**	**Name**
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.	4.1.2	Predict Vehicle Indicators
		6.2.3	Propose Trip Alternatives
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.	4.1.4	Confer to Vehicles
10.5.0.2	The system shall be able to provide two-way data and voice communication between PT vehicles and a central location.	4.1.4	Confer to Vehicles
10.5.0.3	The system shall summon assistance when requested by drivers, or other travellers, e.g. after disorderly behaviour amongst certain passengers.	4.1.4	Confer to Vehicles

3. Trace Table of Functions against User Needs

3.1. Introduction

This Chapter contains the second of the Trace Tables for use in the development of an Architecture or a Physical System. This process is described in Chapters 5 and 4 (respectively) of the Main Document of the European ITS Physical Architecture Document (D 3.2). This Table provides access to the relationship between Functions and User Needs.

3.2. Use of Functions against User Needs Trace Table

The following pages of this Chapter provide the Table that shows the European ITS Functions and the European ITS User Needs that they serve. In some cases there may be more than one User Need for a particular Function. This should be expected and can be for one or more of the following two reasons.

1. The User Needs have been written at a “simple” level, i.e. they each contain a single requirement.
2. Using smaller less complex Functions makes the Functional Architecture more modular thereby promoting the re-use of modules with the same functionality. Thus a Function may serve several User Needs, sometimes from different Groups and/or Categories.

To use the Table, first select the Function(s) for which the range of User Needs that they serve needs to be determined. The Function numbers and names are shown in the two left hand columns of the Table. For each selected Function, it is then possible to see the User Need(s) (number and description) that it serves by looking in right hand columns of the rows on which the Function was found.

If necessary, the full range of Functions that serve a particular User Need can also be determined. This is can be achieved by reference to the Table of User Needs and Functions which is described in Chapter 2.

Table 2 Functions and the User Needs that they serve

Function		User Need	
Number	**Name**	**Number**	**Description**
1.1.1	Create EP Contract	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).
		4.1.2.1	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).
		4.1.3.2	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);
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
1.1.2	Establish Contract Statistics	4.1.0.2	The system shall manage customer data, e.g. identification, account, rights of residents, etc.
		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);
1.2.1	Load User's Account	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.
		4.1.2.2	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).
		4.1.3.2	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);
		4.1.4.1	The system shall be able to collect evidence on the non-payment of tolls, and other illegal financial transactions.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
1.2.2	Debit User's Account	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.
		4.1.0.5	The system shall be able to use a variety of payement or receipt means, including contactless "smart cards".
		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).
		4.1.3.2	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);
1.2.3	Inform Users on Transactions	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.
		4.1.3.3	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);
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
1.3.1	Detect User	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.
		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.
1.3.2	Identify User	4.1.0.2	The system shall manage customer data, e.g. identification, account, rights of residents, etc.
		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.
		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.
		4.1.3.1	The system shall be able to exchange information between a toll collection unit and a vehicle.
		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);

Function		User Need	
Number	**Name**	**Number**	**Description**
1.3.3	Check User's Contract	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.
		4.1.1.1	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.
		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.
		4.1.2.2	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).
		4.1.3.1	The system shall be able to exchange information between a toll collection unit and a vehicle.
		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);
1.3.4	Inform and Guide User	4.1.0.2	The system shall manage customer data, e.g. identification, account, rights of residents, etc.
		4.1.1.1	The system shall have a minimum impact on the traffic flow, e.g. a short transaction duration.
		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).
		4.1.3.3	The system shall have the maximum security necessary for electronic financial transactions.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
1.3.5	Compute Service Fee	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.
		4.1.0.4	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 payement or receipt means, including contactless "smart cards".
		4.1.1.1	The system shall have a minimum impact on the traffic flow, e.g. a short transaction duration.
		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).
		4.1.3.3	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);
1.3.6	Check Advanced Payment	4.1.0.2	The system shall manage customer data, e.g. identification, account, rights of residents, etc.
		4.1.0.4	The system shall be able to manage tariff policies (define fares/fees according to selected criteria).
		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).
		4.1.3.3	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);

Function		User Need	
Number	**Name**	**Number**	**Description**
1.3.7	Recover Fee	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.
		4.1.1.1	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.
		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).
		4.1.3.2	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);
		4.1.4.1	The system shall be able to collect evidence on the non-payment of tolls, and other illegal financial transactions.

Function		User Need	
Number	**Name**	**Number**	**Description**
1.4.1	Distribute Fees Revenue	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.
		4.1.2.1	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).
		4.1.3.2	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);
1.4.2	Credit Operator's Account	4.1.2.1	The system shall be able to share revenues between road network operators.
		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);
1.4.3	Inform Operators on Transactions	4.1.0.2	The system shall manage customer data, e.g. identification, account, rights of residents, etc.

Function		User Need	
Number	**Name**	**Number**	**Description**
1.5.1	Check User's rights	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.
		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.
		4.1.4.1	The system shall be able to collect evidence on the non-payment of tolls, and other illegal financial transactions.
1.5.2	Detect Payment Violations	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.
		4.1.1.3	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.
		4.1.2.2	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).
		4.1.3.3	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);
		4.1.4.1	The system shall be able to collect evidence on the non-payment of tolls, and other illegal financial transactions.

Function		User Need	
Number	**Name**	**Number**	**Description**
1.5.3	Detect Access violations	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.
		4.1.1.3	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.
		4.1.2.2	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).
		4.1.3.3	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);
		4.1.4.1	The system shall be able to collect evidence on the non-payment of tolls, and other illegal financial transactions.
1.5.4	Block Access	4.1.1.1	The system shall have a minimum impact on the traffic flow, e.g. a short transaction duration.
		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.
		4.1.3.1	The system shall be able to exchange information between a toll collection unit and a vehicle.
		4.1.4.1	The system shall be able to collect evidence on the non-payment of tolls, and other illegal financial transactions.

Function		User Need	
Number	**Name**	**Number**	**Description**
1.6.1	Manage Tariffs	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.
1.6.2	Manage Access Rights	4.1.0.2	The system shall manage customer data, e.g. identification, account, rights of residents, etc.
		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.
2.1.1	Acquire Mayday Call on Roadside	5.1.0.1	The system shall be able to make a 'May Day' call.

Function		User Need	
Number	**Name**	**Number**	**Description**
2.1.2.1	Identify and Classify Emergencies	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.
		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.
		7.2.0.7	The system shall be able to validate that an incident has occurred in order to avoid false alarms.
		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.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
2.1.2.2	Manage Incident and Emergency Information	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.
		5.1.0.7	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).
		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.
		7.2.0.7	The system shall be able to validate that an incident has occurred in order to avoid false alarms.
		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.
		7.2.2.1	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.
		7.2.3.1	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.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
2.1.2.3	Plan Emergency Intervention	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.
		5.1.0.7	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).
		5.2.0.1	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.
		5.2.0.5	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.
		7.2.0.8	The system shall be able to suggest one or more responses for dealing with an incident.
		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.
		7.2.2.1	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.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
		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.
2.1.2.4	Process Emergency Progress Reports	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.
		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.
2.1.3	Manage Emergency Vehicle	5.2.0.1	The system shall support a green wave for emergency vehicles.
		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.
		7.2.1.1	The system shall be able to locate and identify emergency vehicles on the road network.
2.1.4	Provide Emergency Control to the Operator	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.

