TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

CEN/TS 17297-2

September 2019

ICS 35.240.60

English Version

Intelligent transport systems - Location Referencing Harmonisation for Urban-ITS - Part 2: Transformation methods

Élément introductif - Élément central - Partie 2 : Élément complémentaire

Einführendes Element - Haupt-Element - Teil 2: Ergänzendes Element

This Technical Specification (CEN/TS) was approved by CEN on 21 July 2019 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, 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: Rue de la Science 23, B-1040 Brussels

© 2019 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

Ref. No. CEN/TS 17297-2:2019 E

This document is a preview generated by EVS

Contents

Page

European foreword **3**
Introduction **4**
1 Scope **5**
2 Normative references **5**
3 Terms and definitions **5**
4 Symbols and abbreviations **6**
5 Basics on transformations between location reference systems **6**
6 Transformation requirements **17**
Annex A (informative) Examples of Transformations **34**
Annex B (informative) Illustration of transformation to linear **40**
Bibliography **43**

This document is a preview generated by EVS

European foreword

This document (CEN/TS 17297-2:2019) 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

This document is a preview generated by EVS

Introduction

Whilst some location data are based on a latitude/longitude system or other coordinate systems, others are based on the gazetteer reference to physical objects, e.g. bus stops, streets or bays in a car park. Translations between different location referencing systems are, therefore, a key feature for moving data between systems and between applications. Nearly all ITS applications need some form of location determination and referencing to put the data or information into a spatial context.

In data terms, for most systems, we need to know values and where the data was collected. For example, a loop detector is referenced to a particular point defined generally by a description of the road, the direction, the lane and a stated distance from a known reference point like a junction. Data from a moving probe vehicle will often be defined by XY coordinates based on an agreed location referencing systems such as WGS84. Similarly, public transport information is often referenced to identified routes and stops but historically, without the need to be concerned about where these routes and stops are in geographically physical space.

Historically, applications in the transport sector have spawned location referencing systems that have properties that suit the application itself; this silo approach has resulted in a significant number of incompatible location referencing systems, often within the same organization. A typical road authority can have 10 or more different location referencing systems for traffic control, pavement management, detectors, asset management and content dissemination etc.; none of which are compatible or easily translated from one to another because of different business rules or definitions. An example of this is 'lanes'; is a long exit lane from a motorway counted as a running lane, and where does it start and end?

In public transport information services, location references – where they exist – can be both inconsistent with location information on the infrastructure. For example, even where a bus stop is geo-located as a point in space, this is often unmatched with the road along which the bus will be travelling. Also, there is a logical divergence on whether the "stop" is the point where passengers are expected to stand or the point where the vehicle will stand; whilst this distinction will generally be of no significance for end users of itself, it makes multimodal information – for example, planning a walk-then-bus journey – difficult and unreliable.

More generally, in the Urban-ITS context, multiple applications are required to cooperate. So, in a multimodal environment, the disparity between location referencing systems becomes a major issue.

The only solution is to first identify the characteristics of location referencing that can be "application independent" and then evolve (a) a conversion strategy for the short-term, and (b) a migration strategy for the long term; with constant pressure on budgets, this represents a major challenge.

This document has been produced by the CEN/TC 278/WG 17 Project Team PT 1703 "Location Referencing Harmonisation" under the mandate M/546 on urban ITS (U-ITS).

This document, in examples, mentions tools that can support transformation processes. It is noted that reference to particular tool does not imply that it is the only or best tool for achieving a task, or that it is currently available.

The audience for this document are those who need to combine data which use different location referencing methods due to their different applications, modes or vendors.

The informative Clause 5 describes basics on transformations between location reference systems:

— The concept of transformation is presented in 5.2.

— Data quality in the context of transformations is discussed in 5.3.

The normative Clause 6 specifies transformation requirements and presents transformation examples.

Location referencing inside buildings is not considered in this document.

This document is a preview generated by EVS

1 Scope

This document specifies requirements, recommendations, and permissions related to translations between location referencing methods applicable in the urban transport environment.

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 14819-3:2013, *Intelligent transport systems — Traffic and travel information messages via traffic message coding — Part 3: Location referencing for Radio Data System — Traffic Message Channel (RDS-TMC) using ALERT-C*

ISO 19157:2013, *Geographic information — Data quality*

INSPIRE Technical Guidelines, INSPIRE, *Data Specification on Coordinate Reference Systems — Technical Guidelines. 2014*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in CEN/TR 17297-1 and the following apply.

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

• IEC Electropedia: available at http://www.electropedia.org/

• ISO Online browsing platform: available at https://www.iso.org/obp

3.1
accuracy
closeness of agreement between a test result or measurement result and the true value

[SOURCE: ISO 6709:2008, definition 4.1]

3.2
area of use
geographical area in which a specific map projection applies

3.3
location reference
description of an identifiable geographic place

Note to entry: ISO 17572-1 defines a location reference as a “label which is assigned to a location”, while ISO TS 21219-7. TPEG2-LRC defines location referencing as “means to provide information that allows a system to identify accurately a location”

3.4
resolution
unit associated with the least significant digit of a coordinate

[SOURCE: ISO 6709:2008, definition 4.10]

3.5
transformation
operations to change the description of a location (a location reference) from one LRS to another LRS

This document is a preview generated by EVS