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Entwurf

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**Intelligente Verkehrssysteme –
 DATEX II Datenaustauschspezifikation für Verkehrsmanagement und
 Verkehrsinformationen –
 Teil 3: Publikation von Verkehrssituationen;
 Englische Fassung prEN 16157-3:2017**

Intelligent transport systems –
 DATEX II data exchange specifications for traffic management and information –
 Part 3: Situation Publication;
 English version prEN 16157-3:2017

Systèmes de transport intelligents –
 Spécifications DATEX II d'échange de données pour la gestion du trafic et l'information
 routière –
 Partie 3: Publication de situations;
 Version anglaise prEN 16157-3:2017

Anwendungswarnvermerk

Dieser Norm-Entwurf mit Erscheinungsdatum 2017-06-16 wird der Öffentlichkeit zur Prüfung und
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Gesamtumfang 154 Seiten

DIN-Normenausschuss Automobiltechnik (NAAutomobil)
 DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE

Nationales Vorwort

Dieses Dokument (prEN 16157-3:2017) wurde vom Technischen Komitee CEN/TC 278 „Intelligente Verkehrssysteme“ ausgearbeitet, dessen Sekretariat von NEN (Niederlande) gehalten wird.

Das zuständige deutsche Normungsgremium ist der Gemeinschaftsarbeitsausschuss NA 052-02-71 GA „Intelligente Verkehrssysteme“ des DIN-Normenausschusses Automobiltechnik.

Der Entwurf ist derzeit zur Umfrage vorgelegt.

Dieser Normentwurf definiert eine gemeinsame Menge von Datenaustausch Spezifikationen um die Vision vom interoperablen Austausch von Verkehrs- und Reiseinformationsdaten über Grenzen hinweg zu ermöglichen.

Dieser Normentwurf basiert weiterhin auf einem Weißbuch der europäischen Kommission, welches die Koordination von Verkehrsmanagement und die Entwicklung von übergangslosen paneuropäischen Diensten festlegt.

Teil 3 dieser Normenreihe behandelt die Veröffentlichung von situativen Informationen. Dabei werden Strukturen und Informationen festgelegt, die für den Austausch situativer Informationen bezogen auf das Straßennetz sowohl aus Sicht der Straßenbetreiber, als auch aus Sicht der Straßennutzer interessant sein könnten.

Änderungen

Gegenüber DIN CEN/TS 16157-3 (DIN SPEC 91271):2011-12 wurden folgende Änderungen vorgenommen:

- a) Überführung in eine Europäische Norm;
- b) Umgestaltung der Ursachen von Verkehrssituationen zur besseren Adaptierung an die betriebliche Verwendung“;
- c) Kennzeichnung der sicherheitsrelevanten Verkehrsinformationen nach (EU) No 886/2013;
- d) Einführung einer Nummerierung von Anforderungen;
- e) Korrektur verschiedener Fehler.

Nationaler Anhang NA (informativ)

Begriffe

Für die Anwendung dieses Dokuments gelten die Begriffe nach CEN/TS 16157-1 und die folgenden Begriffe.

3.1

Zielort

(en: destination)

Spezifikation eines Endpunktes einer festgelegten Strecke oder Reiseroute

Anmerkung 1 zum Begriff: Dies kann entweder eine Netzwerk- oder Gebietsposition sein.

3.2

Position

(en: location)

identifizierbarer geografischer Ort

Anmerkung 1 zum Begriff: Er ist entweder auf einem Straßennetz (als Punkt oder lineare Position) oder ein Gebiet. Er kann in einem oder mehreren Referenzsystemen unterstützt werden.

[QUELLE: EN ISO 19112:2005]

3.3

veröffentlichte Auslastung

(en: payload publication)

verkehrsbezogene Information oder zugeordnete Betriebsinformation, die zu einem festen Zeitpunkt erstellt, und über die DATEX II Schnittstelle übertragen wurde

3.4

Situation

(en: situation)

in der realen Welt identifizierbare Begebenheit, welche ein oder mehrere Verkehrs/Reiseumstände mit einem oder mehreren kausalen Zusammenhängen umfasst

Anmerkung 1 zum Begriff: Jede Situation hat ihre eigene Lebensdauer, welche sich über die Lebensdauer der individuellen Komponentenumstände erstreckt

3.5

Situationselement

(en: situation element)

in der realen Welt identifizierbare Begebenheit, welche einen Verkehrs/Reiseumstand mit eigener Lebensdauer umfasst

Anmerkung 1 zum Begriff: Details jedes einzelnen Situationselementes werden einem einzelnen Datensatz zugeordnet.

— Leerseite —

English Version

Intelligent transport systems - DATEX II data exchange
specifications for traffic management and information -
Part 3: Situation Publication

Intelligente Verkehrssysteme - DATEX II
Datenaustauschspezifikation für Verkehrsmanagement
und Verkehrsinformationen - Teil 3: Publikation von
Verkehrssituationen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 278.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 16157-3:2017) has been prepared by Technical Committee CEN/TC 278 “Intelligent transport systems”, the secretariat of which is held by NEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede CEN/TS 16157-3:2011.

The major differences introduced in the new edition of this part are the following:

- remodelling the cause of traffic situations, better fitting the operational use;
- enabling the mark up of Safety Related traffic information according to Commission Delegated Regulation (EU) No 886/2013;
- improving consistency of accidents and vehicle obstructions;
- adding several requested enumeration literals to support operational requirements;
- correcting different bugs.

prEN 16157-3 is the third part of the EN 16157 series, *Intelligent transport systems — DATEX II data exchange specifications for traffic management and information*; the other parts are:

- *Part 1: Context and Framework;*
- *Part 2: Location referencing;*
- *Part 4: Variable Message Sign (VMS) Publications;*
- *Part 5: Measured and elaborated data publications;*
- *Part 6: Parking Publications;*
- *Part 7: Common data elements.*

Other parts will be developed in the future.

As a user of the standard, attention is drawn to the resources of www.datex2.eu <<http://www.datex2.eu/>>. This website contains related software tools and software resources that aid the implementation of the EN 16157 DATEX II series.

Introduction

This European Standard defines a common set of data exchange specifications to support the vision of a seamless interoperable exchange of traffic and travel information across boundaries, including national, urban, interurban, road administrations, infrastructure providers and service providers. Standardization in this context is a vital constituent to ensure interoperability, reduction of risk, reduction of the cost base, promotion of open marketplaces and many social, economic and community benefits to be gained from more informed travellers, network managers and transport operators.

Delivering European Transport Policy in line with the White Paper issued by the European Commission requires co-ordination of traffic management and development of seamless pan European services. With the aim to support sustainable mobility in Europe, the European Commission has been supporting the development of information exchange mainly between the actors of the road traffic management domain for a number of years. In the road sector, DATEX II has been long in fruition, with the European Commission being fundamental to its development through an initial contract and subsequent co-funding through the Euro-Regional projects. With this standardization of DATEX II, there is a real basis for common exchange between the actors of the traffic and travel information sector.

This European Standard includes the framework and context for exchanges, the modelling approach, data content, data structure and relationships.

This European Standard supports a methodology that is extensible.

This Part, Part 3 of this European Standard deals with the publication of situation information. It specifies the structures and definitions of information that may be exchanged to convey situation information relating to a road network, both from a road network manager and road user point of view.

The European Committee for Standardization (CEN) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning procedures, methods and/or formats given in this document.

CEN takes no position concerning the evidence, validity and scope of patent rights.

1 Scope

This European Standard (EN 16157) series specifies and defines component facets supporting the exchange and shared use of data and information in the field of traffic and travel.

The component facets include the framework and context for exchanges, the modelling approach, data content, data structure and relationships.

This European Standard is applicable to:

- traffic and travel information which is of relevance to road networks (non-urban and urban),
- public transport information that is of direct relevance to the use of a road network (e.g. road link via train or ferry service),
- traffic and travel information in the case of Cooperative intelligent transport systems (C-ITS).

This European Standard series establishes specifications for data exchange between any two instances of the following actors:

- Traffic Information Centres (TICs),
- Traffic Control Centres (TCCs),
- Service Providers (SPs),

Use of this European Standard series may be applicable for use by other actors.

This European Standard series covers, at least, the following types of informational content:

- road traffic event information – planned and unplanned occurrences both on the road network and in the surrounding environment,
- operator initiated actions,
- road traffic measurement data, status data, and travel time data,
- travel information relevant to road users, including weather and environmental information,
- road traffic management information and instructions relating to use of the road network.

This part of the EN 16157 series specifies the informational structures, relationships, roles, attributes and associated data types required for publishing situation traffic and travel information within the DATEX II framework. This is specified as a DATEX II Situation Publication sub-model which is part of the DATEX II platform independent model, but this Part excludes those elements that relate to:

- location information which are specified in prEN 16157-2;
- common information elements, which are specified in prEN 16157-7;
- VMS settings which are specified in CEN/TS 16157-4.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

prEN 16157-1:2017¹⁾, *Intelligent transport systems — DATEX II data exchange specifications for traffic management and information — Part 1: Context and Framework*

prEN 16157-2:2017²⁾, *Intelligent transport systems — DATEX II data exchange specifications for traffic management and information — Part 2: Location referencing*

prEN 16157-7³⁾, *Intelligent transport systems — DATEX II data exchange specifications for traffic management and information — Part 7: Common data elements*

ISO/IEC 19505-1, *Information technology — Object Management Group Unified Modeling Language (OMG UML) — Part 1: Infrastructure*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 16157-1 and the following apply.

3.1

destination

specification of the end point of a defined route or itinerary

Note 1 to entry: This may be either a location on a road network or an area location.

3.2

location

identifiable geographic place

Note 1 to entry: It is either on a road network (as a point or a linear location) or as an area. This may be provided in one or more referencing systems.

[SOURCE: EN ISO 19112:2005]

3.3

payload publication

traffic related information or associated management information created at a specific point in time that is exchanged via a DATEX II interface

3.4

situation

identifiable occurrence in the real world comprising one or more traffic/travel circumstances which are linked by one or more causal relationships

1) Currently at Enquiry stage.

2) Currently at Enquiry stage.

3) Currently at Enquiry stage.

Note 1 to entry: Each Situation has its own life-cycle which encompasses the life-cycles of its component circumstances.

3.5

situation element

identifiable occurrence in the real world comprising one traffic/travel circumstance which has its own life-cycle

Note 1 to entry: Details of each situation element are mapped into a single data record.

4 Symbols and abbreviations

For the purposes of this document, the abbreviation of terms given in prEN 16157-1 and the following apply.

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ETRS89	European Terrestrial Reference System 1989
GUID	Globally Unique Identifier
HTML	Hyper text mark-up language
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
IMDG	International Maritime Dangerous Goods (code)
IP	Internet Protocol
LPG	Liquid Petroleum Gas
PDF	Portable document format created by Adobe
RSS	Really simple syndication comprises a Web feed format used to publish frequently updated sources of information.
TREM	Transport Emergency Card
UML	Unified Modelling Language
UNDG	United Nations Dangerous Goods (number)
URL	Uniform Resource Locator
VIP	Very Important Person
VMS	Variable Message Sign

5 Conformance

The DATEX II platform independent data model of which the Situation Publication sub-model is a part, corresponds to the Level A model as defined in prEN 16157-1.

Conformance with this Part shall require platform independent models from which platform specific models are generated to comply with the UML modelling rules defined in prEN 16157-1 and with the following requirements of this sub-model which are expressed in this Part.

It should be noted that conformance of a publication service with all the structural requirements stated above does not necessarily ensure that the informational content of that service will be semantically comprehensible.

6 UML notation

The UML notation used in these Standards are as described in ISO/IEC 19505-1.

NOTE Some introduction guides to UML 2 are provided in the Bibliography of prEN 16157-1:2017.

7 The Situation model

7.1 Overview of the Situation model

The Situation model shall comprise the packages used in the Situation Publication and the Classes and Enumerations specific for this Payload Publication.

7.2 Overview of the SituationPublication model

The Situation Publication model shall comprise a number of packages, with the “<<D2Package>>SituationPublication” package providing the entry to the model and the subordinate “SituationRecord” package modelling the individual elements of situations. The “SituationPublication” package shall be one of several packages which are immediately subordinate to the “PayloadPublication” package and hence forms the top of the hierarchy in the Situation Publication model. The “SituationRecord” package shall make use of a number of packages thus invoking a hierarchy of packages.

Each “SituationPublication” instance shall specify any number of individual situations in the real world, each of which shall comprise separate, but related, elements which are modelled in DATEX II as “SituationRecords”.

