SLOVENSKI STANDARD
SIST-TS CEN/TS 16157-4:2014

01-september-2014

Inteligentni transportni sistemi - Specifikacije za izmenjavo podatkov DATEX II pri upravljanju prometa in informiranju - 4. del: Objave spremenljivih prometnih znakov (VMS)

Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 4: Variable Message Sign (VMS) Publications

Intelligente Transportsysteme - DATEX II Datenaustausch Spezifikationen für Verkehrsmanagement und Informationen - Teil 4: Variable Verkehrszeichen (VMS) Veröffentlichungen

Systèmes de transport intelligents - Spécifications Datex II d'échange de données pour la gestion du trafic et l'information routière - Partie 4: Publication de VMS

Ta slovenski standard je istoveten z: **CEN/TS 16157-4:2014**

ICS:

35.240.60	Uporabniške rešitve IT v transportu in trgovini	IT applications in transport and trade

SIST-TS CEN/TS 16157-4:2014 **en,fr,de**

iTeh STANDARD PREVIEW

(standards.iteh.ai)

TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

CEN/TS 16157-4

April 2014

ICS 35.240.60

English Version

Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 4: Variable Message Sign (VMS) Publications

Systèmes de transport intelligents - Spécifications Datex II d'échange de données pour la gestion du trafic et l'information routière - Partie 4 : Publication de VMS

Intelligente Transportsysteme - DATEX II Datenaustausch Spezifikationen für Verkehrsmanagement und Informationen - Teil 4: Variable Verkehrszeichen (VMS) Veröffentlichungen

This Technical Specification (CEN/TS) was approved by CEN on 27 January 2014 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. CEN/TS 16157-4:2014 E

CEN/TS 16157-4:2014 (E)

Contents   Pages

CEN/TS 16157-4:2014 (E)

Foreword

This document (CEN/TS 16157-4:2014) has been prepared by Technical Committee CEN/TC 278 "Intelligent transport systems", the secretariat of which is held by NEN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

CEN/TS 16157-4:2014 consists of the following parts, under the general title "Intelligent transport systems — DATEX II data exchange specifications for traffic management and information":

— Part 1: Context and framework

— Part 2: Location referencing

— Part 3: Situation publication

— Part 4: VMS publication

— Part 5: Measured and Elaborated Data Publications

The following parts are under preparation:

— Traffic view publication

— Communication specifications

Other parts may 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 CEN/TS 16157 series DATEX II.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CEN/TS 16157-4:2014 (E)

Introduction

This Technical Specification 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 that interoperability, reduction of risk, reduction of the cost base and promotion of open marketplace objectives are achieved that will lead to many social, economic and community benefits as a result of 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 the 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 Technical Specification includes the framework and context for exchanges, the modelling approach, data content, data structure and relationships and communications specification.

This Technical Specification supports a methodology that is extensible.

The fourth part of this Technical Specification deals with the publication of variable message sign (VMS) information. It specifies the structures and definitions of information that may be exchanged to convey details of the messages displayed on variable message signs and the current configuration/characteristics and status of the variable message signs that are currently deployed on the road network.

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.

4

1 Scope

This Technical Specification (CEN/TS 16157-4:2014) 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, the data content, the data structure and relationships and the communications specification.

This Technical Specification 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).

This Technical Specification 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 Technical Specification may be applicable for use by other actors.

This Technical Specification includes the following types of information 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 CEN/TS 16157 series specifies the informational structures, relationships, roles, attributes and associated data types required for publishing variable message sign information within the Datex II framework. This is specified in two parts, a DATEX II VMS Publication sub-model and a VMS Table Publication sub-model.

The VMS Publication supports the exchange of the graphic and textual content of one or several VMS plus any status information on device configuration that aid the comprehension of the informational content. This content is potentially subject to rapid change. The VMS Table Publication supports the occasional exchange of tables containing generally static reference information about deployed VMS which enable subsequent efficient references to be made to pre-defined static information relating to those VMS. These publications are not intended to support the control or configuration of VMS equipment. Each is part of the DATEX II platform independent model.

