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Intelligent Transport Systems (ITS);
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Part 2: Applications and facilities layer common data dictionary

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Contents

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Intelligent Transport Systems (ITS).

The present document is part 2 of a multi-part deliverable covering the Intelligent Transport Systems (ITS); Users and applications requirements, as identified below:

Part 1: "Facility layer structure, functional requirements and specifications";

Part 2: "Applications and facilities layer common data dictionary".

The specifications of data elements of the facilities layer messages have been tested within various European Projects such as DRIVE C2X, CVIS, SCORE@F, simTD and ETSI Interoperability Test events. Feedbacks from these testing activities have been considered in the present document. The specifications in the present document have also been checked and harmonized with common data dictionary specifications as specified by SAE International.

Introduction

ITS applications are enabled by the data exchanges among ITS stations (ITS-S) via wireless or wired communications. A basic set of application [i.1] has been defined by ETSI TC ITS. Accordingly, a set of higher layer messages and communication protocols have been specified in support of this application set.

Even though each message has specific requirements on the data being included and transmitted to other ITS-Ss, ETSI TC ITS has identified a set of data types which are commonly used in multiple ITS applications and facilities layer messages. A common data dictionary is therefore defined for this common set.

For each data type, this common dictionary includes a textual description of the semantic of the data type in question. It also includes the ASN.1 definition of the data type. Therefore, this common data dictionary can be imported by any message when necessary during the encoding and decoding procedure.

1 Scope

The present document defines a repository of a set of data elements and data element sets that are commonly used in the ITS applications and facilities layer messages. Each data element is defined with a set of attributes, enabling the identification of the data element in question in a number of perspectives, e.g. descriptive name, ASN.1 definition, data definition, minimum data granularity requirement, etc.

The present document focuses on the data elements being used by the Cooperative Awareness basic service [i.2] and Decentralized Environmental Notification basic service [i.3]. Further data elements are expected to be added in the future to support other application and facilities layer messages or functions.

The present document does not specify the syntax and requirements of data elements in the specific context of any message. Such syntax and requirements are specified in the corresponding message standards such as [i.2] and [i.3].

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

[1] Recommendation ITU-T X.680: "Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation".

[2] SAE J670: "Vehicle Dynamics Terminology", January 2008.

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI TR 102 638 (V1.1.1): "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Definitions".

[i.2] ETSI EN 302 637-2: "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2: Specification of Cooperative Awareness Basic Service".

[i.3] ETSI EN 302 637-3: "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 3: Specifications of Decentralized Environmental Notification Basic Service".

[i.4] European Agreement (Applicable as from 1 January 2011): "Concerning the International Carriage of Dangerous Goods by Road".

NOTE: Available at: http://www.unece.org/trans/danger/publi/adr/adr2011/11ContentsE.html.

[i.5] United Nations: "Recommendations on the Transport of Dangerous Goods - Model Regulations", Twelfth revised edition.

NOTE: Available at: http://www.unece.org/trans/danger/publi/unrec/12_e.html.

[i.6] ETSI TS 101 539-1 (V1.1.1): "Intelligent Transport Systems (ITS); V2X Applications; Part 1: Road Hazard Signalling (RHS) application requirements specification".

[i.7] ISO 3779 (2011-07): "Road vehicles — Vehicle identification number (VIN) Content and structure".

[i.8] VDV recommendation 420 (1992): "Technical Requirements for Automatic Vehicle Location / Control Systems - Radio Data Transmission (BON Version) with Supplement 1 and Supplement 2".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

data element: data type that contains one single data

data frame: data type that contains more than one data element in a predefined order

ITS data dictionary: repository of data elements and data frames used in the ITS applications and ITS facilities layer

ITS messages: messages exchanged at ITS facilities layer among ITS stations or messages exchanged at ITS applications layer among ITS stations

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ABS	Anti-lock Braking System
ACC	Adaptive Cruise Control
AEB	Autonomous Emergency Braking
ASN.1	Abstract Syntax Notation One
CAM	Cooperative Awareness Message
DE	Data Element
DENM	Decentralized Environmental Notification Message
DF	Data Frame
DR	Dead Reckoning
ESP	Electronic Stability Program
GNSS	Global Navigation Satellite System
ITS-S	ITS Station
LDM	Local Dynamic Map
OEM	Original Equipment Manufacturer
SAE	Society of Automotive Engineers
TC	Technical Committee
VDS	Vehicle Descriptor Section
WGS84	World Geodetic System 84
WMI	World Manufacturer Identifier

4 ITS data dictionary structure

The ITS data dictionary is a repository that includes a list of data elements (DE) and data frames (DF) that represent data/information necessary for the realization of ITS applications and ITS facilities.

A DE/DF may be used to construct ITS facilities layer or ITS applications layer messages, if needs are identified by the message in question. Examples of ITS facilities layer message are Cooperative Awareness Message (CAM) as specified in [i.2] and Decentralized Environmental Notification Message (DENM) as specified in [i.3]. These messages are named as ITS messages in the scope of the present document.

According to the usage purpose, a DE or a DF can be classified into the following categories:

- Message management: the DE/DF is used to support the management of an ITS facilities layer or ITS application layer message and communication protocol, e.g. protocol version.
- Application usage: the DE/DF includes information and data that are useful for the realization of one or multiple ITS applications.

The present document includes DE and DF definitions for the Cooperative Awareness Message (CAM) as given in [i.2] and Decentralized Environmental Notification Message (DENM) as given in [i.3].

The complete list of DE and DF is provided in the normative annex A of the present document.

Each DE and DF is defined by a set of attributes, enabling the identification of the data in question. These attributes are defined in clauses 4.1 and 4.2.

4.1 Attributes for DE/DF identification

4.1.1 Descriptive name

This attribute provides a descriptive name of the DE or DF. The descriptive name shall be identical as being used in the messages specifications such as [i.2] and [i.3]. It shall also be unique within the common data dictionary. Furthermore, the descriptive name may be used in other ITS applications and facilities layer components, e.g. LDM.

4.1.2 Identifier

This attribute provides a unique identifier of the defined DE or DF. It always starts with the term "DataType" followed by a sequence number as unique identifier. In the present document a three digits sequence number is used. Its length may be extended in the future.

NOTE: The identifier of a DataType is applicable within the present document, it may also be referenced in other standards.

4.1.3 ASN.1 representation

This attribute provide the ASN.1 representation of the defined DE or DF. The ASN.1 definition shall follow the specifications as defined in [1]. The ASN.1 type name shall be identical to the descriptive name.

4.2 Attributes for DE/DF definition

4.2.1 Definition

This attribute provides a textual explication of the defined DE or DF.

4.2.2 Category

This attribute indicates the category that DE or DF in question belongs to. Currently, the following categories are defined:

- **Vehicle information:** the DE or DF describes one or a set of in vehicle data.
- **GeoReference information:** the DE or DF provides geographical description of the data.
- **Road topology information:** the DE or DF describes one or a set of road topology information.
- **Traffic information:** the DE or DF describes one or a set of road traffic information.
- **Infrastructure information:** the DE or DF describes one or a set of ITS infrastructure information.
- **Personal information:** the DE or DF describes one or a set of ITS personal information.
- **Communication information:** the DE or DF describes one or a set of data that are relevant to the ITS application layer or ITS facilities layer communication protocol.
- **Other information:** the DE or DF that does not belong to any of the above categories.

A DE or DF shall belong to at least one of the above categories. One DE or DF may belong to more than one category. It is expected that more categories will be added in the future.

4.2.3 Unit

The applied unit for the data, if necessary.

4.2.4 Last modification date

The date at which the latest modification is done for the DE and DF in the format of yy-mm-dd.

Annex A (normative): Data type specifications

A.1 AccelerationConfidence

Descriptive Name	AccelerationConfidence
Identifier	DataType_001
ASN.1 representation	`AccelerationConfidence ::= INTEGER { pointOneMeterPerSecSquared(1), outOfRange(101), unavailable(102)} (0 .. 102)`
Definition	The absolute accuracy of a reported vehicle acceleration value with a predefined confidence level (e.g. 95 %). It may apply to LongitudinalAccelerationValue as defined in clause A.54, LateralAccelerationValue as defined in clause A.50 or VerticalAccelerationValue as defined in clause A.106. For accuracy equal or worse than 10,1 m/s^2, the value shall be set to 101. The data shall be set to 102 if the data is unavailable.
Unit	0,1 m/s^2
Category	Vehicle information
Modification date	2012-10-15

A.2 AccelerationControl

Descriptive Name	AccelerationControl
Identifier	DataType_002

ASN.1 representation	`AccelerationControl ::= BIT STRING {`
	` brakePedalEngaged (0),`
	` gasPedalEngaged (1),`
	` emergencyBrakeEngaged (2),`
	` collisionWarningEngaged (3),`
	` accEngaged (4),`
	` cruiseControlEngaged (5),`
	` speedLimiterEngaged (6)`
	`} (SIZE(7))`

Definition	Current controlling mechanism for longitudinal movement of the vehicle. The data may be provided via the in vehicle network. It indicates whether a specific in vehicle acceleration control system is engaged or not. Currently, this DE includes the information of the vehicle brake pedal, gas pedal, emergency brake system, collision warning system, autonomous cruise control system, cruise control system and speed limiter system. The corresponding bit shall be set to 1 under the following conditions: • brakePedalEngaged(0): Driver is stepping on the brake pedal • gasPedalEngaged(1): Driver is stepping on the gas pedal • emergencyBrakeEngagegd(2): emergency brake system is engaged NOTE: the system engagement condition is OEM specific • collisionWarningEngaged(3): collision warning system is engaged NOTE: the system engagement condition is OEM specific • accEngagged(4): ACC is engaged • cruiseControlEngaged(5): cruiseControl is engaged • speedLimiterEngaged(6): speed limiter is engaged Otherwise (for example when the corresponding system is not available due to non-equipped system or information is unavailable), the corresponding bit shall be set to 0.
Unit	N/A
Category	Vehicle information
Modification date	2013-06-27

A.3 AccidentSubCauseCode

Descriptive Name	AccidentSubCauseCode
Identifier	DataType_003
ASN.1 representation	`AccidentSubCauseCode ::= INTEGER {unavailable(0), multiVehicleAccident(1), heavyAccident(2), accidentInvolvingLorry(3), accidentInvolvingBus(4), accidentInvolvingHazardousMaterials(5), accidentOnOppositeLane(6), unsecuredAccident(7), assistanceRequested(8) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "accident" as defined in clause A.10. Sub event cause and value setting rule is defined according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case the information on the sub cause of the accident is unavailable, • multiVehicleAccident(1): in case more than two vehicles are involved in accident, • heavyAccident(2): in case the airbag of the vehicle involving is accident is triggered, and accident requires important rescue and recovery work, • accidentInvolvingLorry(3): in case the accident involves a lorry, • accidentInvolvingBus(4): in case the accident involves a bus, • accidentInvolvingHazardousMaterials(5): in case the accident involves hazardous material, • accidentOnOppositeLane(6): in case the accident happens on opposite lanes of the transmitting vehicle, • unsecuredAccident(7): in case the accident is not secured, • assistanceRequested(8): in case the rescue and assistance request is already sent. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-25

A.4 AdverseWeatherCondition-AdhesionSubCauseCode

Descriptive Name	AdverseWeatherCondition-AdhesionSubCauseCode
Identifier	DataType_004
ASN.1 representation	`AdverseWeatherCondition-AdhesionSubCauseCode ::= INTEGER {unavailable(0), heavyFrostOnRoad(1), fuelOnRoad(2), mudOnRoad(3), snowOnRoad(4), iceOnRoad(5), blackIceOnRoad(6), oilOnRoad(7), looseChippings(8), instantBlackIce(9), roadsSalted(10) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "adverseWeatherCondition-Adhesion" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case information on the cause of the low road adhesion is unavailable, • heavyFrostOnRoad(1): in case the low road adhesion is due to heavy frost on the road, • fuelOnRoad(2): in case the low road adhesion is due to fuel on the road, • mudOnRoad(3): in case the low road adhesion is due to mud on the road, • snowOnRoad(4): in case the low road adhesion is due to snow on the road, • iceOnRoad(5): in case the low road adhesion is due to ice on the road, • blackIceOnRoad(6): in case the low road adhesion is due to black ice on the road, • oilOnRoad(7): in case the low road adhesion is due to oil on the road, • looseChippings(8): in case the low road adhesion is due to loose gravel or stone fragments which have become detached from a road surface or form a hazard, • instantBlackIce(9): in case the low road adhesion is due to instant black ice on the road surface, • roadsSalted(10): when the low road adhesion is due to salted road. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-12

A.5 AdverseWeatherCondition-ExtremeWeatherConditionSubCauseCode

Descriptive Name	AdverseWeatherCondition-ExtremeWeatherConditionSubCauseCode
Identifier	DataType_005
ASN.1 representation	`AdverseWeatherCondition-ExtremeWeatherConditionSubCauseCode ::= INTEGER {unavailable(0), strongWinds(1), damagingHail(2), hurricane(3), thunderstorm(4), tornado(5), blizzard(6) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "adverseWeatherCondition-ExtremeWeatherCondition" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case information on the type of extreme weather condition is unavailable, • strongWinds(1): in case the type of extreme weather condition is strong wind, • damagingHail(2): in case the type of extreme weather condition is damaging hail, • hurricane(3): in case the type of extreme weather condition is hurricane, • thunderstorm(4): in case the type of extreme weather condition is thunderstorm, • tornado(5): in case the type of extreme weather condition is tornado, • blizzard(6): in case the type of extreme weather condition is blizzard. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-25

A.6 AdverseWeatherCondition-PrecipitationSubCauseCode

Descriptive Name	AdverseWeatherCondition-PrecipitationSubCauseCode
Identifier	DataType_006
ASN.1 representation	`AdverseWeatherCondition-PrecipitationSubCauseCode ::= INTEGER {unavailable(0), heavyRain(1), heavySnowfall(2), softHail(3) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "adverseWeatherCondition-Precipitation" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case information on the type of precipitation is unavailable, • heavyRain(1): in case the type of precipitation is heavy rain, • heavySnowfall(2): in case the type of precipitation is heavy snow fall, • softHail(3): in case the type of precipitation is soft hail. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-26