A “SituationRecord” shall be further specialized as being either of type “NonRoadEventInformation”, “TrafficElement”, “OperatorAction” or “GenericSituationRecord”. The “GenericSituationRecord” is provided purely for user extension of the model.

“NonRoadEventInformation”, as the name suggests, models events and information which are not occurring directly on or related to the road itself, but may still indirectly affect the operation of the road network, e.g. a road side service area is closed or a ferry service is not operating.

“TrafficElement” models events, activities and conditions which are occurring on the road network or are directly affecting the operation of the road network, e.g. an accident, an obstruction on the road or bad weather.

“OperatorAction” models actions or initiatives that a traffic operator may implement (either manually or automatically) to mitigate dangerous or poor driving conditions, and maintain optimal efficiency and safety of the road network which may include maintenance of the road infrastructure.

The entry class of each of the “NonRoadEventInformation”, “TrafficElement”, “OperatorAction” or “GenericSituationRecord” sub-packages shall be a class in the higher level package. The hierarchy of packages shall be strictly linear without any circular referencing.

Some of the packages and individual classes used within the “SituationPublication” package reside in the D2Namespace “Common” because they can be used in different places within this package or by other packages either now or in the future. The D2Namespace “Common” shall be a container for a number of packages and individual reusable classes. Those packages and classes which are contained in the D2Namespace “Common” are identified in the following clauses. The use of individual classes from

the “Common” namespace are only described in detail if their use in the “SituationPublication” affect their semantics.

7.3 The “<<D2Package>>SituationPublication”

7.3.1 Overview of the “<<D2Package>>SituationPublication”

The “SituationPublication” package shall be immediately subordinate to the “PayloadPublication” package and comprises a sub-model for defining publishable “Situations”, each of which may comprise one or more elements (see Figure 1). Each element of a “Situation” shall be modelled as an individual “SituationRecord”.

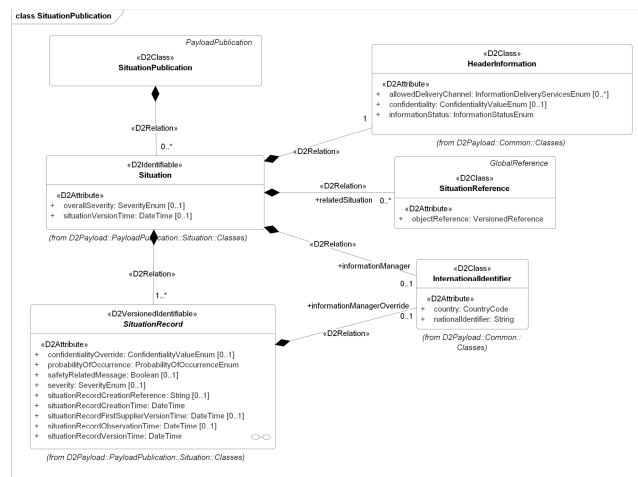


Figure 1 — The “<<D2Package>>SituationPublication” class model

7.3.2 Semantics of the “<<D2Package>>SituationPublication”

7.3.2.1 “<<D2Package>>SituationPublication” semantics – general

The “<<D2Package>>SituationPublication” class shall be the only entry point of the package and is a specific realizable case of a “PayloadPublication”. Each “SituationPublication” may contain any number of separate situations each of which themselves may comprise one or more elements. Each element of a “Situation” shall be modelled as a “SituationRecord” in DATEX II.

The modelling of each situation and each component situation element represented by an instance of a “SituationRecord” class shall be uniquely identifiable for the particular DATEX II service and have its own lifecycle. Although each may iterate through different time-stamped versions all instances of the “Situation” class has an assigned stereotype of <<Identifiable>>, whereas the “SituationRecord” class has an assigned stereotype of <<VersionedIdentifiable>>, to allow for referencing to a specific version of the the SituationRecord during its lifecycle (see prEN 16157-1 for how the implementation of these stereotypes in the PSM allows identity and version to be represented in a data exchange).

7.3.2.2 “Situation” class

The “Situation” class shall be the base class for detailing a situation that may affect traffic on the roads.

7.3.2.3 “HeaderInformation” class

(From “Common” namespace)

Each instance of a “Situation” shall have associated metadata contained in the “HeaderInformation” class which allows the supplier of the publication to specify how the recipient should treat the information contained in the “Situation”.

The “HeaderInformation” class and its components is defined in prEN 16157-7.

7.3.2.4 “SituationReference” class

An instance of a “Situation” can be related somehow to any other “Situation”, either published by the same publication creator or by another one. The use of the SituationReference class is defined as relatedSituation. There may be any number of relatedSituations. For instance a “Situation” containing an “Accident” element and a resulting “AbnormalTraffic” element (e.g. indicating queuing traffic) could be related to a “Situation” containing an “AbnormalTraffic” element on the opposite carriageway.

- **Attribute “objectReference”** shall be used to provide the related “Situation”. In case of a reference to a specific version, the attribute “version” may be used. In case a generic reference to that “Situation” is made, the attribute “version” shall be omitted.

7.3.2.5 “InternationalIdentifier” class

(from “Common” namespace)

The “InternationalIdentifier” class can be used in association with the Situation class, to provide the information Manager of the Situation, by using this attribute in the role “informationManager”. The information Manager is defined as the organization that manages the information content (is responsible for updates of this information) typically the organization that first made the DATEX II publication of this content.

Associated to the situation record the class “InternationalIdentifier” can be used to provide a different organization as being the information manager of that specific situation record, by using this class in the role of “informationManagerOverride”

The “InternationalIdentifier” class and its components is defined in prEN 16157-7.

7.4 The “SituationRecord” package

7.4.1 Overview of the “SituationRecord” package

The package, “SituationRecord”, shall comprise a sub-model for defining an individual element of a “Situation” as a single identifiable, version managed record (see Figure 2).

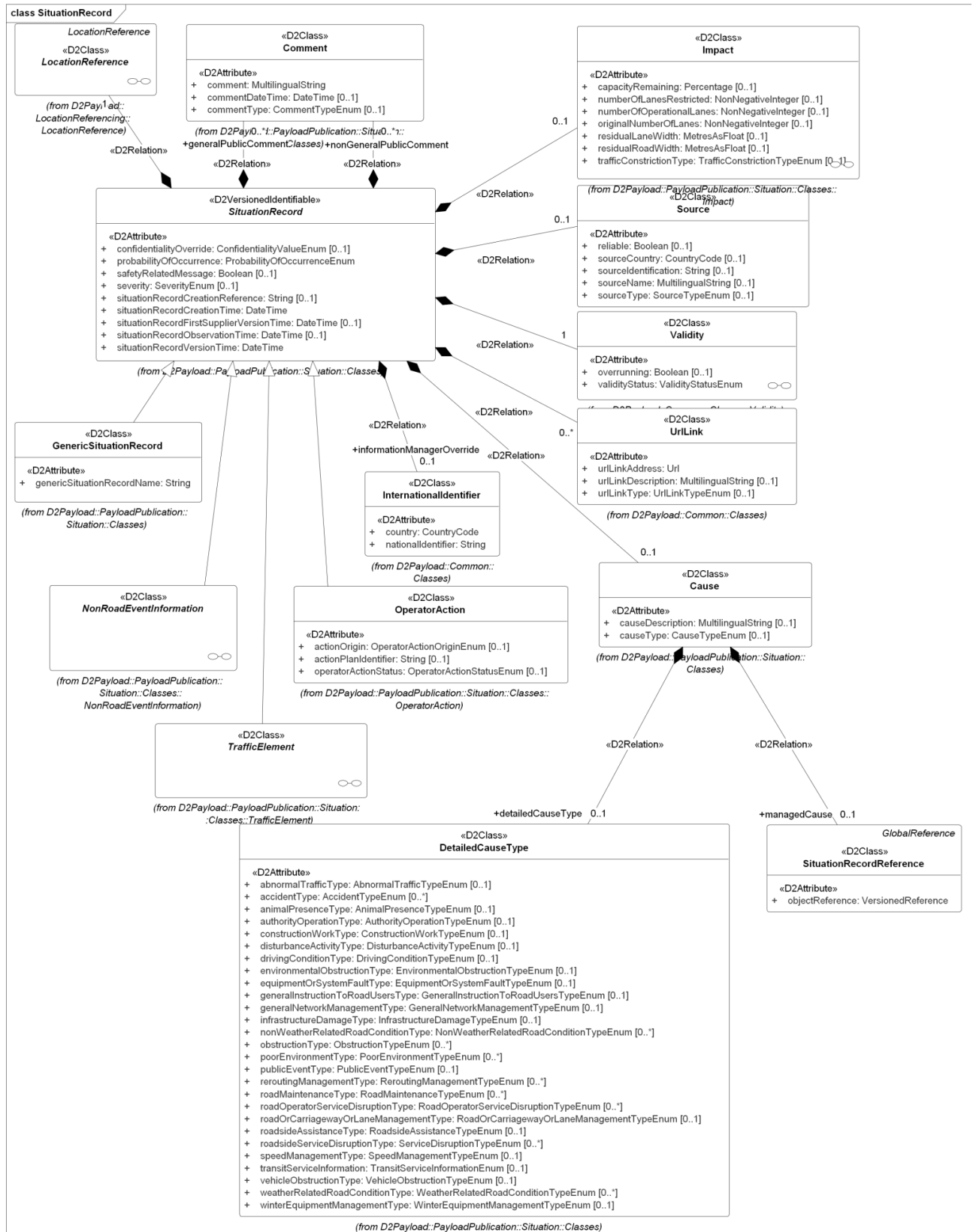


Figure 2 — The “SituationRecord” package class model

7.4.2 Semantics of the “SituationRecord” package

7.4.2.1 “SituationRecord” package semantics – general

The “SituationRecord” package shall comprise an abstract “SituationRecord” class which shall be realized as one of four specializations which are used to model the details of an element of a “Situation”. Each version of a “SituationRecord” shall have associated location information and validity information as a minimum.

7.4.2.2 “SituationRecord” class

The “SituationRecord” class is abstract and shall be realized as an instance of either a “NonRoadEventInformation”, a “TrafficElement”, an “OperatorAction” or a “GenericSituationRecord”. The latter may only be used if a level B extension is required for a new type of “SituationRecord”.

The purpose of each of these instances of a “SituationRecord” is as follows:

- **“NonRoadEventInformation”**: events and information which are not occurring directly on or related to the road itself, but may still indirectly affect the operation of the road network
- **“TrafficElement”**: events, activities and conditions which are occurring on the road network or are directly affecting the operation of the road network
- **“OperatorAction”**: actions or initiatives that a traffic operator (or an automatic system under the operator’s control) may implement to mitigate dangerous or poor driving conditions, and maintain optimal efficiency and safety of the road network
- **“GenericSituationRecord”**: a generic record for use in level B extensions of the DATEX II model.

Before describing the details of the “SituationRecord” class it needs to be understood that the DATEX II model has been designed to cater for the relaying of traffic and travel information down a supply chain of systems or nodes where the first system (the “creator” that can be reflected by using “informationManager”) in that chain creates “SituationRecords” in its database and then supplies them to the next system in the chain. Each system in the supply chain is a “supplier” to the next. The attributes in the “SituationRecord” reflect this supply chain concept and, if used correctly, should assist with the correct processing of situation information received via complex supply chains.

- **Attribute “situationRecordCreationReference”** may be used to specify a reference for the “SituationRecord” object that was created by the original supplier in the supply chain when the first version of the record was created. This shall not change in subsequent versions of the same “SituationRecord”. It is up to the original supplier to manage these references which may be used by downstream systems to correctly process data received via diverse supply chains (e.g. the same data may be unknowingly received via different supply chains and this reference will help identify such occurrences).
- **Attribute “situationRecordCreationTime”** shall be used to specify the date/time that the first version of the SituationRecord object was created by the original supplier. It shall not change in subsequent versions of the same “SituationRecord”. Again shall be up to the original supplier to create this time stamp.
- **Attribute “situationRecordObservationTime”** may be used to specify the time at which the information contained in the current version of the “SituationRecord” was actually observed by the original source of the information (i.e. as close to the sensing source as possible).

- **Attribute “situationRecordVersionTime”** shall be used to specify the date/time that this current version of the “SituationRecord” was written into the database of the supplier which is involved in this data exchange. This time and the associated version identification shall be different from those provided by preceding suppliers (if there are any) in the supply chain since they are relative to this supplier. Note that the actual version of the “SituationRecord” is placed in an attribute which is part of the platform specific realization of the <<versionedIdentifiable>> stereotype.
- **Attribute “situationRecordFirstSupplierVersionTime”** may be used to specify the date/time that the current version of the “SituationRecord” was written into the database of the original supplier in the supply chain. If there is only the current supplier in the supply chain then this time should be identical to that in “situationRecordVersionTime” and hence would not normally be given.
- **Attribute “safetyRelatedMessage”** may be used to indicate, whether this “SituationRecord” specifies a safety related message according to Commission Delegated Regulation (EU) No 886/2013.

