PD CEN/TS 17268:2018

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Intelligent transport systems - ITS spatial data - Data exchange on changes in road attributes

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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

Intelligent transport systems - ITS spatial data - Data exchange on changes in road attributes

Systèmes de transport intelligents - Données spatiales STI - Échange de données sur les modifications d'attributs routiers

Intelligente Verkehrssysteme - Räumliche ITS-Daten - Datenaustausch zu Änderungen von Straßenattributen

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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (CEN/TS 17268:2018) 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 shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organisations 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom

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Introduction

ITS digital maps (digital maps for ITS applications) were initially developed for in-vehicle navigation systems. Over time, these maps evolved, and their use extended beyond mere navigation, as a range of other in-vehicle driving support systems were developed, many of which need ITS digital maps as an important component for processing, interpreting and relating sensor data. This evolution from navigation via ADAS (advanced driver assistance systems) and then C-ITS (cooperative ITS systems) to automated driving generates increasing requirements for the digital map, in terms of content specification, detail, accuracy and timeliness. The latter characteristic signifies whether the map data are up to date with respect to changes in the real world.

ITS digital maps represent the physical road network infrastructure and its attributes, as well as other relevant geographic information. The related data has a more or less permanent character, and is sometimes referred to as static road data; road data that do not often change [9]. Besides for the abovementioned applications, accurate and up to date digital maps have also high significance for the provision of real-time road status and traffic information. This concerns dynamic road-related data, with a highly volatile and temporary character. Typically data that will not be included in a digital map, but generally need digital map data for processing, representation and display.

Although the road infrastructure has a rather permanent character, changes of the road network and related attributes do actually occur at a significant scale. There is a need for timely and comprehensive propagation of information on such changes to digital maps used in ITS applications. Providers of such maps use a multitude of data sources to maintain their map databases, in order to keep these accurate and up to date. These sources include visual inspection (by driving the roads), and the use of vehicle probe data (big data that need processing, interpretation and verification).

The specification in this document aims to enable another mechanism for provision of static road data, with a focus on changes, directly from the source of the changes: the public road authorities and/or (public/private) road operators, who build and maintain the roads, and decide on and implement the day-to-day changes that are relevant for inclusion in ITS digital maps. If road authorities and road operators maintain a digital road database of their network, and have good procedures for keeping such database fully up to date in a timely manner with respect to these changes, this would constitute a highly efficient and potentially timely source for information on such changes for ITS map providers, but also for other users of such data.

Based on good procedures, intense cooperation between the two sides of this data chain, and experience gained over time, the data flow will achieve a high level of reliability, with known and guaranteed quality. The data constitutes well-defined discrete data elements that do not need any big-data type of processing, permitting swift implementation for any potential users. Dependent on the timeliness of the processes deployed at, respectively road authorities, road operators, ITS map providers and map-update-provision services, the TN-ITS concept permits future transfer of information on road network changes to in-vehicle systems with minimal delays. This document defines the TN-ITS specification.

The exchanged data elements are termed road features in this document. Each road feature is required to have a location reference, identifying its location in the road network. The specification within this document is flexible and supports the introduction of new data types by permitting the use of external codelists.

The "Commission Delegated Regulation (EU) 2015/962 of 18 December 2014 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide real-time traffic information services" [9] sets out the requirements, for road authorities, road operators and service providers, for the accessibility, exchange, re-use and provision of updates of static road data, road status data and traffic data. Road authorities and road operators provide the static road data they collect and update in a standardized format, if available, or in any other machine-readable format, on a non-discriminatory basis, and digital map providers collaborate with the data providers to ensure that any inaccuracies related to static road data are signalled without delay to the road authorities

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and road operators from which the data originates. For dynamic road status data and traffic data the Delegated Regulation in Articles 5 and 6 mandates the use of DATEX II (CEN/TS 16157 series and subsequently upgraded versions) format or any machine-readable format fully compatible and interoperable with DATEX II. The Delegated Regulation provides a list of types of static road data to be addressed. This document takes full account of the part of the Regulation concerning static road data, and supports and facilitates road authorities, road operators and digital map providers to implement and fulfil the requirements of the Regulation with respect to the provision and use of such data.

The document's specification is well aligned with Directive 2007/2/EU establishing an Infrastructure for Spatial Information in the European Community (INSPIRE). Under this directive, public authorities provide road network geospatial data sets in an INSPIRE-compliant way. Linear location referencing enabled by this document's specification establishes a direct (and INSPIRE-compliant) connection between the exchanged road features and the originating geospatial data set of the public authority. This will provide users with easy access to the specific location of the road feature in the originating database for inspection, in case decoding of the dynamic location reference, used for automated processing of the data, fails.

The idea for the TN-ITS concept for data exchange developed during the EU-funded projects PReVENT/MAPS&ADAS (2004/2007) and SpeedAlert (2004/2005), and was further elaborated and tested in the EU-funded ROSATTE project (Road Safety Attributes Exchange Infrastructure in Europe; 2008-2010), in which the basis for this specification was laid. This work led in 2013 to the foundation of the TN-ITS Platform for deployment of the concept. In the past years, implementation in several European countries took place, and a further roll-out in Europe with support from the EU CEF Programme (Connecting Europe Facility) is ongoing.

The European Committee for Standardization (CEN) draws attention to the fact that it is claimed that compliance with some stipulations of this document may involve the use of one or more patents when using AGORA-C location referencing, standardized in ISO 17572-3, and/or OpenLR location referencing, both described in 6.4 and Annex B. EN ISO 19148 for linear referencing has not identified any patents.

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

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1 Scope

This document defines the content specification for the exchange of road-related spatial data, and especially updates thereof. Based on the content specification, this document defines also a physical exchange format (structure and encoding) for the actual data exchange. In addition, it defines web services that are needed to make the coded data on updates available. Exchange of dynamic information is not in the scope of this document.

Although the focus of this document is on providing information on updates, the technology described in this document in principle also enables the exchange of full data sets, either concerning the whole road network in a coverage area, including all geometry and all attributes, or a subset, concerning for instance all instances of one or more specific attributes.

NOTE This document does not support the provision of updates concerning geometry. The provision of geometry associated with attribution change is supported, in the context of providing the location of attribute change.

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.

EN ISO 14823, *Intelligent transport systems - Graphic data dictionary (ISO 14823)*

EN ISO 14825, *Intelligent transport systems - Geographic Data Files (GDF) - GDF5.0 (ISO 14825)*

EN ISO 19107, *Geographic information - Spatial schema (ISO 19107)*

EN ISO 19108, *Geographic information - Temporal schema (ISO 19108)*

EN ISO 19109, *Geographic information - Rules for application schema (ISO 19109)*

EN ISO 19111, *Geographic information - Spatial referencing by coordinates (ISO 19111)*

EN ISO 19115-1:2014, *Geographic information – Metadata – Part 1: Fundamentals (ISO 19115-1:2014)*

EN ISO 19115-2, *Geographic information – Metadata – Part 2: Extensions for imagery and gridded data (ISO 19115-2)*

EN ISO 19136, *Geographic information - Geography Markup Language (GML) (ISO 19136)*

EN ISO 19148, *Geographic information - Linear referencing (ISO 19148)*

ISO 17572-3, *Intelligent transport systems (ITS) - Location referencing for geographic databases - Part 3: Dynamic location references (dynamic profile)*

ISO 19103, *Geographic information - Conceptual schema language*

ISO/TS 19115-3, *Geographic information – Metadata – Part 3: XML schema implementation for fundamental concepts*

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