Function		User Need	
Number	**Name**	**Number**	**Description**
2.1.5	Provide Access and Maintain Data for Emergency	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.
		7.2.0.7	The system shall be able to validate that an incident has occurred in order to avoid false alarms.
		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.
3.1.1.1	Collect Urban Traffic Data	2.1.1.3	The system shall be able to collect traffic data for road network use analysis and prediction calculations.
		7.1.0.10	The system shall be able to control urban roads and traffic.
		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.
		7.1.1.4	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).
		7.1.11.3	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.
3.1.1.2	Monitor Urban Car Park Occupation	2.1.1.3	The system shall be able to collect traffic data for road network use analysis and prediction calculations.
		7.1.0.10	The system shall be able to control urban roads and traffic.
		7.1.1.5	The system shall be able to monitor the entire road network (network state surveillance tool).
		7.1.11.1	The system shall be able to monitor the current usage of the parking facilities.

Function		User Need	
Number	**Name**	**Number**	**Description**
3.1.1.3	Provide Urban Traffic Forecasts and Strategies	2.1.2.1	The system shall be able to model the road network for strategic planning calculations.
		2.1.2.3	The system shall be able to assist in the planning of (inter-modal) routes.
		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).
		7.1.0.10	The system shall be able to control 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.
		7.1.0.2	The system shall be able to implement identified control strategies that conform with specified policy.
		7.1.11.2	The system shall be able to forecast the need for parking slots.
		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.
		7.1.2.4	The system shall be able to analyse road and traffic data to predict possible critical situations.
		7.1.6.1	The system shall be able to provide Origin/Destination computations, and route assignment estimations, for the road network.
		7.1.7.4	The system shall be able to transmit recommended speed limits to equipped vehicles.
		7.1.8.1	The system shall be able to transmit information to a vehicle to update its on-board database.

Function		User Need	
Number	**Name**	**Number**	**Description**
3.1.1.4	Manage Urban Traffic Data	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.
		2.1.1.3	The system shall be able to collect traffic data for road network use analysis and prediction calculations.
		2.1.2.3	The system shall be able to assist in the planning of (inter-modal) routes.
		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.
		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.
		7.1.0.6	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.
		7.1.2.1	The system shall be able to use consistent historical data to complement real-time data, when necessary.
		7.1.2.3	The system shall be able to use historical data to complement predicted data, when necessary.

Function		User Need	
Number	**Name**	**Number**	**Description**
		7.1.2.7	The system shall be able to provide historical and predicted data.
		7.1.8.1	The system shall be able to transmit information to a vehicle to update its on-board database.
3.1.1.5.1	Provide Urban Traffic Management	2.1.2.2	The system shall be able to develop and implement traffic environmental management strategies based on current and predicted traffic conditions.
		2.1.3.1	The system shall be able to measure the effect of a strategy, and to modify it when necessary.
		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.
		6.1.1.4	The system shall be able to provide extensive trip information, e.g. prices, fares, routes, incidents, roadworks, forecast & current traffic situations, traffic control, demand mgt measures, local warnings, special events, weather conditions, hotels etc.
		7.1.0.10	The system shall be able to control 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.
		7.1.0.2	The system shall be able to implement identified control strategies that conform with specified policy.
		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.
		7.1.0.6	The system shall be able to help co-ordinate the activities of TICs and TCCs.

Function		User Need	
Number	**Name**	**Number**	**Description**
		7.1.12.1	The system shall be able to control pedestrian and cycle crossings.
		7.1.12.2	The system shall be able to monitor and control pedestrian and cycle crossings in order to optimise their use.
		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).
		7.1.4.8	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.
		7.1.5.1	The system shall be able to provide control measures to protect road maintenance work and workers.
		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.
		7.1.9.2	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.

Function		User Need	
Number	**Name**	**Number**	**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.
3.1.1.5.2	Provide Planned Urban Traffic Management Facilities	7.1.0.10	The system shall be able to control urban roads and traffic.
		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.
3.1.1.5.3	Provide Urban Car Park States	7.1.0.10	The system shall be able to control urban roads and traffic.
		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).
3.1.1.5.4	Provide Urban Traffic Speed Management	7.1.0.10	The system shall be able to control urban roads and traffic.
		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.
		7.1.7.5	The system shall be able to support a database of all speed limits on the road network.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
3.1.1.5.5	Provide Urban Output Actuation	6.1.1.4	The system shall be able to provide extensive trip information, e.g. prices, fares, routes, incidents, roadworks, forecast & current traffic situations, traffic control, demand mgt measures, local warnings, special events, weather conditions, hotels etc.
		7.1.0.10	The system shall be able to control urban roads and traffic.
		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.
		7.1.0.5	The system shall manage road traffic in such a way that congestion (travel time) may be reduced.
		7.1.3.4	The system shall be able to activate control devices (e.g. traffic lights, VMS), either individually or in groups.
		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.
3.1.1.5.6	Provide Urban Traffic Lane Management	7.1.0.10	The system shall be able to control urban roads and traffic.
		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.
		7.1.4.3	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).
		7.1.5.2	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.
		7.1.5.4	The system shall be able to reverse the direction of traffic flow on parts of the urban network.

Function		User Need	
Number	**Name**	**Number**	**Description**
3.1.1.5.7	Provide Operator Urban Traffic Management Facilities	7.1.0.10	The system shall be able to control urban roads and traffic.
		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.
		7.1.3.5	The system shall enable TCC operators to make temporary changes to the normal control strategy in real-time.
3.1.1.5.8	Detect Urban Traffic Violations	7.1.0.10	The system shall be able to control urban roads and traffic.
		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.
3.1.1.5.9	Manage Urban Static Traffic Data	7.1.0.10	The system shall be able to control urban roads and traffic.
		8.2.5.3	The system shall be able to provide infomation about various aspects of the road network, e.g. default speed limits, road hazards, junctions etc.
3.1.2.1	Collect Inter-urban Traffic Data	2.1.1.3	The system shall be able to collect traffic data for road network use analysis and prediction calculations.
		7.1.0.11	The system shall be able to control inter-urban roads and traffic.
		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.
		7.1.1.3	The system shall monitor inter-urban roads and traffic.
		7.1.1.5	The system shall be able to monitor the entire road network (network state surveillance tool).

