



Combined Requirements for Co-operative Systems

Annex 1: CVIS Requirements

Issue 2

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	Projects supported by European Union DG INFSO IST-2004-2.4.12 eSafety – Cooperative systems for road transport	
	Project References	COMeSafety: COOPERS: FP6-2004-IST-4-026814-IP CVIS: FP6-2004-IST-4-027293-IP SAFESPOT: FP6-2004-IST-4-026963-IP
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Abbreviations and Definitions

Abbreviation	Definition
EC	European Commission
F	Functional – used in “Type of Requirement” columns
FRAME	The short name for the European ITS Framework Architecture
IP	Integrated Project, e.g. COOPERS, CVIS and SAFESPOT
NF	Non Functional – used in “Type of Requirement” columns
RSU	Road Side Unit
SP	Sub-Project – applies to both CVIS and SAFESPOT
UC	Use Case
UN	User Need

1. Introduction

1.1 This Annex

This Annex provides listings of all the Requirements from the CVIS Project that have been mapped to the FRAME User Needs. As noted in section 4.4 of the Main Document, the Requirements have been obtained from parts of the documents identified in references 8(b), 8(d), 8(e), 8(f), 8(g) and 8(h) also listed in that Document. They are presented in this Annex to ensure that their identities and descriptions are known in case changes are made in after the completion of the work described in this document, the Main Document and the other Annexes.

1.2 Organisation of this Annex

The rest of this Annex is arranged as a set of tables. There is one table for each of the four CVIS Sub-Projects whose Requirements are being mapped to FRAME User Needs. The tables are as follows:

Table 1: CURB (3.1): Cooperative Urban Applications

Table 2: CINT (3.2): Cooperative Inter-urban Applications

Table 3: CF&F (3.3): Cooperative Freight and Fleet Applications

Table 4: COMO (3.4): Cooperative Monitoring

The contents of the tables have been taken from the documents listed in Chapter 8 of the main document. A few changes have been made to format and layout of the original source tables, principally to omit columns that are not used in the process of mapping the Requirements to the FRAME User Needs. Also some minor changes have been made to the texts in some of the Requirements to correct spelling and punctuation errors but not to change the sense or meaning.

The actual number of Requirements that have been identified for each of the above sub-projects are as follows:

- CURB (3.1) Cooperative Urban Applications: Requirements = 140
- CINT (3.2) Cooperative Inter-urban Applications: Requirements = 195
- CF&F (3.3) Cooperative Freight and Fleet Applications: Requirements = 77
- COMO (3.4¹) Cooperative Monitoring: Requirements = 66

When combined together, the total number of Requirements from the SAFESPOT projects that have been analysed is 478.

¹ The COMO Requirements use both “3.1” and “3.4” in the Requirement ID. This can cause confusion when analysing these Requirements and comparing them with those from other CVIS sub-projects, particularly Requirements from CURB (3.1).

Table 1 CVIS CURB Requirements for mapping to FRAME User Needs

Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.1-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.1-0001	The long-range communication system on board PT vehicles must exchange information with PT Management Centre system	F	SP2.1				
CV-RQ-SP3.1-0002	The long range communication system should provide continuously the real time position of PT vehicles (in movement or stopped) users of the Bus Lane	F	SP2.1, SP2.3				
CV-RQ-SP3.1-0003	Data received from a PT vehicle should allow to estimate its arrival time to the Bus Lane and next crossing/traffic light with suitable advance (depending on Bus Lane length, traffic light to light phases duration, bus speed, dwelling times...)	F	SP2.1, SP2.2, SP2.3, SP3.4	0024	0037		
CV-RQ-SP3.1-0004	A short range communication system along road side infrastructure must recognise PT vehicles entrance in the Bus Lane	F	SP2.1, SP3.4	0024			
CV-RQ-SP3.1-0005	After the PT vehicle entrance in the Bus Lane, the RSU must be able to release new licenses to the following pre-registered vehicles	F	SP2.1, SP2.2, SP3.4	0023	0024		
CV-RQ-SP3.1-0006	The road side infrastructure communication system must transmit encrypted information to the on board communication systems (for data protection purpose)	NF	SP2.1, SP2.2				
CV-RQ-SP3.1-0007	In case of failure, the CVIS system must not release new license	F	SP2.1, SP2.2				
CV-RQ-SP3.1-0008	The HMI of the on-board system must provide the ability of entering the CVIS vehicle's destination (vehicle's position and speed are transmitted automatically without the driver's intervention)	F	SP1.3				
CV-RQ-SP3.1-0009	The roadside controller must receive the destination of the private CVIS vehicle in order to check the legitimacy of the request and availability of the Bus Lane	F	SP2.1, SP2.2, SP2.3, SP3.4	0016	0024		
CV-RQ-SP3.1-0010	The TMC & PTMC systems should have the details (kind of vehicle, transport company of the vehicle, driver data, PT route & schedule ...) of the CVIS vehicles within the monitored area (i.e. the Bus Lane surroundings)	NF	SP2.2, SP3.1, SP3.4				
CV-RQ-SP3.1-0011	The RSU should estimate the time needed by a private vehicle to cover the Bus Lane section (for license release purpose and estimation of license's time of expiration)	F	SP2.1, SP2.3, SP3.1, SP3.4	0024			

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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.1-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.1-0012	The PTMC should send to the roadside controller the PT vehicles identification and esteemed arrival times to the Bus Lane section and next crossing/traffic light	F	SP2.1, SP2.2, SP2.3, SP3.1, SP3.4				
CV-RQ-SP3.1-0013	The roadside controller should receive the real time traffic data from COMO and other CURB applications, the forecast traffic data from the TMC, and the queuing forecast data at crossing/traffic lights from legacy system/traffic lights controller	F	SP2.1, SP3.1, SP3.4	0003	0024	0050	
CV-RQ-SP3.1-0014	The roadside controller must decide or not the deliverance of a Bus Lane access licence to CVIS vehicles (i.e. calculation based on all data received)	F		0018	0023	0024	
CV-RQ-SP3.1-0015	The RSU should manage dynamically the deliverance of access licenses depending on the real time and downstream traffic situation in order to avoid PT disturbances	NF	SP1.3, SP2.1, SP2.3, SP3.1	0024			
CV-RQ-SP3.1-0016	If the queue at the next crossing/traffic light can create disturbances for PT, the RSU must stop releasing licences and restrict access to the Bus Lane to private vehicles (i.e. send "exit the Bus Lane at end of section / next intersection" message to CV	F	SP2.3, SP3.1, SP3.4	0024			
CV-RQ-SP3.1-0017	In case of detected congestion at the next crossing/traffic light, the RSU should communicate this information to the previous and following road side controllers	F	SP2.1	0024			
CV-RQ-SP3.1-0018	If conditions for granting Bus Lane access licenses to CVIS vehicles are not met, the RSU must stop releasing licences and restrict access to the Bus Lane to private vehicles (i.e. send "exit the Bus Lane at end of section / next intersection" message to	F	SP1.3	0024			
CV-RQ-SP3.1-0019	In case of potential disturbances for PT, the RSU must communicate this information to the following RSU for activation of pre-emption procedure in order to prevent Bus Lane congestion	F	SP2.1, SP1.3	0024			
CV-RQ-SP3.1-0020	The RSU must monitor all CVIS vehicles (private and PT) with a precision of few meters (optimum of 2m) in order to evaluate with accuracy the vehicles position	F	SP2.1, SP2.3, SP3.1, SP3.4				
CV-RQ-SP3.1-0021	The RSU supported by legacy systems should detect vehicles (CVIS and non CVIS) without license (including expired license) driving on the Bus Lane	F	SP2.1, SP2.2, SP2.3, SP3.4	0023	0024		
CV-RQ-SP3.1-0022	When a CVIS vehicle with no license is detected on the Bus Lane, the RSU must send violation details to the Enforcement Agency/violation management	F	SP2.1, SP2.2, SP2.3, SP3.4	0023	0024		

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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.1-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.1-0023	When a non CVIS vehicle is detected on the Bus Lane, the violation management centre/TMC should send the information to the RSU in order to update the traffic situation in the Bus Lane	F	SP2.1, SP2.2, SP2.3, SP3.1, SP3.4	0024	0029		
CV-RQ-SP3.1-0024	The RSU should collect detected vehicles data (any lanes)	F	SP2.2, SP3.4	0003	0023	0024	
CV-RQ-SP3.1-0025	The RSU should send to the TMC detected vehicles data	F	SP2.1, SP2.2	0003	0023	0024	
CV-RQ-SP3.1-0026	The TMC should manage detected vehicles data coming from RSU in order to update traffic situation overview and provide forecasts if needed	F	SP2.1, SP2.2, SP2.3, SP3.1, SP3.4	0018			
CV-RQ-SP3.1-0027	The RSU must be able to discriminate each CVIS vehicle among the large amount of vehicles monitored in order to get a correct image of the traffic situation	NF	SP2.1, SP2.2, SP2.3, SP3.1, SP3.4	0023	0029		
CV-RQ-SP3.1-0028	The TMC/legacy system should monitor the real time vehicles' movements within the area (i.e. surroundings of the Bus Lane) in order to evaluate and forecast traffic congestion	F	SP2.3	0003	0018	0029	
CV-RQ-SP3.1-0029	The on board systems must be able to send to the RSU an acknowledgement for the access licence granted	F	SP1.3, SP3.4	0023			
CV-RQ-SP3.1-0030	The user interface of the TMC must be able to detect the licensed vehicles having Bus Lane access (e.g. the colour of vehicle on the map is green or red depending on the granted licence)	NF	SP2.2, SP2.3	0023			
CV-RQ-SP3.1-0031	The lead time of the systems (communication of position, vehicle data, acknowledgement, ...) should be less than 5 seconds in order to manage the licensing process	F	SP1.3, SP2.1, SP2.2, SP2.3, SP3.1, SP3.4				
CV-RQ-SP3.1-0032	In case of emergency, a specific functionality of the TMC and/or PTMC must be able to stop the licenses release	F	SP1.3, SP2.1, SP2.2, SP3.4	0006			
CV-RQ-SP3.1-0033	The roadside controller should estimate the time needed by PT vehicles to cover the Bus Lane section (including dwelling times for pick-up and set-down of passengers)	F	SP2.1, SP2.3, SP3.1, SP3.4	0024			
CV-RQ-SP3.1-0033	The RSU must be able to detect the CVIS vehicles which are within the Bus Lane	F	SP2.1, SP2.2, SP2.3, SP3.4	0023	0024		

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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.1-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.1-0034	When a CVIS vehicle with an expired license is detected on the Bus Lane, the RSU must send an "exit the Bus Lane at end of section / next intersection" message to the CVIS vehicle	F	SP2.1, SP2.2, SP2.3, SP3.4	0023	0024		
CV-RQ-SP3.1-0101	Selected OBU's must be able to send out "green requests" securely. This should happen the following conditions apply:		SP2.1, SP2.3, SP3.1, SP3.4	0024	0026		
CV-RQ-SP3.1-0102	Vehicles should know when it is appropriate to send out green requests (based on GPS / Galileo location and a dynamic database of CVIS functionality)		SP2.1, SP2.3, SP3.1, SP3.4	0024	0026		
CV-RQ-SP3.1-0103	It should be possible to request for a green-route when entering a route in the HMI of the navigation system (e.g. emergency and dangerous goods vehicles)		SP2.1, SP2.3, SP3.1, SP3.4	0024	0026		
CV-RQ-SP3.1-0104	For some vehicles (e.g. emergency) it should be possible to request for a green priority at an intersection		SP2.1, SP2.3, SP3.1, SP3.4	0024	0026		
CV-RQ-SP3.1-0105	A "green request" includes characteristics and (if available) the to-link of the requesting vehicle (this is to make it possible to prioritise the request at controller level)		SP2.1, SP2.3, SP3.1, SP3.4	0024	0026		
CV-RQ-SP3.1-0106	It should be able to send an green (dis-)approved answer to the requesting vehicle		SP2.1, SP2.3, SP3.1, SP3.4	0024	0026		
CV-RQ-SP3.1-0107	It should be able to present some sort of green request approved / disapproved message as an optional feature for some vehicles (e.g. emergency vehicles)		SP2.1, SP2.3, SP3.1, SP3.4	0024	0026		
CV-RQ-SP3.1-0108	It should be able to connect very quickly to and from both OBU applications and RSU applications, bandwidth doesn't need to be very high		SP2.1, SP2.3, SP3.1, SP3.4	0018	0028	0049	
CV-RQ-SP3.1-0109	All CVIS OBU's should be able to receive, process and display speed profiles in a both safe and user friendly way		SP2.1, SP2.3, SP3.1, SP3.4	0018	0028	0049	
CV-RQ-SP3.1-0110	Speed profile-enabled controllers should be able to send out speed profiles in a fixed (but flexible) format		SP2.1, SP2.3, SP3.1, SP3.4	0018	0028	0049	
CV-RQ-SP3.1-0111	It should be able to address the OBU in the CVIS vehicles on a specific link constantly (usually the from-link)		SP2.1, SP2.3, SP3.1, SP3.4	0018	0028	0049	
CV-RQ-SP3.1-0112	It should be possible to address not only vehicles driving on a specific link but also address the vehicles with a certain known direction or to-link		SP2.1, SP2.3, SP3.1, SP3.4	0018	0028	0049	