A.7 AdverseWeatherCondition-VisibilitySubCauseCode

Descriptive Name	AdverseWeatherCondition-VisibilitySubCauseCode
Identifier	DataType_007
ASN.1 representation	`AdverseWeatherCondition-VisibilitySubCauseCode ::= INTEGER {unavailable(0), fog(1), smoke(2), heavySnowfall(3), heavyRain(4), heavyHail(5), lowSunGlare(6), sandstorms(7), swarmsOfInsects(8) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "adverseWeatherCondition-Visibility" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case information on the cause of low visibility is unavailable, • fog(1): in case the cause of low visibility is fog, • smoke(2): in case the cause of low visibility is smoke, • heavySnowfall(3): in case the cause of low visibility is heavy snow fall, • heavyRain(4): in case the cause of low visibility is heavy rain, • heavyHail(5): in case the cause of low visibility is heavy hail, • lowSunGlare(6): in case the cause of low visibility is sun glare, • sandstorms(7): in case the cause of low visibility is sand storm, • swarmsOfInsects(8): in case the cause of low visibility is swarm of insects. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-26

A.8 CauseCode

Descriptive Name	CauseCode
Identifier	DataType_008

ASN.1 representation	`CauseCode ::= SEQUENCE {`
	`  causeCode CauseCodeType,`
	`  subCauseCode SubCauseCodeType`
	`}`

Definition	Encoded value of a travel event type. It shall provide the type of a direct cause (causeCodeType as defined in clause A.10) and sub type of the direct cause code (subCauseCodeType as defined in clause A.91). The value setting is defined in clause 7.1.3 of EN 302 637-3 [i.3].
Unit	N/A
Category	Traffic information
Modification date	2012-09-06

A.9 ClosedLanes

Descriptive Name	ClosedLanes
Identifier	DataType_009

ASN.1 representation	`ClosedLanes ::= SEQUENCE {`
	` hardShoulderStatus HardShoulderStatus OPTIONAL,`
	` drivingLaneStatus DrivingLaneStatus,`
	` ...`
	`}`

Definition	This DF indicates the opening/closure status of a lane or a set of lanes. It shall include the following information: • drivingLaneStatus: open/closing status of driving lane, • hardShoulderStatus: open/closing status of hard shoulder lane.
Unit	N/A
Category	Road topology information
Modification date	2013-06-03

A.10 CauseCodeType

Descriptive Name	CauseCodeType
Identifier	DataType_010

ASN.1 representation	`CauseCodeType ::= INTEGER {`
	`  reserved (0),`
	`  trafficCondition (1),`
	`  accident (2),`
	`  roadworks (3),`
	`  adverseWeatherCondition-Adhesion (6),`
	`  hazardousLocation-SurfaceCondition (9),`
	`  hazardousLocation-ObstacleOnTheRoad (10),`
	`  hazardousLocation-AnimalOnTheRoad (11),`
	`  humanPresenceOnTheRoad (12),`
	`  wrongWayDriving (14),`
	`  rescueAndRecoveryWorkInProgress (15),`
	`  adverseWeatherCondition-ExtremeWeatherCondition (17),`
	`  adverseWeatherCondition-Visibility (18),`
	`  adverseWeatherCondition-Precipitation (19),`
	`  slowVehicle (26),`
	`  dangerousEndOfQueue (27),`
	`  vehicleBreakdown (91),`
	`  postCrash (92),`
	`  humanProblem (93),`
	`  stationaryVehicle (94),`
	`  emergencyVehicleApproaching (95),`
	`  hazardousLocation-DangerousCurve (96),`
	`  collisionRisk (97),`
	`  signalViolation (98),`
	`  dangerousSituation (99)`
	` } (0..255)`

Definition	Value of the direct cause code of a detected event as defined in [i.3]. The value is assigned according to the clause 7.1.3 EN 302 637-3 [i.3]. The cause codes are described as following: • reserved (0): the value is reserved for future use, • trafficCondition (1): the type of detected event is an abnormal traffic condition, • accident (2): the type of detected event is a road accident, • roadworks (3): the type of event is roadwork, • adverseWeatherCondition-Adhesion (6): the type of detected event is low adhesion, • hazardousLocation-SurfaceCondition (9): the type of detected event is abnormal road surface condition, • hazardousLocation-ObstacleOnTheRoad (10): the type of detected event is obstacle on the road, • hazardousLocation-AnimalOnTheRoad (11): the type of detected event is animal on the road, • humanPresenceOnTheRoad (12): the type of detected event is human presence on the road, • wrongWayDriving (14): the type of the detected event is vehicle driving in wrong way, • rescueAndRecoveryWorkInProgress (15): the type of event is rescue and recovery work for accident or for a road hazard is in progress, • adverseWeatherCondition-ExtremeWeatherCondition (17): the type of detected event is extreme weather condition, • adverseWeatherCondition-Visibility (18): the type of detected event is low visibility, • adverseWeatherCondition-Precipitation (19): the type of detected event is precipitation, • slowVehicle (26): the type of event is slow vehicle driving on the road, • dangerousEndOfQueue (27): the type of detected event is dangerous end of vehicle queue, • vehicleBreakdown (91): the type of detected event is break down vehicle on the road, • postCrash (92): the type of detected event is post crash, • humanProblem (93): the type of detected event is human health problem in vehicles involved in traffic, • stationaryVehicle (94): the type of detected event is stationary vehicle, • emergencyVehicleApproaching (95): the type of event is vehicle operating emergency mission is approaching, • hazardousLocation-DangerousCurve (96): the type of event is dangerous curve, • collisionRisk (97): collision risk is detected, • signalViolation (98): the type of detected event is signal violation, • dangerousSituation (99): the type of detected event is dangerous situation and autonomous safety system is vehicle is activated. Additional cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-26

A.11 CollisionRiskSubCauseCode

Descriptive Name	CollisionRiskSubCauseCode
Identifier	DataType_011
ASN.1 representation	`CollisionRiskSubCauseCode ::= INTEGER {unavailable(0), longitudinalCollisionRisk(1), crossingCollisionRisk(2), lateralCollisionRisk(3), vulnerableRoadUser(4) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "collisionRisk" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case information on the type of collision risk is unavailable, • longitudinalCollisionRisk(1): in case the type of detected collision risk is longitudinal collision risk, e.g. forward collision or face to face collision, • crossingCollisionRisk(2): in case the type of detected collision risk is crossing collision risk, • lateralCollisionRisk(3): in case the type of detected collision risk is lateral collision risk, • vulnerableRoadUser(4): in case the type of detected collision risk involves vulnerable road users e.g. pedestrians or bicycles. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-26

A.12 Curvature

Descriptive Name	Curvature
Identifier	DataType_012

ASN.1 representation	`Curvature ::= SEQUENCE {`
	`  curvatureValue CurvatureValue,`
	`  curvatureConfidence CurvatureConfidence`
	`}`

Definition	It describes the curvature of the vehicle trajectory and the accuracy of the provided curvature. The curvature detected by a vehicle represents the curvature of actual vehicle trajectory.
Unit	N/A
Category	Vehicle Information
Modification date	2013-04-05

A.13 CurvatureConfidence

Descriptive Name	CurvatureConfidence
Identifier	DataType_013
ASN.1 representation	`CurvatureConfidence ::= ENUMERATED { onePerMeter-0-00002 (0), onePerMeter-0-0001 (1), onePerMeter-0-0005 (2), onePerMeter-0-002 (3), onePerMeter-0-01 (4), onePerMeter-0-1 (5), outOfRange (6), unavailable (7) }`
Definition	It describes the absolute accuracy range of a CurvatureValue as defined in clause A.15 for a predefined confidence level. The value shall be set to: • 0 when the accuracy is less than or equal to 0,00002 m^{-1} • 1 when the accuracy is less than or equal to 0,0001 m^{-1} • 2 when the accuracy is less than or equal to 0,0005 m^{-1} • 3 when the accuracy is less than or equal to 0,002 m^{-1} • 4 when the accuracy is less than or equal to 0,01 m^{-1} • 5 when the accuracy is less than or equal to 0,1 m^{-1} • 6 when the accuracy is worse than 0,1 m^{-1} • 7 when the information is not available
Unit	N/A
Category	Vehicle Information
Modification date	2013-03-26

A.14 CurvatureCalculationMode

Descriptive Name	CurvatureCalculationMode
Identifier	DataType_014
ASN.1 representation	`CurvatureCalculationMode ::= ENUMERATED { yawRateNotUsed(0), yawRateUsed(1), ... }`
Unit	N/A
Definition	It describes whether the yaw rate is used by vehicle to calculate the curvature as provided by the Curvature data type.
Category	Vehicle Information
Modification date	2012-09-06

A.15 CurvatureValue

Descriptive Name	CurvatureValue
Identifier	DataType_015
ASN.1 representation	`CurvatureValue ::= INTEGER{ straight(0), reciprocalOf1MeterRadiusToLeft(30000), reciprocalOf1MeterRadiusToRight(-30000), unavailable(30001) } (-30000..30001)`
Definition	It describes the inverse of the vehicle turning curve radius scaled with 30 000. The curvature detected by a vehicle represents the curvature of the actual vehicle trajectory. Positive values indicate a turning curve to the left. It corresponds to the vehicle coordinate system A as defined in [2]. The value shall be set to 0 for straight driving. When the information is not available, the DE shall be set to 30 001.
Unit	1 over 30 000 metres
Category	Vehicle Information
Modification date	2013-06-03

A.16 DangerousEndOfQueueSubCauseCode

Descriptive Name	DangerousEndOfQueueSubCauseCode
Identifier	DataType_016
ASN.1 representation	`DangerousEndOfQueueSubCauseCode ::= INTEGER {unavailable(0), suddenEndOfQueue(1), queueOverHill(2), queueAroundBend(3), queueInTunnel(4) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "dangerousEndOfQueue" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case information on the type of dangerous queue is unavailable, • suddenEndOfQueue(1): in case a sudden end of queue is detected, e.g. due to accident or obstacle, • queueOverHill(2): in case the dangerous end of queue is detected on the road hill, • queueAroundBend(3): in case the dangerous end of queue is detected around the road bend, • queueInTunnel(4): in case queue is detected in tunnel. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-26

A.17 DangerousGoodsBasic

Descriptive Name	DangerousGoodsBasic
Identifier	DataType_017

ASN.1 representation	`DangerousGoodsBasic::= ENUMERATED {`
	`explosives1(0),`
	`explosives2(1),`
	`explosives3(2),`
	`explosives4(3),`
	`explosives5(4),`
	`explosives6(5),`
	`flammableGases(6),`
	`nonFlammableGases(7),`
	`toxicGases(8),`
	`flammableLiquids(9),`
	`flammableSolids(10),`
	`substancesLiableToSpontaneousCombustion(11),`
	`substancesEmittingFlammableGasesUponContactWithWater(12),`
	`oxidizingSubstances(13),`
	`organicPeroxides(14),`
	`toxicSubstances(15),`
	`infectiousSubstances(16),`
	`radioactiveMaterial(17),`
	`corrosiveSubstances(18),`
	`miscellaneousDangerousSubstances(19)`
	`}`

Definition	This DE indicates the type of the dangerous goods being carried by a Heavy Vehicle. The value is assigned according to "class" and "division" definitions of dangerous goods as specified in part II, chapter 2.1.1.1 of [i.4].
Unit	N/A
Category	Vehicle information
Modification date	2013-04-05

A.18 DangerousGoodsExtended

Descriptive Name	DangerousGoodsExtended
Identifier	DataType_018

ASN.1 representation	`DangerousGoodsExtended ::= SEQUENCE {`
	`  dangerousGoodsType  DangerousGoodsBasic,`
	`  unNumber  INTEGER (0..9999),`
	`  elevatedTemperature  BOOLEAN,`
	`  tunnelsRestricted  BOOLEAN,`
	`  limitedQuantity  BOOLEAN,`
	`  emergencyActionCode  IA5String OPTIONAL,`
	`  phoneNumber  IA5String OPTIONAL,`
	`  companyName  UTF8String OPTIONAL`
	`}`

Definition	This DF provides a description of dangerous goods being carried by a Heavy Vehicle. It shall include the following information: • dangerousGoodsType as defined in clause A.17, • unNumber: a 4-digit number that identifies the substance of the dangerous goods as specified in [i.5], • elevatedTemperature: whether the carried dangerous goods are transported at high temperature. If yes, the value shall be set to TRUE, • tunnelsRestricted: whether the Heavy Vehicle carrying dangerous goods is restricted to enter tunnels. If yes, the value shall be set to TRUE, • limitedQuantity: whether the carried dangerous goods are packed with limited quantity. If yes, the value shall be set to TRUE, • emergencyActionCode: Physical signage placard at the vehicle that carries information on how an emergency service should deal with an incident. This DE is optional; it shall be present if the information is available, • phoneNumber: contact phone number of assistance service in case of incident or accident. This DE is optional; it shall be present if the information is available, • companyName: name of company that manages the transportation of the dangerous goods. This DE is optional; it shall be present if the information is available.
Unit	N/A
Category	Vehicle information
Modification date	2012-09-07

A.19 DangerousSituationSubCauseCode

Descriptive Name	DangerousSituationSubCauseCode
Identifier	DataType_019
ASN.1 representation	`DangerousSituationSubCauseCode ::= INTEGER {unavailable(0), emergencyElectronicBrakeEngaged(1), preCrashSystemEngaged(2), espEngaged(3), absEngaged(4), aebEngaged(5), brakeWarningEngaged(6), collisionRiskWarningEngaged(7) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "dangerousSituation" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case information on the type of dangerous situation is unavailable, • emergencyElectronicBrakeEngaged(1): in case emergency electronic brake is engaged, • preCrashSystemEngaged(2): in case pre crash system is engaged, • espEngaged (3): in case Electronic Stability Program (ESP) system is engaged. • absEngaged (4): in case Anti-lock braking system (ABS) is engaged, • aebEngaged (5): in case Autonomous Emergency Braking (AEB) system is engaged, • brakeWarningEngaged (6): in case brake warning is engaged, • collisionRiskWarningEngaged (7): in case collision risk warning is engaged. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-06-27

