INTERNATIONAL STANDARD

ISO
17261

Intelligent transport systems — Automatic vehicle and equipment identification — Intermodal goods transport architecture and terminology

Systèmes intelligents de transport — Identification automatique des véhicules et des équipements — Architecture et terminologie du transport intermodal des marchandises

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 17261 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*, in collaboration with Technical Committee CEN/TC 278, *Road transport and traffic telematics*.

This first edition of ISO 17261 cancels and replaces the first edition of ISO/TS 17261:2005, including ISO/TS 17261:2005/Cor. 1:2005, which has been technically revised.

Introduction

This International Standard prescribes the overall parameters within which subsidiary International Standards are constructed. The architecture description defined in this International Standard is a consistent extension to ISO 14814 (AVI reference architectures and terminology).

ISO 14814 provides an architecture context for AVI/AEI for road transport. This International Standard extends this architecture context to include intermodal and multimodal movements.

This International Standard is part of a series of International Standards defining AVI/AEI in the Intelligent Transport Systems/Road Transport and Traffic Telematics (ITS/RTTT) environment. The following documents have been issued from ISO TC 204 to form a family of International Standards for the sector:

ISO 14814   AVI/AEI Reference architectures and terminology;

ISO 14816   AVI/AEI Numbering and data structures;

ISO 14815   AVI/AEI System specification;

ISO 17261   AVI/AEI Intermodal goods transport reference architectures and terminology;

ISO 17262   AVI/AEI Intermodal goods transport: Numbering and data structures;

ISO 17263   AVI/AEI Intermodal goods transport: System parameters;

ISO 17264   AVI/AEI Intermodal goods transport: Interface requirements;

An AVI/AEI interaction in an ITS/RTTT environment comprises an identification of On-Board Equipment (OBE) by a reader/interrogator and can transfer additional data.

The data component in an ITS/RTTT environment provides the basis for unambiguous identification of the OBE, and may also share a medium for a bi-directional interactive exchange of data between the host and OBE and to other equipment (such as smart cards etc.).

The principles of data presentation determined in ISO 17262 have been adopted to provide an interoperable architecture within an International Standard framework. The use of Abstract Syntax Notation One (ASN.1) PER is therefore an integral part of the data architecture determined in this International Standard.

The numbering and data structure are capable of operation both by read/write devices, and by read only devices where there is no requirement (and sometimes no possibility) to write to the OBE.

A key feature of the structure is to provide interoperability of data constructs.

Within the ITS/RTTT sector, applications can range from simple vehicle and equipment identification to complex international systems.

The reference architecture model and the data construct schemes described in this family of International Standards/Technical Specifications extend the approved AVI conceptual architecture to provide a comprehensive conceptual and logical system architecture to describe the relationships and functionality for a wide range of media so that the currency of the International Standard remains good for both existing and future technologies. This International Standard recognises that there are existing AVI/AEI applications and provides a means of supporting such data constructs within this International Standard.

In many cases it is necessary or desirable to use one air carrier frequency and protocol, but this is not always possible or even desirable in all situations.

In accordance with the resolutions of ISO TC 204 and CEN TC 278 the use of Abstract Syntax Notation One (ASN.1) from ISO 8824 as a data definition structure is adopted. Its usage provides maximum interoperability and conformance to existing ITS/RTTT and related International Standards and Technical Specifications.

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Intelligent transport systems — Automatic vehicle and equipment identification — Intermodal goods transport architecture and terminology

1 Scope

This International Standard describes the conceptual and logical architecture for automatic vehicle and equipment identification (AVI/AEI) and supporting services in an intermodal/multimodal environment.

It presents a high level view of AEI intermodal and multimodal system architecture, and describes the key sub systems, their associated interfaces and interactions and how they fit into system wide functions such as management, security and information flow.

This International Standard identifies the context of intermodal/multimodal AEI within the overall AVI/AEI context and key external inter-dependencies and interfaces to the intermodal/multimodal sector IT infrastructure. These include interfaces to the external and internal users of the intermodal/multimodal system services and their associated IT systems, interfaces to intermodal/multimodal management systems, existing intermodal/multimodal networks and system operations, and specifically interfaces to item identification and the domain of JTC 1/SC 31, item logistics International Standards. As an architecture it is designed to be complementary and interlocking to that domain.

This International Standard is intended to be complementary and consistent with the work of ISO/TC 104, Freight containers.

It extends the conceptual and communication AVI architecture determined in ISO 14814 and is neither frequency nor air interface protocol specific. It provides maximum interoperability, has a high population capability, and provides the possibility of upwards migration to more capable systems.

It does not include the air interface nor any implementation aspect, only the reference architectures. Subsequent International Standards define data structures for general AVI/AEI and for specific sectors of application.