7.4.2.3 “Comment” class

The “Comment” class may be used to allow any number of free text comments to be specified for an instance of a “SituationRecord”. The association used to relate to the “SituationRecord” specifies whether the comment shall be allowed to be published to the general public or not (identified by role names of “generalPublicComment” and “NonGeneralPublicComment” respectively). Each “SituationRecord” instance may have any number of each type of these comments.

Each “comment” attribute shall be of a multilingual string type which means a publication may contain the same comment in several different languages.

- **Attribute “commentType”** may be used to classify the type of comment. This should be helpful in allowing a recipient to use the information more effectively.

7.4.2.4 “Source” class

(from “Common” namespace)

The “Source” class may be used to identify details of the source from which the information contained in the instance/version of the “SituationRecord” was obtained. The details can include the source’s statement about the reliability of the information.

Where there are several systems in a supply chain this source information should be set by the first supplier in the chain who acquired the information. It should be relayed unchanged by subsequent suppliers in the chain, unless those suppliers modify the information or merge it with information from other sources, whereupon they should replace this information with their own.

- **Attribute “reliable”** can provide an indication of whether the source of the information deems it to be reliable. It is up to the recipient of the information to understand what criteria the source is using to set this reliability attribute. For instance the source may be using some automatic health check system on the sensor equipment to set this value, or it may be being set manually. An understanding of this can influence the recipient’s perception of this attribute’s value.

The “Source” class and its components is defined in prEN 16157-7.

7.4.2.5 “UrlLink” class

(From “Common” namespace)

The “UrlLink” class may be used to allow any number of Uniform Resource Locators (URL) to be specified where further information relating to the instance of the “SituationRecord” may be found. A URL may point to additional documentation in PDF format or HTML format, image data, video or voice streams or an RSS feed.

The “UrlLink” class and its components is defined in prEN 16157-7.

7.4.2.6 “Cause” class

The “Cause” class may be used to allow a supplier to provide information about the cause of the situation element which is defined by the “SituationRecord”.

7.4.2.7 “NonManagedCause” class

The “NonManagedCause” class may be used to allow a supplier to provide information about the cause of the situation element which is not something that is managed by the supplier which is providing this data exchange service (i.e. the publication creator). Hence the cause cannot be identified by a reference to another “SituationRecord” produced by the supplier. Only a description and a type of cause can be provided.

7.4.2.8 “DetailedCauseType” class

The “DetailedCauseType” class may be used to allow a supplier a more detailed and structured way to provide information about the cause of the situation element. All types used in the SituationPublication that are relevant can be used.

7.4.2.9 “SituationRecordReference” class

The “SituationRecordReference” class in the “managedCause” role may be used to allow a supplier to provide information about the cause of the situation element when it is something that is also managed by the supplier himself or another supplier which is providing this data exchange service (i.e. the publication creator). Hence the cause should be identified by a reference (the “managedCause”) to another managed “SituationRecord” produced by a supplier.

- **Attribute “objectReference”** shall be used to provide the related “SituationRecord”. In case of a reference to a specific version, the attribute “version” may be used. In case a generic reference to that “SituationRecord” is made, the attribute “version” shall be omitted.

7.5 The “Impact” package

7.5.1 Overview of the “Impact” package

The package, “Impact”, shall comprise a sub-model for defining an assessment of the impact that the situation element described in the “SituationRecord” will have or is having on the driving conditions on the road (see Figure 3). The specified impact is deemed to hold true for all the valid periods of the “SituationRecord” as defined by the associated “Validity” class and over the full length of the location defined for the “SituationRecord”. If the impact (e.g. delay) varies over the valid periods of the “SituationRecord” or over separate locations within the “SituationRecord” then separate “SituationRecords” should be created instead for each of the different levels of impact over time or space.

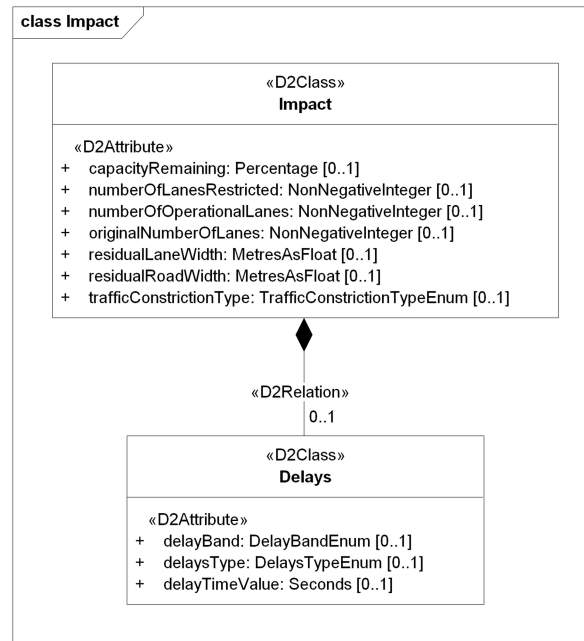


Figure 3 — The “Impact” package class model

7.5.2 Semantics of the “Impact” package

7.5.2.1 “Impact” package semantics – general

The “Impact” package shall model the details of the assessed impact that an event or operator action will have or is having on the driving conditions in terms of the roads ability to carry traffic and in terms of delays on that traffic. The impact shall be deemed to be constant through the validity periods and locations defined for the whole “SituationRecord”.

7.5.2.2 “Impact” class

The “Impact” class shall contain the basic impact information in terms of the constraints imposed by the situation element defined in the “SituationRecord” instance on the road network. This may be expressed in terms of remaining flow capacity, reductions in the physical road size and/or obstructions and blockages.

7.5.2.3 “Delays” class

The “Delays” class may be used to detail the delays being or expected to be caused by the situation element defined in the “SituationRecord” instance within the validity periods and locations defined for the situation element. Delays may be expressed in terms which are relative to normal conditions, in terms of a course classification and as absolute times. It is recommended that only one of these options should be used to avoid confusion.

7.6 The “Validity” package — Overview of “Validity” package

(From “Common” namespace)

The package, “Validity”, shall comprise a sub-model for defining the temporal validity of a situation element described in the “SituationRecord” instance, or the impact of such a situation element, where validity in this context means the time period in which the real world event, activity, action or impact being described actually occurs or is predicted to occur.

The “Validity” package and its components is defined in prEN 16157–7.

7.7 The “NonRoadEventInformation” package

7.7.1 Overview of the “NonRoadEventInformation” package

The package, “NonRoadEventInformation”, may be used which shall comprise a sub-model for defining information about events which are not directly located on or directly affecting the road, but which may never the less indirectly influence the behaviour of drivers and hence the characteristics of traffic flow (see Figure 6).

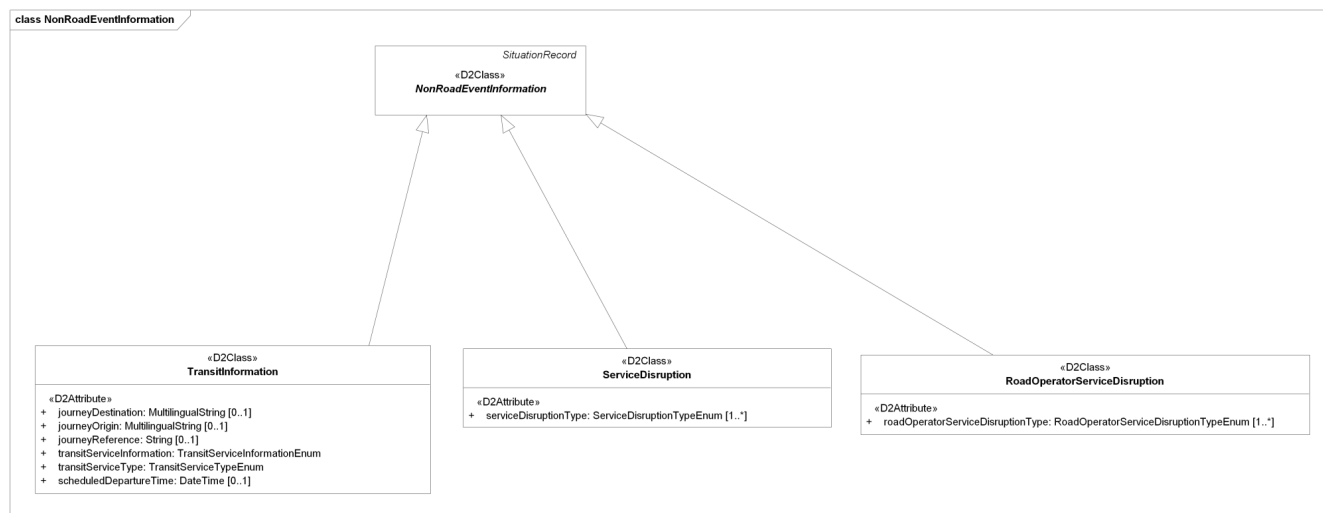


Figure 4 — The “NonRoadEventInformation” package class model

7.7.2 Semantics of the “NonRoadEventInformation” package

7.7.2.1 “NonRoadEventInformation” package semantics – general

The “NonRoadEventInformation” package shall comprise an abstract “NonRoadEventInformation” class which shall be realized as one of four specializations which are used to model the details of information relating to events which are not directly located on or directly affecting the road.

7.7.2.2 “NonRoadEventInformation” class

The “NonRoadEventInformation” class is abstract and shall be realized as an instance of one of “TransitInformation”, “ServiceDisruption” or “RoadOperatorServiceDisruption”.

7.7.2.3 “TransitInformation” class

The “TransitInformation” class may be used which shall allow a supplier to provide information relating to transit services, such as their availability and their departure times/delays, which might be of direct interest to road users, e.g. connecting rail or ferry services. It is not intended to be used as a means of publishing general public transport information, but only that which might be of direct relevance to road users.

7.7.2.4 “ServiceDisruption” class

The “ServiceDisruption” class may be used which shall allow a supplier to provide information about disruption to normal services on the road or roadside (e.g. specific services at a service area, or the unavailability of parkingplaces in general).

7.7.2.5 “RoadOperatorServiceDisruption” class

The “RoadOperatorServiceDisruption” class may be used which shall allow a supplier to provide information about disruption to normal services provided by the road operator such as traffic officer patrol services or telephone information services.

7.8 The “TrafficElement” package

7.8.1 Overview of the “TrafficElement” package

The package, “TrafficElement”, may be used which shall comprise a sub-model for defining information about events or activities which are located on the road network or which may directly affect a section of the road network but which are not planned or instigated by the road operator as part of traffic management activities (see Figure 5). Note that some activities may be planned by others (e.g. the police, civil authorities or dissident groups).

