
**Intelligent transport systems —
Framework for collaborative Telematics
Applications for Regulated commercial
freight Vehicles (TARV) —**

Part 1:

Framework and architecture

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*Systèmes intelligents de transport — Cadre pour applications
télématiques collaboratives pour véhicules de fret commercial
réglementé (TARV) —*

ISO 15638-1:2012
Partie 1: Cadre et architecture

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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 15638-1 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

ISO 15638 consists of the following parts, under the general title *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV)*:

— *Part 1: Framework and architecture*

The following parts are to be published:

— *Part 2: Common platform parameters using CALM*

— *Part 3: Operating requirements, 'Approval Authority' procedures, and enforcement provisions for the providers of regulated services*

— *Part 4: System security requirements*

— *Part 5: Generic vehicle information*

— *Part 6: Regulated applications*

— *Part 7: Other applications*

Subsequent parts of ISO 15638 will provide definitions for specific TARV application services.

Introduction

Many ITS technologies have been embraced by commercial transport operators and freight owners, in the areas of fleet management, safety and security. Telematics applications have also been developed for governmental use. Such regulatory services in use or being considered vary from country to country, but include electronic on-board recorders, vehicle charging, digital tachograph, on-board mass monitoring, vehicle access monitoring, hazardous goods tracking and e-call. Additional applications with a regulatory impact being developed include, fatigue management, speed monitoring and heavy vehicle charging based on mass, location, distance and time.

In such an emerging environment of regulatory and *commercial applications* (4.15), it is timely to consider an overall *architecture* (4.7) (business and functional) that could support these functions from a single platform within a commercial freight vehicle that operates within such regulations. International standards will allow for a speedy development and *specification* (4.40) of new applications that build upon the functionality of a generic *specification* platform. A suite of standards deliverables is required to describe and define the *framework* (4.20) and requirements so that the on-board equipment and *back office* (4.9) systems can be commercially designed in an open market to meet common requirements of *jurisdictions* (4.24).

This suite of standards addresses and defines the *framework* (4.20) for a range of cooperative telematics applications for *regulated commercial freight vehicles* (4.37) (such as access monitoring, driver fatigue management, speed monitoring, on-board mass monitoring and charging). The overall scope includes the concept of operation, legal and regulatory issues, and the generic cooperative provision of services to *regulated commercial freight vehicles* (4.37), using an on-board ITS platform. The *framework* (4.20) is based on a (multiple) *service provider* (4.39) oriented approach provisions for the approval and auditing of *service providers* (4.40).

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- provides the basis for future development of cooperative telematics applications for *regulated commercial freight vehicles* (4.37). Many elements to accomplish this are already available. Existing relevant standards will be referenced, and the *specifications* (4.41) will use existing standards (such as *CALM*) wherever practicable.
- allows for a powerful platform for highly cost-effective delivery of a range of telematics applications for *regulated commercial freight vehicles* (4.37).
- presents a business *architecture* (4.7) based on a (multiple) *service provider* (4.39) oriented approach.
- addresses legal and regulatory aspects for the approval and auditing of *service providers* (4.40).

This suite of standards deliverables is timely as many governments (Europe, North America, Asia and Australia/New Zealand) are considering the use of telematics for a range of regulatory purposes. Ensuring that a single in-vehicle platform can deliver a range of services to both government and industry through open standards and competitive markets is a strategic objective.

This part of the ISO 15638 provides the overall *framework* (4.20) description and *architecture* (4.7) for *TARV*, including the detailed *architecture* (4.7) *specification* (4.40) of the facilities layer.

NOTE 1 The definition of what comprises a 'regulated' vehicle is regarded as an issue for National decision, and may vary from country to country. This suite of standards deliverables does not impose any requirements on nations in respect of how they define a regulated commercial freight vehicle.

NOTE 2 The definition of what comprises a 'regulated' service is regarded as an issue for National decision, and may vary from country to country. This suite of standards deliverables does not impose any requirements on nations in respect

of which services for regulated commercial freight vehicles countries will require, or support as an option, but provides standardised sets of requirements descriptions for identified services to enable consistent and cost efficient implementations where implemented.