A.20 DeltaAltitude

Descriptive Name	DelatAltitude
Identifier	DataType_020
ASN.1 representation	`DeltaAltitude ::= INTEGER { oneCentimeterUp (1), oneCentimeterDown (-1), unavailable(12800) } (-12700..12800)`
Definition	It defines an offset altitude with regards to a specific elevation value. It may be used to describe a geographical point with regards to a specific reference geographical position. Positive values are used for providing altitude offset upon the reference position, negative values are used for providing altitude offset below the reference position.
Unit	0,01 metre
Category	GeoReference information
Modification date	2013-06-27

A.21 DeltaLatitude

Descriptive Name	DeltaLatitude
Identifier	DataType_021
ASN.1 representation	`DeltaLatitude ::= INTEGER { oneMicrodegreeNorth (10), oneMicrodegreeSouth (-10) } (-131072..131071)`
Definition	It defines offset latitude with regards to a specific latitude value. It may be used to describe a geographical point with regards to a specific reference geographical position. Position values are used for providing offset toward the north from the reference position. Negative values are used for providing offset towards the south from the reference position.
Unit	0,1 microdegree
Category	GeoReference information
Modification date	2013-03-26

A.22 DeltaLongitude

Descriptive Name	DeltaLongitude
Identifier	DataType_022
ASN.1 representation	`DeltaLongitude ::= INTEGER { oneMicrodegreeEast (10), oneMicrodegreeWest (-10) } (-131072..131071)`
Definition	It defines an offset longitude with regards to a specific longitude value. It may be used to describe a geographical point with regards to a specific reference geographical position. Position values are used for providing offset toward the east from the reference position. Negative values are used for providing offset towards the west from the reference position.
Unit	0,1 microdegree
Category	GeoReference information
Modification date	2013-03-26

A.23 DeltaReferencePosition

Descriptive Name	DeltaReferencePosition
Identifier	DataType_023

ASN.1 representation	`DeltaReferencePosition ::= SEQUENCE {`
	`  deltaLatitude DeltaLatitude,`
	`  deltaLongitude DeltaLongitude,`
	`  deltaAltitude DeltaAltitude`
	`}`

Definition	It defines a geographical point position as offset position to a reference geographical point, as defined with the DF ReferencePosition specified in clause A.71. It shall include the following information: • deltaLatitude: a delta latitude offset with regards to the Latitude value of the reference position as specified in clause A.48, • deltaLongitude: a delta longitude offset with regards to the Longitude value of the reference position as specified in clause A.52, • deltaAltitude: a delta altitude offset with regards to the AltitudeValue of the reference position as specified in clause A.31.
Unit	N/A
Category	GeoReference information
Modification date	2013-06-27

A.24 Heading

Descriptive Name	Heading
Identifier	DataType_024

ASN.1 representation	`Heading ::= SEQUENCE {`
	`  headingValue HeadingValue,`
	`  headingConfidence HeadingConfidence`
	`}`

Definition	Heading direction with regards to the WGS84 north and the accuracy of the heading value.
Unit	N/A
Category	GeoReference information, vehicle information, road topology information
Modification date	2013-06-03

A.25 HeadingConfidence

Descriptive Name	HeadingConfidence
Identifier	DataObject_025
ASN.1 representation	`HeadingConfidence ::= INTEGER { withinZeroPointOneDegree(1), withinOneDegree(10), outOfRange(126), unavailable(127) } (1..127)`
Definition	The absolute accuracy of the headingValue information as specified in clause A.26 for a predefined confidence level (e.g. 95 %). The required confidence level is defined by the corresponding standards applying the DE. When the heading accuracy information is not available, the DE shall be set to 127. For values equal or worse than 126, the DE shall be set to 126.
Unit	0,1 degree
Category	GeoReference information, vehicle information, road topology information
Modification date	2013-03-26

A.26 HeadingValue

Descriptive Name	HeadingValue
Identifier	DataType_026
ASN.1 representation	`HeadingValue ::= INTEGER { wgs84North(0), wgs84East(900, wgs84Ssouth(1800, wgs84West(2700), unavailable(3600) } (0..3600)`
Definition	Orientation of a heading with regards to the WGS84 north. When the information is not available, the DE shall be set to 3 600.
Unit	0,1 degree
Category	GeoReference information, vehicle information, road topology information
Modification date	2013-03-26

A.27 DriveDirection

Descriptive Name	DriveDirection
Identifier	DataType_027
ASN.1 representation	`DriveDirection ::= ENUMERATED { forward (0), backward (1), unavailable(2) }`
Definition	It denotes whether a vehicle is driving forward or backward. When the information is not available, the value shall be set to 2.
Unit	N/A
Category	Vehicle information
Modification date	2013-04-05

A.28 DrivingLaneStatus

Descriptive Name	DrivingLaneStatus
Identifier	DataType_028
ASN.1 representation	`DrivingLaneStatus ::= BIT STRING { outermostLaneClosed(1), secondLaneFromOutsideClosed(2) } (SIZE (1..14))`
Definition	DE that indicates whether a driving lane is open to traffic. A lane is counted from the outside boarder of the road. If a lane is closed to traffic, the corresponding bit shall be set to 1.
Unit	N/A
Category	GeoReference information, road topology information
Modification date	2013-04-05

A.29 Altitude

Descriptive Name	Altitude
Identifier	DataType_029

ASN.1 representation	`Altitude ::= SEQUENCE {`
	`  altitudeValue AltitudeValue,`
	`  altitudeConfidence AltitudeConfidence`
	`}`

Definition	Altitude and accuracy of an altitude in a WGS84 co-ordinate system. It shall include the following information: • altitudeValue: altitude of a geographical point. It shall be presented as specified in clause A.31 • altitudeConfidence: accuracy of the altitudeValue within a specific confidence level. It shall be presented as specified in clause A.30
Unit	N/A
Category	GeoReference information
Modification date	2013-06-27

A.30 AltitudeConfidence

Descriptive Name	AltitudeConfidence
Identifier	DataType_030

ASN.1 representation	)
	AltitudeConfidence ::= ENUMERATED {
	alt-000-01 (0),
	alt-000-02 (1),
	alt-000-05 (2),
	alt-000-10 (3),
	alt-000-20 (4),
	alt-000-50 (5),
	alt-001-00 (6),
	alt-002-00 (7),
	alt-005-00 (8),
	alt-010-00 (9),
	alt-020-00 (10),
	alt-050-00 (11),
	alt-100-00 (12),
	alt-200-00 (13),
	outOfRange (14),
	unavailable (15)
	}

Definition	Absolute accuracy of the altitudeValue of a geographical point for a predefined confidence level (e.g. 95 %). The required confidence level is defined by the corresponding standards applying the usage of this DE. The DE shall be set to: • 0 if the altitude accuracy is within 0,01 meter • 1 if the altitude accuracy is within 0,02 meter • 2 if the altitude accuracy is within 0,05 meter • 3 if the altitude accuracy is within 0,1 meter • 4 if the altitude accuracy is within 0,2 meter • 5 if the altitude accuracy is within 0,5 meter • 6 if the altitude accuracy is within 1 meter • 7 if the altitude accuracy is within 2 meter • 8 if the altitude accuracy is within 5 meters • 9 if the altitude accuracy is within 10 meters • 10 if the altitude accuracy is within 20 meters • 11 if the altitude accuracy is within 50 meters • 12 if the altitude accuracy is within 100 meters • 13 if the altitude accuracy is within 200 meters • 14 if the altitude accuracy is worse than 201 meters • 15 if the altitude accuracy information is unavailable
Unit	N/A
Category	GeoReference information
Modification date	2013-06-27

A.31 AltitudeValue

Descriptive Name	AltitudeValue
Identifier	DataType_031
ASN.1 representation	`AltitudeValue ::= INTEGER { seaLevel(0), oneCentimeter(1), unavailable(800001) } (-100000..800001)`
Definition	Altitude in a WGS84 co-ordinate system. When the information is not available, the DE shall be set to 800 001. For altitude equal or higher than 8 000 m, the DE shall be set to 800 000. For altitude equal or lower than -1 000 m, the DE shall be set to -100 000.
Unit	0,01 metre
Category	GeoReference information
Modification date	2013-06-27

A.32 EmbarkationStatus

Descriptive Name	EmbarkationStatus
Identifier	DataType_032
ASN.1 representation	`EmbarkationStatus ::= BOOLEAN`
Definition	It indicates whether a vehicle (e.g. public transport vehicle, truck) is under the embarkation process. If it is the case, the data shall be set to TRUE.
Unit	N/A
Category	Vehicle information
Modification date	2012-09-07

A.33 EmergencyPriority

Descriptive Name	EmergencyPriority
Identifier	DataType_033
ASN.1 representation	`EmergencyPriority ::= BIT STRING { requestForRightOfWay(0), requestForFreeCrossingAtATrafficLight(1) } (SIZE(2))`
Definition	It indicates the priority right requested by an operating emergency vehicle. The corresponding bit shall be set to 1 if the priority is requested.
Unit	N/A
Category	Traffic information
Modification date	2013-06-27

A.34 EmergencyVehicleApproachingSubCauseCode

Descriptive Name	EmergencyVehicleApproachingSubCauseCode
Identifier	DataType_034
ASN.1 representation	`EmergencyVehicleApproachingSubCauseCode ::= INTEGER {unavailable(0), emergencyVehicleApproaching(1), prioritizedVehicleApproaching(2) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "emergencyVehicleApproaching" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on the emergency vehicle approaching event is unavailable, • emergencyVehicleApproaching(1): in case an operating emergency vehicle is approaching, • prioritizedVehicleApproaching(2): in case a prioritized vehicle (e.g. bus) is approaching. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-26

A.35 EnergyStorageType

Descriptive Name	EnergyStorageType
Identifier	DataType_035
ASN.1 representation	`EnergyStorageType::= BIT STRING { hydrogenStorage(0), electricEnergyStorage(1), liquidPropaneGas(2), compressedNaturalGas(3), diesel(4), gasoline(5), ammonia(6) } (SIZE(7))`
Definition	Type of energy being used and stored in vehicle. If the corresponding storage type is used by a vehicle, the corresponding bit shall be set to 1. Otherwise, the corresponding bit shall be set to 0.
Unit	N/A
Category	Vehicle information
Modification date	2013-03-26

A.36 ExteriorLights

Descriptive Name	ExteriorLights
Identifier	DataType_036

ASN.1 representation	`ExteriorLights ::= BIT STRING {`
	` lowBeamHeadlightsOn (0),`
	` highBeamHeadlightsOn (1),`
	` leftTurnSignalOn (2),`
	` rightTurnSignalOn (3),`
	` daytimeRunningLightsOn (4),`
	` reverseLightOn (5),`
	` fogLightOn (6),`
	` parkingLightsOn (7)`
	`} (SIZE(8))`

Definition	This DE describes the status of the exterior light switches of a vehicle. The value of each bit indicates the state of the switch, which commands the corresponding light. The bit corresponding to a specific light is set to 1, when the corresponding switch is turned on, either manually by the driver or automatically by a vehicle system. The bit value does not indicate if the corresponding lamps are alight or not. If a vehicle is not equipped with a certain light, the corresponding bit shall be set to 0. The fogLightOn only indicates the status of the tail fog lamp switch. As the bit value indicates only the state of the switch, the turn signal and hazard signal bit values shall not alternate with the blinking interval. For hazard indicator, the leftTurnSignalOn (2) and rightTurnSignalOn (3) shall be set to 1.
Unit	N/A
Category	Vehicle information
Modification date	2013-03-26

A.37 HardShoulderStatus

Descriptive Name	HardShoulderStatus
Identifier	DataType_037
ASN.1 representation	`HardShoulderStatus ::= ENUMERATED { availableForStopping(0), closed(1), availableForDriving(2) }`
Definition	DE that indicates whether a hard should lane is open to traffic.
Unit	N/A
Category	Road topology information
Modification date	2013-04-05

A.38 HazardousLocation-AnimalOnTheRoadSubCauseCode

Descriptive Name	HazardousLocation-AnimalOnTheRoadSubCauseCode
Identifier	DataType_038
ASN.1 representation	`HazardousLocation-AnimalOnTheRoadSubCauseCode ::= INTEGER {unavailable(0), wildAnimals(1), herdOfAnimals(2), smallAnimals(3), largeAnimals(4) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "hazardousLocation-AnimalOnTheRoad" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on the animal on the road event is unavailable, • wildAnimals(1): in case wild animals are detected on the road, • herdOfAnimals(2): in case herd of animals are detected on the road, • smallAnimals(3): in case small size animal is detected on the road, • largeAnimals(4): in case large size animal is detected on the road. Additional cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-26

A.39 HazardousLocation-DangerousCurveSubCauseCode

Descriptive Name	HazardousLocation-DangerousCurveSubCauseCode
Identifier	DataType_039
ASN.1 representation	`HazardousLocation-DangerousCurveSubCauseCode ::= INTEGER {unavailable(0), dangerousLeftTurnCurve(1), dangerousRightTurnCurve(2), multipleCurvesStartingWithUnknownTurningDirection(3), multipleCurvesStartingWithLeftTurn(4), multipleCurvesStartingWithRightTurn(5) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "hazardousLocation-DangerousCurve" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on the dangerous curve is unavailable, • dangerousLeftTurnCurve(1): in case the dangerous curve is left turn, • dangerousRightTurnCurve(2): in case the dangerous curve is right turn, • multipleCurvesStartingWithUnknownTurningDirection(3): in case of multiple curves for which the starting curve turning direction is not known, • multipleCurvesStartingWithLeftTurn(4): in case of multiple curves for which the first curve is left turn. • multipleCurvesStartingWithRightTurn(5): in case of multiple curves for which the first curve is right turn. Additional sub cause codes may be added in the future. The definition of whether a curve is dangerous may vary according to region and according to vehicle types/mass and vehicle speed driving on the curve. This definition is out of scope of the present document.
Unit	N/A
Category	Traffic information
Modification date	2013-03-26

A.40 HazardousLocation-ObstacleOnTheRoadSubCauseCode

Descriptive Name	HazardousLocation-SurfaceConditionSubCauseCode
Identifier	DataType_040
ASN.1 representation	`HazardousLocation-ObstacleOnTheRoadSubCauseCode ::= INTEGER {unavailable(0), shedLoad(1), partsOfVehicles(2), partsOfTyres(3), bigObjects(4), fallenTrees(5), hubCaps(6), waitingVehicles(7) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "hazardousLocation-ObstacleOnTheRoad" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on the detected obstacle is unavailable, • shedLoad(1): in case detected obstacle is large amount of obstacles (shedload), • partsOfVehicles(2): in case detected obstacles are parts of vehicles, • partsOfTyres(3): in case the detected obstacles are parts of tyres, • bigObjects(4): in case the detected obstacles are big objects, • fallenTrees(5): in case the detected obstacles are fallen trees, • hubCaps(6): in case the detected obstacles are hub caps, • waitingVehicles(7): in case the detected obstacles are waiting vehicles. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-26

