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Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 2 (TPEG2) —

Part 26:
Vigilance location information (TPEG2-VLI)

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Contents

Page

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso .org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

A list of all parts in the ISO 21219 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

0.1 History

TPEG technology was originally proposed by the European Broadcasting Union (EBU) Broadcast Management Committee, who established the B/TPEG project group in the autumn of 1997 with a brief to develop, as soon as possible, a new protocol for broadcasting traffic and travel-related information in the multimedia environment. TPEG technology, its applications and service features were designed to enable travel-related messages to be coded, decoded, filtered and understood by humans (visually and/or audibly in the user's language) and by agent systems. Originally, a byte-oriented data stream format, which may be carried on almost any digital bearer with an appropriate adaptation layer, was developed. Hierarchically structured TPEG messages from service providers to end-users were designed to transfer information from the service provider database to an end-user's equipment.

One year later, in December 1998, the B/TPEG group produced its first EBU specifications. Two documents were released. Part 2 (TPEG-SSF, which became ISO/TS 18234-2) described the syntax, semantics and framing structure, which was used for all TPEG applications. Meanwhile, Part 4 (TPEG-RTM, which became ISO/TS 18234-4) described the first application for road traffic messages.

Subsequently, in March 1999, CEN/TC 278, in conjunction with ISO/TC 204, established a group comprising members of the former EBU B/TPEG and this working group continued development work. Further parts were developed to make the initial set of four parts, enabling the implementation of a consistent service. Part 3 (TPEG-SNI, ISO/TS 18234-3) described the service and network information application used by all service implementations to ensure appropriate referencing from one service source to another.

Part 1 (TPEG-INV, ISO/TS 18234-1) completed the series by describing the other parts and their relationship; it also contained the application IDs used within the other parts. Additionally, Part 5, the public transport information application (TPEG-PTI, ISO/TS 18234-5), was developed. The so-called TPEG-LOC location referencing method, which enabled both map-based TPEG-decoders and non-map-based ones to deliver either map-based location referencing or human readable text information, was issued as ISO/TS 18234-6 to be used in association with the other applications parts of the ISO/TS 18234 series to provide location referencing.

The ISO/TS 18234 series has become known as TPEG Generation 1.

0.2 TPEG Generation 2

When the Traveller Information Services Association (TISA), derived from former forums, was inaugurated in December 2007, TPEG development was taken over by TISA and continued in the TPEG applications working group.

It was about this time that the (then) new Unified Modelling Language (UML) was seen as having major advantages for the development of new TPEG applications in communities who would not necessarily have binary physical format skills required to extend the original TPEG TS work. It was also realized that the XML format for TPEG described within the ISO/TS 24530 series (now superseded) had a greater significance than previously foreseen, especially in the content-generation segment and that keeping two physical formats in synchronism, in different standards series, would be rather difficult.

As a result, TISA set about the development of a new TPEG structure that would be UML based. This has subsequently become known as TPEG Generation 2.

TPEG2 is embodied in the ISO/TS 21219 series and it comprises many parts that cover introduction, rules, toolkit and application components. TPEG2 is built around UML modelling and has a core of rules that contain the modelling strategy covered in ISO/TS 21219-2, ISO/TS 21219-3 and ISO/TS 21219-4 and the conversion to two current physical formats: binary and XML; others could be added in the future. TISA uses an automated tool to convert from the agreed UML model XMI file directly into an MS Word document file, to minimize drafting errors, that forms the annex for each physical format.

TPEG2 has a three container conceptual structure: message management (ISO/TS 21219-6), application (several parts) and location referencing (ISO/TS 21219-7). This structure has flexible capability and can accommodate many differing use cases that have been proposed within the TTI sector and wider for hierarchical message content.

TPEG2 also has many location referencing options as required by the service provider community, any of which may be delivered by vectoring data included in the location referencing container.

The following classification provides a helpful grouping of the different TPEG2 parts according to their intended purpose.

— Toolkit parts: TPEG2-INV (ISO/TS 21219-1), TPEG2-UML (ISO/TS 21219-2), TPEG2-UBCR (ISO/TS 21219-3), TPEG2-UXCR (ISO/TS 21219-4), TPEG2-SFW (ISO/TS 21219-5), TPEG2-MMC (ISO/TS 21219-6), TPEG2-LRC (ISO/TS 21219-7), TPEG2-LTE (ISO/TS 21219-24).

