

English Version

Cooperative intelligent transport systems (C-ITS) - Global  
transport data management (GTDM) framework (ISO/TS  
21184:2021)

Systèmes de transport intelligents coopératifs (C-ITS) -  
Cadre de gestion globale des données de transport  
(GTDM) (ISO/TS 21184:2021)

Intelligente Transportsysteme - Sichere  
Fahrzeugschnittstelle - Datenverzeichnis für C-ITS  
anwendungsrelevante Fahrzeuginformationen (ISO/TS  
21184:2021)

This Technical Specification (CEN/TS) was approved by CEN on 12 December 2020 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

## European foreword

This document (CEN ISO/TS 21184:2021) has been prepared by Technical Committee ISO/TC 204 "Intelligent transport systems" in collaboration with 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 organizations 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.

## Endorsement notice

The text of ISO/TS 21184:2021 has been approved by CEN as CEN ISO/TS 21184:2021 without any modification.

# Contents

Page

<b>Foreword</b>	<b>v</b>
<b>Introduction</b>	<b>vi</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms and definitions</b>	<b>2</b>
<b>4 Abbreviated terms</b>	<b>3</b>
<b>5 Conventions</b>	<b>5</b>
<b>6 Global Transport Data Management (GTDM) framework</b>	<b>5</b>
6.1 General	5
6.2 Applicable use case groups	7
6.2.1 General	7
6.2.2 GTDM framework operation	8
6.2.3 GTDM certificate-based access control	9
6.2.4 Proximity use case applications	10
6.2.5 On-board use case applications	11
6.2.6 Remote use case (ITS, product-related) applications	12
6.2.7 Common configuration data authoring process	13
6.3 GTDM Basic principles	14
<b>7 ITS-S global transport data model</b>	<b>15</b>
7.1 Overview	15
7.2 GT basic data model	15
7.2.1 Overview	15
7.2.2 GT basic configuration	16
7.2.3 GT language package	36
7.2.4 GT runtime data	37
7.2.5 GT condition	44
7.3 GT access control data model	48
7.3.1 <class> GTACProtocolConfig	48
7.3.2 <class> ACProtocol	48
7.3.3 <class> ACProtocolService	49
7.3.4 <class> ACProtocolRole	49
7.3.5 <class> GTACPermissionConfig	49
7.3.6 <class> ACEcuDataParamAccessSet	50
7.3.7 <class> ACEcuDataParamAccess	50
7.3.8 <class> ACAccessDetail	51
7.4 GT function monitor data model	51
7.4.1 <class> GTFMConfig	51
7.4.2 <class> FMBrick	53
7.4.3 <class> FMDDataParamCopy	56
7.4.4 <class> FMMessageSequence	56
7.5 SCN data model (optional)	57
7.5.1 <class> SCNDFConfig	57
7.5.2 <class> ProtocolType	60
7.5.3 <class> DlcPin	61
7.5.4 <class> ProtocolAddressing	62
7.5.5 <class> EcuAddress	62
7.5.6 <class> PhysicalEcuAddress	63
7.5.7 <class> ProtocolService	63
7.5.8 <class> ProtocolResponseMessage	64
7.5.9 <class> PackageScheduler	64
7.5.10 <class> PackageSource	65
7.5.11 <class> PackageMapping	65

7.5.12	<class> DtcScheduler .....	66
7.5.13	<class> CompuMethod .....	67
7.5.14	<class> CompuScale .....	69
7.5.15	<class> CompuLimit .....	69
7.5.16	<class> CompuItem .....	70
7.5.17	<class> CompuRational .....	70
7.5.18	<class> CompuTextToValue .....	70
7.5.19	<class> ExceptionRule .....	71
7.5.20	<class> ExceptionRuleElement .....	71
<b>8</b>	<b>ITS-S global transport data management .....</b>	<b>72</b>
8.1	General .....	72
8.2	ITS-S Management .....	73
8.2.1	Configuration Provider (M1) .....	73
8.2.2	Startup sequence .....	74
8.3	ITS-S Security .....	75
8.3.1	General .....	75
8.3.2	ITS application identifier (ITS-AID) .....	76
8.3.3	Certificates and keys for use with ISO/TS 21177 secure sessions .....	76
8.3.4	Access control (S1) .....	77
8.3.5	Security sub-layer (S2) .....	78
8.4	ITS-S Facilities .....	78
8.4.1	Data Provider (F1) .....	78
8.4.2	SCN Handler (F2) .....	82
8.4.3	GTP Handler (F3) .....	84
8.4.4	Function Monitor (F4) .....	89
8.5	ITS-S Network layer and Transport layer .....	91
8.5.1	ITS Network Handler (N1) .....	91
8.5.2	SC Network Handler (N2) .....	92
8.6	ITS-S Applications .....	92
8.6.1	Application (A1) .....	92
<b>9</b>	<b>Service Access Points (SAP) .....</b>	<b>93</b>
9.1	General .....	93
9.2	SAP – Management to Application .....	93
9.3	SAP – Management to Security .....	93
9.4	SAP – Management to Facilities .....	94
9.5	SAP – Management to Network .....	94
9.6	SAP – Security to Facilities .....	94
9.7	SAP – Security to Network .....	95
9.8	SAP – Network to Facilities .....	95
<b>10</b>	<b>ASN.1 definition .....</b>	<b>96</b>
	<b>Annex A (normative) Global Transport ASN.1 definition .....</b>	<b>97</b>
	<b>Bibliography .....</b>	<b>115</b>

## 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](http://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](http://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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 278, *Intelligent transport systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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](http://www.iso.org/members.html).