1.1 Conformance

The platform independent sub-models defined by this Part specify a DATEX II VMS Publication and a DATEX II VMS Table Publication except for those elements that relate to location information which are specified in

CEN/TS 16157-4:2014 (E)

CEN/TS 16157-2. The DATEX II platform independent data model of which these two publication sub-models are a part, corresponds to the Level A model as defined in CEN/TS 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 CEN/TS 16157-1 and with the following requirements of the sub-models which are expressed in this Part:

— comply with all stipulated minimum and maximum multiplicity requirements for UML elements and relationships;

— comply with all definitions, types and ordering;

— employ optional elements as specified;

— comply with all expressed constraints.

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.

2   Normative references

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

CEN/TS 16157-1, *Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 1: Context and framework*

CEN/TS 16157-2, *Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 2: Location referencing*

CEN/TS 16157-3, *Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 3: Situation Publication*

ISO 639-2:1998, *Codes for the representation of names of languages — Part 2: Alpha-3 code*

ISO/IEC 19501:2005, *Information technology — Open Distributed Processing — Unified Modeling Language (UML) Version 1.4.2*

3   Terms and definitions

For the purposes of this document, the terms and definitions given in CEN/TS 16157-1 and in the following list shall apply.

4.1
legend
a sequence of text characters and/or symbols that is displayed on a variable message sign

4.2
location
identifiable geographic place

[EN ISO 19112:2005]

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.

4.3
pictogram
a representation of a graphic symbol displayed on a variable message sign by means of a (usually multi colour capable) matrix or LED display panel

4.4
supplementary panel
an additional display panel, either physically separate or integrated with the main display panel which may display information or regulatory instructions which are supplemental to the associated pictogram, comprising either an additional line of text or a pictogram or both

4.5
variable message sign
VMSA sign/display panel used for the purpose of displaying one or more messages (comprising any combination of textual, symbol or pictogram information) that may be changed or switched on or off as required

4.6
variable message sign unit
a roadside unit which may control one or more variable message signs on a single gantry/mounting or on closely associated separate gantries/mountings

4 Symbols and abbreviated terms

For the purposes of this document, the abbreviation of terms given in CEN/TS 16157-1 and in the following list shall apply.

HTML	Hyper Text Mark-up Language
IP	Internet Protocol
RSS	Really Simple Syndication
NOTE	Comprises a Web feed format used to publish frequently updated sources of information.
UML	Unified Modelling Language
URL	Uniform Resource Locator
VMS	Variable Message Sign

5 UML notation

The UML notation used in these Technical Specifications shall be as described in ISO/IEC 19501. A short summary explaining the notation used in this Technical Specification is provided in Annex A of CEN/TS 16157-1.

6 The VMS Publication model

6.1 Overview of the VMS Publication model

The VMS Publication model shall comprise a top level package, "VmsPublication" and some sub-packages from the "ReusableClasses" package. The "VmsPublication" top level package shall be one of a number which shall be immediately subordinate to the "PayloadPublication" package and hence shall form the top of the hierarchy in the VMS Publication sub-model.

The "VmsPublication" package shall make use of a subordinate "VmsUnit" package and a "VmsMessage" package that together shall model the details of what is currently displayed on and the status of variable

CEN/TS 16157-4:2014 (E)

message signs. The "VmsUnit" and "VmsMessage" packages shall reside in the "VmsRelated" package which is within the "ReusableClasses" package because they are also used in the "SituationPublication" package.

Each "VmsPublication" instance shall contain details of a number of individual deployed VMS units, each of which may control one or more VMSs.

Some of the individual classes used within the "VmsPublication" package, principally those for modelling the characteristics of a VMS, also reside in the "VmsRelated" package which is within the "ReusableClasses" package as they are also used in the "VmsTablePublication" package".