Function		User Need	
Number	**Name**	**Number**	**Description**
3.1.2.2	Monitor Service Area Vehicle Occupation	2.1.1.3	The system shall be able to collect traffic data for road network use analysis and prediction calculations.
		7.1.0.11	The system shall be able to control inter-urban roads and traffic.
3.1.2.3	Provide Inter-urban Traffic Forecasts and Strategies	2.1.2.1	The system shall be able to model the road network for strategic planning calculations.
		2.1.2.3	The system shall be able to assist in the planning of (inter-modal) routes.
		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).
		7.1.0.11	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.
		7.1.0.2	The system shall be able to implement identified control strategies that conform with specified policy.
		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.
		7.1.2.4	The system shall be able to analyse road and traffic data to predict possible critical situations.
		7.1.6.1	The system shall be able to provide Origin/Destination computations, and route assignment estimations, for the road network.
		7.1.7.4	The system shall be able to transmit recommended speed limits to equipped vehicles.
		7.1.8.1	The system shall be able to transmit information to a vehicle to update its on-board database.

Function		User Need	
Number	**Name**	**Number**	**Description**
3.1.2.4	Manage Inter-urban Traffic Data	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.
		2.1.1.3	The system shall be able to collect traffic data for road network use analysis and prediction calculations.
		2.1.2.3	The system shall be able to assist in the planning of (inter-modal) routes.
		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.
		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.
		7.1.0.6	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.
		7.1.2.1	The system shall be able to use consistent historical data to complement real-time data, when necessary.
		7.1.2.3	The system shall be able to use historical data to complement predicted data, when necessary.

Function		User Need	
Number	**Name**	**Number**	**Description**
		7.1.2.7	The system shall be able to provide historical and predicted data.
		7.1.8.1	The system shall be able to transmit information to a vehicle to update its on-board database.
3.1.2.5.1	Provide Inter-urban Traffic Management	2.1.2.2	The system shall be able to develop and implement traffic environmental management strategies based on current and predicted traffic conditions.
		2.1.3.1	The system shall be able to measure the effect of a strategy, and to modify it when necessary.
		5.2.0.2	The system shall inform traffic management about the route that is intended for each green wave before it is used.
		6.1.1.4	The system shall be able to provide extensive trip information, e.g. prices, fares, routes, incidents, roadworks, forecast & current traffic situations, traffic control, demand mgt measures, local warnings, special events, weather conditions, hotels etc.
		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.
		7.1.0.2	The system shall be able to implement identified control strategies that conform with specified policy.
		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.
		7.1.0.6	The system shall be able to help co-ordinate the activities of TICs and TCCs.
		7.1.4.1	The system shall be able to control the entries and exits to motorways.

Function		User Need	
Number	**Name**	**Number**	**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).
		7.1.4.5	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).
		7.1.4.8	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.
		7.1.5.1	The system shall be able to provide control measures to protect road maintenance work and workers.
		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.
3.1.2.5.2	Provide Planned Inter-urban Traffic Management Facilities	7.1.0.11	The system shall be able to control inter-urban roads and traffic.

Function		User Need	
Number	**Name**	**Number**	**Description**
3.1.2.5.2	Provide Planned Inter-urban Traffic Management Facilities	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.
3.1.2.5.3	Provide Service Area Vehicle Occupancy States	7.1.0.11	The system shall be able to control inter-urban roads and traffic.
		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).
3.1.2.5.4	Provide Inter-urban Traffic Speed Management	7.1.0.11	The system shall be able to control inter-urban roads and traffic.
		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.
		7.1.7.5	The system shall be able to support a database of all speed limits on the road network.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
3.1.2.5.5	Provide Inter-urban Output Actuation	6.1.1.4	The system shall be able to provide extensive trip information, e.g. prices, fares, routes, incidents, roadworks, forecast & current traffic situations, traffic control, demand mgt measures, local warnings, special events, weather conditions, hotels etc.
		7.1.0.11	The system shall be able to control inter-urban roads and traffic.
		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.
		7.1.0.5	The system shall manage road traffic in such a way that congestion (travel time) may be reduced.
		7.1.3.4	The system shall be able to activate control devices (e.g. traffic lights, VMS), either individually or in groups.
3.1.2.5.6	Provide Inter-urban Lane Management	7.1.0.11	The system shall be able to control inter-urban roads and traffic.
		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.
		7.1.4.3	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).
		7.1.5.2	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.

Function		User Need	
Number	**Name**	**Number**	**Description**
3.1.2.5.7	Provide Operator Inter-urban Traffic Management Facilities	7.1.0.11	The system shall be able to control inter-urban roads and traffic.
		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.
		7.1.3.5	The system shall enable TCC operators to make temporary changes to the normal control strategy in real-time.
3.1.2.5.8	Detect Inter-urban Traffic Violations	7.1.0.11	The system shall be able to control inter-urban roads and traffic.
3.1.2.5.9	Manage Inter-urban Static Traffic Data	7.1.0.11	The system shall be able to control inter-urban roads and traffic.
		8.2.5.3	The system shall be able to provide infomation about various aspects of the road network, e.g. default speed limits, road hazards, junctions etc.
3.1.3.1	Assess Bridge Status	2.2.2.2	The system shall be able to monitor the structural integrity of items of infratsructure, e.g. roads, bridges, tunnels, gantries, etc.
		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).
		7.1.4.6	The system shall be able to provide control measures for bridges so that warnings of weather conditions, vehicle restrictions and closure can be provided.

Function		User Need	
Number	**Name**	**Number**	**Description**
3.1.3.2	Assess Tunnel Status	2.2.2.2	The system shall be able to monitor the structural integrity of items of infratsructure, e.g. roads, bridges, tunnels, gantries, etc.
		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).
		7.1.4.7	The system shall be able to provide control measures for "tunnel" environments i.e. vehicle restrictions, fire detection, atmospheric pollution and closure.
3.1.3.3	Provide Bridge and Tunnel Operator Interface	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.
3.1.3.4	Output Bridge Information	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.
3.1.3.5	Output Tunnel Information	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.
3.2.1	Detect Incidents	7.1.3.6	The system shall be able to implement planned control strategies for planned events, e.g. sport, cultural, etc.
		7.2.0.1	The system shall detect and respond to various incidents on the road network.
		7.2.0.6	The system shall minimise the time between the occurrence of an incident and its detection.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
3.2.2	Identify and Classify Incidents	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.
		7.1.3.6	The system shall be able to implement planned control strategies for planned events, e.g. sport, cultural, etc.
		7.2.0.1	The system shall detect and respond to various incidents on the road network.
		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.
		7.2.2.1	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.
		7.2.5.1	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.

Function		User Need	
Number	**Name**	**Number**	**Description**
3.2.3	Assess Incidents and Determine Responses	7.1.3.6	The system shall be able to implement planned control strategies for planned events, e.g. sport, cultural, etc.
		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.
		7.2.0.8	The system shall be able to suggest one or more responses for dealing with an incident.
		7.2.0.9	The system shall be able to run (pre-)defined incident mitigation strategies automatically.
		7.2.2.3	The system shall be able to provide information on each incident to TICs for onward transmission to travellers.
		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.
		7.2.5.2	The system shall be able to provide local warnings on dangerous sections of the road network.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
3.2.4	Manage Incident Data	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.
		7.2.2.3	The system shall be able to provide information on each incident to TICs for onward transmission to travellers.
		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.
3.3.1	Receive Information on Travel Factors	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, PT usage, fares, tolls, etc.

