Common C-ITS Service Definitions

HLN

Rescue and Recovery Work in Progress

C-Roads Platform

Working Group 2 Technical Aspects

Taskforce 2 Service Harmonisation

Publication History

Version	Date	Description, updates and changes	Status
0.2	17.10.2019	Copied CZ proposal into the right template	Draft
0.3	18.10.2019	Including comments from TF2 conference call, and Italy, RRWP descriptions added to the text	Draft
0.4	25.10.2019	Update according to topics discussed in TF2 call, and descriptive text added	Draft
0.5	28.10.2019	Incorporated track changes into clean version and added right reference to TF3 documentation	Draft

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1 Functional Description of Emergency Vehicle in Intervention

1.1 Hazardous Location Notifications

Service introduction	
Summary	Already existing
Background	Already existing
Objective	Already existing
Expected benefits	Already existing
Use Cases	Already existing

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1.2 Emergency Vehicle in Intervention

Type of road network	All
Type of vehicle	All
Use case introduction	
Summary	The task of the "Emergency Vehicle in Intervention" is to warn drivers in advance of the emergency vehicle approaching a traffic accident situation.(e.g. a traffic accident, rescue and recovery work). Drivers are alerted about the location of emergency vehicle intervention and will be able to adjust their speed or lane position on the road. The equipped emergency vehicle is sending a warning message when the vehicle is stationary with an activated light bar and being stationary for more than the defined time period. Only the emergency vehicle equipped with the certified C-ITS unit is allowed to send the message.
Background	The place of accident or another type of intervention can be located at unclear sections of the road and could surprise or confuse drivers arriving to the section of the road and could complicate passing the intervention location. This could lead to another accident and could pose a serious danger for the participants of the former accident, drivers and rescue workers.
Objective	Ensure that drivers are informed in a timely manner through C-ITS messages about the place of intervention ahead so it is possible to adjust their speed and distance to lower the risk of other complications or accident. Ensure more attentive driving while approaching and passing the area of an accident by providing in-car information and warnings about the type of rescue and recovery work.
Desired behaviour	• Increased driver attention • Adaptation of the driving speed • Adaptation of the driving trajectory by living space to the emergency vehicle • Providing in-car information and warnings about rescue and position.
Expected benefits	• Reducing the risk of accident with emergency vehicles • Avoid follow up accidents and possible additional confusion on the road • Increased driving comfort • Increasing safety of operation for all participants. • Increased safety of emergency vehicle crews
Use case description	
Situation	If the emergency vehicle is approaching the zone of a road accident it sends out this use case message to warn drivers and to make them aware that they should free the way for the emergency vehicle. If a stationary emergency vehicle stands near the location of the accident or another type of intervention where the rescuers are working. When other drivers are approaching the place of intervention and are in relevant zone they are notified through an application installed in car or mobile device about the position and distance from the intervention. Drivers can adjust their speed and position on the road for easy passing by.
Logic of transmission	$V_{ev}2V$[1], I2V
Actors and relations	• **Road user** receives information on the in-vehicle display about emergency vehicle activity on the road, its distance and exact position, the driver is also notified about rescue and recovery work

[1] $V_{ev}2V$ = Emergency vehicle to vehicle

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	and the respective traffic limitations he will experience on his way. • **Vehicle emergency driver** uses EVI service "Emergency Vehicle Intervention " for warning other drivers about the place and position of accident ahead or on another type of intervention on the road when approaching the accident spot also send an information about distance, direction and lane position of emergency vehicle. • **Road operator** provides information about the emergency vehicle intervention detected on its network mentioned in the use cases specifications and distributes respective warnings as C-ITS messages to all vehicles approaching the respective road segments involved.
Scenario	**V_{ev}2V** • The equipped emergency vehicle is informed about the risky situation on the road and activates the "intervention mode" to drive to the accident spot. On this way it activates the HLN-EVI use case message to warn other drivers on the way. • The equipped emergency vehicle arrives at the incident place • The unit starts to transmit the message when light bars of the vehicle is activated and the vehicle is stationary at least for a predefined time or the warning is activated manually via a HMI device. • Vehicles in the relevance zone receive the message and drivers adapt their behaviour. **I2V** • The road operator generates the event information within the TCC • The correct warning message is coded according to the specified definition and send via defined channels to a roadside ITS station which broadcasts the information • Vehicles in the relevance zone receive the message and drivers adapt their behaviour.
Display / alert principle	• The warning for the driver needs to be displayed early enough for him/her to adapt to cautious driving. However, since he/she should not forget about the alert, it could be repeated closer to the location. • The location information needs to be accurate on road and lane level and related to the physical location of the actual rescue or recovery work. • The warnings may include the type of dangers, distance to the emergency vehicle and lane position. • Instructions may include to change lanes, to prepare for a steering manoeuvre, breaking etc.
Functional Constraints / dependencies	• For road operators the detection quality of the accident and the linked traffic conditions are of high importance to be able to warn precisely and generate a correct message for this use case. • For service providers the transmission speed and targeting accuracy for the road users is a major dependency to implement this use case successfully. • The links of this use case with other C-ITS messages need to be carefully taken into account when implementing the warning priorities for mobile units.
Relation to C-Roads C-ITS Infrastructure Functions and Specifications	The DENM message for EVI is profiled in chapter 3.2.1.1 and 3.2.1.3 of the C-ITS Infrastructure Functions and Specifications document. For this use-case, causeCode is 15 (rescueAndRecoveryWorkInProgress) and subCauseCode is 1 (emergencyVehicles)

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