6.2 The Fault Package

6.2.1 Overview of the "VmsPublication" Package

The "Fault Package" is introduced to manage reusable classes to provide information related to fault for equipment and devices. Classes related to Vms are Fault VmsFault and VmsUnitFault.
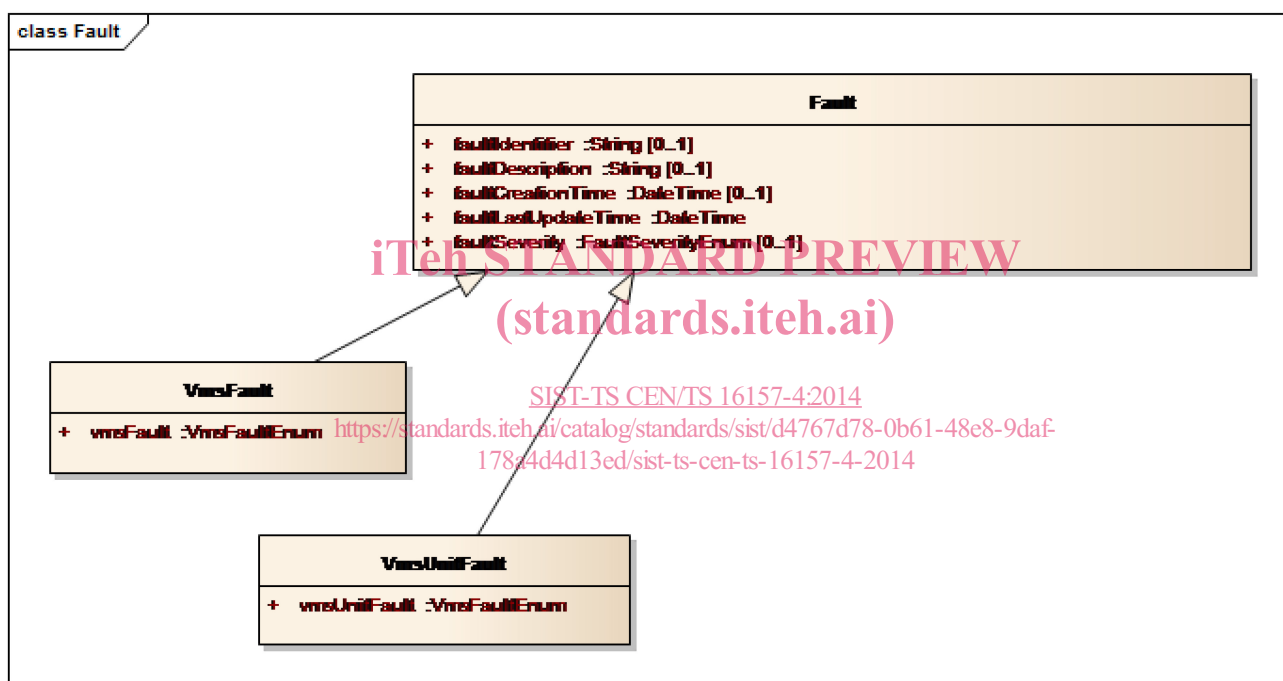

Figure 1 — The "Fault" package class model

6.2.2 Semantics of the "Fault" Package

6.2.2.1 "Fault" Class

Fault Class is defined in Fault package and is used to supply information about a fault relating to a specific piece of equipment or process. It provides information about fault start time, fault identification and description and severity. Fault may vary and update time is used to provide the period since the fault is unmodified. Fault Class is specialized for VMS Unit and VMS.