A.41 HazardousLocation-SurfaceConditionSubCauseCode

Descriptive Name	HazardousLocation-SurfaceConditionSubCauseCode
Identifier	DataType_041
ASN.1 representation	`HazardousLocation-SurfaceConditionSubCauseCode ::= INTEGER {unavailable(0), rockfalls(1), earthquakeDamage(2), sewerCollapse(3), subsidence(4), snowDrifts(5), stormDamage(6), burstPipe(7), volcanoEruption(8), fallingIce(9) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "hazardousLocation-SurfaceCondition" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on the road surface condition is unavailable, • rockfalls(1): in case rock falls are detected on the road surface, • earthquakeDamage(2): in case the road surface is damaged by earthquake, • sewerCollapse(3): in case of sewer collapse on the road surface, • subsidence(4): in case road surface is damaged by subsidence, • snowDrifts(5): in case road surface is damaged due to snow drift, • stormDamage(6): in case road surface is damaged by strong storm, • burstPipe(7): in case road surface is damaged due to pipe burst, • volcanoEruption(8): in case road surface is damaged due to volcano eruption, • fallingIce(9): in case road surface damage is due to falling ice. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-26

A.42 HeightLonCarr

Descriptive Name	HeightLonCarr
Identifier	DataType_042
ASN.1 representation	`HeightLonCarr ::= INTEGER { oneCentimeter(1), unknown(100) } (0..100)`
Definition	Height of left or right longitude carrier of vehicle from base to top (left or right carrier seen from vehicle rear to front). For values equal or higher than 99, the DE shall be set to 99. If the value is unavailable, the DE shall be set to 100.
Unit	1 centimetre
Category	Vehicle information
Modification date	2012-10-15

A.43 HumanPresenceOnTheRoadSubCauseCode

Descriptive Name	HumanPresenceOnTheRoadSubCauseCode
Identifier	DataType_043
ASN.1 representation	`HumanPresenceOnTheRoadSubCauseCode ::= INTEGER {unavailable(0), childrenOnRoadway(1), cyclistOnRoadway(2), motorcyclistOnRoadway(3) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "humanPresenceOnTheRoad" as defined in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on human presence on the road is unavailable, • childrenOnRoadway(1): in case children on the road event is detected, • cyclistOnRoadway(2): in case cyclist presence is detected on the road, • motorcyclistOnRoadway(3): in case motorcyclist presence is detected. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-26

A.44 HumanProblemSubCauseCode

Descriptive Name	HumanProblemSubCauseCode
Identifier	DataType_044
ASN.1 representation	`HumanProblemSubCauseCode ::= INTEGER { unavailable(0), glycemiaProblem(1), heartProblem(2) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "humanProblem" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on human health problem is unavailable, • glycemiaProblem(1): in case human problem is due to glycaemia problem, • heartProblem(2): in case human problem is due to heart problem. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2012-10-15

A.45 InformationQuality

Descriptive Name	InformationQuality
Identifier	DataType_045
ASN.1 representation	`InformationQuality ::= INTEGER { unknown(0), lowest(1), highest(7) } (0..7)`
Definition	Indicate the quality level of provided information.
Unit	N/A
Category	Communication information
Modification date	2013-01-15

A.46 ItsPduHeader

Descriptive Name	ItsPduHeader
Identifier	DataType_046
ASN.1 representation	`ItsPduHeader ::= SEQUENCE { protocolVersion INTEGER{ currentVersion(1) } (0..255), messageID INTEGER{ denm(1),cam(2), poi(3), spat(4), map(5), ivi(6), ivs(7), ev-rsr(8) } (0..255),, stationID StationID }`
Definition	Common message header for application and facilities layer message. It is included at the beginning of an ITS message as the message header. It shall include the following information: • protocolVersion: version of the ITS message and/or communication protocol, • messageID: Message type of the ITS message. Currently, three message type values are assigned, including CAM, DENM, Point of Interest ITS, Signal Phase And Timing (SPAT), MAP, In Vehicle Information (IVI),In Vehicle Signage messages (IVS), and electric vehicle recharging spot reservation message. • stationID: the identifier of the ITS-S that generates the ITS message in question. It shall be represented as specified in clause A.86.
Unit	N/A
Category	Communication information
Modification date	2013-06-27

A.47 LaneNumber

Descriptive Name	LaneNumber
Identifier	DataType_047
ASN.1 representation	`LaneNumber ::= INTEGER { offTheRoad(-1), hardShoulder(0), outermostDrivingLane(1), secondLaneFromOutside(2) } (-1..14)`
Definition	This DE indicates lane position information counted from the outside border of the road; -1 denotes that the referenced geographic position is outside the road.
Unit	N/A
Category	GeoReference information
Modification date	2012-10-15

A.48 Latitude

Descriptive Name	Latitude
Identifier	DataType_048
ASN.1 representation	`Latitude ::= INTEGER { oneMicrodegreeNorth (10), oneMicrodegreeSouth (-10), unavailable(900000001) } (-900000000..900000001) -- multiples of 0.1 microdegree`
Definition	Absolute geographical latitude in a WGS84 coordinate system, providing a range of 90 degrees in north or in south hemisphere. Positive values are used for latitude value in north, negative values are used for latitude in south.
Unit	0,1 microdegree
Category	GeoReference information
Modification date	2013-04-05

A.49 LateralAcceleration

Descriptive Name	LateralAcceleration
Identifier	DataType_049

ASN.1 representation	`LateralAcceleration ::= SEQUENCE {`
	` lateralAccelerationValue LateralAccelerationValue,`
	` lateralAccelerationConfidence AccelerationConfidence`
	`}`

Definition	It indicates the vehicle acceleration at lateral direction and the accuracy of the lateral acceleration.
Unit	N/A
Category	Vehicle information
Modification date	2013-04-05

A.50 LateralAccelerationValue

Descriptive Name	LateralAccelerationValue
Identifier	DataType_050
ASN.1 representation	`LateralAccelerationValue ::= INTEGER { pointOneMeterPerSecSquaredToLeft(1), pointOneMeterPerSecSquaredToRight (-1), unavailable(161) } (-160 .. 161)`
Definition	Vehicle acceleration at lateral direction. It corresponds to the vehicle coordinate system A as specified in [2]. Negative value indicates that the vehicle is accelerating towards the right side with regards to the vehicle orientation. Positive values indicate the acceleration to the left hand side with regards to the vehicle orientation. When the information is not available, the value shall be set to 161.
Unit	0,1 m/s^2
Category	Vehicle information
Modification date	2013-04-05

A.51 LightBarSireneInUse

Descriptive Name	LightBarSireneInUse
Identifier	DataType_051
ASN.1 representation	`LightBarSirenInUse ::= BIT STRING { lightBarActivated (0), sirenActivated (1) } (SIZE(2))`
Definition	It describes the status of light bar and any sort of audible alarm system beside the horn. This includes various common sirens as well as backup up beepers and other slow speed manœuvring alerts. When the lightbar or audible alarm is active, the corresponding bits shall be set to 1. Otherwise, it shall be set to 0.
Unit	N/A
Category	Vehicle information
Modification date	2012-09-07

A.52 Longitude

Descriptive Name	DE_ Longitude
Identifier	DataType_052
ASN.1 representation	`Longitude ::= INTEGER { oneMicrodegreeEast (10), oneMicrodegreeWest (-10), unavailable(1800000001) } (-1800000000..1800000001) -- multiples of 0.1 microdegree`
Definition	Absolute geographical longitude in a WGS84 co-ordinate system, providing a range of 180 degrees to the east or to the west of the prime meridian. Negative values are used for longitudes to the west, position values are used for longitudes to the east.
Unit	0,1 microdegree
Category	GeoReference information
Modification date	2013-04-05

A.53 LongitudinalAcceleration

Descriptive Name	LongitudinalAcceleration
Identifier	DataType_053

ASN.1 representation	`LongitudinalAcceleration ::= SEQUENCE {`
	`  longitudinalAccelerationValue LongitudinalAccelerationValue,`
	`  longitudinalAccelerationConfidence AccelerationConfidence`
	`}`

Definition	It indicates the vehicle acceleration at longitudinal direction and the accuracy of the longitudinal acceleration.
Unit	N/A
Category	Vehicle information
Modification date	2013-04-05

A.54 LongitudinalAccelerationValue

Descriptive Name	LongitudinalAccelerationValue
Identifier	DataType_054

ASN.1 representation	`LongitudinalAccelerationValue ::= INTEGER {`
	`pointOneMeterPerSecSquaredForward(1),`
	`pointOneMeterPerSecSquaredBackward(-1), unavailable(161) } (-160 .. 161)`

Definition	Vehicle acceleration at longitudinal direction. It corresponds to the vehicle coordinate system A as specified in [2]. Negative values indicate that the vehicle is braking.
Unit	0,1 m/s^2
Category	Vehicle information
Modification date	2013-04-17

A.55 TrafficRule

Descriptive Name	TrafficRule
Identifier	DataType_055
ASN.1 representation	`TrafficRule ::= ENUMERATED { noPassing(0), noPassingForTrucks(1) …}`
Definition	It indicates whether overtaking is allowed at a certain position. If the overtaking limitation is apply to trucks only, the DE shall be set to 1.
Unit	N/A
Category	Infrastructure information
Modification date	2013-04-05

A.56 PathDeltaTime

Descriptive Name	PathDeltaTime
Identifier	DataType_056
ASN.1 representation	`PathDeltaTime ::= INTEGER { tenMilliSecondsInPast(1) } (0..65535, ...)`
Definition	This DE defines the recorded or estimated travel time separated between a pathPosition as defined in clause A.58 to a predefined reference position. It may be used to describe the historical path travelled by an ITS-S in mobility (e.g. vehicle ITS-S) as specified in [i.2].
Unit	0,01 second
Category	GeoReference information
Modification date	2012-09-06

A.57 PathHistory

Descriptive Name	PathHistory
Identifier	DataType_057
ASN.1 representation	`PathHistory ::= SEQUENCE SIZE(0..23) OF PathPoint`
Definition	DF that defines a path with a set of path points. It may contain up to 23 PathPoints as defined in clause A.58. It may be used to describe the historical path of a vehicle or any path.
Unit	N/A
Category	GeoReference information
Modification date	2013-06-03

A.58 PathPoint

Descriptive Name	PathPoint
Identifier	DataType_058

ASN.1 representation	`PathPoint ::= SEQUENCE {`
	`  pathPosition  DeltaReferencePosition,`
	`  pathDeltaTime  PathDeltaTime  OPTIONAL`
	`}`

Definition	DF that defines a waypoint position within a path. It shall include the following information: • pathPosition: The waypoint is defined as a DeltaReferencePosition with regards to a pre-defined reference position. It shall be as specified in clause A.23, • pathDeltaTime: The travel time separated from a waypoint to the predefined reference position. It shall be presented as specified in clause A.56. This field is OPTIONAL. It shall be present if the travel delta time is available.
Unit	N/A
Category	GeoReference information
Modification date	2013-03-27

A.59 PerformanceClass

Descriptive Name	PerformanceClass
Identifier	DataType_059
ASN.1 representation	`PerformanceClass ::= INTEGER { unknown(0), performanceClassA(1), performanceClassB(2) } (0..7)`
Definition	This DE denotes the ability of an ITS-S to provide up-to-date information to other ITS-Ss. As defined in [i.6], performance class A shall be set to 1, performance class B shall be set to 2. When the performance class is unknown, it shall be set to 0. The specification of the performance class may be extended in the future. Values in the range 3 to 7 are reserved for future use.
Unit	N/A
Category	Vehicle information
Modification date	2013-04-05

A.60 PosCentMass

Descriptive Name	PosCentMass
Identifier	DataType_060
ASN.1 representation	`PosCentMass ::= INTEGER { tenCentimeters(1), unknown(63) } (0..63)`
Definition	It indicates the perpendicular distance from the centre of mass of an empty load vehicle to the front of the vehicle bounding box. For values equal or higher than 62, the data shall be set to 62. 63 shall be used if the information is unavailable.
Unit	0,1 metre
Category	Vehicle information
Modification date	2013-04-05

A.61 PosConfidenceEllipse

Descriptive Name	PosConfidenceEllipse
Identifier	DataType_061

ASN.1 representation	`PosConfidenceEllipse ::= SEQUENCE {`
	`  semiMajorConfidence  SemiAxisLength,  -- confidence of the ellipse's major semi-axes`
	`  semiMinorConfidence  SemiAxisLength,  -- confidence of the ellipse's minor semi-axes`
	`  semiMajorOrientation  Heading`
	`}`

Definition	DF that provides the horizontal position accuracy in a shape of ellipse with a predefined confidence level (e.g. 95 %). The centre of the ellipse shape corresponds to the reference position point for which the position confidence is evaluated. It shall include the following information: • semiMajorConfidence: half of length of the major axis between the center point and major axis point of the position accuracy ellipse. It shall be presented as specified in clause A.76, • semiMinorConfidence: Half of length of the minor axis between the center point and minor axis point of the position accuracy ellipse. It shall be presented as specified in clause A.76, • semiMajorOrientation: Orientation direction of the ellipse major axis of the position accuracy ellipse with regards to the north. It shall be presented as specified in clause A.26. The required confidence level of the position accuracy is defined by ITS message or ITS application applying this DF.
Unit	N/A
Category	GeoReference information
Modification date	2013-03-27

A.62 PositioningSolutionType

Descriptive Name	PositioningSolutionType
Identifier	DataType_062
ASN.1 representation	`PositioningSolutionType ::= ENUMERATED { noPositioningSolution(0), sGNSS(1), dGNSS(2), sGNSSplusDR(3), dGNSSplusDR(4), dR(5), ... }`
Definition	It indicates the positioning technology being used to estimate a geographical position. It covers the following positioning solutions: • sGNSS(1): Global Navigation Satellite System, • dGNSS(2): Differential GNSS, • sGNSSplusDR(3): GNSS and dead reckoning, • dGNSSplusDR(4): Differential GNSS and dead reckoning, • dR(5): dead reckoning. Other positioning solutions may be added in the future.
Unit	N/A
Category	GeoReference information
Modification date	2013-03-27

