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Intelligent transport systems — Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) —

Part 21: Monitoring of regulated vehicles using roadside sensors and data collected from the vehicle for enforcement and other purposes

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

Partie 21: Surveillance des véhicules réglementés à l'aide de capteurs routiers et de données collectées dans les véhicules pour l'application des lois et à d'autres fins

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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).

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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 204, *Intelligence transport systems*.

A list of all parts in the ISO 15638 series can be found on the ISO website.

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Introduction

The ISO 15638 seriesTARV application standards are based on a triumvirate of vehicle operators with in-vehicle systems, on-board application service providers (3.39) and jurisdictions (3.28). The basic TARV standards focus on the transactions between these parties via ITS-stations (3.25), and do not have measures to detect/avoid tampering/incorrect setting of on-board equipment, and are limited to using data collected from the vehicle for purposes such as control, management and enforcement. In many countries road side sensors (3.37) are already widely used for jurisdiction enforcement and other enhancement purposes. These road side sensors can be used in combination with the TARV framework (3.21) to enhance functionality by eliminating/reducing problems of incorrect setting/tampering etc. and/or complementing/corroborating data obtained from on-board systems. This provides increased capability for jurisdictions and other entities to use existing parts of the ISO 15638 series of standards (which are focussed only on the transaction of data collected from on-board systems), thus potentially providing validation of, or removing weakness in, the accuracy of the data transmitted from the vehicle to an application service provider (3.39), or to provide new management and control measures for regulated commercial freight vehicles. In some cases, new means of management and enforcement may be enabled by using this document.

It, therefore, seems appropriate to include this part of ISO 15638 to the 15638 series of standards to provide the means to use roadside/in-road sensors to validate the accuracy of on-board equipment, and/or complement the data available to application service providers (3.39) and jurisdictions and other entities.

NOTE ISO 15638-9[1)] already covers provisions consistent with EC165/2014. This document is complementary to and not competitive to ISO 15638-9, and therefore consistent with EC 165/2014.

1) To be published. Stage at publication: ISO/DIS 15638-9.

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Intelligent transport systems — Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) —

Part 21:
Monitoring of regulated vehicles using roadside sensors and data collected from the vehicle for enforcement and other purposes

1 Scope

The ISO 15638 series of standards defines the framework (3.21) for online fleet management of regulated commercial freight vehicles utilizing data communication between in-vehicle systems and an application service provider (3.39) via on-board communication unit interfacing with road monitoring infrastructure. This document defines an extension to the existing role model conceptual architecture (3.7) by adding roadside sensors (3.37) to the model for additional data collection path for enhancement of the system.

The objective of this document is to reinforce vehicle monitoring for enforcement and other management purposes of regulated commercial freight vehicle movements. The scope of this document is to

a) Reinforce vehicle monitoring for enforcement and other purposes,

b) Provide additional data security by using roadside sensor data links,

c) Detect/avoid tampering/incorrect setting of onboard sensor equipment,

d) Provide means of using roadside sensors to validate the accuracy of on-board equipment, and

e) Enable the combined use of data obtained from the regulated commercial freight vehicle and roadside/in-road sensors to monitor, manage and control the movement of regulated commercial freight vehicles.

In this extended role model architecture (3.7), roadside sensor (including buried in-road sensors) functionality is added to the existing TARV role model. In this extended role model, jurisdictions (3.28) and other entities can reinforce monitoring or other management purpose applications by using a combination of information from both in-vehicle systems and roadside/in-road sensors.

In this document, the framework (3.21) for this modified and improved reinforcement of vehicle monitoring for enforcement and other management purpose applications is defined.

This document is complementary to, and does not replace, any other parts of the ISO 15638 series of standards. This document is beneficial to jurisdiction enforcement and other vehicle monitoring management purpose entities and it provides a means for using roadside sensors to validate the accuracy of on-board equipment and provides additional use cases for TARV service applications.

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.