Function		User Need	
Number	**Name**	**Number**	**Description**
3.3.2	Implement Demand Management Strategy	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.
		7.3.0.3	The system shall be able to recommend a strategy to reduce demand.
		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.
		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.
		7.3.2.1	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.
		7.3.3.1	The system shall be able to implement parking strategies in specific areas, including P&R strategies.
		7.3.4.1	The system shall be able to provide information to promote the use of cycles and walking.
3.3.3	Develop Demand Management Strategy	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.
		2.1.3.1	The system shall be able to measure the effect of a strategy, and to modify it when necessary.
		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..

Function		User Need	
Number	**Name**	**Number**	**Description**
3.3.4	Manage Demand Data Store	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.
3.3.5	Provide Demand Management Operator Interface	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, PT usage, fares, tolls, etc.
3.4.1	Monitor Weather Conditions	7.1.1.6	The system shall be able to monitor and record weather conditions, e.g. wind, fog, rain level, ice, etc.
3.4.2	Monitor Atmospheric Pollution	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).
3.4.3	Monitor Noise Pollution	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.
3.4.4	Predict Environmental Conditions	7.1.2.5	The system shall be able to predict weather conditions, in particular the formation of fog and/or ice.
		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.
3.4.6	Manage Environmental Conditions Data	2.1.4.1	The system shall collect and report data as required by legally appointed authorities.
		6.1.1.4	The system shall be able to provide extensive trip information, e.g. prices, fares, routes, incidents, roadworks, forecast & current traffic situations, traffic control, demand mgt measures, local warnings, special events, weather conditions, hotels etc.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
3.5.1	Evaluate Short Term Maintenance Needs	2.2.0.1	The system shall provide support for road maintenance and infrastructure management.
		2.2.0.3	The system shall be able to recommend maintenance work schedules such that they cause the minimum disruption to traffic.
		2.2.0.5	The system shall be able to transmit current and future maintenance schedules to TCCs.
		2.2.3.1	The system shall be able to transfer information to, and between, road maintenance units.
		2.2.4.1	The system shall be able to support the management and control of maintenance contracts.
3.5.2	Evaluate Long Term Maintenance Needs	2.2.0.6	The system shall be able to maintain statistics on road usage to evaluate the need for possible maintenance.
		2.2.3.1	The system shall be able to transfer information to, and between, road maintenance units.
		2.2.4.1	The system shall be able to support the management and control of maintenance contracts.
3.5.3	Evaluate Equipment Maintenance Needs	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 infratsructure, e.g. roads, bridges, tunnels, gantries, etc.
3.5.4	Evaluate De-icing Need	2.2.1.1	The system shall be able to activate fixed de-icing equipment on parts of the road network.
3.5.6	Manage Maintenance Data Store	2.2.0.6	The system shall be able to maintain statistics on road usage to evaluate the need for possible maintenance.
		2.2.2.3	The system shall be able to support a database of the road network, infrastructure and road-side equipment.

Function		User Need	
Number	**Name**	**Number**	**Description**
4.1.1	Estimate Vehicle Indicators	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.
		10.1.2.1	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.
		10.1.5.1	The system shall be able to provide two-way data and voice communication between PT vehicles and a central location.
		10.2.1.6	The system shall be able to locate and identify the Demand Responsive PT vehicles.
		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.
		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.
		2.1.4.2	The system shall be able to archive (a summary of) historical data on transport demand and transport supply for all transport modes.

Function		User Need	
Number	**Name**	**Number**	**Description**
4.1.2	Predict Vehicle Indicators	10.1.4.1	The system shall be able to inform travellers about PT operations, e.g. travel times, delays, fares etc.
		10.1.4.2	The system shall be able to provide information about PT services to the travellers either on-board the PT vehicle, or before 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 at PT stops and/or on-board PT vehicles.
		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.
		10.4.1.1	The system shall be able to provide in-vehicle general (dynamic) PT information, as well as the arrival time at, and name of, 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.
		10.4.2.1	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.
		2.1.1.3	The system shall be able to collect traffic data for road network use analysis and prediction calculations.

Function		User Need	
Number	**Name**	**Number**	**Description**
4.1.3	Calculate Service Performance	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.
		10.2.4.1	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.
4.1.4	Confer to Vehicles	10.1.5.1	The system shall be able to provide two-way data and voice communication between PT vehicles and a central location.
		10.2.2.2	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.
		10.5.0.1	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.
		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.
		5.1.0.4	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.

Function		User Need	
Number	**Name**	**Number**	**Description**
4.2.1	Plan & Schedule Services	10.1.0.1	The system shall provide effective and attractive 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.
		10.1.1.1	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.
		10.1.4.4	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.
		10.4.0.1	The system shall be able to inform travellers about all PT operations, e.g. bus, rail, metro, air, taxi, car pooling etc.
		10.4.1.3	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.
		10.4.2.1	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.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
4.2.2	Plan Vehicle Pooling Services	10.1.0.1	The system shall provide effective and attractive 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.
		10.2.0.4	The system shall be able to obtain service information so that other journies may include other modes of transport.
		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.
		10.3.0.3	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
4.2.3	Manage Fare Schemes	10.1.4.1	The system shall be able to inform travellers about PT operations, e.g. travel times, delays, fares etc.
		10.1.4.2	The system shall be able to provide information about PT services to the travellers either on-board the PT vehicle, or before 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.
		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).
		7.3.2.4	The system shall be able to adjust public transport fares according to a given pricing strategy.
4.2.4	Manage PT Route Stores and Operator Interface	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.

Function		User Need	
Number	**Name**	**Number**	**Description**
4.3.1	Provide Service on Demand	10.2.0.1	The system shall be able to provide both planned and spontaneous trips.
		10.2.0.3	The system shall be able to provide access to a wide variety of destinations over a large geographic area.
		10.2.1.7	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.
		10.3.0.1	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.
4.3.2	Provide Maintenance Co-ordination	2.2.0.1	The system shall provide support for road maintenance and infrastructure management.
		2.2.0.3	The system shall be able to recommend maintenance work schedules such that they cause the minimum disruption to traffic.
		2.2.0.5	The system shall be able to transmit current and future maintenance schedules to TCCs.
4.3.3	Manage PT Drivers	10.1.1.2	The system shall be able to produce optimum driver schedules.

Function		User Need	
Number	**Name**	**Number**	**Description**
4.3.4	Manage Vehicle Sharing	10.2.0.4	The system shall be able to obtain service information so that other journies may include other modes of transport.
		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.
		10.2.1.7	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.
		10.3.0.1	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.
		10.3.0.7	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.
		10.4.0.1	The system shall be able to inform travellers about all PT operations, e.g. bus, rail, metro, air, taxi, car pooling etc.

Function		User Need	
Number	**Name**	**Number**	**Description**
4.3.5	Monitor Infrastructure	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.
		2.2.2.1	The system shall be able to receive infrastructure equipment status data remotely.
		2.2.2.3	The system shall be able to support a database of the road network, infrastructure and road-side equipment.