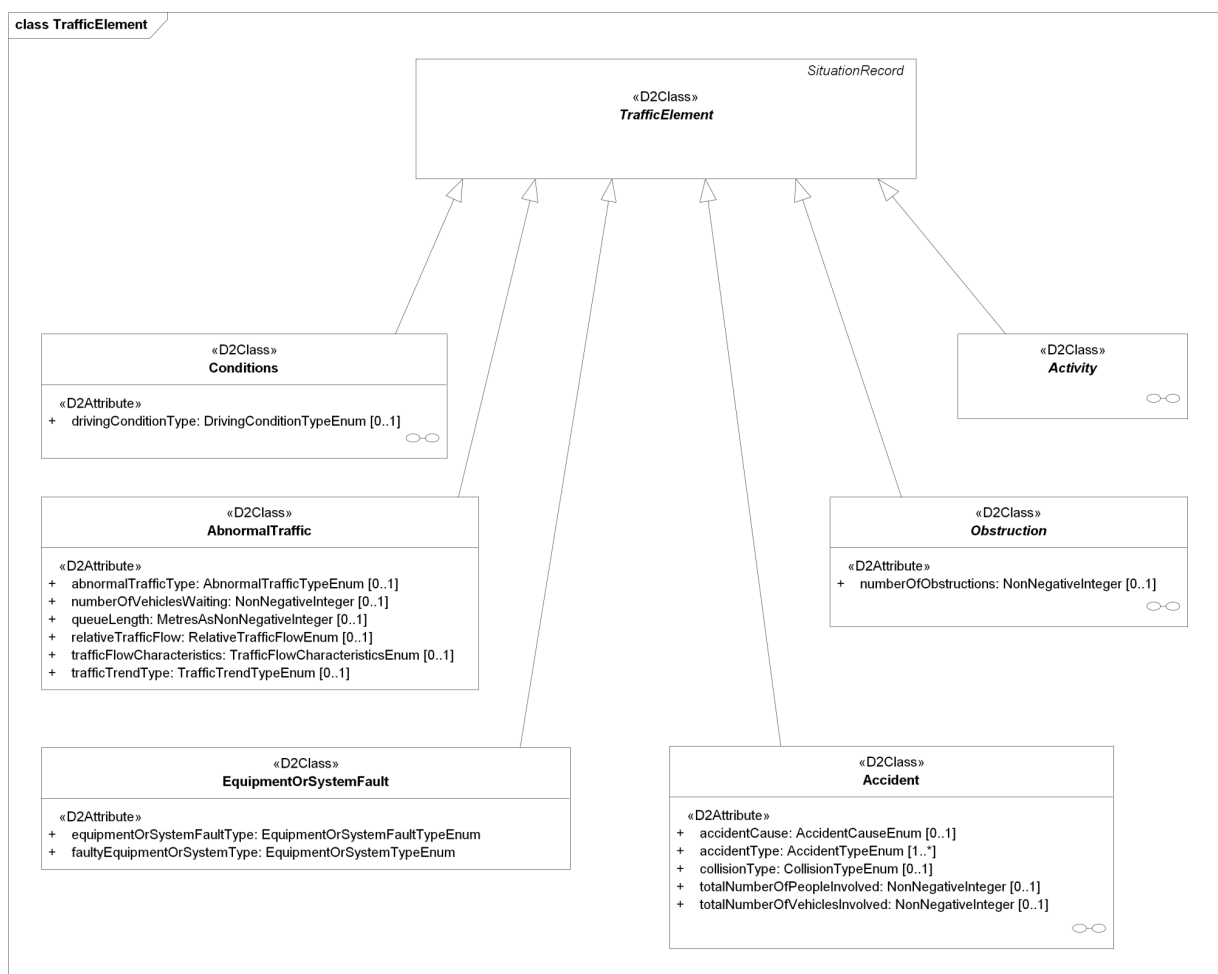


Figure 5 — The “TrafficElement” package class model

7.8.2 Semantics of the “TrafficElement” package

7.8.2.1 “TrafficElement” package semantics – general

The “TrafficElement” package shall comprise an abstract “TrafficElement” class which shall be realized as one of six specializations which are used to model the details of the different types of events.

7.8.2.2 “TrafficElement” class

The “TrafficElement” class is abstract and shall be realized as an instance of either “Conditions”, “AbnormalTraffic”, “EquipmentOrSystemFault”, “Accident” or as one of the specializations of the “Obstruction” or “Activity” classes.

7.8.2.3 “AbnormalTraffic” class

An instance of the “AbnormalTraffic” class may be used which shall allow a supplier to provide information about instances of abnormal traffic conditions at locations on the road network. These conditions can be described in a number of ways, including relative to normally expected conditions at the point on the network and at that date/time.

7.8.2.4 “EquipmentOrSystemFault” class

An instance of the “EquipmentOrSystemFault” class may be used which shall allow a supplier to provide information about an equipment or system which is faulty, malfunctioning or not in a fully operational state that may be of interest or concern to road operators and road users. This shall be used for conveying information about electrical/electronic equipments and systems, not about damaged civil infrastructure (see 7.13, the “Obstruction” package for details).

7.9 The “Conditions” package

7.9.1 Overview of the “Conditions” package

The package, “Conditions”, shall comprise a sub-model for defining information about conditions which may affect driving, and specifically for defining details of road surface conditions or environmental conditions (see Figure 6). The package contains concrete “SituationRecord” subclasses within a “SituationPublication”, some of which may have associated quantitative measures relating to the conditions on the road e.g. wind speed or depth of snow.

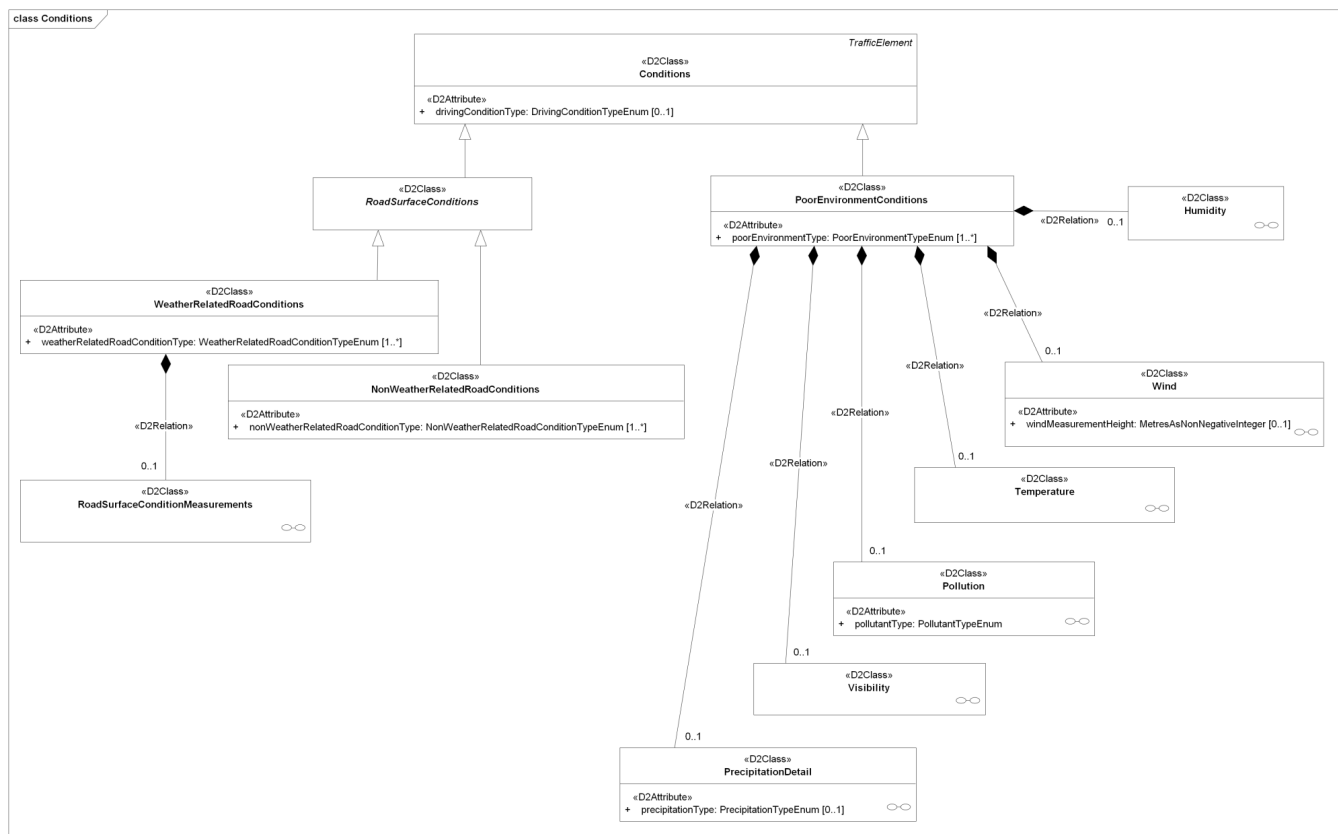


Figure 6 — The “Conditions” package class model

7.9.2 Semantics of the “Conditions” package

7.9.2.1 “Conditions” package semantics – general

The information that is modelled in the “Conditions” package is a general assessment of the driving conditions plus details of the road surface conditions and poor environmental conditions (including weather). The base class, “Conditions”, is a realizable class which shall be specialized as either “RoadConditions” or “PoorEnvironmentConditions”.

7.9.2.2 “Conditions” class

This is the base class that shall be used for detailing all conditions that may affect or degrade normal driving conditions on the road.

- **Attribute “drivingConditionType”** specifies a high level assessment of the driving conditions which are being or may in the future be experienced on the road by travellers.

7.9.2.3 “RoadSurfaceConditions” class

This is an abstract class that shall be realized as an instance of either “WeatherRelatedRoadConditions” or “NonWeatherRelatedRoadConditions”. Road conditions in this context specifically relates to road surface conditions of any type.

7.9.2.4 “WeatherRelatedRoadConditions” class

This class shall allow road surface conditions which are related to weather conditions to be specified.

7.9.2.5 “NonWeatherRelatedRoadConditions” class

This class shall allow road surface conditions which are not related to weather conditions (e.g. diesel on the road or loose chippings) to be specified.

7.9.2.6 “PoorEnvironmentConditions” class

This class shall allow any environmental conditions that may affect driving on the road to be specified. These may be specified as simple poor environment types or may additionally be qualified by specific measurement data relating to the type of conditions (see 7.10, the “WeatherData” package for details).

- **Attribute “poorEnvironmentType”** shall be used to provide a description of the type of poor environmental conditions affecting the driving conditions on the road. There may be more than one type of poor environmental condition specified simultaneously.

7.10 The “WeatherData” package — Overview of the “WeatherData” package

The package, “WeatherData” is defined in prEN 16157-7.

The allowed types in the PoorEnvironmentConditions class are:

- class “Humidity”
- class “Wind”
- class “Temperature”
- class “Pollution”
- class “Visibility”
- class “PrecipitationDetail”

7.11 The “RoadSurfaceConditionMeasurements” package

7.11.1 Overview of the “RoadSurfaceConditionMeasurements” package

(from “WeatherData” package within “Common” namespace)

The package, “RoadSurfaceConditionMeasurements”, shall allow road surface condition measurements which are related specifically to the weather to be specified.

The “RoadSurfaceConditionMeasurements” package and its components is defined in prEN 16157-7, as a specialization of the weatherData class

7.12 The “Accident” package

7.12.1 Overview of the “Accident” package

The package, “Accident”, shall comprise a sub-model for defining information about accident events involving vehicles which occur on the road network (see Figure 7).

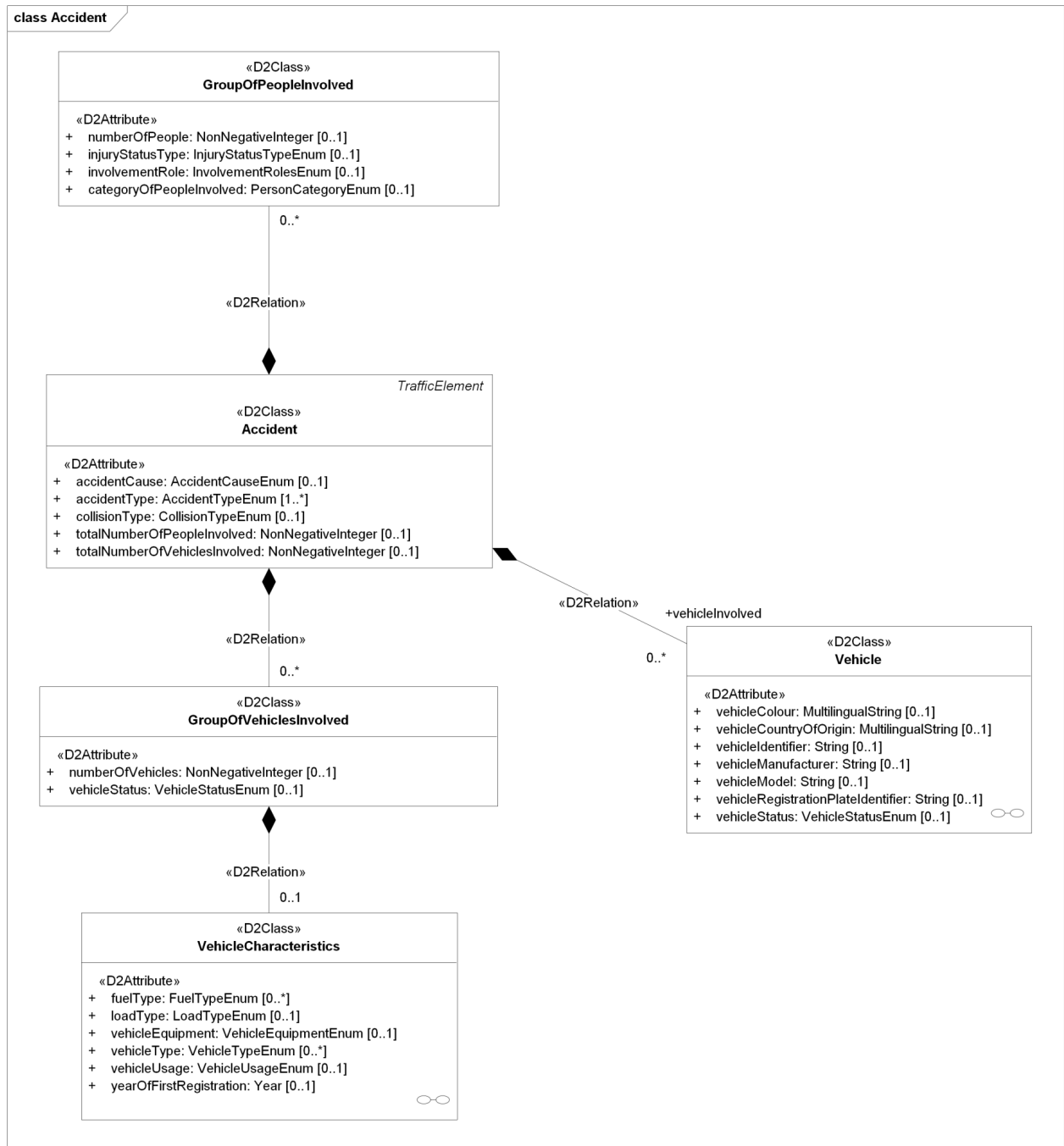


Figure 7 — The “Accident” package class model

7.12.2 Semantics of the “Accident” package

7.12.2.1 “Accident” package semantics – general

The information that is modelled in the “Accident” package shall identify the type and cause of the accident and the details of the vehicle(s) and people involved which may be of use to traffic managers and traffic information service providers. Details of vehicles involved can be provided as relating to a group of vehicles or as information specific to individual vehicles by using the associations with the “GroupOfVehiclesInvolved” class or the “Vehicle” class respectively.