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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.1-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.1-0113	It should be possible to address not only vehicles driving on a specific link but also address different types of vehicles on that link		SP2.1, SP2.3, SP3.1, SP3.4	0018	0028	0049	
CV-RQ-SP3.1-0114	It should be able to access details of a up and downstream vehicles in real-time (details: indicator, speed and position)		SP2.1, SP2.3, SP3.1, SP3.4	0018	0028	0049	
CV-RQ-SP3.1-0115	Como must provide detailed and real-time information about all CVIS vehicles approaching a green request and / or a speed profiled enable intersection. Those detailed messages should include (type of vehicle, location (lane), direction or to-link, speed,		SP2.1, SP2.3, SP3.1, SP3.4	0018	0028	0049	
CV-RQ-SP3.1-0201	RSU shall be identifiable inside the sub-system of the Route guidance	F		0048			
CV-RQ-SP3.1-0202	RSU shall perform local elaboration to improve route advice, when information is present locally	F		0048			
CV-RQ-SP3.1-0203	The RSU shall provide coherence in the information provided to the driver and other sub-systems	F		0029			
CV-RQ-SP3.1-0204	The vehicle shall be temporary identifiable and tracked to allow route update during travel	F		0016			
CV-RQ-SP3.1-0205	The vehicle shall be able to transmit its position, destination and waypoints.	F		0016			
CV-RQ-SP3.1-0206	The vehicle shall interact with the driver to derive destination and potentially way point or preferable route, e.g. via user profiling	F		0016			
CV-RQ-SP3.1-0207	The RSU shall be able to communicate to other nearby RSU to perform communication pattern	F					
CV-RQ-SP3.1-0208	The RSU shall be able to communicate with nearby vehicle in a broadcast fashion	F					
CV-RQ-SP3.1-0209	The RSU shall be able to communicate with nearby vehicle individually	F					
CV-RQ-SP3.1-0211	At network level the system shall convey a coherent information to sub-system of vehicles	F					
CV-RQ-SP3.1-0212	The network level shall be able to address vehicle, via the RSU, by single temp identity or via grouping (location, type, speed, lane, area, approaching or leaving intersection)	F		0013			
CV-RQ-SP3.1-0213	The interface from the RSU/centre to the vehicle shall be "well defined" and unambiguous, self-contained	NF					
CV-RQ-SP3.1-0214	The interface from the vehicle to the RSU/centre shall be "well defined" and unambiguous, self-contained	NF					

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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.1-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.1-0215	The OBU shall be able to transmit position, speed, origin, and destination to the RSU without any trigger from the driver.	F					
CV-RQ-SP3.1-0216	The wireless communication device shall enable data exchange within a range of at least 500 m distance free of charge.	F					
CV-RQ-SP3.1-0217	The RSU shall be able to handle the FCD reception of up to 20 equipped vehicles within 10 (?) sec.	F					
CV-RQ-SP3.1-0218	When the driver sets the indicator (turn signal), this information shall be automatically transferred to the RSU. The RSU shall then interpret the data (turn signal or not).	F					
CV-RQ-SP3.1-0219	The RSU shall be able to communicate with other RSU's in the same area.	F					
CV-RQ-SP3.1-0220	The RSU shall be able to transmit both detection data and FCD to other RSU's.	F					
CV-RQ-SP3.1-0221	The RSU shall be able to merge detection data and FCD.	F					
CV-RQ-SP3.1-0222	The enhanced intersection controllers shall be able to send their local traffic states to the master RSU at least every 2 minutes.	F					
CV-RQ-SP3.1-0223	The master RSU shall be able to receive information on traffic states outside its area from the TMC.	F					
CV-RQ-SP3.1-0224	The vehicle XFCD shall be available in the RSU in real time.	F					
CV-RQ-SP3.1-0225	The vehicle shall be identifiable with a unique (but temporary) identifier for all the duration of the journey.	F					
CV-RQ-SP3.1-0226	It shall be possible to share the temporary id of the vehicle between handover cells	F					
CV-RQ-SP3.1-0227	The CVIS navigation system shall be able to provide calculated route, way points, and partial route						
CV-RQ-SP3.1-0315	The CURB application in the TMC should be able to receive user requests on information about traffic conditions and incidents information on a specific urban area.	F	SP2.1, SP2.2	0003'			
CV-RQ-SP3.1-0316	The CVIS equipped vehicle should be able to send user requests on information about traffic conditions and incidents information on a specific urban area to the TMC.	F	SP2.1, SP2.2	0003'			
CV-RQ-SP3.1-0322	The CURB applications should merge information from central and local traffic state analysis at local level, within the RSU.	F		0003'			

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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.1-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.1-0328	The CURB network routing application in the service centre should calculate route options for vehicles of different characteristics (passenger cars, HGV, PT vehicles) based on the current traffic conditions, current incident information and the current	F		0006			
CV-RQ-SP3.1-0330	The CVIS in car system should be able to send routing requests (current position, vehicle type, and destination) to the service centre via CVIS RSU.	F	SP2.1, SP2.2	0048	0013		
CV-RQ-SP3.1-0331	When a vehicle registers at a CVIS RSU, the local application should be able to receive and interpret vehicle type, destination of the vehicle.	F		0048			
CV-RQ-SP3.1-0332	The CVIS system should be able to address a certain vehicle and send route options from the RSU or the centre to the CVIS vehicle.	F	SP2.1, SP2.2, SP2.3	0048	0013		
CV-RQ-SP3.1-0334	The CVIS in-vehicle system should be able to receive and to process route options coming either from RSU or from the urban traffic centre.	F	SP2.1	0048	0013		
CV-RQ-SP3.1-0335	The in-car HMI should display route options to the driver.	F	SP2.3	0048	0013	0016	
CV-RQ-SP3.1-0337	The CVIS vehicle should send the information about a route confirmed by the user to the service centre	F	SP2.1, SP2.2	0016			
CV-RQ-SP3.1-0338	The CURB cooperative traffic management application in the TMC should be able to compare advised routes against driven routes of CVIS vehicles and to present the results for further elaboration to the road operator.	NF	SP2.3	0016			
CV-RQ-SP3.1-0339	A CURB network routing application should be able to receive and to store route monitoring data (advice route, driven route, vehicle characteristics) in the TMC	F	SP2.1, SP2.2	0015			
CV-RQ-SP3.1-0340	The CURB cooperative traffic management application should provide a standardized interface to provide historical COMO traffic data of the network wide traffic state analysis as input data to an off-line simulation tool.	NF					
CV-RQ-SP3.1-0342	The CURB cooperative traffic management application system should be able to merge control rules from central applications and control rules descending from local applications to determine the current network scenario.	F					
CV-RQ-SP3.1-0343	The CURB cooperative traffic management application should provide a control model to propose based on the current traffic state and traffic messages a predefined cooperative traffic management scenario (consisting in control rules, information to be dist	F					

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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.1-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.1-0344	The CURB cooperative traffic management application should provide a database in which information about implemented scenarios is stored (name, number of scenario, date of implementation, time period of implementation)	F					
CV-RQ-SP3.1-0345	COMO should provide a database in which the results of network traffic state analysis are stored over a certain time period (several years)	F	SP3.4				
CV-RQ-SP3.1-0346	COMO should provide a database from which the road operator may request historical traffic data of a certain area and a certain time period.	F	SP3.4				
CV-RQ-SP3.1-0347	The CURB cooperative traffic management application should provide the possibility to display historical traffic data on a central map (i.e. to regard the temporal and spatial expansion of congestion in the network).	F	SP2.3				
CV-RQ-SP3.1-0348	The CURB cooperative traffic management application should provide the possibility to modify certain measures of a cooperative traffic management scenario in an off-line simulation.	F					
CV-RQ-SP3.1-0349	The CURB cooperative traffic management application should provide the possibility to modify pre-defined scenarios.	F					
CV-RQ-SP3.1-0350	The CURB cooperative traffic management application should provide the possibility to define a combination of measures as a cooperative traffic management scenario.	F					
CV-RQ-SP3.1-0351	COMO should provide periodically (every 5 minutes) the current network traffic state analysis to the CURB cooperative traffic management application.	F					
CV-RQ-SP3.1-0352	COMO should provide periodically or event triggered the actual traffic messages analysis to the CURB cooperative traffic management application.	F					
CV-RQ-SP3.1-0353	The CURB cooperative traffic management application should be able to request the current network traffic management scenario.	F					
CV-RQ-SP3.1-0354	The CURB local and area control applications should send event triggered the current local and area strategy to the traffic management centre.	F					
CV-RQ-SP3.1-0355	The CURB cooperative traffic management application should provide a standardized interface to an on-line simulation tool to provide the input data for the simulation (traffic demand, traffic management scenario, traffic messages).	F					

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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.1-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.1-0356	The CURB cooperative traffic management application should provide a time synchronisation for providing simulation input and evaluating simulation output.	F					
CV-RQ-SP3.1-0357	The CURB cooperative traffic management application should send information to be displayed on VMS aligned to a chosen certain scenario from the TMC to the local RSU's.	F					
CV-RQ-SP3.1-0357	The in-car HMI should provide a possibility for the driver to select his destination	F					
CV-RQ-SP3.1-0358	The CURB cooperative traffic management application should send control rules aligned to a chosen certain scenario from the TMC to the local RSU's.	F					
CV-RQ-SP3.1-0358	POMA should provide the current vehicle position in the vehicle to be send with the routing request to the service centre	F	S.P2.3				
CV-RQ-SP3.1-0359	The CURB cooperative traffic management application should send strategic routing information aligned to a chosen certain scenario to the network routing application.	F					
CV-RQ-SP3.1-0359	The CVIS in car system should be able to send routing requests (current position, vehicle type, and destination) directly to the service centre.	F	SP2.1, SP2.2				
CV-RQ-SP3.1-0360	The CURB network routing application in the service centre should receive periodically the current network traffic state (LOS per link; travel time per link) from COMO	F					
CV-RQ-SP3.1-0361	The CURB network routing application in the traffic management centre should receive event triggered information from the COMO central information pool.	F					
CV-RQ-SP3.1-0362	The CVIS in car system should send a route update request periodically.	F					
CV-RQ-SP3.1-0363	The CVIS in car system should be able to check periodically (every 30 sec) , if the vehicle has left the confirmed route	F	SP2.3				
CV-RQ-SP3.1-0364	The CVIS in car system should send a route update request, if the vehicle has left the confirmed route.	F					
CV-RQ-SP3.1-0365	The in-car HMI should provide the possibility for the driver to select one of the provided route options.	F					
CV-RQ-SP3.1-0366	The route options that are sent from the service centre to the vehicle should include information about bus lanes equipped with flexible lane allocation application along the provided routes.	F					

