

<b>STN</b>	<b>Elektronické zariadenia pre železnice. Palubné multimediálne a telematické subsystémy pre železnice. Časť 1: Všeobecná architektúra.</b>	<b>STN EN 62580-1</b>  33 3558
------------	---	--

Electronic railway equipment - On-board multimedia and telematic subsystems for railways - Part 1: General architecture

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 05/17

Obsahuje: EN 62580-1:2016, IEC 62580-1:2015

**124839**

---

Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2017  
Podľa zákona č. 264/1999 Z. z. o technických požiadavkách na výrobky a o posudzovaní zhody a o zmene a doplnení niektorých zákonov v znení neskorších predpisov sa slovenská technická norma a časti slovenskej technickej normy môžu rozmnožovať alebo rozširovať len so súhlasom slovenského národného normalizačného orgánu.

EUROPEAN STANDARD

**EN 62580-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2016

ICS 45.060

English Version

**Electronic railway equipment - On-board multimedia and  
telematic subsystems for railways -  
Part 1: General architecture  
(IEC 62580-1:2015)**

Matériel électronique ferroviaire - Sous-systèmes  
ferroviaires multimédias et télématiques embarqués -  
Partie 1: Architecture générale  
(IEC 62580-1:2015)

Elektronische Betriebsmittel für Bahnen - Bordinterne  
Multimedia- und Telematik-Untersysteme für  
Bahnanwendungen -  
Teil 1: Allgemeine Architektur  
(IEC 62580-1:2015)

This European Standard was approved by CENELEC on 2015-03-24. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

## European foreword

The text of document 9/1990/FDIS, future edition 1 of IEC 62580-1, prepared by IEC/TC 9 "Electrical equipment and systems for railways" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62580-1:2016.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2017-05-11
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2019-11-11

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

For relationship with EU Directive 2008/57/EC amended by Commission Directive 2011/18/EU, see informative Annex ZZ, which is an integral part of this document.

### Endorsement notice

The text of the International Standard IEC 62580-1:2015 was approved by CENELEC as a European Standard without any modification.

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu)

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
-	-	Railway applications - Classification system for railway vehicles - Part 4: Function groups	EN 15380-4	-
IEC 61375	Series	Electronic railway equipment - Train communication network (TCN)	EN 61375	Series
IEC 61375-2-3	-	Electronic railway equipment - Train communication network (TCN) - Part 2-3: TCN communication profile	EN 61375-2-3	-
IEC/TS 61375-2-4	-	Electronic railway equipment - Train communication network (TCN) - Part 2-4: TCN Application profile	-	-
IEC 61375-2-6 <sup>1)</sup>	-	Electronic railway equipment - Train communication network - Part 2-6: Onboard to ground communication	EN 61375-2-6 <sup>1)</sup>	-
IEC 62280	-	Railway applications - Communication, signalling and processing systems - Safety related communication in transmission systems	-	-
ISO/IEC 8824	series	Information technology - Abstract Syntax Notation One (ASN.1)	-	-
ISO/IEC 8825-1	-	Information technology - ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)	-	-
ISO/IEC 9646	series	Information technology - Open Systems Interconnection - Conformance testing methodology and framework	-	-
ISO/IEC/IEEE 42010	2011	Systems and software engineering - Architecture description	-	-

---

<sup>1)</sup> At draft stage.

## Annex ZZ (informative)

### Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers all relevant essential requirements as given in Annex III of the EC Directive 2008/57/EC (also named as New Approach Directive 2008/57/EC Rail Systems: Interoperability).

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZZ.1 relating to 'rolling stock - locomotives and passenger rolling stock' and Table ZZ.2 relating to the 'telematics applications for passenger services' of the rail system in the European Union, confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

**Table ZZ.1 - Correspondence between this European Standard, the RST LOC&PAS TSI (published in the Official Journal L 356 on 12 December 2014, p. 228) and Directive 2008/57/EC**

Clauses of this European Standard	Chapter / § / points / of RST LOC&PAS TSI	Essential Requirements (ER) of	Comments
The whole standard is applicable	4.2.5. Passenger-related items  4.2.12.2 General documentation: - description of computerised on-board systems	2. Requirements specific to each sub-subsystem 2.4. Rolling Stock  2.4.2. Reliability and availability  2.4.3. Technical compatibility	The TSI does not impose any technical solution regarding physical interfaces between units.  The standard offers a general multi-purpose solution for the digital communication between applications and it is relevant to interoperability.