Attribute "faultCreationTime" may be used to provide the time the fault has been reported or recorded

Attribute "faultDescription may be used to provide a natural language description of the fault

Attribute "faultIdentifier may be used to provide a unique identifier of the fault

8

Attribute "faultLastUpdateTime may be used to provide the time the fault has been reported or recorded as updated

Attribute "faultSeverity" may be used to provide the severity of the fault

6.2.2.2 "VmsUnitFault" Class

VmsUnitFault class is used to provide information of faults related to VMSUnit

Attribute "VmsFault**"** shall be used to provide the detail of the fault

6.2.2.3 "VmsFault" Class

VmsUnitFault class is used to provide information of faults related to VMS

Attribute "VmsFault**"** shall be used to provide the detail of the fault

6.3 The "VmsPublication" Package

6.3.1 Overview of the "VmsPublication" Package

The "VmsPublication" package shall be immediately subordinate to the "PayloadPublication" package and shall comprise the sub-model for defining a publication which identifies the visual and textual content displayed on individual VMSs and the status and settings of those VMSs, where each VMS is controlled by an associated VMS unit (see Figure 2). The information shall be published in sets where each set relates to a particular VMS unit which may control one or more VMSs.

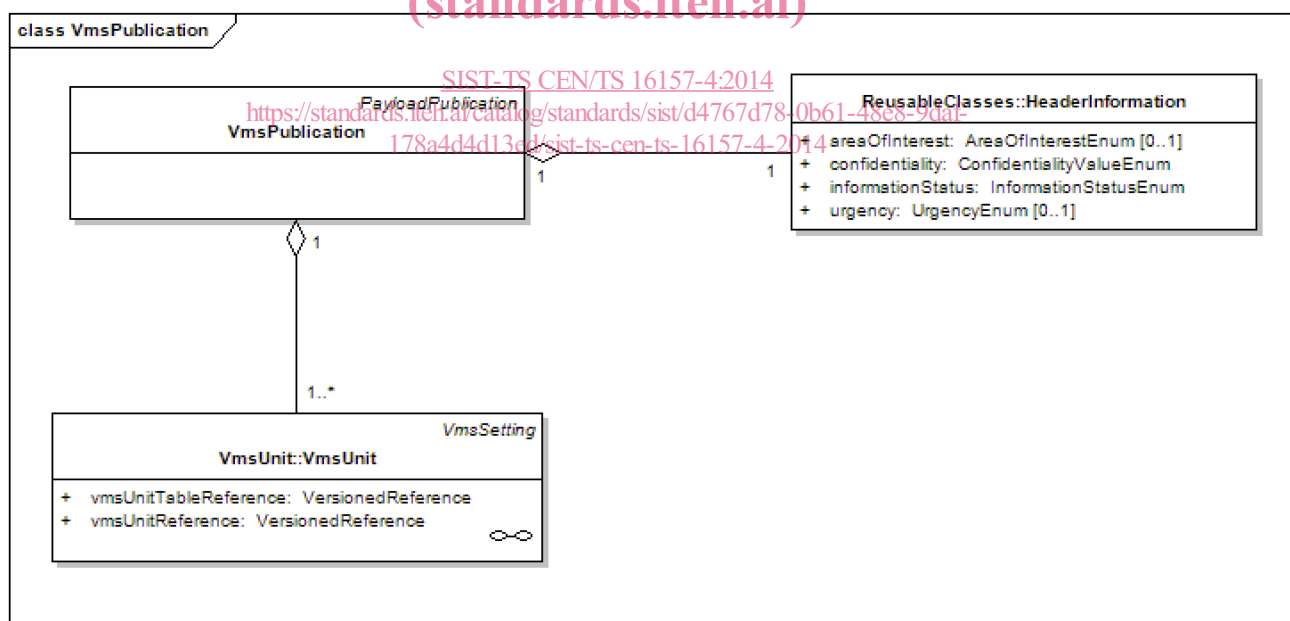Figure 2 — The "VmsPublication" package class model

6.3.2 Semantics of the "VmsPublication" Package

6.3.2.1 "VmsPublication" package semantics - general

The "VmsPublication" class shall be a specific realizable case of a "PayloadPublication". Each "VmsPublication" may contain any number of separate sets of information, each relating to a set of VMSs which shall be controlled by the same VMS unit.