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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.1-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.1-0367	The in-car HMI should inform the driver when he left the confirmed route and a route update is requested.	F					
CV-RQ-SP3.1-0367	The in-car HMI should show a local map with the current position of the vehicle when the driver selects the destination	F	SP2.3				
CV-RQ-SP3.1-0368	The in-car HMI should inform the driver about incidents on his route and inform the driver about route updates because of incidents.	F					
CV-RQ-SP3.1-0369	The in-car routing application should discover the responsible service centre offering the CVIS routing service	F	S.P2.2				
CV-RQ-SP3.1-0369	The confirmed routes should be temporarily stored in the service centre.	F					
CV-RQ-SP3.1-0370	In case of incident the CURB network routing application checks which confirmed routes are affected by the incident.	F					
CV-RQ-SP3.1-0371	The CVIS in car system should check, when receiving an incident warning, if the incident is located on the route in front or behind the CVIS vehicle.	F	SP2.3				
CV-RQ-SP3.1-0372	If the CVIS in car system has identified an incident located on the route in front of the CVIS vehicle, an route update request should be sent to the service centre	F					
CV-RQ-SP3.1-0373	COMO should provide periodically (i.e. every 5 minutes) the current network traffic state analysis to the CURB incident warning application in the centre.	F					
CV-RQ-SP3.1-0374	COMO should provide periodically and/or event triggered the actual traffic messages analysis to the CURB incident warning application in the centre.	F					
CV-RQ-SP3.1-0375	Local COMO application should provide the current local traffic state analysis to the CURB incident warning application in the RSU.	F					
CV-RQ-SP3.1-0376	Local COMO application should provide periodically or event triggered the actual local traffic messages to the CURB incident warning application in the RSU.	F					
CV-RQ-SP3.1-0377	COMO traffic messages should include information about bad road surface conditions, road works, accidents, blockage, congestion	F					
CV-RQ-SP3.1-0378	The CURB incident warning application in the centre should define an area of interest (geographical region) for every generated message to be distributed in that area	F					

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.1-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.1-0379	Incident warning should be distributed only in the area of interest	F					
CV-RQ-SP3.1-0380	Incident warnings provided from the centre via local RSU's should be merged with local information in the RSU before being provided to the vehicles	F					
CV-RQ-SP3.1-0381	The in-car HMI should provide incident information to the driver.	F					
CV-RQ-SP3.1-0382	The in-car HMI should provide a possibility for the driver to select an area of interest, to request traffic state information and incident information for the selected area.						
CV-RQ-SP3.1-0383	The in-car HMI should provide a possibility for the driver to select the time interval to update provided traffic information.						
CV-RQ-SP3.1-0384	The in-car HMI should provide a possibility for the driver to select a prediction time horizon (i.e. 30 min, 1 hour) to request predicted traffic state information.						
CV-RQ-SP3.1-0385	The in-car HMI should provide a possibility to display traffic state and incident information of a certain area to the driver.						
CV-RQ-SP3.1-0386	The CURB application in the TMC should generate information on traffic conditions and incident of a certain area based on the COMO network traffic state analysis and the COMO information pool						
CV-RQ-SP3.1-0387	The CURB application in the TMC should provide the information on traffic conditions and incident of a certain area via RSU or directly to the requesting vehicle						

Table 2 CVIS CINT Requirements for mapping to FRAME User Needs

Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0001	CTA service application of Traveller / Navigating Vehicle Driver shall be able to open up information on (alternative) journey plan(s)	Functionality	Traveller / Navigational Vehicle Driver	CTA
CV-RQ-SP3.2-0002	CTA service application of Traveller / Navigating Vehicle Driver shall be able to open up on demand the additionally received, by default not presented information on events, destinations (type, occupancy rate), et cetera.			
CV-RQ-SP3.2-0003	CTA service application of Traveller / Navigating Vehicle Driver shall (Based on the received information and confirmation of the end-user) update journey plan given new, adjusted preferences of the traveller.			
CV-RQ-SP3.2-0004	CTA service application of Traveller / Navigating Vehicle Driver shall be able to update journey plan given new, received on-trip information			
CV-RQ-SP3.2-0005	CTA service application of Traveller / Navigating Vehicle Driver shall be able to monitor the progress of the journey.			
CV-RQ-SP3.2-0006	CTA service application of Traveller / Navigating Vehicle Driver shall be able to detect the moment an update of the journey plan is necessary.			
CV-RQ-SP3.2-0007	CTA service application of Traveller / Navigating Vehicle Driver will feed CTA service application of Service Provider with information: <ul style="list-style-type: none"> • main vehicle characteristics (amongst others: type / class, dimensions, number of passengers, caravan yes/no, trailer yes/no, class of hazardous goods); • generic travel information • preferred service feature (amongst others: to be traced yes or no) 	Interfacing Regular Event		
CV-RQ-SP3.2-0008	CTA service application of Traveller / Navigating Vehicle Driver will receive from CTA service application of Service Provider: <ul style="list-style-type: none"> • in case of tracing: personalised on-trip travel information + autonomously updates of this information when available and relevant; • in case of non-tracing: personalised on-trip travel information + on request updates of this information when available and relevant. 			

Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0009	CTA service application of Traveller / Navigating Vehicle Driver will feed CTA service application of Service Provider and Traffic Manager with abstract of the selected journey plan information: <ul style="list-style-type: none"> • main vehicle characteristics (amongst others: type / class, dimensions, number of passengers, caravan yes/no, trailer yes/no, class of hazardous goods); • origin and destination; • route to be followed; • ETD/ATD (expected or actual time of departure) and ETA (expected or actual time of arrival) 			
CV-RQ-SP3.2-0010	CTA service application of Traveller / Navigating Vehicle Driver will receive from CTA service application of Service Provider: <ul style="list-style-type: none"> • in case of tracing: an immediate warning for a non-regular event plus the a proposal to adjust the travel plan; • in case of non-tracing: once the request is there or once notified by another service application (e.g. the EDA service application) a warning for a non-regular event plus the a proposal to adjust the travel plan. 	Interfacing Non-regular Event		
CV-RQ-SP3.2-0011	HMI coming with the CTA service application of Traveller / Navigating Vehicle Driver will provide traveller annex vehicle driver with abstract overview of the travel situation at the moment, as foreseen and estimated.	HMI		
CV-RQ-SP3.2-0012	HMI coming with the CTA service application of Traveller / Navigating Vehicle Driver will enable the traveller annex vehicle driver to input his / her travel preferences and vehicle characteristics.			
CV-RQ-SP3.2-0013	HMI coming with the CTA service application of Traveller / Navigating Vehicle Driver shall be able to gather the vehicle characteristics from the vehicle itself.			
CV-RQ-SP3.2-0014	HMI coming with the CTA service application of Traveller / Navigating Vehicle Driver shall be able to present the on-trip voyage plan to the traveller annex vehicle driver and allow the traveller annex vehicle driver to adjust the plan.			
CV-RQ-SP3.2-0015	HMI coming with the CTA service application of Traveller / Navigating Vehicle Driver shall be able to provide the traveller annex vehicle driver with travel information.			
CV-RQ-SP3.2-0016	HMI coming with the CTA service application of Traveller / Navigating Vehicle Driver will provide vehicle driver with strategic traffic image of the actual, foreseen and expected traffic situation on the interurban road network and specifically along the (alternative) route(s).			
CV-RQ-SP3.2-0017	HMI coming with the CTA service application of Traveller / Navigating Vehicle Driver will provide vehicle driver with interurban road network context information, covering environmental conditions, events, density at destinations, occupancy rate of parking places and road construction works.			

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0018	(COMO) CTA service application of Traveller / Navigating Vehicle Driver will be supported with an up-to-date image of the actual, foreseen and expected traffic situation and environmental conditions along the (alternative) route(s).	Core Technologies		
CV-RQ-SP3.2-0019	(POMA) CTA service application of Traveller / Navigating Vehicle Driver will be supported with all relevant data projected on one digital map, which can also be used for (route finding) and navigation support.			
CV-RQ-SP3.2-0020	(FOAM) CTA service application of Traveller / Navigating Vehicle Driver shall be able to contact a Service Provider, roam from a Service Provider to another and thereby keep contact with a Service Provider.			
CV-RQ-SP3.2-0021	(FOAM) CTA service application of Traveller / Navigating Vehicle Driver shall be able to make available data from in-vehicle systems/sensors.			
CV-RQ-SP3.2-0022	(COMM) CTA service application of Traveller / Navigating Vehicle Driver shall be able to communicate with CTA service application of Service Providers.			
CV-RQ-SP3.2-0023	CTA service application of Traffic Manager shall be able to build traffic management strategies based upon the gathered and assessed data.	Functionality Longer and medium-long term	Traffic Manager	
CV-RQ-SP3.2-0024	CTA service application of Traffic Manager shall be able to evaluate the (non)balanced use of the road network (basis for assessment and selection of traffic management strategy).	Functionality Short / Medium Long term		
CV-RQ-SP3.2-0025	CTA service application of Traffic Manager selects appropriate traffic management strategy and passes this on to the traffic manager.			
CV-RQ-SP3.2-0026	CTA service application of Traffic Manager shall be able to processes adjustments made by the traffic manager to the proposed traffic management strategy and activate this traffic management strategy.			
CV-RQ-SP3.2-0027	CTA service application of Traffic Manager shall be able to define the intended balance in the interurban road network and thereby rank the trajectories and segments in the interurban network, based upon the activated traffic management strategy.			
CV-RQ-SP3.2-0028	CTA service application of Traffic Manager shall be able to activate the new behaviour and parameter settings (including the communication strategies) for the road side controllers, based upon the defined intended balance in the interurban road network.			
CV-RQ-SP3.2-0029	CTA service application of Traffic Manager shall be able to process the emergency warning and select the appropriate incident management strategy and pass this on to the traffic manager.	Functionality Non-regular events		

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0030	CTA service application of Traffic Manager shall be able to process adjustments made by traffic manager to the proposed incident management strategy and activate the traffic management strategy.			
CV-RQ-SP3.2-0031	CTA service application of Traffic Manager shall be able to adjust the activated traffic management strategy to the newly activated incident management strategy and pass the adjusted traffic management strategy on to the traffic manager for final verification before activation.			
CV-RQ-SP3.2-0032	-- see regular situation--			
CV-RQ-SP3.2-0033	CTA service application of Traffic Manager shall be able to communicate with CTA service application of other actors in fixed centres (Guard for Mobility and Quality of Environment, Road Operators, Service Providers)	Interfacing Regular event		
CV-RQ-SP3.2-0034	CTA service application of Traffic Manager shall be able to communicate with CTA service application of actors along the interurban roads (vehicle drivers, road side controllers)			
CV-RQ-SP3.2-0035	CTA service application of Traffic Manager will gather (updated) traffic demand strategies from CTA service application of Guard for Mobility and Quality of Environment and Road Operators.			
CV-RQ-SP3.2-0036	CTA service application of Traffic Manager will gather and assess (updated) statistical data of traffic and weather conditions from CTA service application of Service Provider or from own database.			
CV-RQ-SP3.2-0037	CTA service application of Traffic Manager will gather and assess (updated) dynamic data of traffic, weather and road surface conditions from CTA service application of Service Provider or directly from CTA service application of vehicle drivers and road side controllers.			
CV-RQ-SP3.2-0038	CTA service application of Traffic Manager will inform the CTA service application of Service Provider on the ranked trajectories and segments in the interurban network.			
CV-RQ-SP3.2-0039	CTA service application of Traffic Manager shall be able to receive emergency warning from EDA service application of Traffic Manager (accidents like ghost drivers, and incidents via e-Call).	Interfacing Non-regular event		
CV-RQ-SP3.2-0040	CTA service application of Traffic Manager shall be able to receive emergency warning from CTA service application of PSAP-1.			
CV-RQ-SP3.2-0041	HMI coming with the CTA service application of Traffic Manager shall be able to provide the traffic manager with interurban road network context information, covering events, road construction works, density at destinations, density on urban road networks.	HMI		
CV-RQ-SP3.2-0042	HMI coming with the CTA service application of Traffic Manager shall be able to provide the traffic manager with a strategic overview of the traffic and weather situation on the interurban road network.			