A.63 PositionOfOccupants

Descriptive Name	PositionOfOccupants
Identifier	DataType_063

ASN.1 representation	`PositionOfOccupants ::= BIT STRING {`
	` row1LeftOccupied (0),`
	` row1RightOccupied (1),`
	` row1MidOccupied (2),`
	` row1NotDetectable (3),`
	` row1NotPresent (4),`
	`row2LeftOccupied (5),`
	` row2RightOccupied (6),`
	` row2MidOccupied (7),`
	` row2NotDetectable (8),`
	` row2NotPresent (9),`
	`row3LeftOccupied (10),`
	` row3RightOccupied (11),`
	` row3MidOccupied (12),`
	` row3NotDetectable (13),`
	` row3NotPresent (14),`
	`row4LeftOccupied (15),`
	` row4RightOccupied (16),`
	` row4MidOccupied (17),`
	` row4NotDetectable (18),`
	`row4NotPresent (19),`
	`} (SIZE(20))`

Definition	Indicates whether a passenger seat is occupied or whether the occupation status is detectable or not. The number of row in vehicle seats layout is counted in rows from the driver row backwards from front to the rear of the vehicle. The left side seat of a row refers to the left hand side seen from vehicle rear to front side. Additionally, a bit is reserved for each seat row, to indicate if the seat occupation of a row is detectable or not, i.e. row1NotDetectable (3), row2NotDetectable(8), row3NotDetectable(13) and row4NotDetectable(18). Finally, a bit is reserved for each row seat to indicate if the seat row is present or not in the vehicle, i.e. row1NotPresent (4), row2NotPresent (9), row3NotPresent(14), row4NotPresent(19). When a seat is detected to be occupied, the corresponding seat occupation bit shall be set to 1. For example, when the row 1 left seat is occupied, row1LeftOccupied(0) bit shall be set to 1. When a seat is detected to be not occupied, the corresponding seat occupation bit shall be set to 0. Otherwise, the value of seat occupation bit shall be set according to the following conditions: • If the seat occupation of a seat row is not detectable, the corresponding bit shall be set to 1. When any seat row not detectable bit is set to 1, all corresponding seat occupation bits of the same row shall be set to 1. • If the seat row is not present, the corresponding not present bit of the same row shall be set to 1. When any of the seat row not present bit is set to 1, the corresponding not detectable bit for that row shall be set to 1, and all the corresponding seat occupation bits in that row shall be set to 0.
Unit	N/A
Category	Vehicle information
Modification date	2013-03-25

A.64 PosFrontAx

Descriptive Name	PosFrontAx
Identifier	DataType_064
ASN.1 representation	`PosFrontAx ::= INTEGER { tenCentimeters(1), unknown(20) } (0..20)`
Definition	Perpendicular distance between the vehicle front of the bounding box and the front wheel axle in 10 centimetres. Values equal or higher than 19 shall be set to 19. Value 20 shall be set if the data is unavailable.
Unit	0,1 metre
Category	Vehicle information
Modification date	2013-03-27

A.65 PosLonCarr

Descriptive Name	PosLonCarr
Identifier	DataType_065
ASN.1 representation	`PosLonCarr ::= INTEGER { oneCentimeter(1), unknown(127) } (0..127)`
Definition	Distance from the center of vehicle front bumper to the right or left longitudinal carrier of vehicle. The left/right carrier refers to the left/right as seen from a passenger sitting in the vehicle For values equal or higher than 126, the DE shall be set to 126. If the information is unavailable, this DE shall be set to 127.
Unit	0,01 metre
Category	Vehicle information
Modification date	2013-06-03

A.66 PosPillar

Descriptive Name	PosPillar
Identifier	DataType_066
ASN.1 representation	`PosPillar ::= INTEGER { tenCentimeters(1), unknown(30) } (0..30)`
Definition	It indicates the perpendicular inter-distance of neighbouring pillar axis of vehicle starting from the middle point of the front of the vehicle bounding box. For values equal or higher than 29, the data shall be set to 29. 30 shall be used if the information is unavailable.
Unit	0,1 metre
Category	Vehicle information
Modification date	2012-10-15

A.67 PostCrashSubCauseCode

Descriptive Name	PostCrashSubCauseCode
Identifier	DataType_067
ASN.1 representation	`PostCrashSubCauseCode ::= INTEGER {unavailable(0), accidentWithoutECallTriggered (1), accidentWithECallManuallyTriggered (2), accidentWithECallAutomaticallyTriggered (3), accidentWithECallTriggeredWithoutAccessToCellularNetwork(4)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "postCrash" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on post crash event is unavailable, • accidentWithoutECallTriggered(1): in case no eCall has been triggered, • accidentWithECallManuallyTriggered (2): in case eCall has been manually triggered and transmitted to eCall back end, • accidentWithECallAutomaticallyTriggered (3): in case eCall has been automatically triggered and transmitted to eCall back end, • accidentWithECallTriggeredWithoutAccessToCellularNetwork(4): in case eCall has been triggered but cellular network is not accessible from triggering vehicle. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-27

A.68 PtActivation

Descriptive Name	PtActivation
Identifier	DataType_068

ASN.1 representation	`PtActivation ::= SEQUENCE {`
	`ptActivationType PtActivationType ::= INTEGER (0..255)`
	`ptActivationData PtActivationData ::= OCTET STRING (SIZE(1..20))`
	`}`

Definition	Real-time systems designed for operations control, traffic light priorities, track switches, barriers, etc. using a range of activation devices equipped in public transport vehicle. The activation of the corresponding equipment is triggered by the approach or passage of a public transport vehicle at a certain point (e.g. a beacon). This DE shall include the ptActivationType as defined in clause A.70 and ptActicationData as defined in clause A.69. Today there are different payload variants defined for public transport activation-data. The R09.x is one of the industry standard used by public transport vehicles (e.g. buses, trams) in Europe (e.g. Germany Austria) for controlling traffic lights, barriers, bollards etc. This DE includes information like route, course, destination, priority etc. The R09.x content is defined in [i.8]. It includes information as follows: • Priority Request Information (pre-request, request, ready to start) • End of Prioritization procedure • Priority request direction • Public Transport line number • Priority of public transport • Route line identifier of the public transport • Route number identification • Destination of public transport vehicle Other countries may use different message sets defined by the local administration.
Unit	N/A
Category	Vehicle information
Modification date	2013-06-03

A.69 PtActivationData

Descriptive Name	PtActivationData
Identifier	DataType_069
ASN.1 representation	`PtActivationData ::= OCTET STRING (SIZE(1..20))`
Definition	DF used for various tasks in the public transportation environment, especially for controlling traffic signal systems to prioritize and speed up public transportation in urban area (e.g. intersection "bottlenecks"). The traffic lights may be controlled by an approaching bus or tram automatically. This permits "In Time" activation of the green phase, will enable the individual traffic to clear a potential traffic jam in advance. Thereby the approaching bus/tram may pass an intersection with activated green light without slowing down the speed due to traffic congestion. Other usage of the DF is the provision of information like the public transport line number or the schedule delay of a public transport vehicle.
Unit	N/A
Category	Vehicle information
Modification date	2013-01-23

A.70 PtActivationType

Descriptive Name	PtActivationType
Identifier	DataType_070
ASN.1 representation	`PtActivationType ::= INTEGER (0..255)`
Definition	This DE indicates a certain coding of the data frame ptActivationData. – 0 undefined – 1 coding of ptActivationData conform to [i.8]. This represents the state of art coding for public transportation communication in Germany. Switzerland and Austria – 2 coding of ptActivationData based on [i.8]. This represents an alternative way for coding for public transport communication payload defined by VDV (Association of German public transport association) The values 3 to 15 are reserved for alternative and future use.
Unit	N/A
Category	Vehicle information
Modification date	2013-06-03

A.71 ReferencePosition

Descriptive Name	ReferencePosition
Identifier	DataType_071

ASN.1 representation	`ReferencePosition ::= SEQUENCE {`
	`  latitude Latitude,`
	`  longitude Longitude,`
	`  positionConfidenceEllipse PosConfidenceEllipse ,`
	`  altitude Altitude`
	`}`

Definition	The geographical position of a location or of an ITS station. It represents a geographical point position. It shall include the following information: • latitude: Latitude of the geographical point; it shall be presented as specified in clause A.48 • longitude: Longitude of the geographical point; it shall be presented as specified in clause A.52 • positionConfidenceEllipse: Confidence of the geographical position; it shall be presented as specified in clause A.61 • altitude: Altitude and altitude confidence of the geographical point; it shall be presented as specified in clause A.29
Unit	N/A
Category	GeoReference information
Modification date	2013-06-27

A.72 RequestResponseIndication

Descriptive Name	RequestResponseIndication
Identifier	DataType_072
ASN.1 representation	`RequestResponseIndication ::= ENUMERATED { request(0), response(1) }`
Definition	This DE includes whether an ITS message is transmitted as request from ITS-S or a response transmitted from ITS-S after receiving request from other ITS-Ss.
Unit	N/A
Category	Communication information
Modification date	2012-10-15

A.73 RescueAndRecoveryWorkInProgressSubCauseCode

Descriptive Name	RescueAndRecoveryWorkInProgressSubCauseCode
Identifier	DataType_073
ASN.1 representation	`RescueAndRecoveryWorkInProgressSubCauseCode ::= INTEGER {unavailable(0), emergencyVehicles(1), rescueHelicopterLanding(2), policeActivityOngoing(3), medicalEmergencyOngoing(4), childAbductionInProgress(5) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "rescueAndRecoveryWorkInProgress" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on rescue and recovery work is unavailable, • emergencyVehicles(1): in case rescue work is ongoing by emergency vehicles, • rescueHelicopterLanding(2): in case rescue helicopter is landing, • policeActivityOngoing(3): in case police activity is ongoing, • medicalEmergencyOngoing(4): in case medial emergency recovery is ongoing, • childAbductionInProgress (5): in case a child kidnapping alarm is activated. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-27

A.74 RoadType

Descriptive Name	RoadType
Identifier	DataType_074
ASN.1 representation	`RoadType ::= ENUMERATED { urban-NoStructuralSeparationToOppositeLanes(0), urban-WithStructuralSeparationToOppositeLanes(1), nonUrban-NoStructuralSeparationToOppositeLanes(2), nonUrban-WithStructuralSeparationToOppositeLanes(3) }`
Definition	Type of a road segment.
Unit	N/A
Category	Road Topology Information
Modification date	2013-06-27

A.75 RoadworksSubCauseCode

Descriptive Name	RoadworkSubCauseCode
Identifier	DataType_075
ASN.1 representation	`RoadworksSubCauseCode ::= INTEGER {unavailable(0), majorRoadworks(1), roadMarkingWork(2), slowMovingRoadMaintenance(3), winterService(4), streetCleaning(5) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "roadworks" as defined in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on roadworks is unavailable, • majorRoadworks(1): in case a major roadworks is ongoing, • roadMarkingWork(2): in case a road marking work is ongoing, • slowMovingRoadMaintenance(3): in case slow moving road maintenance work is ongoing, • winterService(4): in case winter service work is ongoing, • streetCleaning(5): in case a vehicle street cleaning work is ongoing. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-27

A.76 SemiAxisLength

Descriptive Name	SemiAxisLength
Identifier	DataType_076
ASN.1 representation	`SemiAxisLength ::= INTEGER{ oneCentimeter(1), outOfRange (4094), unavailable(4095) } (0..4095)`
Definition	Absolute position accuracy in one of the axis direction as defined in a shape of ellipse with a predefined confidence level (e.g. 95 %). For accuracy equal or worse than 4 094, the value shall be set to 4 094. The value shall be set to 4 095 when the data is unavailable.
Unit	1 centimetre
Category	GeoReference information
Modification date	2012-10-15

A.77 SignalViolationSubCauseCode

Descriptive Name	SignalViolationSubCauseCode
Identifier	DataType_077
ASN.1 representation	`SignalViolationSubCauseCode ::= INTEGER {unavailable(0), stopSignViolation(1), trafficLightViolation(2), turningRegulationViolation(3) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "signalViolation" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on signal violation event is unavailable, • stopSignViolation(1): in case a stop sign violation is detected, • trafficLightViolation(2): in case a traffic light violation is detected, • turningRegulationViolation(3): in case a turning regulation violation is detected. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-27

A.78 SlowVehicleSubCauseCode

Descriptive Name	SlowVehicleSubCauseCode
Identifier	DataType_078
ASN.1 representation	`SlowVehicleSubCauseCode ::= INTEGER {unavailable(0), maintenanceVehicle(1), vehiclesSlowingToLookAtAccident(2), abnormalLoad(3), abnormalWideLoad(4), convoy(5), snowplough(6), deicing(7), saltingVehicles(8) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "slowVehicle" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on slow vehicle driving event is unavailable, • maintenanceVehicle(1): in case of a slow driving maintenance vehicle on the road, • vehiclesSlowingToLookAtAccident(2): in case vehicle is temporally slowing down to look at accident, spot, etc., • abnormalLoad(3): in case an abnormal loaded vehicle is driving slowly on the road, • abnormalWideLoad(4): in case an abnormal wide load vehicle is driving slowly on the road, • convoy(5): in case of slow driving convoy on the road, • snowplough(6): in case of slow driving snow plough on the road, • deicing(7): in case of slow driving de-icing vehicle on the road, • saltingVehicles(8): in case of slow driving salting vehicle on the road. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-27

A.79 SpecialTransportType

Descriptive Name	SpecialTransportType
Identifier	DataType_079
ASN.1 representation	`SpecialTransportType ::= BIT STRING { heavyLoad(0), excessWidth(1), excessLength(2), excessHeight(3) } (SIZE(4))`
Definition	To indicate if a vehicle ITS-S is carrying goods with heavy load, excess width, excess length or excess height. The corresponding bit shall be set to 1 when the special transport applies to the corresponding case. Otherwise, the corresponding bit shall be set to 0.
Unit	N/A
Category	Vehicle information
Modification date	2013-04-05