Function		User Need	
Number	**Name**	**Number**	**Description**
4.4.1	Optimise Control Action	10.1.0.1	The system shall provide effective and attractive PT.
		10.1.3.1	The system shall be able to identify an incident and to revise its services so that passengers may complete their journies.
		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.
		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.
		2.1.3.1	The system shall be able to measure the effect of a strategy, and to modify it when necessary.
		2.1.4.1	The system shall collect and report data as required by legally appointed authorities.
		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.
		7.1.0.2	The system shall be able to implement identified control strategies that conform with specified policy.
4.4.2	Require Vehicle 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.

Function		User Need	
Number	**Name**	**Number**	**Description**
4.4.3	Control Vehicle Driving	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, next stop for this vehicle.
4.4.4	Manage Additional Vehicles	10.1.3.1	The system shall be able to identify an incident and to revise its services so that passengers may complete their journies.
		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.
5.1.1	Monitor Visibility Range	8.1.0.1	The system shall be able to measure the visibility distance and detect reductions caused by adverse weather and pollution conditions (but not darkness) of the view seen by the driver.
5.1.2	Generate Enhanced Vision of Driving Area	8.1.0.2	The system shall be able to enhance the vision of the driver in adverse visibility conditions, e.g. in fog, darkness etc.
5.1.3	Provide Enhanced Lighting	8.1.0.2	The system shall be able to enhance the vision of the driver in adverse visibility conditions, e.g. in fog, darkness etc.
5.1.4	Provide Anti-glaring (Co-operative) Facilities	8.1.0.2	The system shall be able to enhance the vision of the driver in adverse visibility conditions, e.g. in fog, darkness etc.

Function		User Need	
Number	**Name**	**Number**	**Description**
5.2.1	Provide Longitudinal Dynamic Control	8.2.0.1	The system shall provide direct or indirect assistance for the driving task.
		8.2.1.3	The system shall be able to control the longitudinal dynamic behaviour of the host vehicle automatically
		8.2.6.1	The system shall be able to control the brakes of the vehicle automatically.
		8.2.6.2	The system shall be able to control the engine of the vehicle automatically.
		8.3.0.3	The system shall be able to support a database of safety margins for distances between the vehicle and all other adjacent objects.
		8.4.3.3	The system shall be able to control the brakes of the vehicle automatically.
		8.4.3.4	The system shall be able to control the engine of the vehicle automatically.
5.2.2	Provide Lateral Dynamic Control	8.2.2.1	The system shall be able to control the lateral dynamic behaviour of the vehicle automatically, and keep the vehicle within its current lane of the carriageway.
		8.2.6.7	The system shall be able to control the steering of the vehicle automatically.
		8.3.0.3	The system shall be able to support a database of safety margins for distances between the vehicle and all other adjacent objects.
		8.4.3.2	The system shall be able to control the steering of the vehicle automatically.
5.2.3	Provide Driver-(Automatic Controls) Interactivity	8.3.2.3	The system shall be able to control the brakes of the vehicle automatically.
5.2.5	Provide Pre-Crash Restraints Deployment	8.6.0.1	The system shall be able to detect the imminence of a longitudinal collision.
		8.6.0.2	The system shall be able to detect the imminence of a lateral collision.

Function		User Need	
Number	**Name**	**Number**	**Description**
5.3.1	Provide Dynamic Scenario Intelligence	8.3.0.2	The system shall be able to monitor the conflict zone and predict the trajectory of other vehicles relative to the host vehicle, or the vehicle's movement relative to adjacent stationary objects.
		8.3.1.3	The system shall be able to determine a safe vehicle trajectory relative to the lane/road boundaries.
		8.3.2.1	The system shall be able to detect the position of neighbouring vehicles (and objects).
5.3.2	Provide Longitudinal Dynamic Control of the Vehicle	8.2.3.2	The system shall enable the leading vehicle of a platoon to supervise and manage the operation and tracking of the following vehicle(s).
		8.2.3.3	The system shall enable the following vehicle(s) in a platoon to perform all normal driving manoeuvres without any host driver intervention.
		8.2.3.4	The system shall enable equipped vehicles to leave or join the back of the platoon at any speed.
		8.2.3.5	The system shall allow the following vehicles to perform conventional operations that do not interfere with their tracking of the leading vehicle.
		8.3.1.1	The system shall be able to keep the host vehicle a certain distance behind the vehicle in front (autonomous cruise control).
		8.3.1.2	The system shall be able to warn the driver when the vehicle in front is too close.
5.3.3	Provide Facilities for 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	The system shall be able to provide information to assist in the task of parking, e.g. short range front/rear collision warning/avoidance.

Function		User Need	
Number	**Name**	**Number**	**Description**
5.3.4	Provide Facilities for Intelligent Speed Adaptation	8.2.3.2	The system shall enable the leading vehicle of a platoon to supervise and manage the operation and tracking of the following vehicle(s).
		8.2.3.3	The system shall enable the following vehicle(s) in a platoon to perform all normal driving manoeuvres without any host driver intervention.
		8.2.3.4	The system shall enable equipped vehicles to leave or join the back of the platoon at any speed.
		8.2.3.5	The system shall allow the following vehicles to perform conventional operations that do not interfere with their tracking of the leading vehicle.
		8.2.5.1	The system shall be able to limit the speed of a vehicle automatically to the a given, but variable, maximum (intelligent speed adaptation)
		8.2.5.5	The system shall be able to offer the driver the ability to keep the vehicle below a new mandatory speed limit automatically (manual intelligent speed control).
5.3.5	Provide Facilities for Stop & Go	8.3.1.7	The system shall be able to keep the host vehicle a certain distance behind the vehicle in front in a queue of traffic (stop and go).

Function		User Need	
Number	**Name**	**Number**	**Description**
5.3.6	Provide Facilities for Adaptive Cruise Control	8.2.1.2	The system shall be able to keep the host vehicle a certain distance behind the vehicle in front (autonomous cruise control).
		8.2.3.2	The system shall enable the leading vehicle of a platoon to supervise and manage the operation and tracking of the following vehicle(s).
		8.2.3.3	The system shall enable the following vehicle(s) in a platoon to perform all normal driving manoeuvres without any host driver intervention.
		8.2.3.4	The system shall enable equipped vehicles to leave or join the back of the platoon at any speed.
		8.2.3.5	The system shall allow the following vehicles to perform conventional operations that do not interfere with their tracking of the leading vehicle.
		8.2.5.5	The system shall be able to offer the driver the ability to keep the vehicle below a new mandatory speed limit automatically (manual intelligent speed control).
		8.3.1.1	The system shall be able to keep the host vehicle a certain distance behind the vehicle in front (autonomous cruise control).
5.3.7	Provide Facilities for Speed Enforcement	8.2.5.2	The system shall be able to receive (variable) mandatory speed limits from outside the vehicle.