— Special applications: TPEG2-SNI (ISO/TS 21219-9), TPEG2-CAI (ISO/TS 21219-10).

— Location referencing: TPEG2-GLR (ISO/TS 21219-21), TPEG2-OLR (ISO/TS 21219-22).

— Applications: TPEG2-PKI (ISO/TS 21219-14), TPEG2-TEC (ISO/TS 21219-15), TPEG2-FPI (ISO/TS 21219-16), TPEG2-TFP (ISO/TS 21219-18), TPEG2-WEA (ISO/TS 21219-19), TPEG2-RMR (ISO/TS 21219-23), TPEG2-EMI (ISO/TS 21219-25), TPEG2-VLI (ISO/TS 21219-26 this document).

TPEG2 has been developed to be broadly (but not totally) backward compatible with TPEG1 to assist in transitions from earlier implementations, while not hindering the TPEG2 innovative approach and being able to support many new features, such as dealing with applications having both long-term, unchanging content and highly dynamic content, such as parking information.

This document is based on the TISA specification technical/editorial version reference: SP17003/1.0/002.

Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 2 (TPEG2) —

Part 26:
Vigilance location information (TPEG2-VLI)

1 Scope

This document defines the application for Vigilance Location Information (VLI).

Vigilance messages are intended for in-car applications to inform drivers when they should pay extra attention to their driving behaviour because of dangerous road stretches, traffic enforcement cameras or other hazardous locations, requiring increased driver vigilance. The warnings can be presented visually, audibly, or with the spoken voice, or as a combination of all three.

The presentation of such messages to the drivers allows them to drive relaxed, in the knowledge that they will be warned when necessary. The situation where a vigilance message makes sense can be very different. For example speed cameras are usually placed in areas where vigilance is required; the information about those locations promote safe driving and also more safety for other road users and outside traffic participants. Another example for areas requiring high driver attention are roads close-by a school.

The information can be categorized in two ways:

Fixed or mobile locations:

— Fixed locations refer to locations which are fixed of nature, such as the presence of known accident black-spots.

— Mobile locations refer to locations which are transient in nature, such as the presence of a mobile speed camera.

Spot locations or zones:

— Spot locations refer to single points on a road network where the warning is located, with an indication of which direction of traffic is affected by the vigilance information.

— Zones refer to stretches of road network which represent a continuous area of warning affecting only one traffic direction.

The local regulations regarding the signalling of speed measurement systems, e.g. fixed speed cameras, or mobile speed radar locations can vary depending on the country or region. The signalling of speed measurement systems is encouraged by local authorities in certain markets whereas it can be punishable by law in other markets.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO/TS 21219-1, *Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 1: Introduction, numbering and versions (TPEG2-INV)*

ISO/TS 21219-3, *Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 3: UML to binary conversion rules*

ISO/TS 21219-4, *Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 4: UML to XML conversion rules*

ISO/TS 21219-5, *Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 5: Service framework (TPEG2-SFW)*

ISO/TS 21219-9, *Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 9: Service and network information (TPEG2-SNI)*

3   Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
vigilance information
information for a driver to pay additional attention to

3.2
location
logical position where special attention is needed

EXAMPLE   The position on the road where a speed-check is placed which is not necessarily the physical location of the camera.

3.3
spot location
exact points on a road network where the attention is needed, with an indication of which direction of traffic is affected by the alert

3.4
zone
stretches of road network which represent a continuous area of warning affecting only one traffic direction

3.5
stop time
date and time when the vigilance information expires and is no longer valid

3.6
confidence level
optional indication of the correctness and accuracy of the attributes of the vigilance information

Note 1 to entry: The exact definition of the levels strongly depends on the offer of the vendor as well as the needs of the customer and hence is a matter of negotiation.

3.7
speed limit
regulation defining maximum (which may be variable) speeds allowed

Note 1 to entry: Speed limits are commonly set by the legislative bodies of nations or provincial governments.