A.80 Speed

Descriptive Name	Speed
Identifier	DataType_080

ASN.1 representation	`Speed ::= SEQUENCE {`
	` SpeedValue SpeedValue,`
	` SpeedConfidence SpeedConfidence`
	`}`

Definition	It describes the speed and corresponding accuracy of the speed information for a moving object (e.g. vehicle).
Unit	N/A
Category	Vehicle information
Modification date	2012-06-15

A.81 SpeedConfidence

Descriptive Name	SpeedConfidence
Identifier	DataType_081
ASN.1 representation	`SpeedConfidence ::= INTEGER { withinOneCentimeterPerSec(1), withinOneMeterPerSec(100), outOfRange(126), unavailable(127) } (1..127)`
Definition	The absolute accuracy of the speedValue information for a predefined confidence level. The required confidence level is defined by the station applying this DE. For values equal or higher than 126, the DE shall be set to 126. When the accuracy information is not available, the DE shall be set to 127.
Unit	0,01 m/s
Category	Vehicle information
Modification date	2012-10-15

A.82 SpeedLimit

Descriptive Name	SpeedLimit
Identifier	DataType_082
ASN.1 representation	`SpeedLimit ::= INTEGER { oneKmPerHour(1) } (0..255)`
Definition	Speed limitation applied to a geographical position, a road section or a geographical region.
Unit	km/h
Category	Infrastructure information
Modification date	2013-06-27

A.83 SpeedValue

Descriptive Name	SpeedValue
Identifier	DataType_083
ASN.1 representation	`SpeedValue ::= INTEGER { standstill(0), oneCentimeterPerSec(1), unavailable (16383) } (0..16383)`
Definition	Speed of a moving object (e.g. vehicle). When the information is not available, the DE shall be set to 16 383.
Unit	0,01 m/s
Category	Vehicle information
Modification date	2013-04-05

A.84 StationarySince

Descriptive Name	StationarySince
Identifier	DataType_084
ASN.1 representation	`StationarySince ::= ENUMERATED { lessThan1Minute(0), lessThan2Minutes(1), lessThan15Minutes(2), over15Minutes(3) }`
Definition	Indicates the duration in minutes of a vehicle being stationary. For vehicle being stationary since more than 15 minutes, the DE shall be set to 3.
Unit	N/A
Category	Infrastructure information
Modification date	2012-10-15

A.85 StationaryVehicleSubCauseCode

Descriptive Name	StationaryVehicleSubCauseCode
Identifier	DataType_085
ASN.1 representation	`StationaryVehicleSubCauseCode ::= INTEGER {unavailable(0), humanProblem(1), vehicleBreakdown(2), postCrash(3), publicTransportStop(4), carryingDangerousGoods(5) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "stationaryVehicle" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on stationary vehicle is unavailable, • humanProblem(1): in case stationary vehicle is due to health problem of driver or passenger, • vehicleBreakdown(2): in case stationary vehicle is due to vehicle break down, • postCrash(3): in case stationary vehicle is caused by collision, • publicTransportStop(4): in case public transport vehicle is stationary at bus stop, • carryingDangerousGoods(5): in case the stationary vehicle is carrying dangerous goods. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-27

A.86 StationID

Descriptive Name	StationID
Identifier	DataType_086
ASN.1 representation	`StationID ::=  INTEGER(0..4294967295)`
Definition	Identifier for the ITS station as used in application and facilities layer message. The station ID may be a pseudonym. It may vary over space and/or over time.
Unit	N/A
Category	Communication information
Modification date	2012-06-14

A.87 StationType

Descriptive Name	StationType
Identifier	DataType_087
ASN.1 representation	`StationType ::= INTEGER { unknown(0), pedestrian(1), cyclist(2), moped(3), motorcycle(4), passengerCar(5), bus(6), lightTruck(7), heavyTruck(8), trailer(9), specialVehicles(10), tram(11), roadSideUnit(15) } (0..255)`
Definition	The type of an ITS-S.
Unit	N/A
Category	Other information
Modification date	2012-06-15

A.88 SteeringWheelAngle

Descriptive Name	SteeringWheelAngle
Identifier	DataType_088

ASN.1 representation	`SteeringWheelAngle::= SEQUENCE {`
	`  steeringWheelAngleValue SteeringWheelAngleValue,`
	`  steeringWheelAngleConfidence SteeringWheelAngleConfidence`
	`}`

Definition	Steering wheel angle of the vehicle at certain point in time. In includes a steering wheel angle value and the estimated accuracy of the value.
Unit	1,5 degree
Category	Vehicle information
Modification date	2013-06-03

A.89 SteeringWheelAngleConfidence

Descriptive Name	SteeringWheelAngleConfidence
Identifier	DataType_089
ASN.1 representation	`SteeringWheelAngleConfidence  ::= INTEGER { withinOnePointFiveDegree(1), outOfRange(126), unavailable(127) } (1..127)`
Definition	Absolute accuracy for a SteeringWheelAngleValue as defined in clause A.90 for a predefined confidence level (e.g. 95 %). 126 shall be set if the accuracy is equal or worse than 189 degrees. When the accuracy information is not available, the value shall be set to 127.
Unit	1,5 degree
Category	Vehicle information
Modification date	2013-06-03

A.90 SteeringWheelAngleValue

Descriptive Name	SteeringWheelAngleValue
Identifier	DataType_090
ASN.1 representation	`SteeringWheelAngleValue ::= INTEGER { straight(0), onePointFiveDegreesToLeft(1), onePointFiveDegreesToRight(-1), unavailable(511) } (-511..511)`
Definition	Steering wheel angle of the vehicle at certain point in time. Negative values shall be used when the steering wheel angle is turning clock wise (i.e. to the right). 510 shall be set if the data is equal or higher than 510. It corresponds to the vehicle coordinate system A as specified in [2]. -511 shall be used when the value is equal or less than -511. When the information is not available, the value shall be set to 511.
Unit	1,5 degree
Category	Vehicle information
Modification date	2013-06-03

A.91 SubCauseCodeType

Descriptive Name	SubCauseCodeType
Identifier	DataType_091
ASN.1 representation	`SubCauseCodeType ::= INTEGER (0..255)`
Definition	Type of sub cause of a detected event as defined in [i.3]. For DENM usage, the value as given in clause 7.1.3 of EN 302 637-3 [i.3] apply. NOTE 1: The sub cause code value assignment varies based on value of causeCode as defined in clause A.10. NOTE 2: Complete list of all possible sub cause code values as given in [i.3] is provided in the present document for information and for potential future usage. For example, see clause A.3 for sub cause code of accident event.
Unit	N/A
Category	Traffic information
Modification date	2013-06-18

A.92 TimestampIts

Descriptive Name	TimestampIts
Identifier	DataType_092
ASN.1 representation	`TimestampIts ::= INTEGER { utcStartOf2004(0), oneMillisecAfterUTCStartOf2004(1) } (0..3153600000000)`
Definition	TAI time value in milliseconds since 00:00:00.000 hours of 01 January 2004 UTC.
Unit	milliseconds
Category	Other Information
Modification date	2012-09-07

A.93 Temperature

Descriptive Name	Temperature
Identifier	DataType_093
ASN.1 representation	`Temperature ::= INTEGER { oneDegreeCelsius(1) } (-60..67)`
Definition	Temperature. For temperature equal or lower than -60 °C, the value shall be set to -60. For temperature equal or higher than 67 °C, the value shall be set to 67.
Unit	°C
Category	Other information
Modification date	2013-04-05

A.94 TrafficConditionSubCauseCode

Descriptive Name	TrafficConditionSubCauseCode
Identifier	DataType_094
ASN.1 representation	`TrafficConditionSubCauseCode ::= INTEGER {unavailable(0), increasedVolumeOfTraffic(1), trafficJamSlowlyIncreasing(2), trafficJamIncreasing(3), trafficJamStronglyIncreasing(4), trafficStationary(5), trafficJamSlightlyDecreasing(6), trafficJamDecreasing(7), trafficJamStronglyDecreasing(8) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "trafficCondition" as defined in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on traffic jam is unavailable, • increasedVolumeOfTraffic(1): in case detected jam volume is increased, • trafficJamSlowlyIncreasing(2): in case detected traffic jam volume is increasing slowly, • trafficJamIncreasing(3): in case traffic jam volume is increasing, • trafficJamStronglyIncreasing(4): in case traffic jam volume is strongly increasing, • trafficStationary(5): in case traffic is stationary, • trafficJamSlightlyDecreasing(6): in case traffic jam volume is decreasing slowly, • trafficJamDecreasing(7): in case traffic jam volume is decreasing, • trafficJamStronglyDecreasing(8): in case traffic jam volume is decreasing rapidly. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-27

A.95 TurningRadius

Descriptive Name	TurningRadius
Identifier	DataType_095
ASN.1 representation	`TurningRadius ::= INTEGER { point4Meters(1), unavailable(255) } (0..255)`
Definition	The smallest circular turn (i.e. U-turn) that the vehicle is capable of making. Values equal or higher than 254 shall be set to 254. Value 255 shall be set if the data is unavailable. For vehicle with tracker, the turning radius applies to the vehicle only.
Unit	0,4 metre
Category	Vehicle information
Modification date	2012-10-15

A.96 VDS

Descriptive Name	VDS
Identifier	DataType_096
ASN.1 representation	`VDS ::= IA5String (SIZE(6))`
Definition	Vehicle Descriptor Section (VDS). The values are assigned according to [i.7].
Unit	N/A
Category	Vehicle information
Modification date	2012-09-06

A.97 VehicleBreakdownSubCauseCode

Descriptive Name	VehicleBreakdownSubCauseCode
Identifier	DataType_097
ASN.1 representation	`VehicleBreakdownSubCauseCode ::= INTEGER {unavailable(0), lackOfFuel (1), lackOfBatteryPower (2), engineProblem(3), transmissionProblem(4), engineCoolingProblem(5), brakingSystemProblem(6), steeringProblem(7), tyrePuncture(8)} (0..255)`
Definition	Encoded value of the sub cause codes of the event type "vehicleBreakdown" as specified in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on cause of vehicle break down is unavailable, • lackOfFuel (1): in case vehicle break down is due to lack of fuel, • lackOfBatteryPower (2): in case vehicle break down is caused by lack of battery power, • engineProblem(3): in case vehicle break down is caused by an engine problem, • transmissionProblem(4): in case vehicle break down is caused by transmission problem, • engineCoolingProblem(5): in case vehicle break down is caused by an engine cooling problem, • brakingSystemProblem(6): in case vehicle break down is caused by a braking system problem, • steeringProblem(7): in case vehicle break down is caused by a steering problem, • tyrePuncture(8): in case vehicle break down is caused by tire puncture. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-27

A.98 VehicleIdentification

Descriptive Name	VehicleIdentification
Identifier	DataType_098

ASN.1 representation	`VehicleIdentification ::= SEQUENCE {`
	` wMInumber WMInumber,`
	` vDS VDS`
	`}`

Definition	This DF provides the vehicle identification of a vehicle. It shall include the World Manufacturer Identifier (WMI) code and the Vehicle Descriptor Section (VDS). The values are assigned according to [i.7].
Unit	N/A
Category	Vehicle information
Modification date	2012-09-06

A.99 VehicleLength

Descriptive Name	VehicleLength
Identifier	DataType_099

ASN.1 representation	`VehicleLength ::= SEQUENCE {`
	` vehicleLengthValue VehicleLengthValue,`
	` vehicleLengthConfidenceIndication VehicleLengthConfidenceIndication`
	`}`

Definition	Estimated length of vehicle and the whether the estimated length is confident.
Unit	N/A
Category	Vehicle information
Modification date	2012-09-07

A.100 VehicleLengthConfidenceIndication

Descriptive Name	VehicleLengthConfidenceIndication
Identifier	DataType_100
ASN.1 representation	`VehicleLengthConfidenceIndication ::= ENUMERATED { noTrailerPresent(0), trailerPresentWithKnownLength(1), trailerPresentWithUnknownLength(2), trailerPresenceIsUnknown(3) }`
Definition	To indicate whether the presence of a trailer is detectable or whether its length is included in the vehicleLengthValue.
Unit	N/A
Category	Vehicle information
Modification date	2012-10-15

A.101 VehicleLengthValue

Descriptive Name	VehicleLengthValue
Identifier	DataType_0101
ASN.1 representation	`VehicleLengthValue ::= INTEGER { tenCentimeters(1), outOfRange(1022), unavailable(1023) } (1..1023)`
Definition	Estimated length of vehicle. The DE shall be set to 1 022 if the vehicle length is equal or higher than 1 022. The DE shall be set to 1 023 if the information in unavailable.
Unit	0,1 metre
Category	Vehicle information
Modification date	2012-10-15

A.102 VehicleMass

Descriptive Name	VehicleMass
Identifier	DataType_102
ASN.1 representation	`VehicleMass ::= INTEGER { hundredKg(1), unavailable(1024) } (1..1024)`
Definition	Estimated empty load mass of the vehicle in multiple of 100 kg. For values equal or higher than 1 023, the value shall be set to 1 023. The value shall be set to 1 024 when the data is unavailable.
Unit	100 kg
Category	Vehicle information
Modification date	2012-10-15

A.103 VehicleRole

Descriptive Name	VehicleRole
Identifier	DataType_103
ASN.1 representation	`VehicleRole ::= ENUMERATED { default(0), publicTransport(1), specialTransport(2), dangerousGoods(3), roadWork(4), rescue(5), emergency(6), safetyCar(7) }`
Definition	Role played by a vehicle at a point in time.
Unit	N/A
Category	Vehicle information
Modification date	2012-10-15

A.104 VehicleWidth

Descriptive Name	VehicleWidth
Identifier	DataType_104
ASN.1 representation	`VehicleWidth ::= INTEGER { tenCentimeters(1), outOfRange(61), unavailable(62) } (1..62)`
Definition	Estimated width of vehicle, including side mirrors. For values equal or higher than 61, the DE shall be set to 61. The DE shall be set to 62 if the information is unavailable.
Unit	0,1 metre
Category	Vehicle information
Modification date	2012-10-15