Function		User Need	
Number	**Name**	**Number**	**Description**
5.3.8	Provide Facilities for Anti-collision Emergency Braking	8.2.3.2	The system shall enable the leading vehicle of a platoon to supervise and manage the operation and tracking of the following vehicle(s).
		8.2.3.4	The system shall enable equipped vehicles to leave or join the back of the platoon at any speed.
		8.2.3.5	The system shall allow the following vehicles to perform conventional operations that do not interfere with their tracking of the leading vehicle.
		8.2.3.6	The system shall enable the following vehicles in a platoon to monitor their surroundings and to take indepenent action in an emergency.
		8.3.1.5	The system shall be able to control the vehicle automatically for a short period of time when an impending collision has been detected.

Function		User Need	
Number	**Name**	**Number**	**Description**
5.3.9	Provide Facilities for Vehicle Platooning	8.2.3.1	The system shall be able to create a platoon of vehicles, in particular trucks ("Electronic Towbar" or "Road Train").
		8.2.3.2	The system shall enable the leading vehicle of a platoon to supervise and manage the operation and tracking of the following vehicle(s).
		8.2.3.3	The system shall enable the following vehicle(s) in a platoon to perform all normal driving manoeuvres without any host driver intervention.
		8.2.3.4	The system shall enable equipped vehicles to leave or join the back of the platoon at any speed.
		8.2.3.5	The system shall allow the following vehicles to perform conventional operations that do not interfere with their tracking of the leading vehicle.
		8.2.3.6	The system shall enable the following vehicles in a platoon to monitor their surroundings and to take indepenent action in an emergency.
		8.2.3.7	The system shall enable the vehicles in a platoon to be closer together than when manually controlled.
		8.3.1.1	The system shall be able to keep the host vehicle a certain distance behind the vehicle in front (autonomous cruise control).
5.4.1	Provide Dynamic Scenario Intelligence	8.4.0.2	The system shall be able to monitor the conflict zone and predict the trajectory of other vehicles relative to the host vehicle, or the vehicle's movement relative to adjacent stationary objects.

Function		User Need	
Number	**Name**	**Number**	**Description**
5.4.2	Provide Lateral Dynamic Control of the Vehicle	8.2.3.2	The system shall enable the leading vehicle of a platoon to supervise and manage the operation and tracking of the following vehicle(s).
		8.2.3.3	The system shall enable the following vehicle(s) in a platoon to perform all normal driving manoeuvres without any host driver intervention.
		8.2.3.4	The system shall enable equipped vehicles to leave or join the back of the platoon at any speed.
		8.2.3.5	The system shall allow the following vehicles to perform conventional operations that do not interfere with their tracking of the leading vehicle.
		8.4.3.5	The system shall be able to control the vehicle dynamics automatically.
5.4.3	Provide Facilities for 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	The system shall be able to provide information to assist in the task of parking, e.g. short range front/rear collision warning/avoidance.

Function		User Need	
Number	**Name**	**Number**	**Description**
5.4.4	Provide Facilities for Lane/Road Keeping	8.2.2.1	The system shall be able 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 the driver with information, or active steering support, to assist him/her to keep within the current lane of the carriageway.
		8.2.3.2	The system shall enable the leading vehicle of a platoon to supervise and manage the operation and tracking of the following vehicle(s).
		8.2.3.3	The system shall enable the following vehicle(s) in a platoon to perform all normal driving manoeuvres without any host driver intervention.
		8.2.3.4	The system shall enable equipped vehicles to leave or join the back of the platoon at any speed.
		8.2.3.5	The system shall allow the following vehicles to perform conventional operations that do not interfere with their tracking of the leading vehicle.
		8.3.1.3	The system shall be able to determine a safe vehicle trajectory relative to the lane/road boundaries.
5.4.5	Provide Facilities for Lane Change	8.2.3.2	The system shall enable the leading vehicle of a platoon to supervise and manage the operation and tracking of the following vehicle(s).
		8.2.3.3	The system shall enable the following vehicle(s) in a platoon to perform all normal driving manoeuvres without any host driver intervention.
		8.2.3.4	The system shall enable equipped vehicles to leave or join the back of the platoon at any speed.
		8.2.3.5	The system shall allow the following vehicles to perform conventional operations that do not interfere with their tracking of the leading vehicle.
		8.3.1.3	The system shall be able to determine a safe vehicle trajectory relative to the lane/road boundaries.
		8.4.0.1	The system shall monitor for hazards involved in lane keeping, lane changing, entering and leaving high speed roads, and overtaking.

Function		User Need	
Number	**Name**	**Number**	**Description**
5.4.6	Provide Facilities for Reserved Lanes I/O	8.3.1.3	The system shall be able to determine a safe vehicle trajectory relative to the lane/road boundaries.
		8.4.0.1	The system shall monitor for hazards involved in lane keeping, lane changing, entering and leaving high speed roads, and overtaking.
5.4.8	Provide Facilities for Overtaking	8.4.0.1	The system shall monitor for hazards involved in lane keeping, lane changing, entering and leaving high speed roads, and overtaking.
5.4.9	Provide Facilities for Stop & Go ++	8.3.1.7	The system shall be able to keep the host vehicle a certain distance behind the vehicle in front in a queue of traffic (stop and go).
5.5.1	Monitor Driver Status	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.
5.5.2	Enhance Driver Alertness	8.5.0.3	The system shall be able to warn the driver when a lack of alertness is detected.
5.5.3	Monitor Vehicle Status	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.
5.5.5	Provide Automatic Take-over of Controls	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.
5.5.6	Provide Warnings to Surrounding Traffic	8.5.0.4	The system shall be able to warn surrounding drivers that this driver has a problem.

Function		User Need	
Number	**Name**	**Number**	**Description**
5.5.7	Provide Mayday Call	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.
5.6	Provide Driver-Vehicle Interaction	8.2.5.4	The system shall be able to display continuously to the driver the current mandatory speed limit.
		8.3.1.2	The system shall be able to warn the driver when the vehicle in front is too close.
		8.3.1.4	The system shall be able to warn the driver of possible critical situations using audible, visual or haptic (physical feedback to the driver) methods.
5.7.1	Provide Vehicle-Infrastructure Communication	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.
5.7.2	Provide Vehicle-Vehicle Communication	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.
5.8.4	Provide Road Assistance	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.

Function		User Need	
Number	**Name**	**Number**	**Description**
5.8.7	Provide Stolen Vehicle Tracking/Prosecution	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.
5.8.9	Provide (EFT) Electronic Financial Transactions	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.
		4.1.3.1	The system shall be able to exchange information between a toll collection unit and a vehicle.

Function		User Need	
Number	**Name**	**Number**	**Description**
6.1	Define Traveller's GTP	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 journey.
		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.
		6.1.3.3	The system shall enable the traveller to use cash or electronic means to pay for the one-off usage of the service, where appropriate.
		6.1.3.8	The system shall be able to provide customised pre-trip information to hand-held and in-vehicle devices.
		6.2.3.2	The system shall normally provide messages from a finite set of well defined message texts.
		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.
		6.4.1.4	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.