**Table ZZ.2 - Correspondence between this European Standard, the TAP TSI (published in the Official Journal L 123 on 12 May 2011, p. 11) and Directive 2008/57/EC**

Clauses of this European Standard	Chapter / § / points / of TAP TSI	Essential Requirements (ER) of	Comments
The whole standard is applicable	4.2.21. Networking and communication  4.2.21.1. General architecture	2. Requirements specific to each sub-subsystem  2.4. Rolling Stock  2.4.2. Reliability and availability  2.4.3. Technical compatibility	

**WARNING:** Other requirements and other EU Directives may be applicable to the products falling within the scope of this standard.



# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Electronic railway equipment – On-board multimedia and telematic subsystems  
for railways –  
Part 1: General architecture**

**Matériel électronique ferroviaire – Sous-systèmes ferroviaires multimédias et  
télématiques embarqués –  
Partie 1: Architecture générale**





## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2015 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

#### IEC Catalogue - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

#### IEC publications search - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)

More than 60 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [csc@iec.ch](mailto:csc@iec.ch).

### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

### A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### Catalogue IEC - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

#### Recherche de publications IEC - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

#### Glossaire IEC - [std.iec.ch/glossary](http://std.iec.ch/glossary)

Plus de 60 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [csc@iec.ch](mailto:csc@iec.ch).



# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



---

**Electronic railway equipment – On-board multimedia and telematic subsystems  
for railways –  
Part 1: General architecture**

**Matériel électronique ferroviaire – Sous-systèmes ferroviaires multimédias et  
télématiques embarqués –  
Partie 1: Architecture générale**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

---

ICS 45.060

ISBN 978-2-8322-2225-6

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references .....	8
3 Terms, definitions, abbreviations, acronyms, and conventions .....	9
3.1 Terms and definitions .....	9
3.2 Abbreviations and acronyms.....	13
3.3 Conventions .....	14
4 Architecture.....	14
4.1 General.....	14
4.2 Improvements on XML.....	16
4.3 Boundary.....	17
4.4 OMTS abstract model.....	19
4.5 General principles and basic requirements for OMTS services .....	22
4.6 OMTS interoperability.....	29
5 Use cases .....	37
6 Conformity statement .....	37
Annex A (informative) OMTS classification .....	38
A.1 Identification of On-board Multimedia and Telematic Subsystems and Services .....	38
A.2 OMTS category A: Video surveillance and CCTV services (IEC 62580-2).....	38
A.3 OMTS category B: Driver and crew orientated services .....	39
A.4 OMTS category C: Passenger orientated services .....	40
A.5 OMTS category D: Train operator and maintainer orientated services .....	41
Annex B (informative) FBS, SBS and common structure guidelines.....	43
B.1 Introduction .....	43
B.2 Functional breakdown structure.....	43
B.3 System breakdown structure .....	45
B.4 Guidelines common to all service categories .....	46
Annex C (informative) Example of formal specification.....	47
C.1 Example of formal specification .....	47
C.2 Scope.....	47
C.3 Requirements.....	47
C.4 System Break Down Structure .....	47
C.5 Function Break Down Structure .....	48
C.6 Description of the abstract model using ASN.1 .....	49
Annex D (informative) Use cases .....	59
D.1 General.....	59
D.2 Use cases of on-board multimedia applications in Japan .....	59
D.3 The China locomotive remote monitoring and diagnosis system .....	62
D.4 Passenger orientated services – The Italian high speed train Frecciarossa use case .....	64
Annex E (informative) Introduction to ontology .....	69
Bibliography.....	72