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0043	HMI coming with the CTA service application of Traffic Manager shall be able to provide the traffic manager with a tactical overview of actual traffic features (speed, capacity, incidents, hazards) via a digital dynamic map.			
CV-RQ-SP3.2-0044	HMI coming with the CTA service application of Traffic Manager will enable traffic manager to monitor every non regular events			
CV-RQ-SP3.2-0045	HMI coming with the CTA service application of Traffic Manager shall be able to present the proposed traffic management strategy and enable the traffic manager to adjust and confirm this / the adjusted traffic management strategy.			
CV-RQ-SP3.2-0046	HMI coming with the CTA service application of Traffic Manager shall be able to present the proposed incident management strategy and enable the traffic manager to adjust and confirm this / the adjusted incident management strategy.			
CV-RQ-SP3.2-0047	(COMO) CTA service application of Traffic Manager will be supported with an up-to-date image of the historical, actual, foreseen and expected traffic situation and environmental conditions on the interurban road network.	Core Technologies		
CV-RQ-SP3.2-0048	(POMA) CTA service application of Traffic Manager will be supported with all relevant data projected on one digital map, which can also be used for building traffic management and incident management strategies.			
CV-RQ-SP3.2-0049	(FOAM) CTA service application of Traffic Manager shall be able to contact other Traffic Managers and Service Providers.			
CV-RQ-SP3.2-0050	(FOAM) CTA service application of Traffic Manager shall be able to set up a network connection with the Road Side Controllers in its own area of responsibility.			
CV-RQ-SP3.2-0051	(FOAM) CTA service application of Traffic Manager shall be able to set up and maintain an ad-hoc network with Vehicle Drivers in its own area of responsibility.			
CV-RQ-SP3.2-0052	(COMM) CTA service application of Traffic Manager shall be able to communicate with CTA service application of Traffic Managers and Service Providers in fixed centres.			
CV-RQ-SP3.2-0053	(COMM) CTA service application of Traffic Manager shall be able to communicate with CTA service application of Road Side Controllers.			
CV-RQ-SP3.2-0054	(COMM) CTA service application of Traffic Manager shall be able to communicate with CTA service application of Vehicle Drivers.			

Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0055	CTA service application of Service Provider shall be able to set or update the personalised pre-trip journey plans.	Functionality	Service Provider	
CV-RQ-SP3.2-0056	CTA service application of Service Provider shall be able to set or update the personalised on-trip journey plans.			
CV-RQ-SP3.2-0057	CTA service application of Service Provider shall be able to bring in the non-regular events in the actual personalised on-trip travel plans.	Non-regular event		
CV-RQ-SP3.2-0058	CTA service application of Service Provider shall be able to receive information on the traffic and weather situation from the CTA service application of other Service Providers or Traffic Manager.	Interfacing Regular event		
CV-RQ-SP3.2-0059	CTA service application of Service Provider shall be able to receive information on the ranked trajectories in the interurban road network from the CTA service application of Traffic Manager			
CV-RQ-SP3.2-0060	<ul style="list-style-type: none"> In case of tracing: CTA service application of Service Provider shall be able to gather the relevant information from the CTA service application of the Navigating Vehicle Driver on regular basis; In case of non-tracing: CTA service application of Service Provider shall be able to receive the relevant information from the CTA service application of the Navigating Vehicle Driver. 			
CV-RQ-SP3.2-0061	CTA service application of Service Provider shall be able to send the (updated) personalised on-trip travel plans to the CTA service application of the Traveller and Navigating Vehicle Driver.			
CV-RQ-SP3.2-0062	CTA service application of Service Provider shall be able to send on-trip travel information (traffic situation, environmental conditions, information on destination, event) to the CTA service application of the Traveller and Navigating Vehicle Driver.			
CV-RQ-SP3.2-0063	CTA service application of Service Provider shall be able to receive information on non-regular events from the EDA service application of the Road Side controller(s), Traffic Manager and PSAP-1.	Interfacing Non-regular event		
CV-RQ-SP3.2-0064	HMI coming with the service application of Service Provider shall be able to provide the service provider with interurban road network context information.			
CV-RQ-SP3.2-0065	HMI coming with the service application of Service Provider shall be able to provide the Service Provider with a strategic overview of the traffic situation and environmental conditions on/along the interurban road network.			
CV-RQ-SP3.2-0066	HMI coming with the service application of Service Provider shall be able to provide the service provider with a tactical overview of the ranking of the trajectories in the interurban road network.			
CV-RQ-SP3.2-0067	HMI coming with the service application of Service Provider shall be able to enable the service provider to monitor every non regular events			

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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0068	HMI coming with the service application of Service Provider shall be able to present the proposed travel planning strategy and enable the service provider to adjust and confirm this / the adjusted travel planning strategy.			
CV-RQ-SP3.2-0069	(COMO) CTA service application of Traffic Manager will be supported with an up-to-date image of the historical, actual, foreseen and expected traffic situation and environmental conditions on the interurban road network.	Core Technologies		
CV-RQ-SP3.2-0070	(POMA) CTA service application of Service Provider will be supported with all relevant data projected on one digital map, which can also be used for building journey plans.			
CV-RQ-SP3.2-0071	(FOAM) CTA service application of Traffic Manager shall be able to contact other Traffic Managers and Service Providers.			
CV-RQ-SP3.2-0072	(FOAM) CTA service application of Traffic Manager shall be able to set up a network connection with the Road Side Controllers in its own area of responsibility.			
CV-RQ-SP3.2-0073	(FOAM) CTA service application of Traffic Manager shall be able to set up and maintain an ad-hoc network with subscribed Vehicle Drivers.			
CV-RQ-SP3.2-0074	(COMM) CTA service application of Service Provider shall be able to communicate with CTA service application of other Service Providers, Traffic Managers and PSAP-1 in fixed centres.			
CV-RQ-SP3.2-0075	(COMM) CTA service application of Service Provider shall be able to communicate with EDA service application of Road Side Controllers.			
CV-RQ-SP3.2-0076	(COMM) CTA service application of Service Provider shall be able to communicate with CTA service application of Travellers and Navigating Vehicle Drivers.			
CV-RQ-SP3.2-0077	EDA service application of Manoeuvring Vehicle Driver shall be able to assess compliance with: <ul style="list-style-type: none"> • actual traffic rules (instructions: actual speed versus actual speed limit, actual headway versus actual headway limit, good way/wrong way driving, usage / avoidance of blocked lane); • actual advices (actual speed versus actual speed advise, actual headway versus actual headway advise, actual versus advised traffic lane, actual re-routing advise); • actual warnings (intended impact of warnings on actual speed, headway and traffic lane, and left over time and space to adjust actual speed, headway and traffic lane); • actual information (information relevant for concerned vehicle driver). 	Functionality Regular-events, regular vehicle	Vehicle Drive	EDA

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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0078	EDA service application of Manoeuvring Vehicle Driver shall be able to generate warnings for vehicle driver and will pass on this warning to the HMI, in case the vehicle driver: <ul style="list-style-type: none"> • is non-compliant to actual traffic rules (actual speed exceeds actual speed limit, actual headway 'under spends' headway limit, vehicle driver entering the interurban road via the wrong entrance and is becoming a ghost driver, vehicle driver is actually ghost driving i.e. driving in the wrong way, vehicle driver is driving on a blocked lane) • seems not to take warnings and advices into account (actual speed exceeds advised speed, actual headway 'under spends' advised headway, actual traffic lane is different from advised traffic lane). 			
CV-RQ-SP3.2-0079	EDA service application of Manoeuvring Vehicle Driver shall be able to assess the speed and headway of vehicles at the back.			
CV-RQ-SP3.2-0080	EDA service application of Manoeuvring Vehicle Driver shall be able to generate warnings in case the vehicle at the back 'under spends' the advised / minimum headway.			
CV-RQ-SP3.2-0081	EDA service application of Manoeuvring Vehicle Driver shall be able to generate information on own driving behaviour (sustained speed, and vehicle characteristics (acceleration & deceleration characteristics)).			
CV-RQ-SP3.2-0082	EDA service application of Manoeuvring Vehicle Driver shall be able to generate warnings on detected barriers, experienced disruptions in the traffic flow and own disruptions.			
CV-RQ-SP3.2-0083	EDA service application of Manoeuvring Vehicle Driver shall be able to generate incident warnings (amongst others: accident, ghost-driving).	Functionality Non-regular-events, regular and concerned vehicle		
CV-RQ-SP3.2-0084	EDA service application of Manoeuvring Vehicle Driver shall be able to guide vehicle driver to the appropriate exit lane or hard shoulder.			
CV-RQ-SP3.2-0085	EDA service application of Manoeuvring Vehicle Driver shall be able to recognise incident / accident that is unavoidable, respectively that has occurred.			
CV-RQ-SP3.2-0086	EDA service application of Manoeuvring Vehicle Driver shall be able to generate warnings in case of unavoidable incident / accident.			
CV-RQ-SP3.2-0087	EDA service application of Manoeuvring Vehicle Driver shall be able to detect blockage due to incident / accident.	Functionality Non-regular-events by non-concerned vehicle		

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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0088	EDA service application of Manoeuvring Vehicle Driver shall be able to detect blockage ghost drivers.			
CV-RQ-SP3.2-0089	EDA service application of Manoeuvring Vehicle Driver shall be able to: <ul style="list-style-type: none"> • generate warnings on detected barriers; • generate warnings on detected ghost driver(s). 			
CV-RQ-SP3.2-0090	EDA service application of Manoeuvring Vehicle Driver shall be able to recognise approaching emergency vehicles in good time (< 3 min).			
CV-RQ-SP3.2-0091	EDA service application of Manoeuvring Vehicle Driver in emergency vehicle shall be able to shall be able to receive instructions from EDA service application of PSAP-2.	Functionality Emergency vehicle		
CV-RQ-SP3.2-0092	EDA service application of Manoeuvring Vehicle Driver in emergency vehicle shall be able to shall be able to create a blue corridor by warning in due time manoeuvring vehicle drivers in the front.			
CV-RQ-SP3.2-0093	EDA service application of Manoeuvring Vehicle Driver in emergency vehicle shall be able to shall be able to create a safe local situation by positioning virtual cones.			
CV-RQ-SP3.2-0094	EDA service application of Manoeuvring Vehicle Driver shall be able to gather updated: <ul style="list-style-type: none"> • Information (amongst others for the actual and on-coming road segments: traffic state, road surface condition, vision, blocked lanes) • Warnings (amongst others: on-coming irregularities in the road trajectory, on-coming 'hitches' in the traffic flow, 'bad' road surface conditions, limited vision) • Advices (amongst others: advised speed and headway, traffic lane, re-routing advise) • Instructions (amongst others: actual speed limits, actual parameters speed / headway relation coming with the actual speed limits, driving direction, blocked lanes,). 	Interfacing Regular events		
CV-RQ-SP3.2-0095	EDA service application of Manoeuvring Vehicle Driver shall be able to gather the rationale behind all these information.			
CV-RQ-SP3.2-0096	EDA service application of Manoeuvring Vehicle Driver shall be able to gather monitor the trajectory of vehicle with respect to a map.			
CV-RQ-SP3.2-0097	EDA service application of Manoeuvring Vehicle Driver shall be able to pass on information on own driving behaviour (sustained speed, and vehicle characteristics (acceleration & deceleration characteristics) to the EDA service applications of other vehicles in front (vehicles in manoeuvre area).			
CV-RQ-SP3.2-0098		Interfacing Non- regular events		