CEN/TS 16157-4:2014 (E)

The information relating to each VMS in the "VmsPublication shall specify the message/s that have actually been set on the VMS at a specified time[1].

6.3.2.2 "VmsPublication" Class

The "VmsPublication" class shall be the base class for containing the published VMS information.

6.3.2.3 "HeaderInformation" Class

Each instance of a "VmsPublication" shall have associated metadata contained in an instance of the "HeaderInformation" class which shall allow the supplier of the publication to specify how the recipient of the "VmsPublication" should treat the information contained in it. For "HeaderInformation" class refer to CEN/TS 16157-3.

6.4 The "VmsUnit" Package

6.4.1 Overview of the "VmsUnit" Package

The package, "VmsUnit", shall comprise a sub-model for defining information about the settings, status, and characteristics of VMS units and their component VMSs which are deployed on the road network (see Figure 3 — The "VmsUnit" package class model).

Each VMS unit[2] controls one or more VMSs, where a VMS may display one message or a sequence of messages each comprising a combination of textual, symbol or pictogram information.

A VMS can display only one message at a time where each individual message shall comprise zero or one text component and zero or more pictograms components (see Clause 6.5).

---

1) The information in the "VmsPublication" should relate to the current state of VMSs deployed on the road, and not to any state information at the control centre, such as "pending" or "queued" or to any prioritized lists of messages which may be displayed at some point in the future.

2) Variable Message Sign (VMS) units are mostly static installations but some may be mobile changing their locations from time to time. Matrix signs used by some countries are classed in DATEX II as a simple type of VMS with limited display capabilities.

Figure 3 — The "VmsUnit" package class model

CEN/TS 16157-4:2014 (E)

6.4.2   Semantics of the "VmsUnit" Package

6.4.2.1   "VmsUnit" package semantics - general

The "VmsUnit" package shall comprise a "VmsUnit" class which has one or more indexed components where each component shall model the details of an individual VMS that is controlled by the VMS unit.

The static characteristics of each VMS shall be identified by using an indexed reference into a specified record in a "VmsUnitTable" published in a "VmsTablePublication" (see Clause 7). Alternatively where a VMS's characteristics are more dynamic these may be given directly in this publication which, if provided, shall override any static characteristics defined in the referenced record in the "VmsUnitTable". The "VmsUnit" class shall be a specialization of the "VmsSetting" class which may be used in a Situation Publication to provide details of VMSs which are set as a direct result of the situation that is defined in the "SituationPublication" (see CEN/TS 16157-3, 7.23).

6.4.2.2   "VmsUnit" Class

An instance of the "VmsUnit" class shall represent a single VMS control unit at the roadside which may control one or more VMS. It shall be possible to associate fault information with each "VmsUnit" class instance via the "VmsFault" class.

Each VMS controlled by a VMS unit is referenced by its "vmsIndex" qualifier. The "vmsIndex" qualifier provides an index into the specific "VmsRecord" within the relevant "VmsUnitRecord" (see VmsTablePublication in Clause 7) from where the static VMS characteristics that are relevant for the VMS can be obtained. These VmsUnitRecords are contained in a referenced VmsUnitTable that is published in a VmsTablePublication.

— **Attribute "vmsUnitTableReference"** shall be used to provide a reference to an instance of a "VmsUnitTable" that is published in a "VmsTablePublication" which contains a set of VMS unit records where each record holds details of the characteristics and configuration data relating to a VMS unit and its controlled VMSs. This reference shall point to the relevant table which holds the record containing the details for this VMS unit.

— **Attribute "vmsUnitReference"** shall be used to provide a reference to an instance of a "VmsUnitRecord" within the referenced "VmsUnitTable" that is published in a "VmsTablePublication". The "VmsUnitRecord" shall contain the relevant characteristics and configuration details relating to this VMS unit and its controlled VMSs.