7.12.2.2 “Accident” class

An instance of the “Accident” class shall allow a supplier to provide basic information about vehicle accidents which includes at a minimum the type of the accident.

7.12.2.3 “GroupOfVehiclesInvolved” class

(From “Common” namespace)

This class may be used to allow details of a group of vehicles involved in an accident which share common characteristics and/or status to be specified. There may be more than one group of vehicles involved in an accident, each having a common set of characteristics (e.g. lorries over a certain weight) and/or status (e.g. broken down). The number in each group can be specified.

The “GroupOfVehiclesInvolved” class and its components is defined in prEN 16157–7.

7.12.2.4 “GroupOfPeopleInvolved” class

This class may be used to allow details of a group of people involved in an accident which share common attributes to be specified. There may be more than one group of people involved in an accident, each having a common role in the accident (e.g. vehicle passenger), status (e.g. seriously injured) and/or category (e.g. child). The number in each group can be specified.

7.12.2.5 “Vehicle” class

(from “Common” namespace)

This class is used with the vehicleInvolved Role and may be used to allow details of individual vehicles involved in an accident. There may be more than one vehicleInvolved in an accident, each having a set of characteristics and/or status (e.g. broken down).

The “Vehicle” class and its components is defined in prEN 16157–7.

7.13 The “Obstruction” package

7.13.1 Overview of the “Obstruction” package

The package, “Obstruction”, shall comprise a sub-model for defining information about obstructions of a physical nature on or adjacent to the roadway which may disrupt or endanger traffic (see Figure 8).

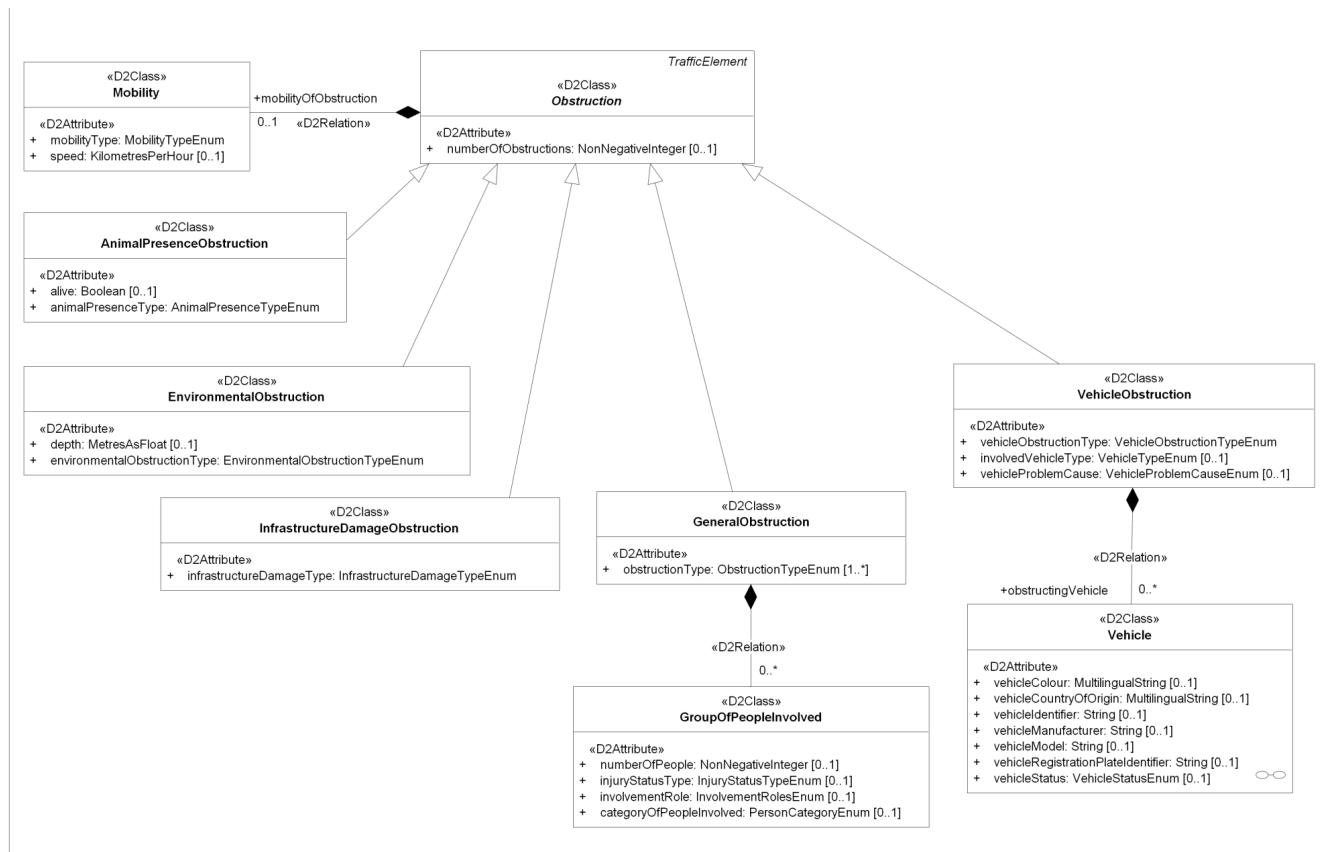


Figure 8 — The “Obstruction” package class model

7.13.2 Semantics of the “Obstruction” package

7.13.2.1 “Obstruction” package semantics – general

The information that is modelled in the “Obstruction” package shall identify details of obstructions of a variety of types which may be either stationary or mobile. The obstructions modelled shall be of type general, animal presence, environmental, infrastructure or vehicle related. Obstructions are things of a physical nature which are having, or potentially may have, a material impact on the traffic flowing on the road network. Usually these physical things occur on the road itself, but not always. For instance a house fire or a rail crash close to the road may have a material effect on traffic flows and would therefore be classed as an obstruction.

7.13.2.2 “Obstruction” class

The “Obstruction” class is abstract and shall be realized as an instance of either “GeneralObstruction”, “AnimalPresenceObstruction”, “EnvironmentalObstruction”, “InfrastructureDamageObstruction” or “VehicleObstruction”.

7.13.2.3 “GeneralObstruction” class

An instance of the “GeneralObstruction” class shall allow a supplier to identify the nature of the obstruction(s) as being one of a number of general types.

7.13.2.4 “AnimalPresence” class

An instance of the “AnimalPresence” class shall allow a supplier to specify details of obstruction(s) which involve animals on the road.

7.13.2.5 “EnvironmentalObstruction” class

An instance of the “EnvironmentalObstruction” class shall allow a supplier to specify details of obstruction(s) which are the result of environmental conditions.

7.13.2.6 “InfrastructureDamageObstruction” class

An instance of the “InfrastructureDamageObstruction” class shall allow a supplier to specify details of obstruction(s) which are the result of failures or damage to the road infrastructure. This is specifically the civil infrastructure, not the electronic/system infrastructure which is covered by the “EquipmentOrSystemFault” class. It may be on, under or above the road itself.

7.13.2.7 “VehicleObstruction” class

An instance of the “VehicleObstruction” class shall allow a supplier to specify details of obstruction(s) which are caused by one or more vehicles.

7.13.2.8 “Vehicle” class

(From “Common” namespace)

This class is used with the “obstructingVehicle” Role and may be used to allow details of individual vehicles causing the obstruction. There may be more than one “obstructingVehicle” causing the obstruction, each having a set of characteristics and/or status (e.g. broken down).

The “Vehicle” class and its components is defined in prEN 16157-7.

7.13.2.9 “Mobility” class

The “Mobility” class in this case shall allow a supplier to specify whether the obstruction is mobile or stationary. In case of a mobile obstruction, the speed at which the “obstruction” is moving may be specified.

7.14 The “Activity” package

7.14.1 Overview of the “Activity” package

The package, “Activity”, shall comprise a sub-model for defining information about human activities other than relating to the traffic stream which are causing or may cause traffic disruption (see Figure 9).

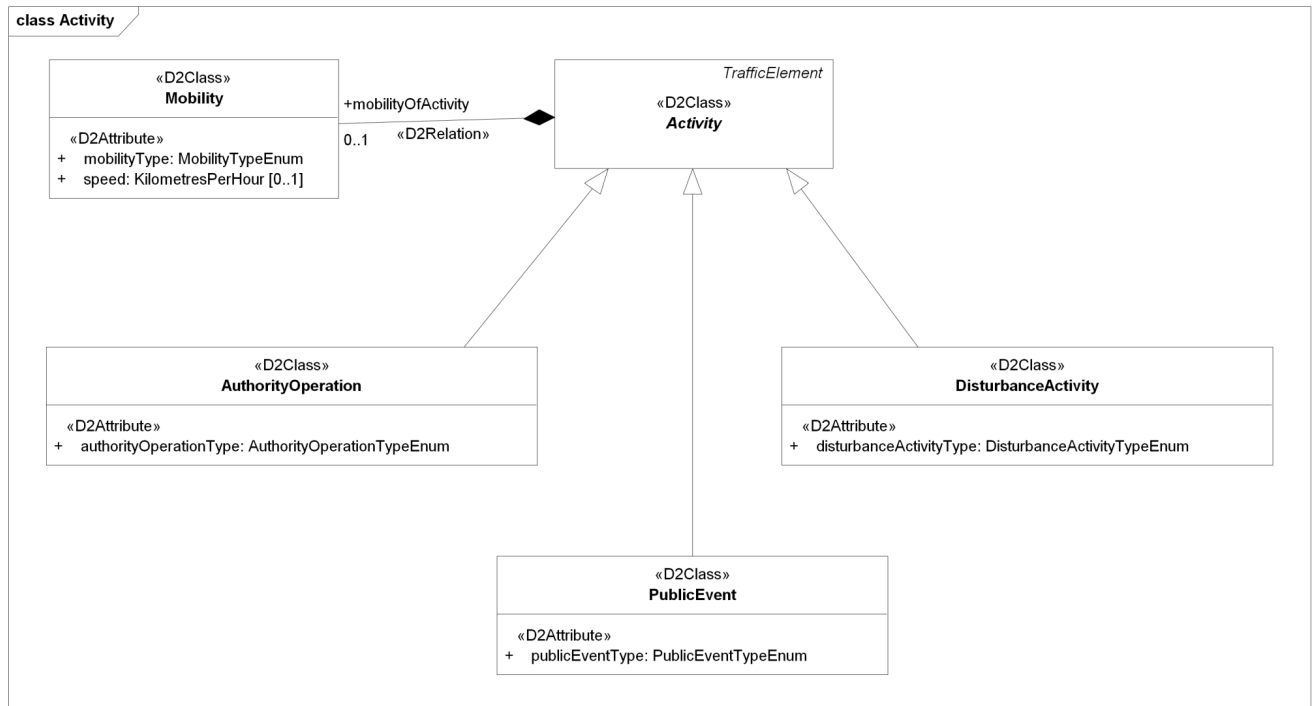


Figure 9 — The “Activity” package class model

7.14.2 Semantics of the “Activity” package

7.14.2.1 “Activity” package semantics – general

The information that is modelled in the “Activity” package shall identify details of human activities of a variety of types which may be either stationary or mobile. The activities modelled relate to those organized or initiated by official authorities (other than the road operator itself), those relating to public events or those activities which are of a disturbance nature.

