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Intelligent transport systems (ITS) — Guidance protocol via personal ITS station for advisory safety systems —

Part 2: Road guidance protocol (RGP) requirements and specification

Systèmes intelligents de transport — Protocole d'orientation par station ITS personnelle pour systèmes à avis de sécurité —

Partie 2: Spécifications et exigences du protocole d'orientation routière

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Contents

Page

Foreword ..... **v**
Introduction ..... **vi**
1 Scope **1**
2 Normative references **2**
3 Terms and definitions **2**
4 Abbreviated terms **3**
5 Conventions **4**
6 Road guidance implementation overview **4**
7 Use cases implementation into the road guidance protocol **7**
7.1 Use case clusters overview 7
7.2 Use cases implementation 9
7.2.1 UC cluster 1 — Crossroads with a traffic signal 9
7.2.2 UC cluster 2 — Crossroads 13
7.2.3 UC cluster 3 — Parking space 14
7.2.4 UC cluster 4 — Risky environment alarm 15
8 RGP messages **21**
8.1 Overview 21
8.2 Real-time RGP "Data eXchange Message" communication 22
9 RGP defined data exchange messages **24**
9.1 General Data eXchange Message definition 24
9.2 notify-on-position 25
9.2.1 Definition 25
9.2.2 Example 28
9.3 stop-notify 29
9.3.1 Definition 29
9.3.2 Example 29
9.4 collision-possible 30
9.4.1 Definition 30
9.4.2 Example 32
9.5 vehicle-blocks-road 32
9.5.1 Definition 32
9.5.2 Example 33
9.6 pedestrian-blocks-road 34
9.6.1 Definition 34
9.6.2 Example 34
9.7 bumper-to-bumper 35
9.7.1 Definition 35
9.7.2 Example 35
9.8 crossing-priority 36
9.8.1 Definition 36
9.8.2 Example 36
9.9 oncoming-vehicle 37
9.9.1 Definition 37
9.9.2 Example 37
9.10 overspeed 38
9.10.1 Definition 38
9.10.2 Example 39
9.11 bad-weather 39
9.11.1 Definition 39
9.11.2 Example 41
9.12 speed-limit 42

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9.12.1 Definition 42
9.12.2 Example 42
9.13 road-occupation 43
9.13.1 Definition 43
9.13.2 Example 44
9.14 emergency-vehicle 45
9.14.1 Definition 45
9.14.2 Example 46
9.15 release 47
9.15.1 Definition 47
9.15.2 Example 47
9.16 search-parking-space 48
9.16.1 Definition 48
9.16.2 Example 50
9.17 guide-parking-space 51
9.17.1 Definition 51
9.17.2 Example 52

Annex A (normative) **Vehicle Interface Data Format (VIDF)** **54**

Annex B (normative) **Data eXchange Message definition** **74**

Annex C (normative) **Data eXchange Message ASN.1 definition** **76**

Annex D (informative) **Requirements** **82**

Bibliography **83**

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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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*.

ISO 13184 consists of the following parts, under the general title *Intelligent transport systems (ITS) — Guidance protocol via personal ITS station for advisory safety systems*:

— *Part 1: General information and use cases definition*

— *Part 2: Road guidance protocol (RGP) requirements and specification*

Additional part dealing with road guidance protocol (RGP) conformance test specification is under preparation.

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Introduction

This part of ISO 13184 specifies the use cases implementation of a real-time decision support system for guidance information, designed to enhance mobility and vehicle safety and to provide a parking guide service using the Personal ITS Station (P-ITS-S). The purpose of the system is to transmit guidance or warning messages to drivers and pedestrians in real-time, enhance the user's convenience and avoid congestion in parking facilities by preventing accidents and enabling easy parking.

This part of ISO 13184 implements the road guidance protocol (RGP) requirements (derived from the use cases defined in ISO 13184–1) based on the Data eXchange Message (DXM) at the application level regarding the safety warning and parking guide services between the Roadside ITS Station (R-ITS-S) installed at the roadside and the user's Personal ITS Station (P-ITS-S), e.g. Nomadic Device.

This part of ISO 13184 covers subjects related to traffic safety, including pedestrians besides vehicle drivers. Therefore, this DXM implementation describes how the safety-related services are provided using the P-ITS-S.

This system is based on the following assumptions.

— Based on the fact that the P-ITS-S has limited resources considers these limitations.

— Use cases related to the safety warning and parking guide service can be classified in various ways. These use cases can be added or deleted frequently depending on the specific circumstances of roads and parking spaces. Therefore, the DXM implementation design needs to be flexible and extendable, which enables to add or delete the use cases conveniently.

— The DXM implementation of road guidance contains data elements to configure the message transmitted between the ITS Stations.

— The major use cases include safety warnings at roads and parking guide services to be used between the R-ITS-S and the P-ITS-S.

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Intelligent transport systems (ITS) — Guidance protocol via personal ITS station for advisory safety systems —

Part 2:
Road guidance protocol (RGP) requirements and specification

Systèmes intelligents de transport -- Protocole d'orientation par station ITS personnelle pour systèmes à avis de sécurité -- Partie 2

1 Scope

This part of ISO 13184 specifies the road guidance use cases on the DXM to provide the real-time decision support system to drivers or pedestrians using P-ITS-S. The road guidance protocol (RGP) is an instantiation of the data exchange message (DXM), which represents a generic message to exchange data between ITS stations.