Figure 1 – OMTS categories and structure of the IEC 62580 series .....	7
Figure 2 – Overview of the generic OMTS architecture .....	14
Figure 3 – Middleware concept .....	17
Figure 4 – Relationship between IEC 61375 and IEC 62580 .....	18
Figure 5 – ETB on-board network and board-ground link through MCG-GCG pairs .....	19
Figure 6 – Concept of abstract model .....	19
Figure 7 – Conceptual model .....	20
Figure 8 – Principle of abstract model definition .....	21
Figure 9 – Methodology for abstract model definition .....	21
Figure 10 – SOA approach.....	23
Figure 11 – Clients and devices arrangements.....	24
Figure 12 – Service concept .....	25
Figure 13 – Block diagram of the service based interface .....	26
Figure 14 – Principle of the ontology based Information Exchange Format 2.....	28
Figure 15 – Compatibility map .....	28
Figure 16 – Service interfaces .....	30
Figure 17 – Subsystem breakdown structure.....	31
Figure 18 – Coupling of two consists and related subsystems.....	31
Figure 19 – Function mapping and role arbitration .....	32
Figure 20 – Function and service mapping on consist network .....	32
Figure 21 – Function and service role arbitration .....	33
Figure 22 – Uncoupled functional breakdown structure .....	34
Figure 23 – Coupled functional breakdown structure.....	35
Figure 24 – Service space .....	36
Figure 25 – Interaction between on-board services and ground services.....	37
Figure C.1 – Display management .....	47
Figure C.2 – Display system breakdown structure.....	48
Figure C.3 – Display functional breakdown structure.....	49
Figure D.1 – Passenger information system structure .....	60
Figure D.2 – On board video surveillance system structure.....	61
Figure D.3 – Driver Only Operation CCTV System structure.....	61
Figure D.4 – China locomotive remote monitoring and diagnosis system structure .....	62
Figure D.5 – CMD system structure .....	62
Figure D.6 – Data flow of the remote monitoring and diagnosis system.....	63
Figure D.7 – Integrated IT network structure .....	64
Figure D.8 – Radio mobile cellular network coverage.....	65
Figure D.9 – Geometry of the ground cells.....	66
Figure D.10 – Mobile network structure.....	66
Figure D.11 – Download and upload performance.....	67
Figure D.12 – On-board WiFi and UMTS communication.....	67
Figure D.13 – On-board back bone and wireless board to ground communication .....	68
Figure D.14 – Performance test arrangement.....	68
Figure E.1 – Traditional approach .....	69

Figure E.2 – Ontology based approach .....	69
Figure E.3 – Benefits of ontology based approach .....	70
Figure E.4 – Screen shot of Protégé interface.....	71
Table 1 – Relationships in the conceptual model.....	20
Table B.1 – Example of FBS .....	44
Table D.1 – PIS applications in Japan.....	60

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRONIC RAILWAY EQUIPMENT –  
ON-BOARD MULTIMEDIA AND TELEMATIC  
SUBSYSTEMS FOR RAILWAYS –**

**Part 1: General architecture**

**FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62580-1 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

The text of this standard is based on the following documents:

FDIS	Report on voting
9/1990/FDIS	9/2005/RVD

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of IEC 62580 series, under the general title *Electronic railway equipment – On-board multimedia and telematic subsystems for railways*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

## INTRODUCTION

IEC 62580-1 defines the general architecture of the On-board Multimedia and Telematic Subsystems (OMTS), so as to achieve compatibility between subsystems in the same vehicle and between subsystems on-board of different vehicles in the same train.

NOTE 1 The acronym OMTS replaces the previous OMMS (On-board MultiMedia Subsystem) definition, due to a change in the title of this standard.

The multimedia and telematic system is composed of but not limited to:

- A Video surveillance/CCTV
- B Driver and crew orientated services
- C Passenger orientated services
- D Train operator and maintainer orientated services

OMTSs installed in the same vehicle (consist) communicate by means of the consist network.

OMTSs, installed in different vehicle (consist) in the same train, communicate by means of the train network.

It is likely that each OMTS exchanges information with applications installed on-ground by means of a wireless communication gateway.

The on-board communication and the on-board to ground communication are specified by the IEC 61375 series.

