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Intelligent transport systems (ITS) — Location referencing for geographic databases —

Part 4: Precise relative location references (precise relative profile)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 17572 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.

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Introduction

A Location Reference (LR) is a unique identification of a geographic object. In a digital world, a real-world geographic object can be represented by a feature in a geographic database. An example of a commonly known LR is a postal address of a house. Examples of object instances include a particular exit ramp on a particular motorway, a road junction or a hotel. For efficiency reasons, LRs are often coded. This is especially significant if the LR is used to define the location for information about various objects between different systems. For ITS, many different types of real-world objects will be addressed. Amongst these, the LR of the road network, or components thereof, is a particular focus.

Communication of a LR for specific geographic phenomena, corresponding to objects in geographic databases, in a standard, unambiguous manner is a vital part of an integrated ITS system in which different applications and sources of geographic data will be used. Location Referencing Methods (LRM), methods of referencing object instances, differ by applications, by the data model used to create the database, or by the enforced object referencing imposed by the specific mapping system used to create and store the database. A standard LRM allows for a common and unambiguous identification of object instances representing the same geographic phenomena in different geographic databases produced by different vendors, for varied applications, and operating on multiple hardware/software platforms. If ITS applications using digital map databases are to become widespread, data reference across various applications and systems must be possible. Information prepared on one system, such as traffic messages, need to have LRs that are interpretable by all receiving systems. A standard method to refer to specific object instances is essential to achieving such objectives.

Japanese, Korean, Australian, Canadian, North American and European ITS bodies all support LR activities . In Japan, precise location referencing is needed due to the increasing introduction of C-ITS and automated driving systems such as SIP-adus. Due to the mechanisms for the creation of digital maps, even with high accuracies, representation of a real-world position will differ between maps. Additionally, because of crustal movement over time, discrepancies would occur for locations determined simply by measurements from ground-based objects if only latitude and longitude were utilized.

Location referencing at the precise relative level is needed to describe exact positions and exchange LRs accordingly. Location referencing at the precise relative level requires referencing to a position that is sufficiently detailed and accurate to distinguish the lane in which the object exists, and to distinguish the position within a lane or a lane junction. This does not imply the need to provide an absolute position with a high accuracy.

This document provides specifications for location referencing for ITS systems (although other committees or standardization bodies may subsequently consider extending it to a more generic context).

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Intelligent transport systems (ITS) — Location referencing for geographic databases —

Part 4:
Precise relative location references (precise relative profile)

1 Scope

This document describes and lists the characteristics of the Precise Relative Location Referencing Method (PRLRM) which describes precise relative locations in the context of geographic databases and is used to locate transport-related objects in an encoder system as well as in the decoder side.

This document does not define a physical format for implementing the PRLRM. However, the requirements for physical formats are defined. This document does not define details of the Precise Relative Location Referencing System (PRLRS), i.e. how the PRLRM is to be implemented in software, hardware or processes.

This document specifies PRLRM, comprising:

— conceptual data model for Location Referencing Methods (LFMs);

— specification of location referencing for precise relative information;

— use cases for Precise Relative Location References (informative Annex C);

— use cases for elements of Precise Relative Location References (informative Annex D);

— implementation of Precise Relative Location References (Japanese example) (informative Annex E).

This document defines methods that enable exchange location information of the object to be referenced in the lane or the lane junction. This document does not specify the road (link) on which the object of reference exists.

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 17572-1:2015, *Intelligent transport systems (ITS) — Location referencing for geographic databases — Part 1: General requirements and conceptual model*

ISO 17572-2:2018, *Intelligent transport systems (ITS) — Location referencing for geographic databases — Part 2: Pre-coded location references (pre-coded profile)*

ISO 17572-3:2015, *Intelligent transport systems (ITS) — Location referencing for geographic databases — Part 3: Dynamic location references (dynamic profile)*

ISO 19148:2012, *Geographic information — Linear referencing*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 17572-1 and the following apply.

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

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

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

3.1
lane
strip of carriageway intended to accommodate a single line of moving vehicles, frequently defined by carriageway marks

3.2
lane junction
area of roadway common to two or more lanes, whether in the same or different directions, frequently without carriageway marks and where it may be difficult to count lanes

3.3
reference point
point which is used as a starting point for referencing

4 Abbreviated terms

C-ITS	Cooperative Intelligent Transport Systems
GNSS	Global Navigation Satellite System
ID	Identifier
LR	Location Referencing (or Reference)
LP	Location Point
LRM	Location Referencing Method
PRLRM	Precise Relative Location Referencing Method
PRLRS	Precise Relative Location Referencing System
SIP-adus	Cross-ministerial Strategic Innovation Promotion Program Innovation of Automated Driving for Universal Services (Japan)

5 Conformance

A location referencing message shall be provided as specified in Clause 8.

Any location referencing message claiming conformance with this document shall pass the requirements presented in the abstract test suite in Annex A.

6 Requirements for a location referencing standard

For details, see ISO 17572-1:2015, Clause 4.

NOTE For an inventory of LRMs, see ISO 17572-1:2015, Annex A.

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