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

ISO/IEC 8824-2, *Information technology — Abstract Syntax Notation One (ASN.1): Information object specification*

ISO/IEC 8824-3, *Information technology — Abstract Syntax Notation One (ASN.1): Constraint specification*

ISO/IEC 8824-4, *Information technology — Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 specifications*

ISO/IEC 8825-2:1996, *Information technology — ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*

ISO 14813-6, *Intelligent transport systems — Reference model architecture(s) for the ITS sector — Part 6: Data presentation in ASN.1*

ISO 14816, *Road transport and traffic telematics — Automatic vehicle and equipment identification — Numbering and data structure*

ISO 17262, *Intelligent transport systems — Automatic vehicle and equipment identification — Numbering and data structures*

ISO 17263, *Intelligent transport systems — Automatic vehicle and equipment identification — System parameters*

ISO 14817, *Transport information and control systems — Requirements for an ITS/TICS central Data Registry and ITS/TICS Data Dictionaries*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8824-1, ISO 8824-2, ISO 8824-3, ISO 8824-4, ISO 14816 and the following apply.

3.1
address
data element designating the originating source or destination of data being transmitted

3.2
Automatic Equipment Identification
AEI
process of identifying equipment or entities that uses the surface transportation infrastructures by means of OBE's combined with the unambiguous data structure defined in these International Standards

NOTE   Within this series of International Standards, "Equipment" indicates large equipment that is carried in, or forms an integral part of, a trailer or trailer mounted unit.

3.3
air interface
conductor-free medium between an OBE and the reader/interrogator through which the linking of the OBE to the reader /interrogator is achieved by means of electro-magnetic signals

3.4
application identifier
one item of a data element construct (usually the first octet) that uniquely identifies the domain of an ITS/RTTT information exchange at an explicitly defined reference point, usually at reference points "Alpha", "Beta" or "Zeta"

NOTE 1   This octet identifies that the message is a specific RTTT message.

NOTE 2   See Figure 5.

3.5
ASN.1
Abstract Syntax Notation One
International Standard for representing data types and structures

NOTE   The encoding rules for this abstract syntax notation are defined in ISO 8825-2.

3.6
Automatic Vehicle Identification
AVI
process of identifying vehicles using OBE combined with the unambiguous data structure defined in these International Standards

3.7
AVI/AEI system operator
commercial operator of an AVI/AEI/RTTT system that uses OBE(s) for the purposes defined in this International Standard

3.8
bi-directional dialogue
two way communications between fixed equipment and OBE(s)

3.9
bill of lading
document which evidences a contract of the carriage and the taking over or loading of the goods by the carrier, and by which the carrier undertakes to deliver the goods against surrender of the document

NOTE   A provision in the document that the goods are to be delivered to the order of a named person, or to order, or to bearer, constitutes such an undertaking. The document has the following functions:

— a receipt for goods, signed by a duly authorised person on behalf of the carriers;
— a document of title to the goods described therein;
— evidence of the terms and conditions of carriage agreed upon between the two parties.

3.10
communication control
fixed equipment function to control the communication between fixed equipment and OBE

3.11
compatibility
capability of two or more items or components of equipment or material to exist and/or function in the same system or environment without modification, adaptation or mutual interference

3.12
consignment
separately identifiable amount of goods (available to be) transported from one consignor to one consignee via one or more than one modes of transport and specified in one single transport document

3.13
consignor
goods providor
party that provides goods to another party

NOTE   A consignor can be a manufacturer, trader, agent, or individual.

3.14
container
receptacle for the transport of goods, especially one readily transferable from one form of transport to another

NOTE   See also non-ISO Container.

3.15
Dedicated Short Range Communication
DSRC
means of effecting local (short range) transactions between fixed equipment and OBE(s) using an "air interface" comprising inductive or propagated signals between the fixed equipment and OBE(s)

3.16
data element structure
framework comprising a number of data elements in a prescribed form

NOTE   Also known as a "message".

3.17
Electronic Data Interchange
EDI
passing of a data message, or series of messages, between computers and/or between different software systems

NOTE   Within this context an EDI message is normally compatible with the form specified in ISO 9897. EDI is an instance of an EDT transaction.

3.18
Electronic Data Transfer
EDT
passing of data sets comprising an entire message from one computer to another or from one software system to another

3.19
goods provider
party that provides goods to another party

NOTE   A goods provider can be a manufacturer, trader, agent, or individual. More commonly known as a "consignor".

3.20
information
data, documentation, and other relevant knowledge organized to inform and describe

3.21
information manager
function of managing information in a system

NOTE   The role of information manager can be provided by one or many actors. The role of information manager can be performed internally by one or more of the system principal actors, or can be formed commercially or altruistically by one or more third parties.