7.14.2.2 “Activity” class

The “Activity” class is abstract and shall be realized as an instance of either “AuthorityOperation”, “PublicEvent” or “DisturbanceActivity”.

7.14.2.3 “AuthorityOperation” class

An instance of the “AuthorityOperation” class shall allow a supplier to identify a type of activity organized or initiated by an official authority. This does not include road operator initiated activities that are normally used to ameliorate dangerous or poor driving conditions (see 7.23, the OperatorActions package for details).

7.14.2.4 “PublicEvent” class

An instance of the “PublicEvent” class shall allow a supplier to identify a type of public event activity which may cause traffic disruption, typically because it may be a traffic generator or because it may disrupt the flow of traffic such as in the case of a parade or procession.

7.14.2.5 “DisturbanceActivity” class

An instance of the “DisturbanceActivity” class shall allow a supplier to identify a type of human action either of a public disorder nature or of a situation alert type which may cause traffic disruption. Usually

these are of an unplanned nature, although not necessarily unplanned by the perpetrators of the disturbance.

7.14.2.6 “Mobility” class

The “Mobility” class in this case shall allow a supplier to specify whether the activity is mobile or stationary. In case of a mobile obstruction, the speed at which the “obstruction” is moving may be specified.

7.15 The “OperatorAction” package

7.15.1 Overview of the “OperatorAction” package

The package, “OperatorAction”, may be used which shall comprise a sub-model for defining information about road operator actions which affect the road network or the users of the road network and are intended to help prevent or correct dangerous or poor driving conditions or maintain the road infrastructure (see Figure 10).

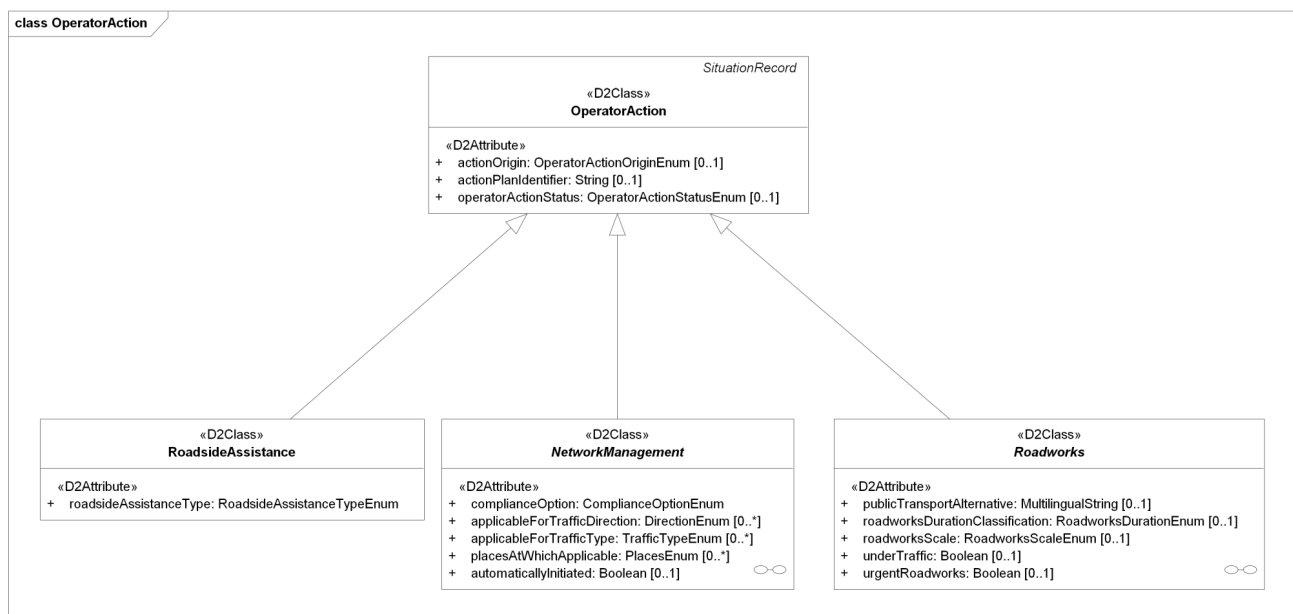


Figure 10 — The “OperatorAction” package class model

7.15.2 Semantics of the “OperatorAction” package

7.15.2.1 “OperatorAction” package semantics – general

The “OperatorAction” package shall comprise an “OperatorAction” class which shall be specialized as one of four types which are used to model the details of the different road operator actions.

7.15.2.2 “OperatorAction” class

The “OperatorAction” class is a realizable class which may be further specialized as instances of “RoadsideAssistance” or as one of the specializations of the “Roadworks” or “NetworkManagement” abstract classes.

- **Attribute “actionOrigin”** indicates whether the action has been instigated by the road operator (internal) or by someone or some system external to the road operator, e.g. an adjacent road authority/operator requesting the action.

- **Attribute “actionPlanIdentifier”** provides the identification of the traffic management action plan to which the action relates, if it is part of such a plan.
- **Attribute “operatorActionStatus”** provides information about the status of the operator action in terms of whether it is actually now only a request, is approved but not yet implemented, is in the process of being implemented (i.e. not yet fully implemented), is fully implemented, is rejected by the road operator, has had its termination requested, or is in the process of being terminated. If this attribute is not present then it should be assumed that the action is implemented in accordance with the information in the “Validity” package.

7.15.2.3 “RoadsideAssistance” class

An instance of the “RoadsideAssistance” class may be used to allow a supplier to provide information about assistance that is required or being given at the roadside, for example, vehicle repair.

7.16 The “Roadworks” package

7.16.1 Overview of the “Roadworks” package

The package, “Roadworks”, shall comprise a sub-model for defining information about road works, either maintenance or construction works, instigated by the road operator or authority or instigated by an authorized organization such as a utility company (see Figure 11).

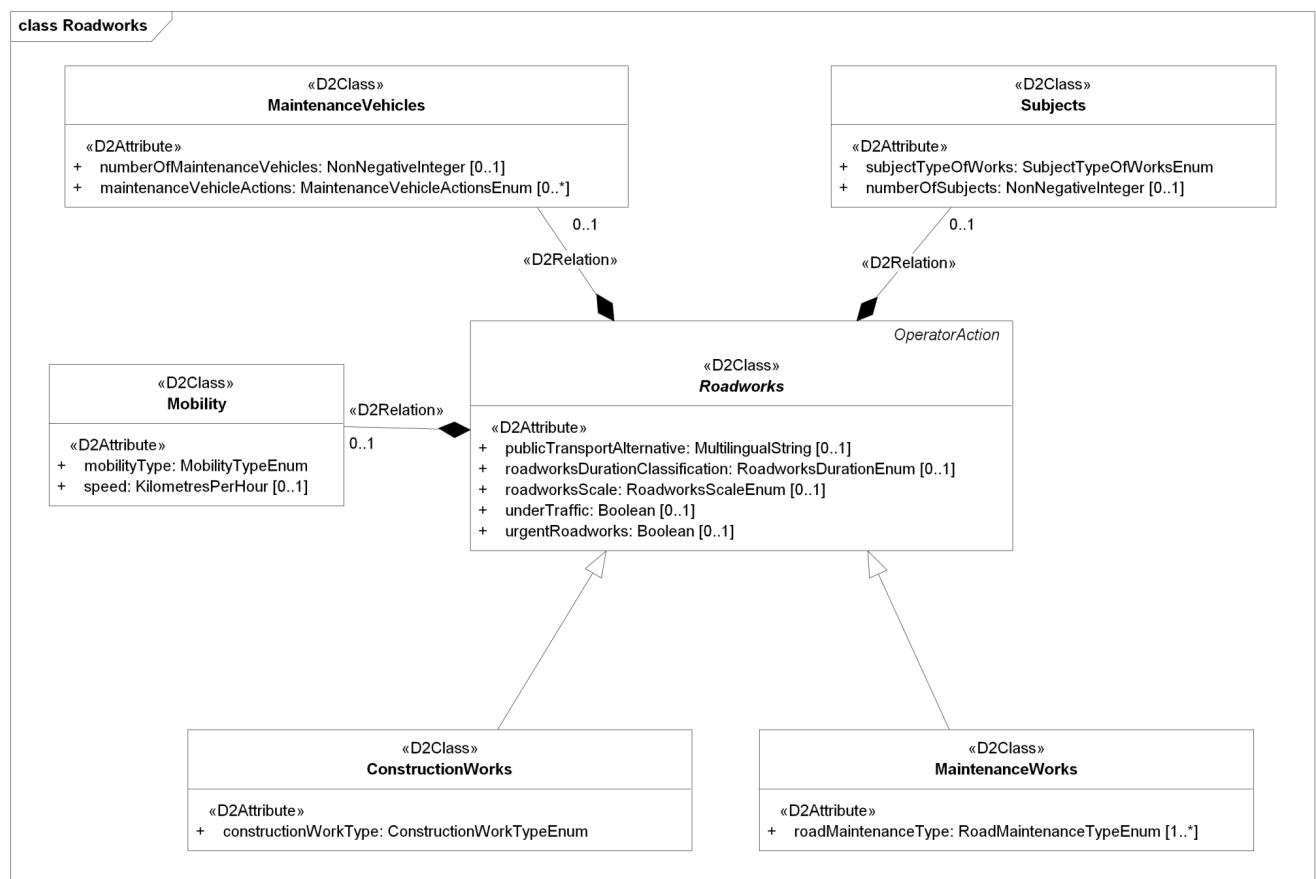


Figure 11 — The “Roadworks” package class model

7.16.2 Semantics of the “Roadworks” package

7.16.2.1 “Roadworks” package semantics – general

The “Roadworks” package shall comprise an abstract “Roadworks” class which is realized as one of two specializations which are used to model the details of the different types of road works activities (i.e. construction works and maintenance works).

7.16.2.2 “Roadworks” class

The “Roadworks” class is abstract and shall be realized as an instance of either “ConstructionWorks” or “MaintenanceWorks”.

- **Attribute “publicTransportAlternative”** may be used to provide information about (special) publictransport arrangements that are available to avoid the roadworks.
- **Attribute “underTraffic”** may be used to identify whether the road section where the road works are located is open or closed to traffic. A value of “true” indicates that the road section is still open to traffic.

7.16.2.3 “ConstructionWorks” class

An instance of the “ConstructionWorks” class shall allow a supplier to identify the road works as being associated with a type of road infrastructure construction.

7.16.2.4 “MaintenanceWorks” class

The “MaintenanceWorks” class shall allow a supplier to identify the road works as being associated with a type of maintenance of the road infrastructure.

7.16.2.5 “MaintenanceVehicles” class

The “MaintenanceVehicles” class may be used to allow a supplier to identify the number of maintenance vehicles involved with the road works and their types of actions, e.g. slow moving.

7.16.2.6 “Subjects” class

The “Subjects” class may be used to allow a supplier to identify the type and number of road infrastructure items that are the subject of the road works.

7.16.2.7 “Mobility” class

The “Mobility” class in this case may be used to allow a supplier to specify whether the road works activity is mobile or stationary. In case of a mobile roadwork, the speed at which the “MaintenanceVehicle” is moving may be specified.

7.17 The “NetworkManagement” package

7.17.1 Overview of the “NetworkManagement” package

The package, “NetworkManagement”, shall comprise a sub-model for defining an individual road operator action that is specifically related to managing the usage of the road network or for controlling the behaviour of road users on the road network (see Figure 23). This includes road usage restrictions, whether by legal order or by operator decision, road, carriageway and lane closures, weight and dimension limits, contraflows, reroutings, specific instructions to drivers and other general management actions. These actions may be identified as being automatically or manually initiated and marked as requiring either mandatory or advisory driver compliance.