Function		User Need	
Number	**Name**	**Number**	**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).
6.2.1	Define Traveller's ATP	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 journey.
		6.1.3.8	The system shall be able to provide customised pre-trip information to hand-held and in-vehicle devices.
		6.2.3.2	The system shall normally provide messages from a finite set of well defined message texts.
		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.
		6.4.1.4	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.

Function		User Need	
Number	**Name**	**Number**	**Description**
6.2.2	Define Prime Criteria	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 journey.
		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.
		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.
		6.4.1.4	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.

Function		User Need	
Number	**Name**	**Number**	**Description**
6.2.3	Propose Trip Alternatives	10.1.4.2	The system shall be able to provide information about PT services to the travellers either on-board the PT vehicle, or before 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.
		10.4.2.1	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.
		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, or when major events occur, or due to weather conditions, strikes, cultural or sports events etc.
		6.1.1.3	The system shall be able to provide current and forecast traffic and travel information at local, regional, national and international levels.
		6.1.1.4	The system shall be able to provide extensive trip information, e.g. prices, fares, routes, incidents, roadworks, forecast & current traffic situations, traffic control, demand mgt measures, local warnings, special events, weather conditions, hotels etc.
		6.2.1.1	The system shall be able to provide alternative routes or mode-switch recommendations when it detects, or is informed, that road network problems have occurred.
		6.2.1.3	The system shall be able to provide information about other transport modes: e.g. location of P&R, PT timetable, etc.
		6.2.2.2	The system shall be able to provide real-time P&R and PT information to vehicle drivers.
		6.2.3.2	The system shall normally provide messages from a finite set of well defined message texts.

Function		User Need	
Number	**Name**	**Number**	**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.
		6.4.1.3	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".
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
6.2.4	Select and Define Bookings	6.1.1.4	The system shall be able to provide extensive trip information, e.g. prices, fares, routes, incidents, roadworks, forecast & current traffic situations, traffic control, demand mgt measures, local warnings, special events, weather conditions, hotels etc.
		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.
		6.1.2.3	The system shall be able to provide route information to all drivers, e.g. restrictions, travel times, etc.
		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.
		6.1.3.4	The system shall be able to provide access to reservations and pre-payment services.
		6.1.3.6	The system shall enable a traveller to book a parking space at Park and Ride sites as part of a trip.
		6.2.2.1	The system shall be able to inform travellers on the current average travel time between fixed points.
		6.2.2.3	The system shall be able to provide cyclists and pedestrians with information about suitable routes.
		6.2.3.2	The system shall normally provide messages from a finite set of well defined message texts.
		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.
		6.4.1.1	The system shall be able to provide guidance to Car Parks (with parking spaces).
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
6.2.5	Plan Road Trip(s)	6.1.3.6	The system shall enable a traveller to book a parking space at Park and Ride sites as part of a trip.
		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. .
		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.
		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.
		6.4.0.1	The system shall provide travellers with recommended routes to specified destinations.
		6.4.1.1	The system shall be able to provide guidance to Car Parks (with parking spaces).
		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.
		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.
		7.3.4.1	The system shall be able to provide information to promote the use of cycles and walking.

Function		User Need	
Number	**Name**	**Number**	**Description**
6.2.6	Perform Bookings and Payments	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.
		6.1.3.4	The system shall be able to provide access to reservations and pre-payment services.
		6.1.3.6	The system shall enable a traveller to book a parking space at Park and Ride sites as part of a trip.
		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.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
6.2.7	Produce Itinerary and Trip File	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.
		6.2.3.2	The system shall normally provide messages from a finite set of well defined message texts.
		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.
		6.4.0.1	The system shall provide travellers with recommended routes to specified destinations.
		6.4.1.3	The system shall be able to compute the total predicted journey time over the route selected.
6.2.8	Provide GTP Store Operator Interface	6.1.2.9	The system shall provide Information Management tools for the operator.
6.3.1	Track Traveller and Implement Trip Plan	6.4.0.3	The system shall know where it is within the road network.
		6.4.1.2	The system shall be able to use real-time information to compute the recommended route.

Function		User Need	
Number	**Name**	**Number**	**Description**
6.3.2	Assess Perturbations	6.1.1.4	The system shall be able to provide extensive trip information, e.g. prices, fares, routes, incidents, roadworks, forecast & current traffic situations, traffic control, demand mgt measures, local warnings, special events, weather conditions, hotels etc.
		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 a railway station, an airport , a port or a coach station (due to the weather; strikes or other reasons).
		6.2.0.6	The system shall inform the User when changes occur to the criteria upon which the trip information had been given.
		6.2.2.13	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.

Function		User Need	
Number	**Name**	**Number**	**Description**
6.3.3	Inform Traveller	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.
		6.1.2.3	The system shall be able to provide route information to all drivers, e.g. restrictions, travel times, etc.
		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. .
		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.
		6.2.2.1	The system shall be able to inform travellers on the current average travel time between fixed points.
		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.
		6.2.2.2	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 condiftions, e.g. route restrictions, travel times, etc.

Function		User Need	
Number	**Name**	**Number**	**Description**
6.3.4	Provide 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.
		6.2.1.1	The system shall be able to provide alternative routes or mode-switch recommendations when it detects, or is informed, that road network problems have occurred.
		6.2.3.2	The system shall normally provide messages from a finite set of well defined message texts.
		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.
		6.4.0.1	The system shall provide travellers with recommended routes to specified destinations.
		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.
		6.4.1.5	The system shall be able to provide guidance to "Points of Interest".
		6.4.2.4	The system shall enable the use of portable equipment to provide route guidance.
6.3.5	Provide Tip File Management Operator Interface	6.1.2.9	The system shall provide Information Management tools for the operator.
6.4	Evaluate Trip	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.
		6.4.1.7	The system shall be able to provide reports on the effectiveness of the navigation instructions that have been provided.

Function		User Need	
Number	**Name**	**Number**	**Description**
7.1.1	Perform Measure	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.
		3.1.1.3	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").
		3.1.1.4	The system shall be able to identify the cargo being carried by a heavy goods vehicle automatically.
7.1.2	Check Compliance	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
7.2.1	Analyse Image	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.
		3.1.1.1	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.

Function		User Need	
Number	**Name**	**Number**	**Description**
7.2.2	Determine Violator ID	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.
		3.1.1.1	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.
7.3.1	Sort Fraud Notifications	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.
7.3.2	Establish Prosecution File	3.1.0.5	The system shall be able to communicate with Police Command and Control Systems.
		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.
7.4	Store Fraud	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.
		3.1.0.5	The system shall be able to communicate with Police Command and Control Systems.
7.5.1	Manage Rules	3.1.0.1	The system shall enforce the traffic laws and regulations of the region automatically (where possible).
7.5.2	Manage Users' Registration	3.1.0.5	The system shall be able to communicate with Police Command and Control Systems.