3.22
interchangeability
condition which exists when two or more items possess such functional and physical characteristics as to be equivalent in performance and durability, and are capable of being exchanged one for the other without alteration of the items themselves, or of adjoining items, and without selection for fit and performance

3.23
intermodal transport
movement of goods in one or more loading unit(s) or vehicle(s) which uses successively several modes of transport without handling of the goods themselves when changing modes

[ISO 17262, ISO 17263]

3.24
interoperability
ability of systems to provide services to and accept services from other systems and to use the services so exchanged to enable them to operate effectively together

3.25
interrogator
device that performs the functions of a reader, but in addition has the ability to write new data to an OBE, or change data held in the OBE memory via an air interface

3.26
ISO Container
large boxlike receptacle of standard design for the transport of goods

[ISO 668]

3.27
item
item of goods to be moved

NOTE   An item can be a single unit, such as a letter, a bundle or box of units or other units that will be bundled into a receptacle which will be carried in equipment (such as an ISO intermodal container) as a sub component of an AEI item. Items are not defined in this family of International Standards and are defined by the International Standards of JTC 1/SC 31, Automatic identification and data capture techniques.

3.28
journey
within the AVI/AEI context, the physical movement of goods from the goods provider to the receiver

3.29
load
that which is to be transported from the consignor to the receiver and which comprises the consignment, packaging, pallets and or containers that are smaller than an ISO container

3.30
manifest
document which lists complete specifications of the goods loaded for transport to various destinations by a vessel or other means of transport

NOTE   As a rule cargo manifests are drawn up by the agents in the ports of loading and are based upon the bills of lading. For shipping, a manifest represents a cumulating of bills of lading for official and administrative purposes.

3.31
media adaptation
function to adapt the communication media (air interface propagated modulation) to communication and computing equipment

3.32
monologue
one way communication between the fixed equipment and OBE(s)

3.33
multimodal transport
carriage of goods by at least two different modes of transport

NOTE   In contrast, intermodal transport implies changing from mode to another using the same form of loading unit. Multimodal transport implies that either there is more than one modal shift, or that loads can be broken into partial loads as part of a modal change.

3.34
non ISO container
container used in the transport of goods that does not comply with any ISO container International Standard (e.g. non compliant with ISO 668 and ISO 10374)

3.35
non returnable unit
one trip pallets, containers or packaging which is not returned to the consignor or returnables manager

3.36
On Board Equipment
OBE
device on board or attached to the vehicle/equipment to perform the functionality of AVI/AEI

3.37
operator
commercial operator of an AVI/AEI/RTTT system that uses OBEs for the purposes defined in this International Standard

3.38
Packed Encoding Rules
PER
encoding rules for an abstract syntax specification in ASN1

NOTE   There are alternate forms of encoding such as "Basic Encoding Rules" (BER). Within TICS International Standards, reference to ASN.1 implies also the use of PER as specified in ISO 8825-2 unless otherwise stated.

[ISO 8825-2]

3.39
packet
collation of goods to be moved

NOTE   A packet can be a single unit, or a collection of smaller packets and items that will be bundled into a receptacle which will be carried in equipment (such as an ISO intermodal container) as a sub component of an AEI item. Packets are not defined in this family of International Standards and are defined by the International Standards of JTC 1/SC 31, Automatic identification and data capture techniques.

3.40
pallet
wooden, plastic or metal platform that enables a bundle of goods to be moved around by a fork lift truck or similar platform moving device that will be carried in equipment (such as an ISO Intermodal Container) as a sub component of an AEI item

NOTE   Pallets are not defined in this family of International Standards and are defined by the International Standards of JTC 1/SC 31, Automatic identification and data capture techniques. See also "AEI", "items", "packets", and "receptacles".

3.41
programmable device/OBE
device where all or part of the identity and memory can be reprogrammed many times by an external device, but not during a normal "on the fly" read/write cycle

3.42
Returnable Container Unit
RCU
unit (container) used as part of a load, which is returned to the consignor or a returnables manager

3.43
reader
device that transmits a signal as a means of initiating a response in a compatible OBE

NOTE   It subsequently receives the modulated electro-magnetic response and decodes the data. See also "interrogator".

3.44
read only device/OBE
device which is programmed at the time of manufacture or prior to use and thereafter can only be read, with no further opportunity to change any of the data held on the device nor its core identification

3.45
read/write device/OBE
data mode corresponding to an OBE in which data content can be changed by means of a compatible interrogator via the air interface

3.46
read/write cycle
complete sequence of interaction by the reader/interrogator where the OBE is unambiguously identified and new data, comprising either whole or part of the full data set, is written onto the OBE by means of the air interface

3.47
receiver
within the AVI/AEI context, one who receives goods as a result of a journey from a consignor

3.48
receptacle
single unit, or a carrier of items and of smaller packets and items

NOTE   A receptacle will normally take the form of a bag, box or roller cage, which will be carried in equipment (such as an ISO Intermodal Container) as a sub component of an AEI item. Packets are not defined in this family of International Standards and are defined by the International Standards of JTC 1/SC 31, Automatic identification and data capture techniques.