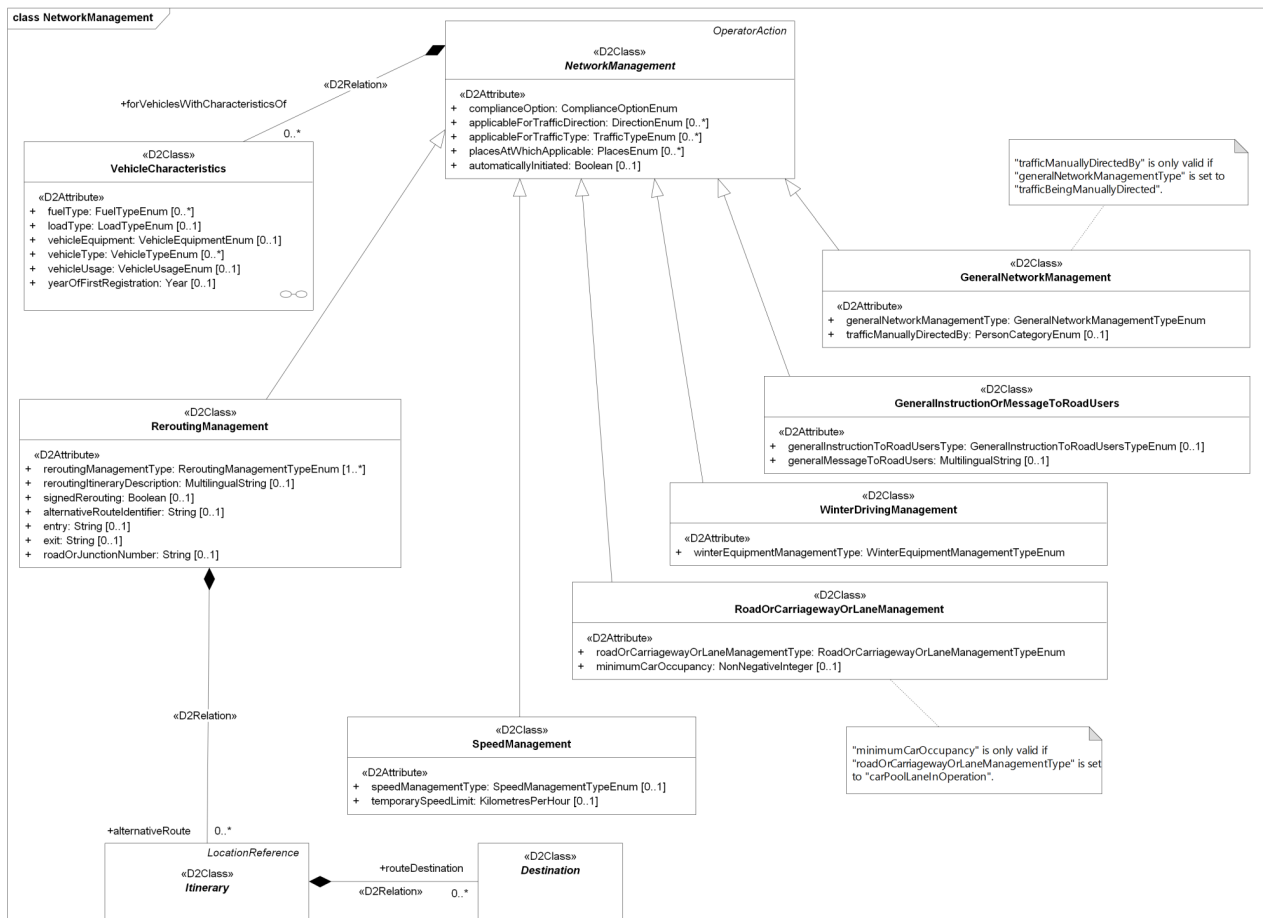


Figure 12 — The “NetworkManagement” package class model

7.17.2 Semantics of the “NetworkManagement” package

7.17.2.1 “NetworkManagement” package semantics – general

The “NetworkManagement” package shall allow network management actions undertaken by a road operator to be modelled as one of a number of specific types. Network management actions range from specific actions which apply to the road network, such as the closure of a road, to a range of instructions, such as no overtaking which may be issued to users of the road network. The range of actions specifically covers the management of reroutings on the road network, management of speed, winter driving restrictions, instructions to road users, and general traffic management actions.

Each management action can be qualified as applying to vehicles with specific characteristics, and/or travelling towards a general direction or destination and can be specified as having mandatory or advisory compliance status.

7.17.2.2 “NetworkManagement” class

The “NetworkManagement” class is abstract and shall be realized as an instance of either “ReroutingManagement”, “SpeedManagement”, “RoadOrCarriagewayOrLaneManagement”, “WinterDrivingManagement”, “GeneralInstructionToRoadUsers” or “GeneralNetworkmanagement”.

Each “NetworkManagement” action may be qualified as being only relevant to vehicles with specific characteristics. This shall be specified by using one or more associations on the “NetworkManagement”

class with instances of the “VehicleCharacteristics” class via the role name “forVehiclesWithCharacteristicsOf”.

- **Attribute “complianceOption”** shall define whether compliance with the network management action is advisory or mandatory. If it is set to be mandatory this implies that compliance is legally enforceable. Even though some network management actions are statements of fact and hence might be thought to be always mandatory, e.g. “convoyService” (is operating) within “GeneralNetworkManagement”, sometimes, as in this case compliance with the action may still be only advisory (i.e. there is a convoy service operating but it may not be mandatory to use it).
- **Attributes “applicableForTrafficDirection” and “placesAtWhichApplicable”** - These attributes may be used to provide information which is semantically different from that given in the “SupplementaryPositionalDescription” class within the “GroupOfLocations” package. The information in the “SupplementaryPositionalDescription” class describes a specific location at which the action is taken, e.g. a point or linear section of road or even an area. On the other hand, the attribute “placesAtWhichApplicable” describes, in generic terms, where the network management action is applicable, e.g. on underground sections or on roundabouts. It does not specify one specific location. Hence you could specify that there is a speed limit on all underground sections of a specified section of road, or that there is no overtaking permitted in all tunnels on a specified section of road. Similarly, the “applicableForTrafficDirection” attribute may be used to identify to which traffic direction the network management action applies based on where they are ultimately heading, while the “Location” package information identifies where the action is taken. For instance, you could have an instruction which is issued at a specified location on the northbound carriageway (hence a location on the northbound carriageway would be specified in the “GroupOfLocations” package), but it is only applicable for traffic heading northeast, rather than northwest (i.e. the road splits into two directions after the point at which the instruction is given or posted on the road).
- **Attribute “applicableForTrafficType”** may be used to allow the network management action to be qualified as being relevant to a specific type of traffic, mostly classified on the type of destinations, e.g. destined for airport, local traffic, etc.
- **Attribute “automaticallyInitiated”** may be used to indicate whether the network management action was automatically initiated by some system, possibly triggered by sensor data or historical traffic profile data or whether it was manually initiated by an operator. Sometimes automatic systems suggest actions for operators to approve. In this case if an operator decision made the final approval then it should not be classed as an automatically initiated action.

7.17.2.3 “ReroutingManagement” class

This class may be used to define a rerouting management action/instruction that is issued by an operator at a specific location on the road network and potentially details one or more alternative routes or itineraries. Each alternative route may be specified by an associated instance of the “Itinerary” class (see prEN 16157-2:2017, 7.1.1.2) via the role “alternativeRoute” and each alternative route may be associated with zero or multiple “routeDestinations”.

- **Attribute “reroutingManagementType”** shall identify the specific rerouting management instruction being given to drivers which may require reference to a road entry, exit, intersection or junction that is identified in another attribute within this class.
- **Attribute “alternativeRouteIdentifier”** may be used to provide an identity used on signs to identify (or mark) the alternative route. Usually a short sequence of letters, or digits.

- **Attribute “entry”** may be used to identify a specific entry to another road. Depending on what is specified in the “reroutingManagementType” attribute this entry should or should not be used for the rerouting.
- **Attribute “exit”** may be used to identify a specific exit from the normal route/road. Depending on what is specified in the “reroutingManagementType” attribute this exit should or should not be used for the rerouting.
- **Attribute “roadOrJunctionNumber”** may be used to identify a specific intersecting road or junction on the normal route/road. Depending on what is specified in the reroutingManagementType attribute this intersection or junction should or should not be used for the rerouting.

7.17.2.4 “SpeedManagement” class

This class may be used to define a management action/instruction relating to speed that is issued by an operator which is applicable to one or more specific locations on the road network as defined in the “GroupOfLocations” package.

7.17.2.5 “RoadOrCarriagewayOrLaneManagement” class

This class may be used to define a management action/instruction relating to road or carriageway or lane usage on the road network that is issued by an operator which is applicable to one or more specific locations on the road network as defined in the “GroupOfLocations” package.

- **Attribute “minimumCarOccupancy”** may be used to specify the minimum number of persons required in a vehicle in order for it to be allowed to transit the road section(s) specified in the “GroupOfLocations” package. Population of this attribute is only valid if the “roadOrCarriagewayOrLaneManagementType” attribute is set to “carPoolLaneInOperation”.

7.17.2.6 “WinterDrivingManagement” class

This class may be used to define a management action/instruction relating to winter driving that is issued by an operator which is applicable to one or more specific locations on the road network as defined in the “GroupOfLocations” package.

7.17.2.7 “GeneralInstructionOrMessageToRoadUsers” class

This class may be used to define a general instruction or a message that is issued by an operator to road users which is applicable to one or more specific locations on the road network as defined in the “GroupOfLocations” package.

7.17.2.8 “GeneralNetworkManagement” class

This class may be used to define a management action which is applicable to one or more specific locations on the road network which does not fall into any of the other types of network management described previously. Each of these actions directly affect the usage of the road network (e.g. a bridge swing is in operation or traffic is being held). Usually there is no issue about compliance since these actions are statements of fact (e.g. ramp metering is in operation). However, it is possible for compliance to be advisory as in the case of “convoyService” which indicates that a convoy service is operating, for instance when there is very bad weather, but it may be only advisory to use the convoy service.

Annex A (normative)

Data Dictionary

A.1 Overview

This data dictionary the definitions and characteristics of the different classes, attributes, association roles, data types and enumerations appearing in the data model defined in Clause 7. The data dictionary is specified in three parts, one for packages, one for <<datatypes>> and one for <<enumerations>>, each ordered alphabetically.

The generic data types which are used throughout all publications are defined in prEN 16157-7.

The first part of the data dictionary is partitioned into subclauses which relate to each of the UML model packages and each subclause defines the contained classes, their attributes and any roles defined for associations between the classes within that package.

The Data Dictionary tables use the following columns:

- 1) Column **Class name**: it provides the symbolic name (Upper Camel Case) given to the corresponding class.
- 2) Column **Role name**: it provides the symbolic name (Lower Camel Case) given to the corresponding role of an association.
- 3) Column **Attribute name**: it provides the symbolic name (Lower Camel Case) given to the corresponding attribute of a class.
- 4) Column **Enumerated value name**: It provides the symbolic name (Lower Camel Case) given to the corresponding enumerated value.
- 5) Column **Designation**: it provides the corresponding name in natural language of the corresponding class, attribute, role or enumeration value.
- 6) Column **Definition**: it provides a comprehensive definition detailing the class, attribute or role.
- 7) Column **Stereotype**: it provides a statement of the stereotype that is assigned to the class, if any – see prEN 16157-1 for further details.
- 8) Column **Abstract**: it provides a statement as to whether the class is abstract (non realizable) or concrete (realizable).
- 9) Column **Multiplicity**: it provides a statement of the allowed multiplicity for the attribute or role.
- 10) Column **Target**: It provides the name of the class which is at the end of the association to which the role applies.
- 11) Column **Type**: it provides the name of the class used to define the data type relating to the attribute of the class.