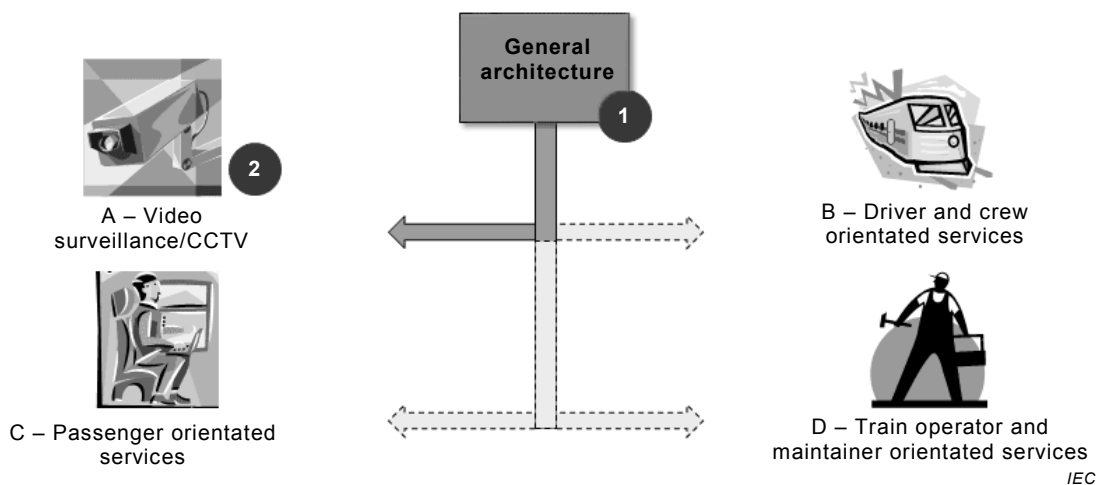
NOTE 2 Board-to-ground communication is intended as a generic link, with no assumption on the underlying technology (radio, satellite or other).

As illustrated in Figure 1, the IEC 62580 series is structured as follows:

IEC 62580-1: General architecture

IEC 62580-2: Video surveillance/CCTV services

Driver and crew orientated services, passenger orientated services and train operator/maintainer orientated services are matters of standardisation which can be addressed in the future.



**Figure 1 – OMTS categories and structure of the IEC 62580 series**

# ELECTRONIC RAILWAY EQUIPMENT – ON-BOARD MULTIMEDIA AND TELEMATIC SUBSYSTEMS FOR RAILWAYS –

## Part 1: General architecture

### 1 Scope

This part of IEC 62580 specifies the general architecture of the On-board Multimedia and Telematic Subsystem, which includes four categories of multimedia and telematic subsystems identified as:

- A Video surveillance/CCTV
- B Driver and crew orientated services
- C Passenger orientated services
- D Train operator and maintainer orientated services

This part establishes:

- the boundary between the OMTS and the on-board communication system, as described by the IEC 61375 series
- the methodology to describe an OMTS in terms of abstract model
- the general principles and the basic requirements to specify the services provided/needed by each category
- the approach to ensure interoperability between services

This part gives guidelines for:

- OMTS classification
- functional breakdown structuring
- system breakdown structuring
- formal specification of an OMTS

This part is applicable to any type of train, e.g. open trains, multiple unit trains and closed trains.

NOTE The general architecture provides a common basis for the application categories defined in part 2 and possible future parts of this series of standards. Consequently, the approach is homogeneous for all multimedia and telematic subsystems addressed by this series of standards.

### 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.

IEC 61375 (all parts), *Electronic railway equipment – Train communication network (TCN)*

IEC 61375-2-3, *Electronic railway equipment – Train communication network (TCN) – Part 2-3: TCN communication profile*

IEC 61375-2-4, *Electronic railway equipment – Train communication network (TCN) – Part 2-4: TCN application profile*<sup>1</sup>

IEC 61375-2-6, *Electronic railway equipment – Train communication network – Part 2-6: On-board to ground communication*

IEC 62280, *Railway applications – Communication, signalling and processing systems – Safety related communication in transmission systems*

ISO/IEC 8824 (all parts), *Information technology – Abstract Syntax Notation One (ASN.1)*

ISO/IEC 8825, *Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)*

ISO/IEC 9646 (all parts), *Information technology – Open Systems Interconnection – Conformance testing methodology and framework*

ISO/IEC 42010:2011, *Systems and software engineering – Architecture description*

EN15380-4, *Railway applications – Classification system for railway vehicles – Part 4: Function groups*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**

---

<sup>1</sup> To be published.