NOTE 3 *Cooperative ITS (4.14)* applications, in this context, are defined as the use of an in-vehicle *ITS* platform to meet both commercial and regulatory needs from a (functionally) single on-board platform.

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Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) —

Part 1: Framework and architecture

1 Scope

This part of ISO 15638 provides the following for cooperative telematics applications for *regulated commercial freight vehicles* (4.37):

- a) A *framework* (4.20) for the provision of cooperative telematics application services for regulated commercial freight vehicles;
- b) A description of the concept of operation, regulatory aspects and options and the role models;
- c) A conceptual *architecture* (4.7) using an on-board platform and wireless communications to a *regulator* (4.25) or his agent;
- d) References for the key documents on which the *architecture* (4.7) is based;
- e) Details of the *architecture* (4.7) of the facilities layer;
- f) A taxonomy of the organisation of generic procedures;
- g) Common terminology for the ISO 15638 family of standards.

This part of ISO 15638 is based on a (multiple) *service provider* (4.39) oriented approach.

ISO 15638 has been developed for use in the context of regulated commercial freight vehicles. There is nothing however to prevent a jurisdiction extending or adapting the scope to include other types of regulated vehicles, as it deems appropriate.

NOTE The specific 'approval' procedures for specific application services are a matter for the jurisdiction (4.24) and are outside the scope of this (or any) part of 15638. However approval authorities (4.6) are encouraged to use the guidance of ISO 17000 and ISO/IEC 17065:2012 when developing and implementing such procedures.

2 Conformance

This part of ISO 15638 defines a general architecture (4.7), and has no specific conformance tests defined herein. Some aspects defined within may have conformance tests defined in other parts of ISO 15638.

Conformance declarations for the various parts of a CALM-compliant system shall be based on the relevant CALM-related international standards.

Conformance to any other international standard or specification (4.40) referenced in this part of ISO 15638 shall be ascertained according to the requirements of the referenced deliverable.

Conformance to this part of ISO 15638 is therefore a matter of self declaration of compliance, or by submission to a test house to ascertain that the provisions of the clauses of this part of ISO 15638 have been adhered to.

3 Normative references

The following referenced documents are indispensable for the application 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/TR 12859, *Intelligent transport systems — System architecture — Privacy aspects in ITS standards and systems*

ISO 15638-2¹, *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Common platform parameters using CALM*

ISO 15638-3², *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Operating requirements, 'Approval Authority' procedures, and enforcement provisions for the providers of regulated services*

ISO 15638-5³, *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Generic vehicle information*

ISO/TS 15638-6⁴, *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Regulated applications*

ISO 15638-7⁵, *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Other applications*

ISO 21210, *Intelligent transport systems — Communications access for land mobiles (CALM) — IPv6 Networking*

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

ISO 21218, *Intelligent transport systems — Communications access for land mobiles (CALM) — Medium service access points*

ISO 24102, *Intelligent transport systems — Communications access for land mobiles (CALM) — Management*

ETSI TS 102 665, *Digital Enhanced Cordless Telecommunications (DECT); DECT access to IP networks*

NOTE 1 Subsequent parts of ISO 15638 will provide definitions for specific TARV application services.

NOTE 2 See Bibliography for references to other parts of ISO 15638 which are in various stages of ballot, but not yet published at the date of publication of this International Standard.

¹ To be published.

² To be published.

³ To be published.

⁴ To be published. Full International Standard approval procedures are in process.

⁵ To be published.

4 Terms and definitions

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

NOTE This clause contains all definitions generally used within the ISO 15638 suite of standards.