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0099	EDA service application of Manoeuvring Vehicle Driver shall be able to pass on warnings on detected barriers, experienced disruptions in the traffic flow and own disruptions to the other vehicles at the back (vehicles in manoeuvre area) and to the EDA service applications of the Traffic Manager.			
CV-RQ-SP3.2-0100	EDA service application of Manoeuvring Vehicle Driver shall be able to pass on incident warnings (amongst others: accident, ghost-driving) to EDA service application of vehicles in the back (in case of accident) and vehicles in front (in case of ghost driving).			
CV-RQ-SP3.2-0101	EDA service application of Manoeuvring Vehicle Driver shall be able to pass on warnings in case of unavoidable incident / accident to EDA service applications of other actors (vehicle drives in manoeuvre area, traffic manager, PSAP-1).			
CV-RQ-SP3.2-0102	EDA service application of Manoeuvring Vehicle Driver shall be able to receive warnings from EDA service application: <ul style="list-style-type: none"> • Traffic Management Centre; • Road Side Controllers that corresponding vehicles is starting to drive, respectively driving in the wrong way (ghost driving).			
CV-RQ-SP3.2-0103	EDA service application of Manoeuvring Vehicle Driver shall be able to receive instructions from EDA service application: <ul style="list-style-type: none"> • Traffic Management Centre; • Road Side Controllers on speed and traffic lane to be kept, and on exit-lane or hard shoulder to be used.			
CV-RQ-SP3.2-0104	EDA service application of Manoeuvring Vehicle Driver shall be able to receive warnings (on barrier and ghost drivers) from EDA service application: <ul style="list-style-type: none"> • Traffic Manager; • Road Side Controllers. 			
CV-RQ-SP3.2-0105	EDA service application of Manoeuvring Vehicle Driver shall be able to receive instructions from EDA service application: <ul style="list-style-type: none"> • Traffic Manager; • Road Side Controllers on speed and traffic lane to be kept.			
CV-RQ-SP3.2-0106	EDA service application of Manoeuvring Vehicle Driver shall be able to receive warning of emergency vehicle and advise vehicle driver on appropriate traffic lane.	Interfacing Emergency Vehicle		
CV-RQ-SP3.2-0107	EDA service application of Manoeuvring Vehicle Driver in emergency vehicle shall be able to receive instructions from EDA service application of PSAP-2.			

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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0108	EDA service application of Manoeuvring Vehicle Driver in emergency vehicle shall be able to identify itself to EDA service application of Manoeuvring Vehicle Driver who is driving in the wrong way (ghost driver) or who is involved in accident.			
CV-RQ-SP3.2-0109	EDA service application of Manoeuvring Vehicle Driver in emergency vehicle shall be able to send instructions to EDA service application of Manoeuvring Vehicle Driver who is driving in the wrong way (ghost driver) on how to behave (speed, traffic lane, exit lane to us, hard shoulder to stop at).			
CV-RQ-SP3.2-0110	EDA service application of Manoeuvring Vehicle Driver in emergency vehicle shall be able to instruct other Manoeuvring Vehicle Drivers not to enter the zone within the virtual cones.			
CV-RQ-SP3.2-0111	HMI coming with EDA service application of Manoeuvring Vehicle Driver shall be able to present actual maximum speed to vehicle driver and shall be able to open motivations for this maximum speed.	HMI		
CV-RQ-SP3.2-0112	HMI coming with EDA service application of Manoeuvring Vehicle Driver shall be able to present actual minimum headway to vehicle driver and shall be able to open motivations for this minimum headway.			
CV-RQ-SP3.2-0113	HMI coming with EDA service application of Manoeuvring Vehicle Driver shall be able to present the traffic lane to be followed given an accident and/or incident.			
CV-RQ-SP3.2-0114	HMI coming with EDA service application of Manoeuvring Vehicle Driver shall be able to present a warning for an approaching emergency vehicle and the traffic lane to be followed.			
CV-RQ-SP3.2-0115	HMI coming with EDA service application of Manoeuvring Vehicle Driver shall be able to provide feedback to vehicle driver on (non)compliance to social rules (maximum speed, minimum headway, traffic lane)			
CV-RQ-SP3.2-0116	HMI coming with EDA service application of Manoeuvring Vehicle Driver shall be able to present actual advised speed to vehicle driver and shall be able to open motivations for this advised speed.			
CV-RQ-SP3.2-0117	HMI coming with EDA service application of Manoeuvring Vehicle Driver shall be able to present actual advised headway to vehicle driver and shall be able to open motivations for this advised headway.			
CV-RQ-SP3.2-0118	HMI coming with EDA service application of Manoeuvring Vehicle Driver shall be able to present the advised traffic lane to be followed.			
CV-RQ-SP3.2-0119	HMI coming with EDA service application of Manoeuvring Vehicle Driver shall be able to present warnings for non-regular events (e.g. barriers, slippery road surface, reduced sight), incidents (e.g. ghost driver) and accidents.			
CV-RQ-SP3.2-0120	HMI coming with EDA service application of Manoeuvring Vehicle Driver shall be able to present warnings that he or she is driving in the wrong way (is a ghost driver).			

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0121	HMI coming with EDA service application of Manoeuvring Vehicle Driver shall be able to present instructions on how to manoeuvre in case he or she is driving in the wrong way (is a ghost driver).			
CV-RQ-SP3.2-0122	(COMO) EDA service application of Manoeuvring Vehicle Driver will be supported with an up-to-date image of the actual and foreseen (on the on-coming road segments) traffic situation and environmental conditions, including maximum speed and minimum headway.	Core Technologies		
CV-RQ-SP3.2-0123	(POMA) EDA service application of Manoeuvring Vehicle Driver will be supported with all relevant data projected on one digital map, which can also be used for navigation support.			
CV-RQ-SP3.2-0124	(FOAM) EDA service application of Manoeuvring Vehicle Driver shall be able to contact a (strategic and local) Traffic Manager, roam from a Traffic Manager to another and thereby keep contact with a (strategic and local) Traffic Manager.			
CV-RQ-SP3.2-0125	(FOAM) EDA service application of Manoeuvring Vehicle Driver shall be able to set up and keep in contact with the Road Side Controllers he or she is passing or approaching.			
CV-RQ-SP3.2-0126	(FOAM) EDA service application of Manoeuvring Vehicle Driver shall be able to set up and maintain an ad-hoc network with the surrounding vehicles in the manoeuvring zone.			
CV-RQ-SP3.2-0127	(FOAM) CTA service application of Traveller / Navigating Vehicle Driver shall be able to make available data from in-vehicle systems/sensors.			
CV-RQ-SP3.2-0128	(COMO) EDA service application of Manoeuvring Vehicle Driver shall be able to communicate with EDA service application of other actors (vehicles, road side controllers, traffic management centres, PSAP-1).			
CV-RQ-SP3.2-0129	EDA service application of the Traffic Manager shall be able to assess actual features of traffic on a given interurban road network with respect to the 'rules and guidelines' for safe and fluent traffic	Functionality Regular events	Traffic Manager	
CV-RQ-SP3.2-0130	EDA service application of the Traffic Manager shall be able to: <ul style="list-style-type: none"> • assess the maximum speed and speed – headway relation coming with the observed state of traffic – road surface condition, blockages and barriers; • evaluate the success of speed limitations and corresponding head-ways so far. 			

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0131	EDA service application of the Traffic Manager shall be able to generate / update a set of road segment bound: <ul style="list-style-type: none"> • instructions (actual traffic rules: actual speed limit, actual headway limit, driving directions per traffic lane, blocked lanes,); • advices (actual speed advise, actual headway advise, actual traffic lane advise, actual re-routing advise); • warnings ('hitches' in the traffic flow, 'bad' road surface conditions, limited vision); • information per road segment (traffic flow conditions, road surface condition, vision). 			
CV-RQ-SP3.2-0132	EDA service application of the Traffic Manager shall be able to process emergency warning to EDA service application of road side controllers, vehicles and PSAP-1.	Functionality Non-regular events		
CV-RQ-SP3.2-0133	EDA service application of the Traffic Manager shall be able to select a strategy to manage the incident.			
CV-RQ-SP3.2-0134	EDA service application of the Traffic Manager shall be able to assess the incoming warnings and additional information from EDA service applications of road side controllers, vehicles, adjacent traffic management centres and PSAP-1.			
CV-RQ-SP3.2-0135	EDA service application of the Traffic Manager shall be able to generate instructions and advices based upon the incoming warnings and additional information from EDA service applications of road side controllers, vehicles and PSAP-2.	Interfacing Regular events		
CV-RQ-SP3.2-0136	EDA service application of the Traffic Manager shall be able to track the ghost driving vehicle.			
CV-RQ-SP3.2-0137	EDA service application of the Traffic Manager shall be able to monitor the progress in the incident management.			
CV-RQ-SP3.2-0138	EDA service application of the Traffic Manager shall be able to gather updated floating car data send by EDA service application of vehicle: <ul style="list-style-type: none"> • Information on: <ul style="list-style-type: none"> – driving behaviour (sustained speed, headway, traffic lane, route); – experienced road surface conditions; – experienced road weather and vision; • Warnings on: <ul style="list-style-type: none"> – detected barriers, experienced disruptions in the traffic flow and own disruptions; – incident / accident. 			

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0139	EDA service application of the Traffic Manager shall be able to gather updated data from road side controllers on: <ul style="list-style-type: none"> • driving behaviour (sustained speed, headway, traffic lane); • experienced road surface conditions; • experienced road weather and vision. 			
CV-RQ-SP3.2-0140	EDA service application of the Traffic Manager shall be able to gather updated data from cellular telephone network on driving behaviour (travel times).			
CV-RQ-SP3.2-0141	EDA service application of the Traffic Manager shall be able to pass the instructions – advises – warnings – information from the Traffic Manager on to the: <ul style="list-style-type: none"> • vehicles (in case of direct communication vehicles – traffic management centre); • road side controllers (in case of indirect communication vehicles – traffic management centre). 			
CV-RQ-SP3.2-0142	EDA service application of the Traffic Manager shall be able to receive emergency warning from EDA service application of vehicles involved in an incident (accident → e-Call, ghost driving).	Interfacing Non-regular-events		
CV-RQ-SP3.2-0143	EDA service application of the Traffic Manager shall be able to receive emergency warning from EDA service application of PSAP-1.			
CV-RQ-SP3.2-0144	EDA service application of the Traffic Manager shall be able pass-on emergency warning to EDA service application of road side controllers, vehicles and PSAP-1.			
CV-RQ-SP3.2-0145	EDA service application of the Traffic Manager will be pass on instructions and warnings to EDA service applications of road side controllers, vehicles, adjacent traffic management centres and PSAP-2.			
CV-RQ-SP3.2-0146	HMI coming with the EDA service application of the Traffic Manager will enable traffic manager to dynamically change traffic rules (speed limits, access to lanes, and access to tollgate...)	HMI		
CV-RQ-SP3.2-0147	HMI coming with the EDA service application of the Traffic Manager shall be able to: <ul style="list-style-type: none"> • pass on the generated / updated set of instructions – warnings – advises – information to the HMI of the Traffic Manager; • gather from this HMI and process the adjustments of Traffic Manager to the new set of instructions – warnings – advises – information for every road segment; • depict the rationale behind the new set of instructions – warnings – advises – information. 			
CV-RQ-SP3.2-0148	(COMO) EDA service application of Traffic Manager will be supported with an up-to-date, road segment based image of the actual and foreseen traffic situation and environmental conditions on the interurban road network.	Core Technologies		

Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0149	(POMA) EDA service application of Traffic Manager will be supported with all relevant data projected on one digital map, which can also be used for defining the actual dynamics traffic rules (maximum speed, actual minimum headway, traffic lane to be kept) and signals per road segment.			
CV-RQ-SP3.2-0150	(FOAM) EDA service application of Traffic Manager shall be able to contact other Traffic Managers and Service Providers.			
CV-RQ-SP3.2-0151	(FOAM) EDA service application of Traffic Manager shall be able to set up a network connection with the Road Side Controllers in its own area of responsibility.			
CV-RQ-SP3.2-0152	(FOAM) EDA service application of Traffic Manager shall be able to set up and maintain an ad-hoc network with Vehicle Drivers in its own area of responsibility.			
CV-RQ-SP3.2-0153	(COMM) CTA service application of Traffic Manager shall be able to communicate with CTA service application of Traffic Managers and Service Providers in fixed centres.			
CV-RQ-SP3.2-0154	(COMM) CTA service application of Traffic Manager shall be able to communicate with CTA service application of Road Side Controllers.			
CV-RQ-SP3.2-0155	(COMM) CTA service application of Traffic Manager shall be able to communicate with CTA service application of Vehicle Drivers.			
CV-RQ-SP3.2-0156	EDA service application of Road Side Controller shall be able to gather from the EDA service application of the passing vehicles information – warnings – advices on own & experienced driving behaviour, experienced events in traffic, experienced road surface conditions, weather and vision, and detected barriers / blockages.	Interfacing Road Side Controller in the role of an information broker	Road Side Controller	
CV-RQ-SP3.2-0157	EDA service application of Road Side Controller shall be able to bundle and process this / these information, warnings and advices.			
CV-RQ-SP3.2-0158	EDA service application of Road Side Controller shall be able to pass on this/these information – warnings – advices to the EDA service application of the other passing vehicles.			
CV-RQ-SP3.2-0159	EDA service application of Road Side Controller shall be able to pass on the warnings to the EDA service application of adjacent road side controllers.			
CV-RQ-SP3.2-0160	EDA service application of Road Side Controller shall be able to pass on this/these information – warnings – advices to the EDA service application of the Traffic Manager.			
CV-RQ-SP3.2-0161	EDA service application of Road Side Controller shall be able to set up collaborations with EDA service application of actually related Road Side Controllers	Functionality Road Side Controller as autonomous agent		

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0162	EDA service application of Road Side Controller shall be able to bundle and process this / these information, warnings and advices.			
CV-RQ-SP3.2-0163	EDA service application of Road Side Controller shall be able to gather from the EDA service application of the passing vehicles information – warnings – advices on own & experienced driving behaviour, experienced events in traffic, experienced road surface conditions, weather and vision, and detected barriers / blockages.	Interfacing Road Side Controller as autonomous agent		
CV-RQ-SP3.2-0164	EDA service application f Road Side Controller shall be able to tune the received / gathered information, warnings and advices with the EDA service applications of the related road side controller in the collaboration → fill in - in the collaboration - the tasks of the EDA service application of the traffic Manager	Functionality Road Side Controller as actor in collaboration Regular event		
CV-RQ-SP3.2-0165	EDA service application shall be able to process and pass-on emergency warning to EDA service application of related road side controllers, vehicles, traffic management centre and PSAP-1.	Functionality Road Side Controller as actor in collaboration Non-regular-event		
CV-RQ-SP3.2-0166	EDA service application will monitor the progress in the incident management.			
CV-RQ-SP3.2-0167	EDA service application of Road Side Controller shall be able to pass on the set of instructions – advices – warnings – information to the EDA service application of the other passing vehicles.	Interfacing Regular event		
CV-RQ-SP3.2-0168	EDA service application of Road Side Controller shall be able to pass on this/these information – warnings – advices to the EDA service application of the Traffic Manager.			
CV-RQ-SP3.2-0169	EDA service application of Road Side Controller shall be able to receive emergency warning from EDA service application of vehicles involved in an incident (accident → e-Call, ghost driving.	Interfacing Road Side Controller as actor in collaboration – Non-regular-event		
CV-RQ-SP3.2-0170	EDA service application of Road Side Controller shall be able to receive emergency warning from EDA service application of traffic management centre and PSAP-1.			
CV-RQ-SP3.2-0171	EDA service application of Road Side Controller shall be able to receive instructions and advices from EDA service applications of traffic management centre and PSAP-2.			

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0172	EDA service application of Road Side Controller shall be able to pass on instructions and warnings to EDA service applications of adjacent road side controllers and passing vehicles.			
CV-RQ-SP3.2-0173	EDA service application of Road Side Controller shall be able to track the ghost driving vehicle.			
CV-RQ-SP3.2-0174	n.a.	HMI		
CV-RQ-SP3.2-0175	(COMO) EDA service application of Road Side Controller will be supported with an up-to-date image on the own and related road segments of the actual and foreseen (on the on-coming road segments) traffic situation and environmental conditions, including maximum speed and minimum headway.	Core Technologies		
CV-RQ-SP3.2-0176	(POMA) EDA service application of Road Side Controller will be supported with all relevant data projected on one digital map, which can also be used for positioning the signals (information, warnings, advices and instructions).			
CV-RQ-SP3.2-0177	(FOAM) EDA service application of Road Side Controller shall be able to set and keep contact with the responsible (strategic and local) Traffic Manager.			
CV-RQ-SP3.2-0178	(FOAM) EDA service application of Road Side Controller shall be able to set up and keep in contact with the related Road Side Controllers.			
CV-RQ-SP3.2-0179	(FOAM) EDA service application of Road Side Controller shall be able to set up and maintain an ad-hoc network with the passing and on-coming vehicles.			
CV-RQ-SP3.2-0180	(FOAM) CTA service application of Road Side Controller shall be able to make available data from road side sensors.			
CV-RQ-SP3.2-0181	(COMO) EDA service application of Road Side Controller shall be able to communicate with EDA service application of other actors (vehicles, road side controllers, traffic management centres, service providers, PSAP-1).			
CV-RQ-SP3.2-0182	EDA service application will assess actual features of weather (vision) and road surface and their impact for traffic on the interurban road network.	Functionality	Service Provider	
CV-RQ-SP3.2-0183	EDA service application will generate / update a set of road segment bound: <ul style="list-style-type: none"> • information per road segment (road surface condition, vision); • warnings (road surface condition, vision). 			
CV-RQ-SP3.2-0184	EDA service application will gather updated floating car data: <ul style="list-style-type: none"> • Information on: <ul style="list-style-type: none"> – experienced road surface conditions; – experienced road weather and vision. 	Interfacing		

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0185	EDA service application will gather updated data from road side controllers on: <ul style="list-style-type: none"> • experienced road surface conditions; • experienced road weather and vision. 			
CV-RQ-SP3.2-0186	EDA service application will pass these warnings – information on to the: <ul style="list-style-type: none"> • vehicles (in case of direct communication vehicles – service centre); • road side controllers (in case of indirect communication vehicles – service centre). 			
CV-RQ-SP3.2-0187	HMI shall be able to prioritise the information – warnings – advices – instructions passed on to the HMI by the service applications also taking into account the current driving conditions (e.g. if the surrounding traffic is particularly heavy the HMI will refrain to provide low priority advices that could distract the driver).	HMI	All	Core Technologies for CTA and EDA
CV-RQ-SP3.2-0188	HMI shall be able to activate a digital map and project information – warnings – advices – instructions on this map			
CV-RQ-SP3.2-0189	HMI will include a navigation system. Alternatively it will integrate with the in-car navigation system which is available on the vehicle.			
CV-RQ-SP3.2-0190	The geographical link between an area of responsibility and a road side system (on all three levels) will be flexible.	POMA		
CV-RQ-SP3.2-0191	The Service applications for EDA and CTA will share information.	FOAM		

Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0192	<p>The enabling FOAM-platform will support the following service behaviours:</p> <ul style="list-style-type: none"> – Cyclic Behaviour The main parts of the CTA and EDA service applications are cyclic, i.e. they pass their loop just as long as the service is operational. – Transaction Behaviour Specific parts of CTA (enabling e.g. road charging) are focussed on setting a transaction. – Sequential Behaviour The parts of the CTA and EDA service applications that are focussed on managing non-regular events are sequential, in the sense that they are triggered by a non-regular event, start to manage the non-regular event, monitor and if necessary accentuate to non-regular event management progress and bring the situation to normal once the non-regular event has been taken care of. – OneShot – Sender Behaviour Immediately send (broadcast and directly addressed) a warning in case a non-regular event has been detected. – OneShot – Receiver Behaviour Be available to receive a send (broadcast and directly addressed) a warning for a detected non-regular event. – Waker Behaviour Be resident while the service does not need to be operational, wake-up the end-user starts to need the service. – Composite Behaviour Be able to conduct those behaviours in parallel. 			
CV-RQ-SP3.2-0193	It will be possible to update the service applications in vehicles, road side controller, traffic management centres and service centres at any time in a fault-tolerant way.			

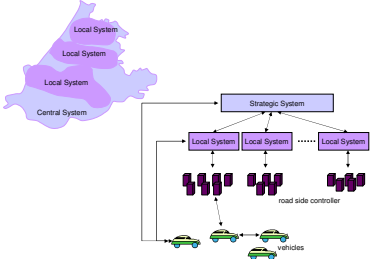
Requirement ID	Requirement Text / Description	Type	Actor(s)	
CV-RQ-SP3.2-0194	<p>A vehicle driver will be enabled in:</p> <ul style="list-style-type: none"> • Floating from one (strategic or local) Traffic Manager to the neighbouring (strategic or local) Traffic Manager (see figure below); • Floating from one Service Provider to the neighbouring Service Provider. 			
CV-RQ-SP3.2-0195	<p>Vehicle drivers shall be able to position them selves relatively to the other vehicle drivers in the manoeuvring area.</p>	COMM		

Table 3 CVIS CF&F Requirements for mapping to FRAME User Needs

Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0101	All the TMC/NSP (Traffic Management Centre/Navigation Service Provider) have a pre assigned competence area.	F	CFF, FOAM, COMM (service discovery)	0124														
CV-RQ-SP3.3-0102	CVIS on board system is able to long-range communicate with TMC/NSP.	F	COMM															
CV-RQ-SP3.3-0103	CVIS on board system is able to position itself (GPS and Galileo).	F	POMA	0120	0122	0127	0143											
CV-RQ-SP3.3-0104	CVIS on board system is able to register/deregister at a TMC/NSP for DG monitoring and routing	F	CFF, FOAM	0120	0121	0133												
CV-RQ-SP3.3-0105	CVIS on board system determines the responsible TMC/NSP.	F	CFF, FOAM, COMM (service discovery)	0120	0121													
CV-RQ-SP3.3-0106	TMC/NSP is able to register/deregister DG-vehicles for DG routing and monitoring.	F	CFF, FOAM	0120	0121	0133												

Co-operative Systems Combined Requirements

Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0107	CVIS on board system is navigating the driver by following the preferred DG network as given by the TMC/NSP.	F	CFF, POMA	0125	0133													
CV-RQ-SP3.3-0108	CVIS on board system is navigating the driver taking actual traffic information into account.	F	CFF, POMA, IP Routing Application	0122	0125	0133												
CV-RQ-SP3.3-0109	TMC/NSP provides a DG monitoring service showing a map display with all registered DG vehicles.	F	CFF, POMA	0120	0121	0122	0123	0126	0127									
CV-RQ-SP3.3-0110	DG monitoring service allows access to retrieve status information of single vehicles.	F	CFF	0120	0121	0122	0123	0126	0127									
CV-RQ-SP3.3-0111	DG monitoring service grants access to different user groups (and users): health services, police, rescue services, fleet operator, ...	F	CFF, FOAM	0111, ' ' ' ' ,	0112	0120	0121	0122	0123	0126	0127	0142	0143	0152	0161	0172	0173	0181

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0112	Client application for the different user groups gives access to the DG monitoring service.	F	CFF, FOAM	0111	0112	0120	0121	0122	0123	0126	0127	0143	0152	0161	0172	0173	0181	
CV-RQ-SP3.3-0113	CVIS on board system reports status changes to the TMC/NSP.	F	CFF	0120	0123													
CV-RQ-SP3.3-0114	DG monitoring service is recognising DG preferred network violations.	F	CFF	0120	0121	0125	0126											
CV-RQ-SP3.3-0115	DG monitoring service is actively informing about important DG vehicles status changes (accident) and DG preferred network violations.	F	CFF	0111	0112	0123	0126	0127	0152	0161	0172	0173	0181					
CV-RQ-SP3.3-0116	DG monitoring service allows sending of free text messages to single DG vehicles.	F	CFF, COMM															
CV-RQ-SP3.3-0117	CVIS on board system changes the responsible TMC/NSP when crossing a TMC/NSP border.	F	CFF, FOAM	0133														