A.105 VerticalAcceleration

Descriptive Name	VerticalAcceleration
Identifier	DataType_105
ASN.1 representation	`VerticalAcceleration ::= SEQUENCE { verticalAccelerationValue VerticalAccelerationValue, verticalAccelerationConfidence AccelerationConfidence }`
Definition	It indicates the vehicle acceleration at vertical direction and the accuracy of the vertical acceleration.
Unit	N/A
Category	Vehicle information
Modification date	2013-06-03

A.106 VerticalAccelerationValue

Descriptive Name	VerticalAccelerationValue
Identifier	DataType_106
ASN.1 representation	`VerticalAccelerationValue ::= INTEGER { pointOneMeterPerSecSquaredUp(1), pointOneMeterPerSecSquaredDown(-1), unavailable(161) } (-160 .. 161)`
Definition	Vehicle acceleration at vertical direction. It corresponds to the vehicle coordinate system A as specified in [2]. Negative values indicate the vehicle is accelerating downwards. When the information is not available, the value shall be set to 161.
Unit	0,1 m/s^2
Category	Vehicle information
Modification date	2013-04-05

A.107 WheelBaseVehicle

Descriptive Name	WheelBaseVehicle
Identifier	DataType_107
ASN.1 representation	`WheelBaseVehicle ::= INTEGER { tenCentimeters(1), unavailable(127) } (0..127)`
Definition	Perpendicular distance between front and rear axle of the wheel base of vehicle. Values equal or higher than 126 shall be set to 126. Value 127 shall be set if the data is unavailable.
Unit	0,1 metre
Category	Vehicle information
Modification date	2012-09-07

A.108 WMInumber

Descriptive Name	WMInumber
Identifier	DataType_108
ASN.1 representation	`WMInumber ::= IA5String (SIZE(1..3))`
Definition	World Manufacturer Identifier (WMI). The values are assigned according to [i.7].
Unit	N/A
Category	Vehicle information
Modification date	2012-09-06

A.109 WrongWayDrivingSubCauseCode

Descriptive Name	WrongWayDrivingSubCauseCode
Identifier	DataType_109
ASN.1 representation	`WrongWayDrivingSubCauseCode ::= INTEGER {unavailable(0), wrongLane(1), wrongDirection(2) } (0..255)`
Definition	Encoded value of the sub cause codes of the event type "wrongWayDriving" as defined in clause A.10. Definition of the sub event cause is defined and the value is assigned according to clause 7.1.3 of EN 302 637-3 [i.3]. The sub causes are described as following: • unavailable(0): in case further detailed information on wrong way driving event is unavailable, • wrongLane(1): in case vehicle is driving on a lane for which it has no authorization to use, • wrongDirection(2): in case vehicle is driving in a direction that it is not allowed. Additional sub cause codes may be added in the future.
Unit	N/A
Category	Traffic information
Modification date	2013-03-27

A.110 YawRate

Descriptive Name	YawRate
Identifier	DataType_110

ASN.1 representation	`YawRate::= SEQUENCE {`
	` yawRateValue YawRateValue,`
	` yawRateConfidence yawRateConfidence`
	`}`

Definition	Yaw rate of vehicle at a point in time. It shall include a measured yaw rate of vehicle and accuracy information of the provided measured value.
Unit	N/A
Category	Vehicle information
Modification date	2013-03-27

A.111 YawRateConfidence

Descriptive Name	YawRateConfidence
Identifier	DataType_111

ASN.1 representation	`YawRateConfidence ::= ENUMERATED {`
	
	` degSec-000-01 (0)`
	` degSec-000-05 (1),`
	` degSec-000-10 (2),`
	` degSec-001-00 (3),`
	` degSec-005-00 (4),`
	` degSec-010-00 (5),`
	` degSec-100-00 (6),`
	` outOfRange (7),`
	` unavailable (8),`
	`}`

Definition	DE that denotes the absolute accuracy range for the measured yawRateValue for a predefined confidence level (e.g. 95 %). The DE shall be set to: • 0 if the accuracy is within 0,01 degrees/second • 1 if the accuracy is within 0,05 degrees/second • 2 if the accuracy is within 0,1 degrees/second • 3 if the accuracy is within 1 degrees/second • 4 if the accuracy is within 5 degrees/second • 5 if the accuracy is within 10 degrees/second • 6 if the accuracy is within 100 degrees/second • 7 if the accuracy is worse than 100 degrees/second • 8 if the accuracy information is unavailable
Unit	N/A
Category	Traffic information
Modification date	2013-06-27

A.112 YawRateValue

Descriptive Name	YawRateValue
Identifier	DataType_112
ASN.1 representation	`YawRateValue ::= INTEGER { straight(0), degSec-000-01ToRight(-1), degSec-000-01ToLeft(1), unavailable(32767) } (-32767..32767)`
Definition	YawRateValue denotes the vehicle rotation around z-axis of Coordinate System A centered on the center of mass of the empty-loaded vehicle. The leading sign denotes the direction of rotation. The value is negative if the rotation is clockwise (i.e. turning right). It corresponds to the vehicle Coordinate System A as specified in [2]. The yaw rate value shall be a raw data value, i.e. not filtered, smoothed or otherwise modified. The reading instant should be the same as for the vehicle acceleration. When the information is not available, the DE shall be set to 32 767.
Unit	0,01 degree per second
Category	Vehicle information
Modification date	2013-03-27

