ASN.1 extension for Pre-Crash Information

CAR 2 CAR Communication Consortium

About the C2C-CC

Enhancing road safety and traffic efficiency by means of Cooperative Intelligent Transport Systems and Services (C-ITS) is the dedicated goal of the CAR 2 CAR Communication Consortium. The industrial driven, non-commercial association was founded in 2002 by vehicle manufacturers affiliated with the idea of cooperative road traffic based on Vehicle-to-Vehicle Communications (V2V) and supported by Vehicle-to-Infrastructure Communications (V2I). Today, the Consortium comprises 61 members, with 11 vehicle manufacturers, 31 equipment suppliers and 29 research organisations.

Over the years, the CAR 2 CAR Communication Consortium has evolved to be one of the key players in preparing the initial deployment of C-ITS in Europe and the subsequent innovation phases. CAR 2 CAR members focus on wireless V2V communication applications based on ITS-G5 and concentrate all efforts on creating standards to ensure the interoperability of cooperative systems, spanning all vehicle classes across borders and brands. As a key contributor, the CAR 2 CAR Communication Consortium works in close cooperation with the European and international standardisation organisations such as ETSI and CEN.

Disclaimer

Document information

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Table 1: Document information

Changes since last version

Title:	ASN.1 extension for Pre-Crash Information		
Explanatory notes:			
31/07/2020	Minor corrections	Release Management	Steering Committee
27/03/2020	No changes	Release Management	Steering Committee
13/09/2019	Initial Version	Release Management	Steering Committee
Date	**Changes**	**Edited by**	**Approved**

Table 2: Changes since last version

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1 Introduction

Other (informational) **RS_PciAsn_001**

The proposed use case for the Exchange of Pre-Crash Information (see C2CCC_RS_2066_Pre-CrashInformation) requires additional data elements in the DENM to transport the necessary minimum set of information. This necessary extension is specified in this document and serves as an input to a corresponding change request to ETSI.

Thereby, where possible, already existing data elements of the Common Data Dictionary (CDD) [TS 102 894-2] had been re-used instead of defining new data elements. Additionally, other data elements had been imported from other drafts or standards.

2 ASN.1 specification of the DENM Extension

2.1 Additional Imports

Other (informational) **RS_PciAsn_002**

The proposed extension of the DENM requires the following additional data element of the Common Data Dictionary [TS 102 894-2]. This element has to be added to the DENM's import section:

```
StationID
```

Besides that import from the Common Data Dictionary, the structures of a PerceivedObject and WGS84Angle has to be included, too. These structures are part of the Collective Perception Message and specified in [TR 103 562]. The TR is currently under development within ETSI and not published yet. The following lines needs to be added to the DENM's import section:

```
  PerceivedObject, WGS84Angle
  FROM CPM-PDU-Descriptions {
  itu-t (0) identified-organization (4) etsi (0) itsDomain (5) wg1 (1)
tr (103562) cpm (1) version (1) }
```

Note: This Object Identifier refers to the CPM definition of June, 2019 (V0.0.16).

2.2 Extension of the Alacarte-Container

Other (informational) **RS_PciAsn_003**

The Alacarte-Container in the DENM needs to be extended by the newly defined PreCrashContainer. The definition of the Alacarte-Container within the DENM should look like:

```
AlacarteContainer ::= SEQUENCE {
  lanePosition LanePosition OPTIONAL,
  impactReduction ImpactReductionContainer OPTIONAL,
  externalTemperature Temperature OPTIONAL,
  roadWorks RoadWorksContainerExtended OPTIONAL,
  positioningSolution PositioningSolutionType OPTIONAL,
  stationaryVehicle StationaryVehicleContainer OPTIONAL,
  ...,
  preCrashContainer PreCrashContainer OPTIONAL
}
```

2.3 Definition of the new PreCrashContainer

Other (informational) **RS_PciAsn_004**

The DENM definition itself has to be extended by the following part, which defines the new PreCrashContainer. The container consists of a PerceviedObject and additional information, which are not covered by that structure but are required by this use case.

```
PreCrashContainer ::= SEQUENCE {

  perceivedObject PerceivedObject (WITH COMPONENTS{..., sensorID
ABSENT, objectAge ABSENT, objectConfidence ABSENT, zDistance ABSENT,
zSpeed ABSENT, xAcceleration ABSENT, yAcceleration ABSENT,
zAcceleration ABSENT, planarObjectDimension1 PRESENT,
planarObjectDimension2 ABSENT, verticalObjectDimension ABSENT,
dynamicStatus ABSENT, classification ABSENT, matchedPosition
ABSENT}),

  objectStationId StationID OPTIONAL,
  timeToCollision TransmissionInterval OPTIONAL,
  impactSection ImpactSection OPTIONAL,
  hostVehicleOrientation WGS84Angle,
  ...
}

ImpactSection ::= ENUMERATED { unavailable(0), rear(1), front(2),
sideLeftFront(3), sideLeftBack(4), sideRightFront(5),
sideRightBack(6)
}
```