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0118	The TMC/NSP hands over the responsibility for DG vehicles crossing borders to neighbouring TMC/NSP.	F	CFF, FOAM	0124														
CV-RQ-SP3.3-0119	Fleet operator monitoring application is able to manage TMC/NSP changes for single vehicles.	F	CFF	0143														
CV-RQ-SP3.3-0120	Application for the traffic supervisor is able to edit and change the DG preferred network.	F	CFF	0128	0129													
CV-RQ-SP3.3-0121	DG preferred network changes are becoming effective as soon as possible for the TMC/NSP route guidance.	F	CFF, POMA	0128	0129	0133	0144											
CV-RQ-SP3.3-0122	The traffic manager shall be able to link a traffic information event (e.g. road works, accident, congestion information) to a specific DG preferred network change.	F	CFF, POMA, IP Routing Application	0128														

Co-operative Systems Combined Requirements

Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0123	When a specific traffic information event (that was linked to a network change) is closed or no longer active, the change to the DG preferred network due to that event shall be automatically removed.	F	CFF, POMA, IP Routing Application	0128														
CV-RQ-SP3.3-0201	The Fleet Operator must have the ability to make requests for "Parking Slots", specifying the time of day required, the duration required, the type of vehicle to be used, and possible dangerous goods transported in a Parking Zone / premise.	F	CFF	CV-RQ-SP3.3-0231	CV-RQ-SP3.3-0232	CV-RQ-SP3.3-0234	CV-RQ-SP3.3-0241	CV-RQ-SP3.3-0242	CV-RQ-SP3.3-0243	CV-RQ-SP3.3-0244								
CV-RQ-SP3.3-0202	The Fleet Operator must have the ability to make requests for "Parking Slots" in Urban Areas, specifying the time of day required, the duration required, the vehicle type and the delivery address.	F	CFF															

Co-operative Systems Combined Requirements

Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0203	The Fleet Operator must have the ability to make requests for "Parking Slots", specifying the time of day required, the duration required, the motorway section, the vehicle type.	F	CFF															
CV-RQ-SP3.3-0204	The driver, during its trip must have the ability to make request for a "parking slot", specifying the vehicle type, the duration required, the time of day required, the delivery address/motorway section , and driving time remaining/ETA.	F	CFF															
CV-RQ-SP3.3-0205	The Parking System must be able to process the parking request and to generate an acceptance response confirming the booking of a specific Parking Slot or an error response indicating that no Slot in the Parking Zone is available.	F	CFF	CV-RQ-SP3.3-0221	CV-RQ-SP3.3-0222	CV-RQ-SP3.3-0223	CV-RQ-SP3.3-0224	CV-RQ-SP3.3-0245										

Co-operative Systems Combined Requirements

Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0206	Regarding the delivery address, time of day, duration, vehicle type, the parking system must be able to deduce the nearest parking slot available.	F	CFF, POMA															
CV-RQ-SP3.3-0207	The Parking System must be able to process the parking request and to generate a list of possible parking zone with indication of available parking slot or an error response indicating that no Slot in the Parking Zone is available.	F	CFF, POMA															
CV-RQ-SP3.3-0208	The response from the Parking System must be available to the Fleet Operator or Vehicle within 60 seconds.	NF	CFF	CV-RQ-SP3.3-0221	CV-RQ-SP3.3-0222	CV-RQ-SP3.3-0223	CV-RQ-SP3.3-0224	CV-RQ-SP3.3-0245										
CV-RQ-SP3.3-0209	The Vehicle should identify when it is within a defined perimeter/ distance of the Parking Zone and inform the parking system.	F	CFF, POMA	CV-RQ-SP3.3-0237	CV-RQ-SP3.3-0238	CV-RQ-SP3.3-0246												

Co-operative Systems Combined Requirements

Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0210	The Vehicle system should provide updates of its ETA to the Parking system as the vehicle approaches the parking zone.	F	CFF, CINT, CURB	CV-RQ-SP3.3-0236	CV-RQ-SP3.3-0237	CV-RQ-SP3.3-0238	CV-RQ-SP3.3-0246											
CV-RQ-SP3.3-0211	Every 5 minutes (every minute within Urban areas), the Vehicle system must be able to provide an ETA and remaining kilometres to destination based on real time vehicle position.	NF	CFF, CINT, CURB	CV-RQ-SP3.3-0236	CV-RQ-SP3.3-0237	CV-RQ-SP3.3-0238	CV-RQ-SP3.3-0247											
CV-RQ-SP3.3-0212	The Parking System should process the ETA and respond to the Vehicle with an indication that the requested Parking Slot is available and deliver micro-routing information to the Zone, based on current traffic conditions.	F	CFF, IP Routing Application	CV-RQ-SP3.3-0236	CV-RQ-SP3.3-0238	CV-RQ-SP3.3-0246	CV-RQ-SP3.3-0247											
CV-RQ-SP3.3-0213	The Parking System should monitor the status of the Parking Zone at regular intervals.	F	CFF, COMO	CV-RQ-SP3.3-0227	CV-RQ-SP3.3-0228	CV-RQ-SP3.3-0247												

Co-operative Systems Combined Requirements

Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0214	On receiving a Vehicle ETA, the Parking System should determine if the Parking Zone is free at the given time.	F		CV-RQ-SP3.3-0236														
CV-RQ-SP3.3-0215	If the Parking Zone will not be free, the Parking System should be able to identify a Holding Zone and communicate this information, together with micro-routing information to the Vehicle.	F	CFF, POMA, IP Routing Application	CV-RQ-SP3.3-0236	CV-RQ-SP3.3-0237													
CV-RQ-SP3.3-0216	The Vehicle should be able to process updated Parking or Holding Zone bookings and micro-routing information from the Parking System and present the information to the Driver.	F	CFF, POMA, IP Routing Application	CV-RQ-SP3.3-0236	CV-RQ-SP3.3-0237	CV-RQ-SP3.3-0238												
CV-RQ-SP3.3-0217	The Parking System should identify the arrival of the Vehicle at the Parking Zone and activate any access mechanism to allow the Vehicle to park.	F		CV-RQ-SP3.3-0227	CV-RQ-SP3.3-0243	CV-RQ-SP3.3-0244	CV-RQ-SP3.3-0247	CV-RQ-SP3.3-0248										

Co-operative Systems Combined Requirements

Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0218	The Parking System should detect when the Vehicle leaves the Parking Zone and note that the Parking Zone is now free.	F		CV-RQ-SP3.3-0221	CV-RQ-SP3.3-0222	CV-RQ-SP3.3-0236												
CV-RQ-SP3.3-0219	The Vehicle system should be able to accept a request from the Driver for a Parking Zone at a specific location, a specific time, with a given duration for a specific type of vehicle.	F		CV-RQ-SP3.3-0231	CV-RQ-SP3.3-0232	CV-RQ-SP3.3-0233	CV-RQ-SP3.3-0234	CV-RQ-SP3.3-0235										
CV-RQ-SP3.3-0220	The Parking System should be able to generate a response proposing an alternative time slot and communicate it to the Vehicle.	F		CV-RQ-SP3.3-0221	CV-RQ-SP3.3-0222	CV-RQ-SP3.3-0223	CV-RQ-SP3.3-0224	CV-RQ-SP3.3-0245										
CV-RQ-SP3.3-0221	The Parking System should be able to generate a response proposing an alternative parking zone (with a parking slot associated) and communicate it to the Vehicle.	F																

Co-operative Systems Combined Requirements

Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0222	The Parking System will monitor the expected ETA for the Vehicle and, if the Vehicle is not detected at the Parking Zone, it will request an update of the ETA.	F		CV-RQ-SP3.3-0221														
CV-RQ-SP3.3-0223	The Parking System will process updated ETAs from vehicle and propose alternate Parking Zones and slots if necessary.	F		CV-RQ-SP3.3-0221	CV-RQ-SP3.3-0236													
CV-RQ-SP3.3-0224	The response from the Parking System must be available to the Vehicle and Fleet Operator within 60 seconds.	NF		CV-RQ-SP3.3-0221	CV-RQ-SP3.3-0236													
CV-RQ-SP3.3-0225	The Vehicle system will provide the ability to the Driver to accept or reject updates.	F		CV-RQ-SP3.3-0236	CV-RQ-SP3.3-0238													

Co-operative Systems Combined Requirements

Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0226	The Parking Zone system will have the ability to detect that a Parking Zone is occupied by a vehicle which does not have permission to park and to initiate enforcement action.	F		CV-RQ-SP3.3-0227	CV-RQ-SP3.3-0228	CV-RQ-SP3.3-0247												
CV-RQ-SP3.3-0227	The Parking Zone system should have the ability to detect that a Vehicle has exceed the requested length of time at the Parking Zone. The Parking System will generate responses for other vehicles which will be affected and then propose alternative Parking Slots.	F		CV-RQ-SP3.3-0231	CV-RQ-SP3.3-0236	CV-RQ-SP3.3-0238												
CV-RQ-SP3.3-0228	The Parking System must be able to request updated micro-routing information for guiding the Vehicle towards the Parking or Holding Zones, from the Road Operator / Traffic Management Centre or equivalent.	F		CV-RQ-SP3.3-0236														

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0229	The Road Operator TMC should provide within 10 seconds the micro-routing information.	NF	CFF	CV-RQ-SP3.3-0236														
CV-RQ-SP3.3-0230	The Parking system must be able to know about the number of spaces remaining / available in a parking zone / within a premise.	F	CFF															
CV-RQ-SP3.3-0231	The Driver and Fleet operator need a safeguarded Highway resting area.	F	CFF															
CV-RQ-SP3.3-0232	The Parking System must be able to propose solutions in order to respect regulation regarding distance between vehicles with specific dangerous goods.	F	CFF															
CV-RQ-SP3.3-0233	The retention of the parking enforcement data in must be in a format compatible with any current or future enforcement system	F	COMM	0248														

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0234	The system that is authorising electronic payment should be secure, reliable and auditable	F	COMM	0227	0228													
CV-RQ-SP3.3-0301	The vehicle should transmit to road side infrastructure the information vehicle characteristics immediately when a vehicle approaches the monitoring area surrounding a sensitive zone.	F	CFF, COMM	0321	0325													
CV-RQ-SP3.3-0302	The infrastructure near the monitoring zone should alert all approaching vehicles about the sensitive zone limits and characteristics.	F	CFF, COMM	0331	0341	0343	0311											
CV-RQ-SP3.3-0303	In CVIS on board system should be available a user interface allowing the receiving of messages from the infrastructure and access control centre.	F	CFF	0332	0333	0324	0325											

Co-operative Systems Combined Requirements

Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0304	CVIS on board system should be connected to OEM device/platform in order to acquire vehicle characteristics, operating data and diagnostic parameters.	F	CFF, OEM Gateway	0321	0322	0332												
CV-RQ-SP3.3-0305	The vehicle should be tracked with high precision through on board GPS and road infrastructure.	F	CFF, POMA	0321	0325	0326	0335	0331	0332	0341	0343							
CV-RQ-SP3.3-0306	The information exchange between on board system and infrastructure and access control centre should be granted through different communication channels in order to allow recovery communication strategy in case of failure.	F	CFF, COMM	0321	0324	0333	0334											
CV-RQ-SP3.3-0307	The access control centre should receive real time data on traffic, road and weather conditions.	F	CFF, COMO	0321	0324	0334	0323	0326										

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0308	The road infrastructure should be able to monitor a large number of vehicles and to discriminate each vehicle.	F	CFF, FOAM, COMM	0342	0312	0313	0326	0325	0335	0342	0343							
CV-RQ-SP3.3-0309	The access control centre should have the real time situation about vehicles displacement in monitoring area and sensitive zone.	F	CFF, COMO	0313	0323	0325	0335											
CV-RQ-SP3.3-0310	All critical information sent to the vehicles should be acknowledged.	F	CFF, COMM	0334	0324	0333	0342											
CV-RQ-SP3.3-0311	The vehicle entrance inside the Monitoring Area must be detected with a precision of at least 150 m in a urban environment.	NF	CFF, POMA	0325	0335													
CV-RQ-SP3.3-0312	The vehicle entrance inside the Monitoring Area must be detected with a precision of at least 500 m in a interurban environment.	NF	CFF, POMA	0325	0335													