The RGP defines an interoperable service protocol between P-ITS-S and R-ITS-S for exchanging data elements. This part of ISO 13184 specifies the following:

— Reference architecture for real-time decision support system.

  This reference architecture provides a general structure for the real-time decision support system and the method of message exchange between the P-ITS-S and the R-ITS-S. This reference architecture is used to build the interconnections between the P-ITS-S and the R-ITS-S.

— Technique of application protocol design for various use cases on a P-ITS-S.

  This technique adopts a flexible and extendable protocol design. In many cases, the application protocol for the ITS is designed to provide a set of messages that is dependent on the use cases and the message exchange method. However, it is not easy to enumerate all use cases for some applications. The use cases can be changed or enhanced frequently. For this type of application, the protocol design, depending on the use cases, is not appropriate. This part of ISO 13184 provides a general technique of designing the road guidance application protocol based on the use cases.

— Primitive data element.

  The primitive data element will be commonly used to configure the safety warning and parking guide service in the form of speed, location and time.

— Use cases at the road and parking spaces for warning and parking guide.

  This part of ISO 13184 describes the use cases applicable to the communication services between the P-ITS-S and the R-ITS-S for the purposes of providing safety warning and parking guidance.

ISO 13184 (all parts) have been aligned according to the requirements specified in ISO 21217, ISO/TS 17419 and ISO/TS 17423.

This part of ISO 13184 only specifies the RGP messages based on the DXM definition (see Annex B and Annex C) at real-time. The content of the RGP messages are based on the definition of road guidance use cases as documented in ISO 13184–1.

This part of ISO 13184 implements ITS-SU objects, which is a general reference to ITS application objects, ITS message sets and other objects which may require globally unique identification and registration.

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The management of ITS-SU objects is many-fold, e.g. specified in ISO 24102–4, ISO 24102–5, ISO 24102–6, ISO 24102–7, ISO 24102–8 and ISO 24102–9, and in CEN/ISO/TS 17423. This part of ISO 13184 implements authorized and controlled operation of ITS-SU objects, which requires considerations of ITS-SU object identifiers, i.e. ITS-AID, ITS-MsgSetID, ITS-SUID, ITS-SCUID, addresses and protocol identifiers used in the communication protocol stack of an ITS-S, and others.

NOTE The accuracy of the navigation and positioning system as input to the Road Guidance application is important for road guidance but is not part of the ISO 13184 series. Detailed information about crossroads is needed for implementation of Road Guidance applications.

2 Normative references

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

ISO/TS 17419, *Intelligent transport systems — Cooperative systems — Classification and management of ITS applications in a global context*

ISO/TS 17423, *Intelligent transport systems — Cooperative systems — ITS application requirements and objectives for selection of communication profiles*

ISO 21217, *Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TS 17419, ISO/TS 17423, ISO 21217 and the following apply.

3.1
FA-SAP
service access point between facilities and application layer

3.2
GPS coordinates
collection of GPS position and time

3.3
GPS position
collection of GPS latitude, longitude and altitude

3.4
ITS-S capability (ITS-S capabilities)
uniquely addressable protocol functionality

3.5
ITS station
ITS-S
entity in a communication network, comprised of application, facilities, networking and access layer components specified in ISO 21217 that operate within a bounded secure management domain

3.6
ITS-S application process
ITS-S AP
element in an ITS station that performs information processing for a particular application, and uses ITS-S services to transmit and receive information

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3.7
ITS-S application process provisioner
ITS-S APP
functionality in an ITS-SU offering *ITS-S application processes* (3.6) for download and installation to other ITS-Ss

3.8
personal ITS station
P-ITS-S
implementation of an ITS station as personal ITS subsystem

Note 1 to entry: P-ITS-S is used to send the information of each user (drivers and pedestrians) to the roadside ITS station, and receives the safety warning and parking guide service and transfers them to the users.

3.9
roadside ITS station
R-ITS-S
system that receives and processes vehicular and pedestrian information within a certain zone and determines the situation, in order to provide the safety warning and parking guide service to vehicles and pedestrians

Note 1 to entry: The system is installed at the roadside.

3.10
sensor
device designed to collect general information (e.g., road surface state, potential hazard vehicle's speed) within the server's zone

3.11
WGS-84 coordinate system
WGS-84 is the reference system used in the satellite-based positioning system NAVSTAR Global Positioning System (GPS)

Note 1 to entry: The World Geodetic System (WGS) is a standard for use in cartography, geodesy, and navigation. The latest revision is WGS-84.

4 Abbreviated terms

ADU	application data unit
AP	application process
ASN.1	abstract syntax notation one
BT	Bluetooth
C	conditional
C-ITS-S	central–intelligent transport system–station
CRC	cyclic redundancy check
Cvt	convention (M, O, C)
DER	distinguished encoding rules
DTC	diagnostic trouble code
DXM	data exchange message
FA-SAP	facility application–service access point
GPS	global positioning system
HTML	hypertext mark-up language
ITS	intelligent transport systems
ITS-AID	intelligent transport systems–application identifier
ITS-MsgSetID	intelligent transport systems–message set identifier

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