A.2 Data Dictionary for “Situation”

A.2.1 “Accident” package

A.2.1.1 General

D2Payload/PayloadPublication/Situation/Classes/TrafficElement/Accident

A.2.1.2 “Accident” package classes

Table A.1 — Classes of the “Accident” package

Class name	Designation	Definition	Stereotype	Abstract
Accident	Accident	Accidents are events where one or more vehicles are involved in collisions or in leaving the roadway. These include collisions between vehicles or with other road users or obstacles.	D2Class	no

A.2.1.3 “Accident” package association roles

Table A.2 — Associations of the “Accident” package

Class name	Role name	Designation	Definition	Multiplicity	Target
Accident	vehicleInvolved	Vehicle involved	The vehicle involved in the accident.	0..*	Vehicle

A.2.1.4 “Accident” package attributes

Table A.3 — Attributes of the “Accident” package

Class name	Attribute name	Designation	Definition	Multiplicity	Type
Accident	accidentCause	Accident cause	A descriptor indicating the most significant factor causing an accident.	0..1	AccidentCauseEnum
	accidentType	Accident type	A characterization of the nature of the accident.	1..*	AccidentTypeEnum
	collisionType	Collision type	Identifies a type of collision	0..1	CollisionTypeEnum

Class name	Attribute name	Designation	Definition	Multiplicity	Type
	totalNumberOfPeopleInvolved	Total number of people involved	The total number of people that are involved.	0..1	NonNegativeInteger
	totalNumberOfVehiclesInvolved	Total number of vehicles involved	The total number of vehicles that are involved.	0..1	NonNegativeInteger

A.2.2 “Activity” package

A.2.2.1 General

D2Payload/PayloadPublication/Situation/Classes/TrafficElement/Activity

A.2.2.2 “Activity” package classes

Table A.4 — Classes of the “Activity” package

Class name	Designation	Definition	Stereotype	Abstract
Activity	Activity	Deliberate human action external to the traffic stream or roadway which could disrupt traffic.	D2Class	yes
AuthorityOperation	Authority operation	Authority initiated operation or activity that could disrupt traffic.	D2Class	no
DisturbanceActivity	Disturbance activity	Deliberate human action of either a public disorder nature or of a situation alert type which could disrupt traffic.	D2Class	no
PublicEvent	Public event	Organized public event which could disrupt traffic.	D2Class	no

A.2.2.3 “Activity” package association roles

Table A.5 — Associations of the “Activity” package

Class name	Role name	Designation	Definition	Multiplicity	Target
Activity	mobilityOfActivity	Mobility of activity	Mobility of the activity.	0..1	Mobility

A.2.2.4 “Activity” package attributes

Table A.6 — Attributes of the “Activity” package

Class name	Attribute name	Designation	Definition	Multiplicity	Type
AuthorityOperation	authorityOperationType	Authority operation type	Type of authority initiated operation or activity that could disrupt traffic.	1..1	AuthorityOperationTypeEnum
DisturbanceActivity	disturbanceActivityType	Disturbance activity type	Includes all situations of a public disorder type or of an alert type, with potential to disrupt traffic.	1..1	DisturbanceActivityTypeEnum
PublicEvent	publicEventType	Public event type	Type of public event which could disrupt traffic.	1..1	PublicEventTypeEnum

A.2.3 “Classes” package

A.2.3.1 General

D2Payload/PayloadPublication/Situation/Classes

A.2.3.2 “Classes” package classes

Table A.7 — Classes of the “Classes” package

Class name	Designation	Definition	Stereotype	Abstract
Cause	Cause	Contains details of the cause of a record within a situation	D2Class	no
Comment	Comment	A free text comment with an optional date/time stamp that can be used by the operator to convey un-coded observations/information.	D2Class	no
DetailedCauseType	Detailed cause type	The type of influence that may be the cause of components of a situation. At least one attribute shall be populated.	D2Class	no
GenericSituationRecord	Generic situation record	A generic SituationRecord for use when adding level B extensions at the SituationRecord level.	D2Class	no
GroupOfPeopleInvolved	Group of people involved	Group of people involved in the event having common characteristics and/or status.	D2Class	no

Class name	Designation	Definition	Stereotype	Abstract
ManagedCause	Managed cause	A cause of this situation record which is managed by the publication creator, i.e. one which is represented by another situation record produced by the same publication creator.	D2Class	no
Mobility	Mobility	An indication of whether the associated instance of a SituationRecord is mobile (e.g. a march or parade moving along a road) or stationary.	D2Class	no
Situation	Situation	An identifiable instance of a traffic/travel situation comprising one or more traffic/travel circumstances which are linked by one or more causal relationships. Each traffic/travel circumstance is represented by a Situation Record.	D2Class	no
SituationRecord	Situation record	An identifiable versioned instance of a single record/element within a situation.	D2Class	yes

A.2.3.3 “Classes” package association roles

Table A.8 — Associations of the “Classes” package

Class name	Role name	Designation	Definition	Multiplicity	Target
Cause	detailedCauseType	Detailed cause type	The type of cause, expressed in more detail than the NonManagedCause causeType. If both are present then they shall be consistent.	0..1	DetailedCauseType
	managedCause	Managed cause	A reference to another situation record which defines a cause of the event defined here.	0..1	SituationRecordReference
Situation	informationManager	Information manager	Organization that manages the information content (is responsible for updates of this information) typically the organization that first made the DATEX II publication of this content.	0..1	InternationalIdentifier
	relatedSituation	Related situation	Reference to related situations via unique identifiers.	0..*	SituationReference
SituationRecord	generalPublicComment	General public comment	A comment which may be freely distributed to the general public	0..*	Comment

Class name	Role name	Designation	Definition	Multiplicity	Target
	informationManagerOverride	Information manager override	Organization that manages the information content (is responsible for updates of this information) typically the organization that first made the DATEX II publication of this content. This value overrides any value specified at a more general level.	0..1	InternationalIdentifier
	nonGeneralPublicComment	Non general public comment	A comment which should not be distributed to the general public.	0..*	Comment

A.2.3.4 “Classes” package attributes

Table A.9 — Attributes of the “Classes” package

Class name	Attribute name	Designation	Definition	Multiplicity	Type
Cause	causeDescription	Cause description	Description of a cause which is not managed by the publication creator (e.g. an off network cause).	0..1	MultilingualString
	causeType	Cause type	Indicates an external influence that may be the causation of components of a situation.	0..1	CauseTypeEnum
Comment	comment	Comment	A free text comment that can be used by the operator to convey un-coded observations/information.	1..1	MultilingualString
	commentDateTime	Comment date time	The date/time at which the comment was made.	0..1	DateTime
	commentType	Comment type	A classification of the the type of comment.	0..1	CommentTypeEnum
DetailedCauseType	abnormalTrafficType	Abnormal traffic type	A characterization of the nature of abnormal traffic flow, i.e. specifically relating to the nature of the traffic movement.	0..1	AbnormalTrafficTypeEnum
	accidentType	Accident type	A characterization of the nature of the accident.	0..*	AccidentTypeEnum

Class name	Attribute name	Designation	Definition	Multiplicity	Type
	animalPresenceType	Animal presence type	Indicates the nature of animals present on or near the roadway.	0..1	AnimalPresenceTypeEnum
	authorityOperationType	Authority operation type	Type of authority initiated operation or activity that could disrupt traffic.	0..1	AuthorityOperationTypeEnum
	constructionWorkType	Construction work type	The type of construction work being performed.	0..1	ConstructionWorkTypeEnum
	disturbanceActivityType	Disturbance activity type	Includes all situations of a public disorder type or of an alert type, with potential to disrupt traffic.	0..1	DisturbanceActivityTypeEnum
	drivingConditionType	Driving condition type	Description of the driving conditions at the specified location.	0..1	DrivingConditionTypeEnum
	environmentalObstructionType	Environmental obstruction type	Characterization of an obstruction on the road resulting from an environmental cause.	0..1	EnvironmentalObstructionTypeEnum
	equipmentOrSystemFaultType	Equipment or system fault type	Failure, malfunction or non operational condition of equipment or system.	0..1	EquipmentOrSystemFaultTypeEnum
	generalInstructionToRoadUsersType	General instruction to road users type	General instruction that is issued by the network/road operator which is applicable to drivers and sometimes passengers.	0..1	GeneralInstructionToRoadUsersTypeEnum
	generalNetworkManagementType	General network management type	The type of traffic management action instigated by the network/road operator.	0..1	GeneralNetworkManagementTypeEnum
	infrastructureDamageType	Infrastructure damage type	Characterization of an obstruction on the road resulting from the failure or damage of infrastructure on, under, above or close to the road.	0..1	InfrastructureDamageTypeEnum
	nonWeatherRelatedRoadConditionType	Non weather related road condition type	The type of road conditions which are not related to the weather.	0..*	NonWeatherRelatedRoadConditionTypeEnum

Class name	Attribute name	Designation	Definition	Multiplicity	Type
	obstructionType	Obstruction type	Characterization of the type of general obstruction.	0..*	ObstructionTypeEnum
	poorEnvironmentType	Poor environment type	The type of environment condition which is affecting driving conditions.	0..*	PoorEnvironmentTypeEnum
	publicEventType	Public event type	Type of public event which could disrupt traffic.	0..1	PublicEventTypeEnum
	reroutingManagementType	Rerouting management type	Type of rerouting management action instigated by operator.	0..*	ReroutingManagementTypeEnum
	roadMaintenanceType	Road maintenance type	The type of road maintenance or installation work at the specified location.	0..*	RoadMaintenanceTypeEnum
	roadOperatorServiceDisruptionType	Road operator service disruption type	The type of road operator service which is disrupted.	0..*	RoadOperatorServiceDisruptionTypeEnum
	roadOrCarriagewayOrLaneManagementType	Road or carriageway or lane management type	Type of road, carriageway or lane management action instigated by operator.	0..1	RoadOrCarriagewayOrLaneManagementTypeEnum
	roadsideAssistanceType	Roadside assistance type	Indicates the nature of the road side assistance that will be, is or has been provided.	0..1	RoadsideAssistanceTypeEnum
	roadsideServiceDisruptionType	Roadside service disruption type	The type of roadside service which is disrupted.	0..*	ServiceDisruptionTypeEnum
	speedManagementType	Speed management type	Type of speed management action instigated by operator.	0..1	SpeedManagementTypeEnum
	transitServiceInformation	Transit service information	Information about transit services.	0..1	TransitServiceInformationEnum
	vehicleObstructionType	Vehicle obstruction type	Characterization of an obstruction on the road caused by one or more vehicles.	0..1	VehicleObstructionTypeEnum
	weatherRelatedRoadConditionType	Weather related road condition type	The type of road surface condition that is related to the weather which is affecting the driving conditions.	0..*	WeatherRelatedRoadConditionTypeEnum

Class name	Attribute name	Designation	Definition	Multiplicity	Type
	winterEquipmentManagementType	Winter equipment management type	Type of winter equipment management action instigated by operator.	0..1	WinterEquipmentManagementTypeEnum
GenericSituationRecord	genericSituationRecordName	Generic situation record name	The name of the GenericSituationRecord.	1..1	String
GroupOfPeopleInvolved	categoryOfPeopleInvolved	Category of people involved	The category of persons involved.	0..1	PersonCategoryEnum
	injuryStatusType	Injury status type	The injury status of the people involved.	0..1	InjuryStatusTypeEnum
	involvementRole	Involvement role	The involvement role of the people.	0..1	InvolvementRolesEnum
	numberOfPeople	Number of people	The number of people of this group that are involved.	0..1	NonNegativeInteger
Mobility	mobilityType	Mobility type	An indication of whether the associated instance of a SituationRecord is mobile (e.g. a march or parade moving along a road) or stationary.	1..1	MobilityTypeEnum
	speed	Speed	Speed of the mobile entity.	0..1	KilometresPerHour
Situation	overallSeverity	Overall severity	The overall assessment of the impact (in terms of severity) that the situation as a whole is having, or will have, on the traffic flow as perceived by the supplier.	0..1	SeverityEnum
	situationVersionTime	Situation version time	The date/time that this current version of the Situation was written into the database of the supplier which is involved in the data exchange. Identity and version of the situation are defined by the class stereotype implementation.	0..1	DateTime

Class name	Attribute name	Designation	Definition	Multiplicity	Type
SituationRecord	confidentialityOverride	Confidentiality override	The extent to which the related information may be circulated, according to the recipient type. Recipients shall comply with this confidentiality statement. This overrides any confidentiality defined for the situation as a whole in the header information.	0..1	ConfidentialityValueEnum
	probabilityOfOccurrence	Probability of occurrence	An assessment of the degree of likelihood that the reported event will occur.	1..1	ProbabilityOfOccurrenceEnum
	safetyRelatedMessage	Safety related message	Indicates, whether this SituationRecord specifies a safety related message according to Commission Delegated Regulation (EU) No 886/2013.	0..1	Boolean
	severity	Severity	The assessment of the impact (in terms of severity) that this element of the situation is having, or will have, on the traffic flow as perceived by the supplier.	0..1	SeverityEnum
	situationRecordCreationReference	Situation record creation reference	A unique alphanumeric reference (either an external reference or GUID) of the SituationRecord object (the first version of the record) that was created by the original supplier.	0..1	String
	situationRecordCreationTime	Situation record creation time	The date/time that the SituationRecord object (the first version of the record) was created by the original supplier.	1..1	DateTime
	situationRecordFirstSupplierVersionTime	Situation record first supplier version time	The date/time that the current version of the Situation Record was written into the database of the original supplier in the supply chain.	0..1	DateTime
	situationRecordObservationTime	Situation record observation time	The date/time that the information represented by the current version of the SituationRecord was observed by the original (potentially external) source of the information.	0..1	DateTime