3.8
hard shoulder
hardened strip alongside a motorway for stopping on in an emergency

4 Abbreviated terms

ACID   application and content identifier

ADC   application data container

CEN   Comité Européen de Normalisation

EBU   European Broadcasting Union

LRC   location reference container

MMC   message management container

n.a.   not available

OSI   Open Systems Interconnection

TISA   Traveller Information Services Association

TPEG   Transport Protocol Expert Group

TTI   traffic and travel information

UML   Unified Modelling Language

5 Application specific constraints

5.1 Application identification

The word 'application' is used in the TPEG specifications to describe specific subsets of the TPEG structure. An application defines a limited vocabulary for a certain type of messages, e.g. parking information or road traffic information. Each TPEG application is assigned a unique number, called the Application IDentification (AID). An AID is defined whenever a new application is developed and these are all listed in ISO/TS 21219-1.

The application identification number is used within the TPEG-SNI application ISO/TS 21219-9 to indicate how to process TPEG content and facilitates the routing of information to the appropriate application decoder.

5.2 Version number signaling

Version numbering is used to track the separate versions of an application through its development and deployment. The differences between these versions may have an impact on client devices.

The version numbering principle is defined in ISO/TS 21219-1.

Table 1 shows the current version numbers for signaling VLI within the SNI application:

Table 1 — Current version numbers for signalling of VLI

major version number	1
minor version number	0

5.3 Ordered components

TPEG2-VLI requires a fixed order of TPEG components. The order for the VLI message component is shown in Figure 1; the first component shall be the *Message Management Container.* This shall be the only component if the message is a cancellation message. Otherwise, the MMC component shall be followed by the one or more *Application Data Container* component(s) which includes the application-specific information.
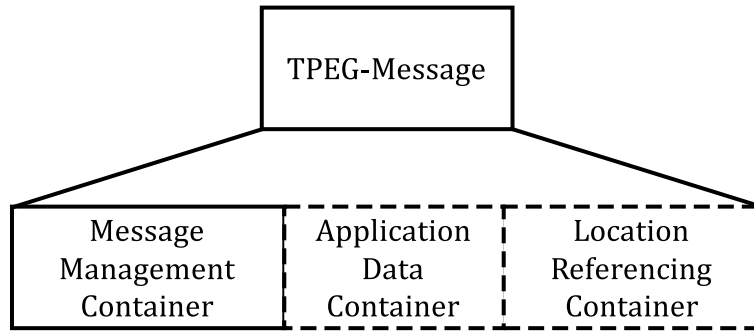

Figure 1 — Composition of TPEG messages

5.4 Extendibility

The requirement of a fixed component order does not affect the extension of TPEG2-VLI. Future application extensions may insert new components or may replace existing components by new ones without losing backward compatibility, i.e. a TPEG2-VLI decoder shall be able to detect and skip unknown components.

5.5 TPEG Service Component Frame

TPEG2-VLI makes use of the "Service Component Frame with dataCRC and messageCount" according to ISO/TS 21219-5.