6.4.2.3   "VmsUnitFault" Class

An instance of the "VmsUnitFault" class shall allow a supplier of information via a DATEX II interface to provide fault information relating to a variable message sign control unit. More than one type of fault may exist at the same time. Each instance of a "VmsUnitFault" inherits fault details from the "Fault" class which, at a minimum, shall contain the time that the fault information was last updated.

6.4.2.4   "Vms" Class

An instance of the "Vms" class shall represent a single VMS and shall allow a supplier of information via a DATEX II interface to define what textual legend and pictograms are being displayed, its dynamic characteristics/configuration and any current fault status of the VMS.

A VMS may be set to display a sequence of messages in a defined order where each message comprises a combination of text pages and pictograms. In this case the "messageIndex" qualifier shall be used to distinguish the individual messages and their order of display.

Each VMS has a location which will normally be defined in the referenced record of a specific "VmsUnitTable". Note that it is the location of the individual VMSs which is to be provided, not the location of the VMS unit which controls them.

Where the location of a VMS is dynamic or has changed recently, the current location shall be provided as an aggregation ("vmsLocationOverride") to the "Vms" class instance which shall override any location given in a referenced "VmsUnitTable". Similarly any location which a VMS is used to manage such as a car park or a road junction, that has changed recently, can be provided via the "managedLogicalLocationOverride" aggregation, again which shall override any managed location given in the relevant "VmsUnitTable" entry.

6.4.2.5 "VmsFault" Class

An instance of the "VmsFault" class shall allow a supplier to provide fault information relating to a VMS. More than one type of fault may exist at the same time. Each instance of a "VmsFault" class inherits fault details from the "Fault" class which, at a minimum, shall contain the time that the fault information was last updated.

6.4.2.6 "VmsDynamicCharacteristics" Class

An instance of the "VmsDynamicCharacteristics" class shall allow a supplier to associate dynamic characteristics with a VMS which shall override any characteristics given in the referenced record of the "VmsUnitTable". The characteristics for each pictogram display area on the VMS shall be referenced by the area's "pictogramDisplayAreaIndex" qualifier which provides a **notional** indication of the importance of the pictogram display area ("1" indicating the highest "importance") as perceived by the supplier of the information. Note. "Importance" in the previous sentence refers to conventional semantic logic associated to interpretation and comprehension of information related to pictograms and text messages, e.g. in case of 2 pictos associated to a diaply text area, the 2 pictos can be at same side of VMS or one at left and the other at right side of the display text area, the highest relevance for occidental writing is the one on the left to the display text area, the other is the less relevant, normally is used to display complementary information such as cause or additional information.

6.4.2.7 "VmsTextDisplayCharacteristics" Class

An instance of the "VmsTextDisplayCharacteristics" class shall allow a supplier to identify the text display area characteristics currently being used on the VMS which, if provided, shall override those defined in the referenced record of the "VmsUnitTable".

The characteristics for the text display area optionally include area dimensions (in pixels and metric measurements), font sizes, number of characters and rows, details of text area positioning on the VMS panel and the maximum luminance level.

— **Attribute "textPageSequencingCapable"** may be used to provide an indication of whether the VMS is capable of displaying a number of text pages which are automatically displayed in a defined sequence and at a defined rate.

— **Attribute "legendCodeListIdentifier"** may be used to identify what list of legends or texts are being used by the VMS. Usually specific deployments of VMS across a road network or part of a network will use defined sets of legend or text which are specified by the road authority/operator and are consistent with the display capabilities of the particular VMS. This attribute allows the identity of this list to be promulgated.

6.4.2.8 "VmsPictogramDisplayCharacteristics" Class

An instance of the "VmsPictogramDisplayCharacteristics" class shall allow a supplier to identify the pictogram display characteristics currently being used on the VMS within a particular display area which, if provided, shall override those defined in the referenced record of the "VmsUnitTable".