## Introduction

This document is part of a family of deliverables from Standard Development Organizations (SDOs) for Cooperative Intelligent Transport Systems (C-ITS), which is a subset of standards for Intelligent Transport Systems (ITS).

ITS aims to improve surface transportation in terms of:

- **safety**  
e.g. crash avoidance, obstacle detection, emergency calls, dangerous goods;
- **efficiency**  
e.g. navigation, green wave, priority, lane access control, contextual speed limits, car sharing;
- **comfort**  
e.g. telematics, parking, electric vehicle charging, infotainment; and
- **sustainability,**

by applying information and communication technologies (ICT).

The whole set of standards for deployment of C-ITS is difficult to understand for developers of equipment and software, especially ITS application software, and thus guidelines explaining a beneficial choice of standards (C-ITS release), the purpose and interaction of standardized features, beneficial implementation approaches, and guidance in developing ITS applications are a prerequisite for a fair and open market allowing early deployment of interoperable and future-proof solutions; see ISO/TR 21186-1. More details on the C-ITS domain can be found in the Brochure<sup>[14]</sup> produced by CEN/TC 278.

Referencing other SDOs and their respective deliverables is in no way to be understood as an endorsement, but rather as an informative piece of information.

At the time of writing this document, no applicable Intellectual Property Rights (IPR) issues were known related to this document. However, this document references standards for which IPRs are known. Information on such IPRs is expected to be provided in those respective standards, which might be from any one of the SDOs working on ITS or C-ITS.

# Cooperative intelligent transport systems (C-ITS) — Global transport data management (GTDM) framework

## 1 Scope

This document specifies a global transport data management (GTDM) framework composed of

- global transport basic data model,
- global transport access control data model,
- global transport function monitor data model, and
- sensor and control network data model

to support data exchange between applications.

This document defines standardized data classes in a Global Transport Data Format (GTDF), and the means to manage them.

Application and role-based access control to resources in GTDF are specified in accordance with IEEE 1609.2 certificates.

This document specifies GTDM as an ITS-S capability which is an optional feature (ITS-capabilities are specified in ISO 24102-6).

The GT access control (GTAC) data model specifies access permissions to data and function control by defining role-based mechanisms.

The GT function monitor (GTFM) data model specifies a configuration method to generate a flow logic for monitoring purposes, e.g. observing data parameters with respect of a defined limit.

## 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/IEC 8824-1, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation — Part 1:*

ISO/IEC 8825-7, *Information technology — ASN.1 encoding rules — Part 7: Specification of Octet Encoding Rules (OER)*

ISO 14229-1, *Road vehicles — Unified diagnostic services (UDS) — Part 1: Application layer*

ISO/TS 17429, *Intelligent transport systems — Cooperative ITS — ITS station facilities for the transfer of information between ITS stations*

ISO/TS 21177, *Intelligent transport systems — ITS station security services for secure session establishment and authentication between trusted devices*

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

ISO 22900-2, *Road vehicles — Modular vehicle communication interface (MVCi) — Part 2: Diagnostic protocol data unit (D-PDU API)*

ISO 24102-6, *Intelligent transport systems — Communications access for land mobiles (CALM) — ITS station management — Part 6: Path and flow management*

CEN/TS 17496, *Cooperative intelligent transport systems — Communication profiles*

IEEE 1609.2, *IEEE Standard for Wireless Access in Vehicular Environments — Security Services for Applications and Management Messages*

RFC 5646, *Tags for Identifying Languages*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TS 21177, CEN/TS 17496, ISO 21217 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 **class** **<class>**

an extensible programme-code-template for creating objects, providing initial values for state (member variables) and implementations of behaviour (member functions or methods) in object-oriented programming

#### 3.2 **convention** **Cvt**

indicates if specification is "M" (mandatory), "O" (optional), or "C" (conditional)

#### 3.3 **global transport protocol client** **GTP client**

entity that instigates the provision of the GTP service

#### 3.4 **global transport protocol server** **GTP server**

entity that provides the GTP service

#### 3.5 **raw data**

data of a sensor control network (SCN) in the untreated format as specified by the SCN owner

#### 3.6 **raw data source identifier**

unique identifier of an entity in an SCN ([3.9](#))

#### 3.7 **retrofit**

addition of new technology or features to existing systems

#### 3.8 **secure data interface** **SDI**

gateway providing bidirectional means for security and access control