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0313	The vehicle entrance inside the Monitoring Area must be detected with a latency of at less than 10 s in any environment.	NF	CFF, COMM	0325	0335													
CV-RQ-SP3.3-0314	The vehicle exit from the Monitoring Area must be detected with a precision of at least 150 m in a urban environment.	NF	CFF, POMA	0325	0335													
CV-RQ-SP3.3-0315	The vehicle exit from the Monitoring Area must be detected with a precision of at least 500 m in a interurban environment.	NF	CFF, POMA	0325	0335													
CV-RQ-SP3.3-0316	The vehicle exit from the Monitoring Area must be detected with a latency of at less than 10 s in any environment.	NF	CFF, COMM	0325	0335													
CV-RQ-SP3.3-0317	The vehicle access to the Critical Area must be detected with a precision of at least 10 m in any environment.	NF	CFF, POMA	0325	0335													

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.3-nnn)														
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CV-RQ-SP3.3-0318	The vehicle access to the Critical Area must be detected with a latency of less than 2 s in any environment.	NF	CFF, COMM	0325	0335													
CV-RQ-SP3.3-0319	The vehicle exit from the Critical Area must be detected with a precision of at least 10 m in any environment.	NF	CFF, POMA	0325	0335													
CV-RQ-SP3.3-0320	The vehicle exit from the Critical Area must be detected with a latency of less than 2 s in any environment.	NF	CFF, COMM	0325														

Table 4 CVIS COMO Requirements for mapping to FRAME User Needs

Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.4-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.4-0001	CVIS vehicles shall detect hazardous situations like obstacles or low grip	F	CINT, COMO, COMM, FOAM, POMA	0001			
CV-RQ-SP3.4-0002	CVIS vehicles shall transmit information on hazardous situations to TCC	F	CINT, COMO, COMM, POMA	0001			
CV-RQ-SP3.4-0003	Danger warnings shall be derived from probe vehicle and infrastructure information on hazardous situations	F	CINT, COMO	0002			
CV-RQ-SP3.4-0004	The road side infrastructure to vehicle communication shall transmit danger warning well timed upstream of a hazardous location	F	COMM, POMA	0001			
CV-RQ-SP3.4-0005	CVIS vehicles shall be equipped with HMI for the presentation of hazard warnings	F	CINT, COMO, FOAM	0001			
CV-RQ-SP3.4-0006	Data from all available sources should be transmitted to CVIS monitoring centre	F	COMO, COMM, POMA	0002			
CV-RQ-SP3.4-0007	Data from all available sources should be fused	F	COMO	0002			
CV-RQ-SP3.4-0008	Data from all available sources should be visualised	NF	COMO	0002			
CV-RQ-SP3.4-0009	Data from all available sources should be provided to traffic control systems in a compatible format	F	COMO	0002			
CV-RQ-SP3.4-0010	Data from navigation-systems (origin-destination) should be transmitted to CVIS monitoring centre continuously	F	COMO, COMM, POMA	0003			
CV-RQ-SP3.4-0011	Data from navigation-systems (origin-destination) should be integrated into traffic model	NF	COMO	0003			
CV-RQ-SP3.4-0013	The OEM-Gateway as the Interface between the CALM suitcase (in-vehicle use) must be able to deal not only with vehicle-raw-data, but also with event based message (e.g. "congestion entry" , "slippery road")	F	COMM, COMO	0010	0011		

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.4-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.4.0019	Communication system that links the onboard navigation system with the system communicating with the road side controller	F	FOAM	0001	0004		
CV-RQ-SP3.4.0020	Positioning system indicating the exact position and speed of the vehicle (on continuous basis?)	F	POMA	0001	0005		
CV-RQ-SP3.4.0021	Algorithm that provides a prediction of the timing of arriving vehicles at junction	F	COMO	0001	0006		
CV-RQ-SP3.4.0022	Algorithm to calculate optimal green phases on specific junction	F	CURB	0001	0007		
CV-RQ-SP3.4.0024	System informing drivers when the system isn't operational	F	CURB, COMM	0001	0009		
CV-RQ-SP3.4.0025	The frequency that the vehicles have contact with CVIS is relevant. You want to know where the vehicle is.	NF	CURB, COMO	0001	0010		
CV-RQ-SP3.4.0026	The CVIS system shall provide means to adapt traffic light programs to current queue lengths in the network in a coordinated manner	F	FOAM	0020			
CV-RQ-SP3.4.0028	Update cycles of information in CVIS systems shall be minimal and adaptable to future applications.	F	COMO	0024			
CV-RQ-SP3.4.0029	The infrastructure to vehicle communication infrastructure shall transmit information about the upcoming section to the vehicle when a vehicle approaches a next section	F	FOAM/COMM	0001	0002	0003	0004
CV-RQ-SP3.4.0030	The vehicle to infrastructure communication infrastructure shall transmit information on its speed and position when the vehicle remains in a section	F	FOAM/COMM	0001	0002	0003	0004
CV-RQ-SP3.4.0034	The CVIS system shall provide a short term prediction on the traffic situation in the next road section		CINT	0001	0002	0003	0004
CV-RQ-SP3.4.0035	The CVIS system shall calculate the optimal speed of each vehicle to optimize the throughput of a road section		CINT	0001	0002	0003	0004
CV-RQ-SP3.4.0036	The infrastructure to vehicle communication infrastructure shall transmit speed advise to each individual vehicle in a section		FOAM/COMM	0001	0002	0003	0004
CV-RQ-SP3.4.0037	The CVIS system shall receive information about the position and speed of vehicles without CVIS technology moving through a section		COMO	0001	0002	0003	0004

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.4-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.1-0038	The CVIS vehicle applications shall provide high-resolution data on environmental conditions (snow, rain, fog etc.)	F	COMO	0002	0020		
CV-RQ-SP3.1-0039	The CVIS vehicle applications shall provide high-resolution data on road surface conditions (black-ice etc.)	F	COMO	0002	0020		
CV-RQ-SP3.1-0040	The CVIS vehicle application shall provide data on safety relevant vehicle conditions (e.g. breakdown)	F	COMO	0002	0020		
CV-RQ-SP3.1-0042	The CVIS system shall provide geo-referenced high-resolution travel times	F	COMO	0024			
CV-RQ-SP3.1-0043	The CVIS system shall provide means to supply an impersonalised, unique, alternating ID to a vehicle at log-on	F	COMO	0024			
CV-RQ-SP3.1-0044	The CVIS system shall provide high-resolution information on queue length in front of traffic lights in urban areas.	F	COMO	0024			
CV-RQ-SP3.1-0045	The CVIS system shall provide information on current intersection capacity depending on traffic light programs.	F	COMO, CURB	0024			
CV-RQ-SP3.1-0046	CVIS vehicle must provide access information on approaching a road section. Vehicle's position and direction is provided to the roadside infrastructure in the relevant area as well.	F	FOAM, COMM, POMA	0007	0008		
CV-RQ-SP3.1-0047	Roadside infrastructure has to merge and process (less than 4 sec.) instant data about road events from probe vehicles and from near roadside infrastructures. It means that some rather simple processing algorithms are executed inside the infrastructure itself	F	COMO	0007			
CV-RQ-SP3.1-0048	CVIS vehicles shall transmit information on detected traffic events to the nearest roadside infrastructure.	F	FOAM, COMM	0007			
CV-RQ-SP3.1-0049	Roadside infrastructure shall broadcast relevant information to the near vehicles and infrastructures (to achieve redundancy).	F	FOAM, COMM, POMA	0007			
CV-RQ-SP3.1-0050	The CVIS vehicle's on-board unit shall present warnings and suggestions of possible actions to the driver.	F	COMO	0007			
CV-RQ-SP3.1-0051	Car driver must provide his route and personal settings as intended destination, type of road, style of driving, planned stops and personal habits (if not yet present in the CVIS platform)	F	COMO, COMM, FOAM	0008			

Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.4-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.1-0052	CVIS system shall calculate the expected time of arrival based on dynamic road events as well as expected travel time on each road section. Complex algorithms shall run in the control centre to calculate the best route based on the user profile. They merge the real/expected dynamic data from all the available sources (cars, roadside infrastructure, service providers) taking into account historical data too.	F	COMO	0008			
CV-RQ-SP3.1-0053	QA for the data collected in the CVIS control centre shall be guaranteed from different sources	F	COMO	0008			
CV-RQ-SP3.1-0054	CVIS control centre shall send to the car driver a planned personalized route to follow	F	COMO, COMM, FOAM	0008			
CV-RQ-SP3.1-0055	CVIS control centre shall deliver expected/actual travel times on sections to car driver and suggest diversions in real time.	F	COMO, COMM, FOAM	0008			
CV-RQ-SP3.1-0056	CVIS roadside units shall deliver tempest well-timed road events to car driver for quick first-level information	F	COMO, COMM, FOAM	0008			
CV-RQ-SP3.1-0057	The roadside infrastructure shall sends the dynamic data to the control centre to recalculate the route	F	COMO, COMM, FOAM	0008			
CV-RQ-SP3.4-0060	CVIS provides vehicle data towards RSU of unique identifier, speed, direction, position of vehicles in the vicinity of the RSU	F	CF&F, POMA	0009	0010	0015	0016
CV-RQ-SP3.4-0061	algorithm to decide which trajectory delivered by the radar belongs to the CVIS car entering the measured section	F	COMO	0009	0010	0015	0016
CV-RQ-SP3.4-0062	algorithm to process traffic state in section in RSU (e.g. avg. speed, density in- outgoing intensity maybe per lane) for different zooming levels	F	COMO, CURB	0009	0010	0015	0016
CV-RQ-SP3.4-0063	CVIS provides connection towards signal controller	F	COMM	0009			
CV-RQ-SP3.4-0064	CVIS provides definition of dataset for signal controller	F	COMO	0009			
CV-RQ-SP3.4-0065	CVIS provides info to RSU of traffic safety behaviour for (individual) vehicles in the section assessed locally	F	COMO	0010			
CV-RQ-SP3.4-0066	CVIS provides info to RSU of traffic safety behaviour for (individual) vehicles in the section	F	CINT	0010			
CV-RQ-SP3.4-0067	CVIS provides info to RSU of traffic safety behaviour for (individual) vehicles in the section	F	CURB	0010			

	Co-operative Systems Combined Requirements
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Requirement ID	Requirement Text / Description	Type	Targeted Contributors	Originating User Need (CV-UN-SP3.4-nnnn)			
				(1)	(2)	(3)	(4)
CV-RQ-SP3.4-0068	CVIS sends data of traffic state to individual cars in a section	F	COMO	0010			
CV-RQ-SP3.4-0069	CVIS sends data of desired behaviour to individual cars in a section	F	COMO	0010			
CV-RQ-SP3.4-0070	CVIS stores data in the RSU to be send on a convenient moment if communication fails	F	COMO	0009	0010	0015	0016

2. Further Definitions

The following are more detailed definitions than those that are provided in the table of “Abbreviations”.

XCFD: According to part of the the BMW web-site, which can be found at:

([http://www.automotoportal.com/article/BMW_XFCD -
Extended Floating Car Data System Video](http://www.automotoportal.com/article/BMW_XFCD_-_Extended_Floating_Car_Data_System_Video))

XFCD is data that comprises information about weather and road conditions. According to the CVIS project web-site at: (<http://www.cvisproject.org/en/links/xfcd.htm>), XFCD comprises traffic states and safety relevant events and situations. It goes on to say that the BMW cars process various information, such as speed, brake activity, headlight and wiper status, and also data from the navigation system and the stability control system. The program can use this data to draw conclusions about the traffic and weather situation and warn subsequent vehicles about traffic jams or icy conditions, for example.