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Vägtrafikinformatik – Kommunikationstillgång till markmobiler (CALM) – Arkitektur (ISO 21217:2014, IDT)

Intelligent transport systems – Communications access for land mobiles (CALM) – Architecture (ISO 21217:2014, IDT)



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Den internationella standarden ISO 21217:2014 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 21217:2014.

Denna standard ersätter SS-ISO 21217:2010, utgåva 1

The International Standard ISO 21217:2014 has the status of a Swedish Standard. This document contains the official English version of ISO 21217:2014.

This standard supersedes the SS-ISO 21217:2010, edition 1

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Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Vägtrafikinformatik, SIS/TK 255.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

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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).

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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*.

This second edition cancels and replaces the first edition (ISO 21217:2010) which has been technically revised.

Introduction

“Communications Access for Land Mobile” (CALM) is the acronym used to refer to ISO TC204 WG16 work items. This acronym is used in the titles of the set of International Standards on communication for “Intelligent Transport Systems” (ITS). These International Standards focus on specifying open interfaces with regard to the functionalities required for all relevant layers and entities of the ITS station reference architecture specified in this International Standard. Note that these International Standards may also specify implementation details in situations where such specifications are deemed essential to interoperability of interface protocols.

The set of CALM International Standards is designed to allow interoperable instantiations of ITS stations which are based on the concept of abstracting applications and services from the underlying communication layers of the ITS station. This abstraction and the functionalities and services that can be easily implemented make the ITS station architecture described herein also well-suited to the development and deployment of ITS applications and services that share information amongst each other to improve the safety, sustainability and efficiency of transport systems.

The set of CALM International Standards include specifications for

- ITS station management,
- ITS communications security,
- ITS station facilities layer protocols,
- ITS station networking and transport layer protocols,
- communication interfaces (CIs) designed specifically for ITS applications and services such as those designed specifically for safety of life and property,
- interfacing existing access technologies into ITS stations,
- distributed implementations of ITS stations, and
- interfacing ITS stations to existing communication networks and communicating with nodes thereon.

This International Standard describes the common architectural framework around which ITS stations are instantiated and provides references to relevant International Standards, including access technology support standards, various networking and transport protocol standards, facilities standards, and ITS station management and security standards. It also describes the general architecture of peer-to-peer communications over various communication networks between ITS communication nodes. These nodes may be ITS stations as described in this International Standard or any other reachable nodes.

The set of CALM International Standards is complemented by ITS communication International Standards from other International Standards development organizations which together form the basis for implementation of ITS communications networks around the world.

Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture

1 Scope

This International Standard describes the communications reference architecture of nodes called “ITS station units” designed for deployment in intelligent transport systems (ITS) communication networks. The ITS station reference architecture is described in an abstract way. While this International Standard describes a number of ITS station elements, whether or not a particular element is implemented in an ITS station unit depends on the specific communication requirements of the implementation.

This International Standard also describes the various communication modes for peer-to-peer communications over various networks between ITS communication nodes. These nodes may be ITS station units as described in this International Standard or any other reachable nodes.

This International standard specifies the minimum set of normative requirements for a physical instantiation of the ITS station based on the principles of a bounded secured managed domain.

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.

None.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

access technology

technology employed in a communication interface to access a specific medium

3.2

application data unit

data unit exchanged between ITS-S application processes

3.3

communication adaptation layer

set of protocols and functions to adapt access technologies to the ITS-S networking and transport layer

3.4

communication interface

instantiation of a specific access technology and ITS-S access layer protocol

3.5

communication path

directed sequence of nodes connected by links, starting at a source node and ending at one or more destination nodes

3.6

FA interface

interface between the ITS-S facilities layer and the ITS-S applications entity

3.7**IN interface**

interface between the ITS-S access layer and the ITS-S networking and transport layer

3.8**in-vehicle network**

generic term for a network in a vehicle which is not an ITS station-internal network

3.9**ITS application**

instantiation of an ITS service that involves an association of two or more complementary ITS-S application processes

Note 1 to entry: Fragments of an application may also reside in nodes that are not ITS stations.

3.10**ITS message set**

set of messages designed for an ITS-related purpose

3.11**ITS service**

functionality provided to users of intelligent transport systems designed e.g. to increase safety, sustainability, efficiency, or comfort

3.12**ITS station**

functional entity comprised of an ITS-S facilities layer, ITS-S networking and transport layer, ITS-S access layer, ITS-S management entity, ITS-S security entity, and ITS-S applications entity providing ITS services

Note 1 to entry: From an abstract point of view, the term “ITS station” refers to a set of functionalities. The term is often used to refer to an instantiation of these functionalities in a physical unit. Often, the appropriate interpretation is obvious from the context. The proper name of the physical instantiation of an ITS-S is ITS station unit (ITS-SU).