6 VLI Structure
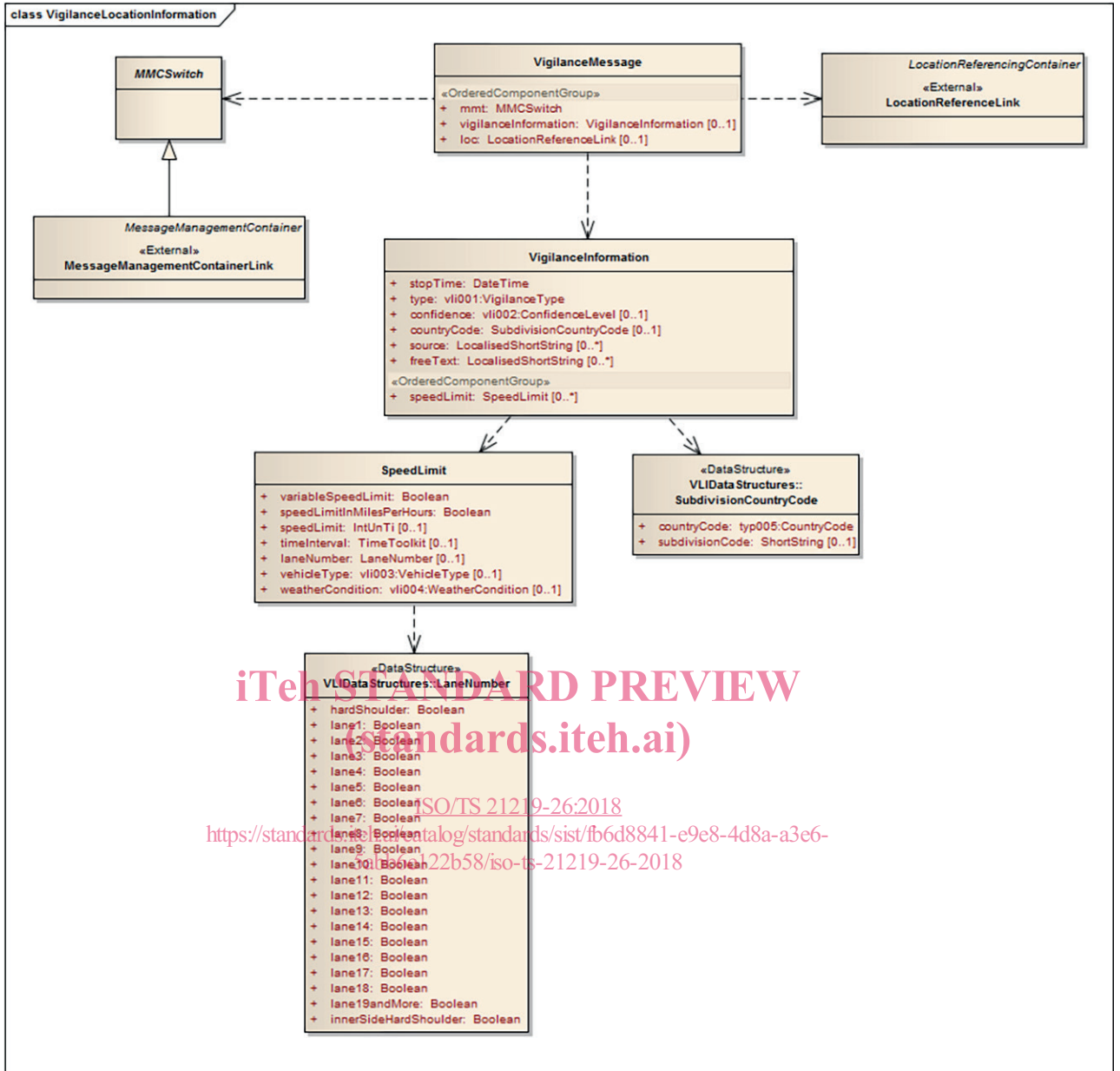
The structure of VLI messages is shown in Figure 2.

Figure 2 — VLI message structure

7 VLI Message components

7.1 LocationReferenceLink

The LocationReferenceLink component is a placeholder for the LocationReferencingContainer (LRC). It assigns the VLI application specific local component ID for the LRC container. All component IDs within the LRC container are local to the LRC toolkit.

7.2 MessageManagementContainerLink

The MessageManagementContainerLink component is a placeholder for the MessageManagementContainer.

7.3 VigilanceMessage

The VigilianceMessage is the data component of TPEG2-VLI.

Table 2 defines the VigilanceMessage component.

Table 2 — VigilanceMessage

Name	Type	Multiplicity	Description
Ordered Components			
mmt	MMCSwitch	1	The message management information.
vigilanceInformation	VigilanceInformation	0..1	The vigilance information.
loc	LocationReferenceLink	0..1	The location reference.

7.4 MMCSwitch

The MMCSwitch is an abstract container included for formal reasons, to allow future extension of the MMC.

7.5 VigilanceInformation

The VigilanceInformation component describes a vigilance information.

Table 3 defines the VigilanceInformation component.

Table 3 — VigilanceInformation

Name	Type	Multiplicity	Description
stopTime	DateTime	1	The date and time when the vigilance information expires and is no longer valid.
type	vli001:VigilanceType	1	The type of the vigilance information.
confidence	vli002:ConfidenceLevel	0..1	A confidence value for this message.
countryCode	SubdivisionCountryCode	0..1	The subdivision country code to further specify the region for which this method is valid for.
source	LocalisedShortString	0..*	The source of the information.
freeText	LocalisedShortString	0..*	This field may be used to provide additional information (e.g. human readable position description)
Ordered Components			
speedLimit	SpeedLimit	0..*	If the vigilance information contains speed limit information this is provided in the SpeedLimit component.

7.6 SpeedLimit

The component SpeedLimit contains fields to describe a speed limit and add restrictions to it. The timeInterval, laneNumber, vehicleType and weatherCondition, if set, restrict the validity of the speed limit.

Table 4 defines the SpeedLimit component.