4.1

applicant

party which has applied for approval as a *service provider* (4.39)

4.2

application service

service provided by a *service provider* (4.39) accessing data from the *IVS* (4.23) of a *regulated commercial freight vehicle* (4.37) via a wireless communications network

4.3

appoint/appointment/appointed

assign officially to take responsibility for a role

4.4

approval

formal affirmation that an *applicant* (4.1) has satisfied all the requirements for *appointment* (4.3) as a *service provider* (4.39)

4.5

approval agreement

written agreement made between an *approval authority (regulatory)* (4.6) and a *service provider* (4.39)

NOTE An *approval agreement* (4.5) recognises the fact that a '*service provider*' (4.39) having satisfied the '*approval authority (regulatory)*' (4.6) requirements for *appointment* (4.3) as a '*service provider*', is *appointed* (4.3) in that capacity, and sets out the legal obligations of the parties with respect to the on-going role of the '*service provider*'.

4.6

approval authority (regulatory)

organisation (usually independent) which conducts *approval* (4.4) and ongoing *audit* (4.8) for *service providers* (4.39)

4.7

architecture

formalised description of the design of the structure of *TARV* and its *framework* (4.20)

4.8

audit

review of a party's capacity to meet, or continue to meet, the initial and ongoing *approval agreements* (4.5) as a *service provider* (4.39)

4.9

back office

generic term for the computing and communication facilities of a *service provider* (4.39) or an *approval authority (regulatory)* (4.6) or *jurisdiction regulator* (4.25)

4.10

basic vehicle data

data that shall be maintained/provided by all *IVS* (4.23), regardless of *jurisdiction* (4.24)

4.11

Controller Area Networking bus

CAN bus

network designed for use in automotives; it uses a single terminated twisted pair cable; is multi master; maximum signal frequency used is 1 Mbit/sec; length is typically 40M at 1Mbit/sec up to 10KM at 5Kbits/sec; it has high reliability with extensive error checking; typical maximum data rate achievable is 40KBytes/sec; maximum latency of high priority message <120 µsec at 1Mbit/sec

NOTE CAN is unusual in that the entities on the network, called nodes, are not given specific addresses. Instead, it is the messages themselves that have an identifier which also determines the messages' priority. For this reason there is no theoretical limit to the number of nodes although in practice it is ~64.

4.12

certification authority (digital)

organization which issues digital certificates for use by other parties (specifically in the context of communications security)

4.13

cmpn

OSGi® (open services gateway initiative) service platform specifications

[OSGi®]

4.14

cooperative ITS

C-ITS

ITS applications in *regulated commercial freight vehicles* (4.37) for both regulatory and commercial purposes that require the exchange of data between (uncontracted parties using ITS) stations

4.15

commercial applications

ITS applications in *regulated commercial freight vehicles* (4.37) for commercial (non-regulated) purposes

Example Asset tracking, vehicle and engine monitoring, cargo security, driver management etc.

4.16

condition

set of rules determined by the *jurisdiction* (4.24) to trigger the generation of reports

EXAMPLE Compliance or non-compliance reports, *exception reports* (4.19), condition reports, events, alarms and passage reports.

4.17

core application data

basic vehicle data (4.10) plus any additional data required to provide an implemented *regulated application service* (4.36)

4.18

enrolment

official registration to participate

4.19

exception report

report that is generated according to the *condition(s)* (4.16) in an application, and forwarded to a *jurisdiction* (4.24) by a *service provider* (4.39)

4.20

framework

particular set of beliefs or ideas referred to in order to describe a scenario or solve a problem

4.21**global navigation satellite system****GNSS**

comprises several networks of satellites that transmit radio signals containing time and distance data that can be picked up by a receiver, allowing the user to identify the location of its receiver anywhere around the globe

4.22**global positioning system****GPS**

instantiation of *GNSS* (4.21) controlled by the US Department of Defence

4.23**in-vehicle system (IVS)**

ITS-station and connected equipment on board a vehicle

4.24**jurisdiction**

government, road or traffic authority which owns the *regulatory applications* (4.35)

Example

Country, state, city council, road authority, government department (customs, treasury, transport), etc.

4.25**jurisdiction regulator****regulator**

agent of the *jurisdiction* (4.24) *appointed* (4.3) to regulate and manage TARV within the domain of the jurisdiction

NOTE

May or may not be the *approval authority (regulatory)* (4.6).