Annex B (normative): ASN.1 module of the common data dictionary

```
ITS-Container {
 itu-t (0) identified-organization (4) etsi (0) itsDomain (5) wg1 (1) ts (102894) cdd (2) version
(1)
}

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

ItsPduHeader ::= SEQUENCE {
    protocolVersion     INTEGER{ currentVersion(1) } (0..255),
    messageID       INTEGER{ denm(1),cam(2), poi(3), spat(4), map(5), ivi(6), ivs(7), ev-rsr(8)  }
(0..255),
    stationID StationID
}

StationID ::=   INTEGER(0..4294967295)

ReferencePosition ::= SEQUENCE {
  latitude Latitude,
  longitude Longitude,
  positionConfidenceEllipse PosConfidenceEllipse ,
  altitude Altitude
}

DeltaReferencePosition ::= SEQUENCE {
  deltaLatitude DeltaLatitude,
  deltaLongitude DeltaLongitude,
  deltaAltitude DeltaAltitude
}

Longitude ::= INTEGER { oneMicrodegreeEast (10), oneMicrodegreeWest (-10), unavailable(1800000001) }
(-1799999999..1800000001) -- multiples of 0.1 microdegree

Latitude ::= INTEGER { oneMicrodegreeNorth (10), oneMicrodegreeSouth (-10), unavailable(900000001) }
(-900000000..900000001) -- multiples of 0.1 microdegree

Altitude ::= SEQUENCE {
 altitudeValue AltitudeValue,
 altitudeConfidence AltitudeConfidence
}

AltitudeValue ::= INTEGER { seaLevel(0), oneCentimeter(1), unavailable(800001) } (-100000..800001)

AltitudeConfidence ::= ENUMERATED {
alt-000-01 (0),
alt-000-02 (1),
alt-000-05 (2),
alt-000-10 (3),
alt-000-20 (4),
alt-000-50 (5),
alt-001-00 (6),
alt-002-00 (7),
alt-005-00 (8),
alt-010-00 (9),
alt-020-00 (10),
alt-050-00 (11),
alt-100-00 (12),
alt-200-00 (13),
outOfRange (14),
unavailable (15)
}

DeltaLongitude ::= INTEGER { oneMicrodegreeEast (10), oneMicrodegreeWest (-10) } (-131072..131071) -
- multiples of 0.1 microdegree

DeltaLatitude ::= INTEGER { oneMicrodegreeNorth (10), oneMicrodegreeSouth (-10) } (-131072..131071)
-- multiples of 0.1 microdegree

DeltaAltitude  ::= INTEGER { oneCentimeterUp (1), oneCentimeterDown (-1), unavailable(12800) } (-
12700..12800)
```

```
PosConfidenceEllipse ::= SEQUENCE {
  semiMajorConfidence   SemiAxisLength,   -- confidence of the ellipse's major semi-axes
  semiMinorConfidence   SemiAxisLength,   -- confidence of the ellipse's minor semi-axes
  semiMajorOrientation  Heading
}

PathPoint ::= SEQUENCE {
 pathPosition DeltaReferencePosition,
 pathDeltaTime PathDeltaTime OPTIONAL
}

PathDeltaTime ::= INTEGER { tenMilliSecondsInPast(1) } (0..65535, ...)

PtActivation ::= SEQUENCE {
  ptActivationType PtActivationType,
  ptActivationData PtActivationData
}

PtActivationType ::= INTEGER { undefinedCodingType(0), r09-16CodingType(1), vdv-50149CodingType(2) }
(0..255)

PtActivationData ::= OCTET STRING (SIZE(1..20))

AccelerationControl ::= BIT STRING {
 brakePedalEngaged (0),
 gasPedalEngaged (1),
 emergencyBrakeEngaged (2),
 collisionWarningEngaged (3),
 accEngaged (4),
 cruiseControlEngaged (5),
 speedLimiterEngaged (6)
} (SIZE(7))


SemiAxisLength ::= INTEGER{ oneCentimeter(1), outOfRange(4094), unavailable(4095) } (0..4095)

 CauseCode ::= SEQUENCE {
  causeCode CauseCodeType,
  subCauseCode SubCauseCodeType
 }

 CauseCodeType ::= INTEGER {
  reserved (0),
  trafficCondition (1),
  accident (2),
  roadworks (3),
  adverseWeatherCondition-Adhesion (6),
  hazardousLocation-SurfaceCondition (9),
  hazardousLocation-ObstacleOnTheRoad (10),
  hazardousLocation-AnimalOnTheRoad (11),
  humanPresenceOnTheRoad (12),
  wrongWayDriving (14),
  rescueAndRecoveryWorkInProgress (15),
  adverseWeatherCondition-ExtremeWeatherCondition (17),
  adverseWeatherCondition-Visibility (18),
  adverseWeatherCondition-Precipitation (19),
  slowVehicle (26),
  dangerousEndOfQueue (27),
  vehicleBreakdown (91),
  postCrash (92),
  humanProblem (93),
  stationaryVehicle (94),
  emergencyVehicleApproaching (95),
  hazardousLocation-DangerousCurve (96),
  collisionRisk (97),
  signalViolation (98),
  dangerousSituation (99)
 } (0..255)

 SubCauseCodeType ::= INTEGER (0..255)

 TrafficConditionSubCauseCode ::= INTEGER {unavailable(0), increasedVolumeOfTraffic(1),
trafficJamSlowlyIncreasing(2), trafficJamIncreasing(3), trafficJamStronglyIncreasing(4),
trafficStationary(5), trafficJamSlightlyDecreasing(6), trafficJamDecreasing(7),
trafficJamStronglyDecreasing(8) }  (0..255)
```

```
AccidentSubCauseCode ::= INTEGER {unavailable(0), multiVehicleAccident(1), heavyAccident(2),
accidentInvolvingLorry(3), accidentInvolvingBus(4), accidentInvolvingHazardousMaterials(5),
accidentOnOppositeLane(6), unsecuredAccident(7), assistanceRequested(8) } (0..255)

RoadworksSubCauseCode ::= INTEGER {unavailable(0), majorRoadworks(1), roadMarkingWork(2),
slowMovingRoadMaintenance(3), winterService(4), streetCleaning(5) }  (0..255)

HumanPresenceOnTheRoadSubCauseCode ::= INTEGER {unavailable(0), childrenOnRoadway(1),
cyclistOnRoadway(2), motorcyclistOnRoadway(3) }  (0..255)

WrongWayDrivingSubCauseCode ::= INTEGER {unavailable(0), wrongLane(1), wrongDirection(2) }
(0..255)

AdverseWeatherCondition-ExtremeWeatherConditionSubCauseCode ::= INTEGER {unavailable(0),
strongWinds(1), damagingHail(2), hurricane(3), thunderstorm(4), tornado(5), blizzard(6) } (0..255)

AdverseWeatherCondition-AdhesionSubCauseCode ::= INTEGER {unavailable(0), heavyFrostOnRoad(1),
fuelOnRoad(2), mudOnRoad(3), snowOnRoad(4), iceOnRoad(5), blackIceOnRoad(6), oilOnRoad(7),
looseChippings(8), instantBlackIce(9), roadsSalted(10) } (0..255)

AdverseWeatherCondition-VisibilitySubCauseCode ::= INTEGER {unavailable(0), fog(1), smoke(2),
heavySnowfall(3), heavyRain(4), heavyHail(5), lowSunGlare(6), sandstorms(7), swarmsOfInsects(8) }
(0..255)

AdverseWeatherCondition-PrecipitationSubCauseCode ::= INTEGER {unavailable(0), heavyRain(1),
heavySnowfall(2), softHail(3) } (0..255)

SlowVehicleSubCauseCode ::= INTEGER {unavailable(0), maintenanceVehicle(1),
vehiclesSlowingToLookAtAccident(2), abnormalLoad(3), abnormalWideLoad(4), convoy(5), snowplough(6),
deicing(7), saltingVehicles(8) } (0..255)

StationaryVehicleSubCauseCode ::= INTEGER {unavailable(0),  humanProblem(1), vehicleBreakdown(2),
postCrash(3), publicTransportStop(4), carryingDangerousGoods(5) } (0..255)

HumanProblemSubCauseCode ::= INTEGER { unavailable(0), glycemiaProblem(1), heartProblem(2) }
(0..255)

EmergencyVehicleApproachingSubCauseCode ::= INTEGER {unavailable(0),
emergencyVehicleApproaching(1), prioritizedVehicleApproaching(2) } (0..255)

HazardousLocation-DangerousCurveSubCauseCode ::= INTEGER {unavailable(0),
dangerousLeftTurnCurve(1), dangerousRightTurnCurve(2),
multipleCurvesStartingWithUnknownTurningDirection(3), multipleCurvesStartingWithLeftTurn(4),
multipleCurvesStartingWithRightTurn(5) } (0..255)

HazardousLocation-SurfaceConditionSubCauseCode ::= INTEGER {unavailable(0), rockfalls(1),
earthquakeDamage(2), sewerCollapse(3), subsidence(4), snowDrifts(5), stormDamage(6), burstPipe(7),
volcanoEruption(8), fallingIce(9) }  (0..255)

HazardousLocation-ObstacleOnTheRoadSubCauseCode ::= INTEGER {unavailable(0), shedLoad(1),
partsOfVehicles(2), partsOfTyres(3), bigObjects(4), fallenTrees(5), hubCaps(6), waitingVehicles(7) }
(0..255)

HazardousLocation-AnimalOnTheRoadSubCauseCode ::= INTEGER {unavailable(0), wildAnimals(1),
herdOfAnimals(2), smallAnimals(3), largeAnimals(4) } (0..255)

CollisionRiskSubCauseCode ::= INTEGER {unavailable(0), longitudinalCollisionRisk(1),
crossingCollisionRisk(2), lateralCollisionRisk(3), vulnerableRoadUser(4) } (0..255)

SignalViolationSubCauseCode ::= INTEGER {unavailable(0), stopSignViolation(1),
trafficLightViolation(2), turningRegulationViolation(3) } (0..255)

RescueAndRecoveryWorkInProgressSubCauseCode ::= INTEGER {unavailable(0), emergencyVehicles(1),
rescueHelicopterLanding(2), policeActivityOngoing(3), medicalEmergencyOngoing(4),
childAbductionInProgress(5) } (0..255)

DangerousEndOfQueueSubCauseCode ::= INTEGER {unavailable(0), suddenEndOfQueue(1), queueOverHill(2),
queueAroundBend(3), queueInTunnel(4) } (0..255)

DangerousSituationSubCauseCode ::= INTEGER {unavailable(0), emergencyElectronicBrakeEngaged(1),
preCrashSystemEngaged(2), espEngaged(3), absEngaged(4), aebEngaged(5), brakeWarningEngaged(6),
collisionRiskWarningEngaged(7) } (0..255)

VehicleBreakdownSubCauseCode ::= INTEGER {unavailable(0), lackOfFuel (1), lackOfBatteryPower (2),
engineProblem(3), transmissionProblem(4), engineCoolingProblem(5), brakingSystemProblem(6),
steeringProblem(7), tyrePuncture(8)} (0..255)
```

```
 PostCrashSubCauseCode ::= INTEGER {unavailable(0), accidentWithoutECallTriggered (1),
accidentWithECallManuallyTriggered (2), accidentWithECallAutomaticallyTriggered (3),
accidentWithECallTriggeredWithoutAccessToCellularNetwork(4)} (0..255)


Curvature ::= SEQUENCE {
 curvatureValue CurvatureValue,
 curvatureConfidence CurvatureConfidence
}

CurvatureValue ::= INTEGER { straight(0), reciprocalOf1MeterRadiusToRight(-30000),
reciprocalOf1MeterRadiusToLeft(30000), unavailable(30001) } (-30000..30001)

CurvatureConfidence ::= ENUMERATED {
 onePerMeter-0-00002 (0), -- within  0.00002 m^-1
 onePerMeter-0-0001 (1), -- within 0.0001 m^-1
 onePerMeter-0-0005 (2), -- within 0.0005 m^-1
 onePerMeter-0-002 (3), -- within 0.002 m^-1
 onePerMeter-0-01 (4), -- within 0.01 m^-1
 onePerMeter-0-1 (5), -- within 0.1 m^-1
 outOfRange (6),
 unavailable (7)
}

CurvatureCalculationMode ::= ENUMERATED { yawRateUsed(0), yawRateNotUsed(1),
transitionMode(2), ... }

Heading ::= SEQUENCE {
 headingValue HeadingValue,
 headingConfidence HeadingConfidence
}

HeadingValue ::= INTEGER { wgs84North(0), wgs84East(900), wgs84South(1800), wgs84West(2700),
unavailable(3600) } (0..3600)

HeadingConfidence ::= INTEGER { withinZeroPointOneDegree(1), withinOneDegree(10), outOfRange(126),
unavailable(127) } (1..127)

LaneNumber ::= INTEGER { offTheRoad(-1), hardShoulder(0),
outermostDrivingLane(1), secondLaneFromOutside(2) } (-1..14)

ClosedLanes ::= SEQUENCE {
 hardShoulderStatus HardShoulderStatus OPTIONAL,
 drivingLaneStatus DrivingLaneStatus,
 ...
}

HardShoulderStatus ::= ENUMERATED { availableForStopping(0), closed(1), availableForDriving(2) }

DrivingLaneStatus ::= BIT STRING { outermostLaneClosed(1), secondLaneFromOutsideClosed(2) } (SIZE
(1..14)) -- numbering matches LaneNumber numbering


PerformanceClass ::= INTEGER { unavailable(0), performanceClassA(1), performanceClassB(2) } (0..7)
-- values in range 3-7 are reserved for later definition

SpeedValue ::= INTEGER { standstill(0), oneCentimeterPerSec(1), unavailable(16383)  } (0..16383)

SpeedConfidence ::= INTEGER { withinOneCentimeterPerSec(1), withinOneMeterPerSec(100),
outOfRange(126), unavailable(127) } (1..127)

VehicleMass ::= INTEGER  { hundredKg(1), unavailable(1024) } (1..1024)

Speed ::= SEQUENCE {
 speedValue SpeedValue,
 speedConfidence SpeedConfidence
}

DriveDirection ::= ENUMERATED { forward (0), backward (1), unavailable (2) }

EmbarkationStatus ::= BOOLEAN

LongitudinalAcceleration ::= SEQUENCE {
 longitudinalAccelerationValue LongitudinalAccelerationValue,
 longitudinalAccelerationConfidence AccelerationConfidence
}
```

```
LongitudinalAccelerationValue ::= INTEGER { pointOneMeterPerSecSquaredForward(1),
pointOneMeterPerSecSquaredBackward(-1), unavailable(161)} (-160 .. 161)

AccelerationConfidence ::= INTEGER { pointOneMeterPerSecSquared(1), outOfRange(101),
unavailable(102)} (0 .. 102)

LateralAcceleration ::= SEQUENCE {
 lateralAccelerationValue LateralAccelerationValue,
 lateralAccelerationConfidence AccelerationConfidence
}

LateralAccelerationValue ::= INTEGER { pointOneMeterPerSecSquaredToRight(-1),
pointOneMeterPerSecSquaredToLeft(1), unavailable(161) } (-160 .. 161)

VerticalAcceleration ::= SEQUENCE {
 verticalAccelerationValue VerticalAccelerationValue,
 verticalAccelerationConfidence AccelerationConfidence
}

VerticalAccelerationValue ::= INTEGER { pointOneMeterPerSecSquaredUp(1),
pointOneMeterPerSecSquaredDown(-1), unavailable(161) } (-160 .. 161)

StationType ::= INTEGER { unknown(0), pedestrian(1), cyclist(2), moped(3), motorcycle(4),
passengerCar(5), bus(6),
lightTruck(7), heavyTruck(8), trailer(9), specialVehicles(10), tram(11), roadSideUnit(15) } (0..255)

ExteriorLights ::= BIT STRING {
 lowBeamHeadlightsOn      (0),
 highBeamHeadlightsOn     (1),
 leftTurnSignalOn         (2),
 rightTurnSignalOn        (3),
 daytimeRunningLightsOn   (4),
 reverseLightOn           (5),
 fogLightOn               (6),
 parkingLightsOn          (7)
} (SIZE(8))


DangerousGoodsBasic::= ENUMERATED {
      explosives1(0),
      explosives2(1),
      explosives3(2),
      explosives4(3),
      explosives5(4),
      explosives6(5),
      flammableGases(6),
      nonFlammableGases(7),
      toxicGases(8),
      flammableLiquids(9),
      flammableSolids(10),
      substancesLiableToSpontaneousCombustion(11),
      substancesEmittingFlammableGasesUponContactWithWater(12),
      oxidizingSubstances(13),
      organicPeroxides(14),
      toxicSubstances(15),
      infectiousSubstances(16),
      radioactiveMaterial(17),
      corrosiveSubstances(18),
      miscellaneousDangerousSubstances(19)
}

DangerousGoodsExtended ::= SEQUENCE {
   dangerousGoodsType  DangerousGoodsBasic,
   unNumber            INTEGER (0..9999),
   elevatedTemperature BOOLEAN,
   tunnelsRestricted   BOOLEAN,
   limitedQuantity     BOOLEAN,
   emergencyActionCode IA5String OPTIONAL,
   phoneNumber         IA5String OPTIONAL,
   companyName         UTF8String OPTIONAL
}


SpecialTransportType  ::= BIT STRING { heavyLoad(0), excessWidth(1), excessLength(2),
excessHeight(3) } (SIZE(4))

LightBarSirenInUse ::= BIT STRING {
 lightBarActivated (0),
```

```
 sirenActivated (1)
} (SIZE(2))

HeightLonCarr ::= INTEGER { oneCentimeter(1), unavailable(100) } (0..100)

PosLonCarr ::= INTEGER { oneCentimeter(1), unavailable(127) } (0..127)

PosPillar ::= INTEGER { tenCentimeters(1), unavailable(30) } (0..30)

PosCentMass ::= INTEGER { tenCentimeters(1), unavailable(63) } (0..63)

RequestResponseIndication ::= ENUMERATED { request(0), response(1) }

SpeedLimit ::= INTEGER { oneKmPerHour(1) } (0..255)

StationarySince ::= ENUMERATED { lessThan1Minute(0), lessThan2Minutes(1), lessThan15Minutes(2),
over15Minutes(3) }

Temperature ::= INTEGER { oneDegreeCelsius(1) } (-60..67)

TrafficRule ::= ENUMERATED { noPassing(0),
 noPassingForTrucks(1), ...
 }

WheelBaseVehicle ::= INTEGER { tenCentimeters(1), unavailable(127) } (0..127)

TurningRadius ::= INTEGER { point4Meters(1), unavailable(255) } (0..255)

PosFrontAx ::= INTEGER { tenCentimeters(1), unavailable(20) } (0..20)

PositionOfOccupants ::= BIT STRING {
 row1LeftOccupied (0),
 row1RightOccupied (1),
 row1MidOccupied (2),
 row1NotDetectable (3),
 row1NotPresent (4),
 row2LeftOccupied (5),
 row2RightOccupied (6),
 row2MidOccupied (7),
 row2NotDetectable (8),
 row2NotPresent (9),
 row3LeftOccupied (10),
 row3RightOccupied (11),
 row3MidOccupied (12),
 row3NotDetectable (13),
 row3NotPresent (14),
 row4LeftOccupied (15),
 row4RightOccupied (16),
 row4MidOccupied (17),
 row4NotDetectable (18),
 row4NotPresent (19) } (SIZE(20))

PositioningSolutionType ::= ENUMERATED { noPositioningSolution(0), sGNSS(1), dGNSS(2),
sGNSSplusDR(3), dGNSSplusDR(4), dR(5), ... }

VehicleIdentification ::= SEQUENCE {
 wMInumber WMInumber,
 vDS VDS
}

WMInumber ::= IA5String (SIZE(1..3))

VDS ::= IA5String (SIZE(6))

EnergyStorageType::= BIT STRING { hydrogenStorage(0), electricEnergyStorage(1), liquidPropaneGas(2),
compressedNaturalGas(3), diesel(4), gasoline(5), ammonia(6) } (SIZE(7))

VehicleLength ::= SEQUENCE {
 vehicleLengthValue VehicleLengthValue,
 vehicleLengthConfidenceIndication VehicleLengthConfidenceIndication
}

VehicleLengthValue  ::= INTEGER { tenCentimeters(1), outOfRange(1022), unavailable(1023) }
(1..1023)

VehicleLengthConfidenceIndication ::= ENUMERATED { noTrailerPresent(0),
trailerPresentWithKnownLength(1), trailerPresentWithUnknownLength(2),
trailerPresenceIsUnknown(3) }
```

```
VehicleWidth  ::= INTEGER { tenCentimeters(1), outOfRange(61), unavailable(62) }  (1..62)

PathHistory::=  SEQUENCE (SIZE(0..23)) OF PathPoint

EmergencyPriority ::= BIT STRING { requestForRightOfWay(0),
requestForFreeCrossingAtATrafficLight(1) } (SIZE(2))

InformationQuality ::= INTEGER { unavailable(0), lowest(1), highest(7) }  (0..7)

RoadType ::= ENUMERATED {
 urban-NoStructuralSeparationToOppositeLanes(0),
 urban-WithStructuralSeparationToOppositeLanes(1),
 nonUrban-NoStructuralSeparationToOppositeLanes(2),
 nonUrban-WithStructuralSeparationToOppositeLanes(3) }

SteeringWheelAngle::= SEQUENCE {
 steeringWheelAngleValue SteeringWheelAngleValue,
 steeringWheelConfidence SteeringWheelConfidence
}

SteeringWheelAngleValue  ::= INTEGER { straight(0), onePointFiveDegreesToRight(-1),
onePointFiveDegreesToLeft(1), unavailable(511) } (-511..511)

SteeringWheelConfidence ::= INTEGER { withinOnePointFiveDegrees(1), outOfRange(126),
unavailable(127) } (1..127)

TimestampIts ::= INTEGER { utcStartOf2004(0), oneMillisecAfterUTCStartOf2004(1) } (0..3153600000000)

VehicleRole ::= ENUMERATED { default(0), publicTransport(1), specialTransport(2), dangerousGoods(3),
roadWork(4), rescue(5), emergency(6), safetyCar(7) }

YawRate::= SEQUENCE {
 yawRateValue YawRateValue,
 yawRateConfidence YawRateConfidence
}

YawRateValue ::= INTEGER { straight(0), degSec-000-01ToRight(-1), degSec-000-01ToLeft(1),
unavailable(32767) } (-32767..32767)
-- LSB units of 0.01 degrees per second

YawRateConfidence ::= ENUMERATED {
 degSec-000-01 (0),
 degSec-000-05 (1),
 degSec-000-10 (2),
 degSec-001-00 (3),
 degSec-005-00 (4),
 degSec-010-00 (5),
 degSec-100-00 (6),
 outOfRange (7),
 unavailable (8)
}


END
```

Annex C (informative): Bibliography

SAE J2735: "Dedicated Short Range Communications (DSRC) Message Set Dictionary".

ISO/DTS 18234-9: "Intelligent transport systems -- Traffic and travel information via transport protocol expert group (TPEG) data-streams -- Part 9: Traffic Event Compact (TPEG-TEC)".

DATEX II v2.0 Data Dictionary.

History

Document history		
V1.1.1	August 2013	Publication