Function		User Need	
Number	**Name**	**Number**	**Description**
8.1.1.1	Negotiate Principal Requests	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.
		9.5.1.3	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
		9.5.2.14	The system shall be able to inform the driver about a change of task, e.g. change of pick-up, delivery, route etc.
8.1.1.2	Choose a Fleet Supplier	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.
		9.5.1.3	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
		9.5.2.10	The system shall be able to predict a time of arrival.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
8.1.1.3	Administrate Freight Transactions	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.
		9.5.1.3	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
8.1.2.1	Handle Customs Declaration	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
8.1.2.2	Handle Hazardous Goods Transport Declaration	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

Function		User Need	
Number	**Name**	**Number**	**Description**
8.1.2.3	Prepare and Deliver Official Transport Documents	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
8.1.3	Control Freight/Cargo Operations	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.
8.1.4	Evaluate Freight Operations Performance	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.
8.1.5.1	Identify Possible Transport Optimisations	9.5.5.1	The system shall be able to manage the use of the interface between freight transport modes in an effective manner.
		9.5.5.4	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, (muli-modal) freight transport resources.
8.1.5.2	Book Storage Places	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

Function		User Need	
Number	**Name**	**Number**	**Description**
8.2.1.1	Negotiate Freight Operator Requests	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.
		9.5.1.3	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
		9.5.2.10	The system shall be able to predict a time of arrival.
		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.
8.2.1.2	Administrate Fleet Transactions	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.
		9.5.1.3	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

Function		User Need	
Number	**Name**	**Number**	**Description**
8.2.2.1.1	Elaborate and Store Operational trip and load plan	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.
		9.5.2.10	The system shall be able to predict a time of arrival.
		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.
8.2.2.1.2	Determine Compliant Resources	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.
		9.5.2.2	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.

Function		User Need	
Number	**Name**	**Number**	**Description**
8.2.2.1.3	Prepare and Deliver Operational Transport Document	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.
		9.5.2.2	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.
		9.5.2.7	The system shall be able to transfer all information relating to a cargo (e.g. task assigment, load planning etc.) to the vehicle.
		9.5.3.22	The system shall be able to provide the driver with a route to a destination
8.2.2.2.1	Prepare/Process information to/from board	9.1.0.2	The system shall enable all electronically recorded information stored on-board the vehicle to be interrogated whenever 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.
		9.5.2.10	The system shall be able to predict a time of arrival.
		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.
		9.5.3.12	The system shall be able to record the actual route taken.

Function		User Need	
Number	**Name**	**Number**	**Description**
8.2.2.2.2	Manage Incident	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.
		5.3.1.5	Systems shall exchange information on hazardous goods in a manner that is understood by all parties.
		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.
8.2.2.2.3	Process On-board Payments	9.5.3.23	The system shall be able to record the payment of tolls.
8.2.2.2.4	Evaluate Transport Conditions	9.5.0.2	The system shall be able to incorporate additional regulations as and when required, and provide an indication of compliance.
		9.5.3.10	The system shall be able to record driver's hours, and report on available hours, deviations and disturbances.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
8.2.2.2.5	Evaluate and Record Safety Status	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.
		9.5.3.10	The system shall be able to record driver's hours, and report on available hours, deviations and disturbances.
		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.
8.2.2.3.1	Manage and Schedule Maintenance Activities	9.5.2.15	The system shall be able to schedule the maintenance of vehicles, equipment and cargo units.
8.2.2.3.2	Manage Vehicle and Equipment	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.
		9.5.0.2	The system shall be able to incorporate additional regulations as and when required, and provide an indication of compliance.
		9.5.3.3	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.
8.2.2.3.3	Manage Driver Employment	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.

Function		User Need	
Number	**Name**	**Number**	**Description**
8.2.3	Evaluate Fleet Operations Performance	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.
		9.5.2.16	The system shall be able to monitor and analyse the vehicle fleet and drivers' staff costs and performance.
		9.5.3.21	The system shall be able to monitor and analyse the vehicle and driver's staff costs and performance.
8.3.1.1	Check Transport Order	9.5.3.8	The system shall be able to assist the process of checking the vehicle, equipment and cargo documents.
8.3.1.2	Create New Transport Unit	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.
		9.5.3.11	The system shall enable the driver to receive a change (e.g. to the route, task, etc.) at any time.

Function		User Need	
Number	**Name**	**Number**	**Description**
8.3.1.3	Monitor Transport Order	9.2.0.1	The system shall be able to store all necessary statutory (i.e. required by law) information on-board the vehicle.
		9.5.1.2	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.
		9.5.1.4	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
		9.5.1.7	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.
		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.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
8.3.1.4	Monitor Operational Task	9.2.0.1	The system shall be able to store all necessary statutory (i.e. required by law) information on-board the vehicle.
		9.5.1.2	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.
		9.5.1.4	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
		9.5.2.12	The system shall be able to provide a driver with a suitable alternative route, when the original planned route becomes unavailable.
		9.5.3.11	The system shall enable the driver to receive a change (e.g. to the route, task, etc.) at any time.
		9.5.3.2	The system shall be able to store all necessary commercial and statutory vehicle, driver, trip and freight information on-board the vehicle.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
8.3.2.1	Monitor Driver	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.
		9.5.3.2	The system shall be able to store all necessary commercial and statutory vehicle, driver, trip and freight information on-board the vehicle.
		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.
8.3.2.2	Monitor Vehicle	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).
		9.4.0.1	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.
		9.5.2.6	The system shall be able to weigh the vehicle, compare it with the expected weight and report on any discrepancies or overweight.
		9.5.3.2	The system shall be able to store all necessary commercial and statutory vehicle, driver, trip and freight information on-board the vehicle.
		9.5.3.20	The system shall enable automatic remote vehicle diagnostics.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
8.3.2.3	Monitor Cargo	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.
		9.5.3.16	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.
		9.5.3.2	The system shall be able to store all necessary commercial and statutory vehicle, driver, trip and freight information on-board the vehicle.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
8.3.2.4	Monitor Equipment	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).
		9.4.0.1	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.
		9.5.2.6	The system shall be able to weigh the vehicle, compare it with the expected weight and report on any discrepancies or overweight.
		9.5.3.2	The system shall be able to store all necessary commercial and statutory vehicle, driver, trip and freight information on-board the vehicle.
		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.

Function		User Need	
Number	**Name**	**Number**	**Description**
8.3.3	Comply with Regulation	9.1.0.1	The system shall enable the device storing the information recorded by the tachograph to be physically removed from the vehicle.
		9.3.0.1	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.
		9.5.1.4	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
		9.5.2.6	The system shall be able to weigh the vehicle, compare it with the expected weight and report on any discrepancies or overweight.
		9.5.3.4	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.

4. Creation of the Trace Tables

The Trace Tables provided in the previous two Chapters have been created from the European ITS Functional Architecture Database. This is described by Chapter 15 in the Main Document of the European ITS Function Architecture Document (D 3.1). The creation process used the "query" feature of the Microsoft® Access Package that has been used to produce the Database. This can easily be re-run if the contents of the Database are changed. However if the contents of the User Needs are changed, then the User Needs spreadsheet must be converted into a Database and imported into the Functional Architecture Datanbase using the Access Package.