3.13**ITS-S access layer**

protocol layer in the ITS-S reference architecture containing the OSI physical and data link layer protocols for ITS communications

3.14**ITS-S access layer protocol data unit**

protocol data unit exchanged between peer ITS-S access layers

3.15**ITS-S access layer service data unit**

service data unit exchanged between ITS-S access layer and ITS-S networking and transport layer

3.16**ITS-S access router**

ITS-S border router with additional functionality that provides other ITS communication nodes a point of attachment to an external network

3.17**ITS-S access technology**

access technology dedicated to operation in an ITS-S

3.18**ITS-S application**

ITS-S application process residing in the ITS-S application entity

3.19**ITS-S application process**

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

3.20**ITS-S border router**

ITS-S router with additional functionality that provides connectivity to other ITS communication nodes over external networks

3.21**ITS-S communication unit**

physical unit in an ITS-SU containing a part or all of the functionality of an ITS-S

Note 1 to entry: In case an ITS-SU consists of a single physical unit, the ITS-SU and the ITS-SCU are identical. In case an ITS-SU consists of more than one ITS-SCU, then these ITS-SCUs are interconnected via the ITS station-internal network of the ITS-SU.

3.22**ITS-S facilities layer**

layer in the ITS-S reference architecture containing OSI layers 5, 6, and 7 that connects applications to the ITS-S networking and transport layer

3.23**ITS-S facilities layer protocol data unit**

protocol data unit exchanged between peer ITS-S facility layers

3.24**ITS-S facilities layer service data unit**

service data unit exchanged between ITS-S facilities layer and ITS-S application entity

3.25**ITS-S facility application**

ITS-S application process residing in the ITS-S facilities layer

3.26**ITS-S gateway**

ITS-S node used to interconnect two different OSI protocol stacks at layers 5 through 7

Note 1 to entry: An ITS-S gateway may convert between different protocols.

3.27**ITS-S host**

ITS-S node comprised of ITS-S functionalities other than the functionalities of an ITS-S router, ITS-S border router, ITS-S mobile router, or an ITS-S gateway

3.28**ITS-S internal router**

ITS-S router that connects two or more ITS station-internal networks

3.29**ITS-S management application**

ITS-S application process residing in the ITS-S management entity

3.30**ITS-S mobile router**

ITS-S border router with additional functionality that allows a change of point of attachment to an external network while maintaining session continuity

3.31**ITS-S networking and transport layer protocol data unit**

protocol data unit exchanged between peer ITS-S networking and transport layers

3.32**ITS-S networking and transport layer service data unit**

service data unit exchanged between ITS-S networking and transport layer and ITS-S facilities layer

3.33**ITS-S networking and transport layer**

layer in the ITS-S reference architecture containing OSI layers 3 and 4 that connects the ITS-S facilities layer to the ITS-S access layer

3.34**ITS-S node**

node comprised of a set of functionalities in an ITS station unit that is connected to the ITS station-internal network or comprises an entire ITS station unit

3.35**ITS-S router**

ITS-S node comprised of routing functionalities of an ITS station unit used to connect two networks and to forward packets not explicitly addressed to itself

3.36**ITS-S security application**

ITS-S application process residing in the ITS-S security entity

3.37**ITS-S service**

communication functionality of an ITS-S that provides the capability to connect to other nodes

3.38**ITS station unit**

implementation of an ITS-S

3.39**MA interface**

interface between the ITS-S management entity and ITS-S applications

3.40**medium**

physical entity that supports the transmission of signals carrying information between ITS communication nodes, e.g. a set of wires supporting Ethernet signals or the space between two antennas that supports electromagnetic, optical, or acoustical transmissions

3.41**MF interface**

interface between the ITS-S management entity and the ITS-S facilities layer

3.42**MI interface**

interface between the ITS-S management entity and the ITS-S access layer

3.43**MN interface**

interface between the ITS-S management entity and the ITS-S networking and transport layer

3.44**MS interface**

interface between the ITS-S management entity and the ITS-S security entity

3.45**NF interface**

interface between the ITS-S networking and transport layer and the ITS-S facilities layer