4.26**map**

spatial dataset that defines the road system

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4.27**on-board unit****OBU**

integrated telematics unit installed on board which provides the specified telematics functionality required for the *IVS* (4.23)

4.28**OSGi® Bundles**

OSGi® components made by the developers

4.29**OSGi® Execution environment**

defines what methods and classes are available in a specific platform

4.30**OSGi® Life-cycle**

application programming interface (API) to install, start, stop, update, and uninstall bundles

4.31**OSGi® Modules**

layer that defines how a bundle can import and export code

4.32**OSGi® Security**

layer that handles the security aspects

4.33

OSGi® Services

connect bundles in a dynamic way by offering a publish-find-bind model for plain old JAVA® objects

4.34

prime service provider

service provider (4.39) who is the first contractor to provide *regulated application services* (4.36) to the *regulated commercial freight vehicle* (4.37), or a nominated successor on termination of that initial contract

NOTE The *prime service provider* is also responsible for maintaining the installed *IVS* (4.23); if the *IVS* was not installed during the manufacture of the vehicle, the *prime service provider* is also responsible for installing and commissioning the *IVS*.

4.35

regulated/regulatory application

approval arrangement utilised by *jurisdictions* (4.24) for granting certain categories of commercial vehicle rights to operate in regulated circumstances subject to certain *conditions* (4.16)

NOTE Each *jurisdiction* may use their own terminology including, but not limited to, permit, application, scheme, concession, exemption, gazettal and notice.

4.36

regulated application service

TARV application service (4.2) that is mandated by a regulation imposed by a *jurisdiction* (4.24), or an option supported by a *jurisdiction*

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4.37

regulated commercial freight vehicle

vehicle (often but not always designed to haul commercial freight) that is subject to regulations determined by the *jurisdiction* (4.24) as to its use on the road system of the jurisdiction in regulated circumstances, subject to certain *conditions* (4.16), and in compliance with specific regulations for that class of vehicle

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NOTE At the option of jurisdictions this may require the provision of information via *TARV* or provide the option to do so.

4.38

regime for open application management

ROAM

facilities and open application execution and its management for *TARV* systems

4.39

service provider

party which is certified by an *approval authority (regulatory)* (4.6) as suitable to provide regulated or commercial *ITS application services* (4.2)

4.40

specification

explicit and detailed description of the nature and functional requirements and minimum performance of equipment, service or a combination of both

4.41

tamper

conduct towards *IVS* (4.23) or a *service provider's* (4.39) system which is intended to prevent the *IVS* or the *service provider's* system from functioning correctly

4.42

Unified Modeling Language

UML

graphical language for visualizing, specifying, constructing, and documenting the artifacts of a software-intensive system

NOTE *UML* offers a standard way to write a system's blueprints, including conceptual things such as business processes and system functions as well as concrete things such as programming language statements, database schemas, and reusable software components, and is standardised as ISO/IEC 19501.

4.43

uniform resource identifier

URI

string of characters used to identify a name or a resource on the Internet

NOTE Such identification enables interaction with representations of the resource over a network (typically the World Wide Web) using specific protocols; schemes specifying a concrete syntax and associated protocols define each URI.

4.44

uniform resource locator

URL

uniform resource identifier [*URI* (4.43)] that specifies where an identified resource is available and the mechanism for retrieving it

NOTE In popular usage and in many technical documents and verbal discussions it is often incorrectly used as a synonym for *URI* (4.43) (The best-known example of the use of *URLs* is for the addresses of web pages on the World Wide Web, such as <http://www.example.com/>).

4.45

user

individual or party that enrolls in and operates within a regulated or commercial *application service* (4.2)

Example Driver, transport operator, freight owner, etc.

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5 Abbreviated terms

For the purposes of this part of ISO 15638 and the ISO 15638 suite of standards deliverables, the following abbreviated terms apply.

API

application programming interface

app

application programme

CALM

communications access for land mobiles

CAD

core application data (4.17)

CAN

controller area network (4.11)

C-ITS

cooperative intelligent transport systems

CDS

charging data services

DDS

distributed directory service

DMT

device management tree