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ISO 15638 (all parts), *Intelligent transport systems — Framework (3.21) for cooperative telematics (3.43) applications for regulated commercial freight vehicles (TARV)*

ISO/TR 12859:2009, *System architecture — Privacy aspects in ITS standards and systems*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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 https://www.electropedia.org

3.1
access methods
procedures and protocols to provision and retrieve data

3.2
app
small (usually) applets, organised as software bundles, that support *application services* (3.3) by keeping the *data pantry* provisioned with up to date data

3.3
application service
service provided by a *service provider* (3.39) enabled by accessing data from the *IVS* (3.23) of a *regulated vehicle* (3.35) via a wireless communications network

3.4
application service provider
ASP
party that provides an *application service* (3.3)

3.5
app library
separately secure area of memory in *IVS* (3.23) where apps are stored (with different access controls to *data pantry*)

3.6
application service data file
ASD file
file held in the data pantry of the *IVS* (3.23) containing data specific to an *application service* (3.3)

3.7
architecture
formalised description of the design of the structure of *TARV* and its *framework* (3.21)

3.8
audit
auditing
review of a party's capacity to meet, or continue to meet, the initial and ongoing *certification agreements* as a *service provider* (3.39)

3.9
authentication
function intended to establish and verify a claimed identity

3.10
basic vehicle data
data that shall be maintained/provided by all *IVS* (3.23) (regardless of jurisdiction)

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3.11
certification
formal affirmation that an applicant has satisfied all the requirements for appointment as an *application service provider* (3.39)or that an *application service* (3.3) delivers the required service levels.

3.12
certification authority
<digital> organization which issues digital certificates for use by other parties (specifically in the context of communications security)

3.13
certification authority
<regulatory> organisation (usually independent) which conducts *certification* (3.11) and ongoing *audit* (3.8) for *service providers* (3.39) on behalf of a jurisdiction

3.14
commercial application(s)
ITS applications in *regulated vehicles* (3.35) for commercial (non-regulated) purposes

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

3.15
consignment
shipment of goods/cargo to a destination

3.16
conveyance
vehicle or trailer used to transport from one place to another

3.17
cooperative ITS
C-ITS
ITS applications for both regulatory and commercial purposes that require the exchange of data between uncontracted parties using multiple *ITS-stations* (3.25) communicating with each other and sharing data with other parties with whom they have no direct contractual relationship to provide one or more *ITS services* (3.24)

3.18
data pantry
secure area of memory in *IVS* (3.23) where data values are stored [with different access controls to *app library* (3.5)]

3.19
driver
person driving the *regulated vehicle* (3.35) at any specific point in time

3.20
facilities
layer that sits on top of the communication stack and helps to provide data interoperability and reuse, and to manage applications and enable dynamic real time loading of new applications

3.21
framework
particular set of beliefs and ideas referred to in order to describe a scenario or solve a problem

3.22
global navigation satellite system
GNSS
system that 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* (3.45) to identify the location of its receiver anywhere around the globe

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3.23
in-vehicle system
IVS
ITS-station (3.25) and connected equipment on board a vehicle

3.24
ITS service
communication functionality offered by an *ITS-station* (3.25) to an *ITS-station* (3.25) application

3.25
ITS-station
ITS-s
entity in a communication network, comprised of application, *facilities* (3.20), networking and access layer components specified in ISO 21217 that operate within a bounded secure management domain

3.26
IVS installer
actor who installs *IVS* (3.23) on behalf of the vehicle manufacturer or the initial prime service provider (3.32)

3.27
IVS maintainer
actor who maintains *IVS* (3.23) on behalf of the *prime service provider* (3.32)

3.28
jurisdiction
government, road or traffic authority which owns the *regulatory applications* (3.33)

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

3.29
jurisdiction regulator
regulator
agent of the *jurisdiction* (3.28) appointed to regulate and manage TARV within the domain of the *jurisdiction* (3.28); may or may not be the *certification authority (regulatory)* (3.13)

3.30
local data tree
LDT
frequently updated data concept stored in the on-board *data pantry* containing a collection of data values deemed essential for either a) *TARV regulated application service* (3.34), or b) cooperative intelligent transport systems

3.31
operator
fleet manager of a *regulated vehicle* (3.35)

3.32
prime service provider
service provider (3.39) who is the first contractor to provide *regulated application* (3.33) *services* (3.3) to the *regulated vehicle* (3.35), or a nominated successor on termination of that initial contract

Note 1 to entry: The prime *service provider* (3.32) is also responsible to maintain the installed *IVS* (3.23), if the *IVS* (3.23) was not installed during the manufacture of the vehicle the prime service provider is also responsible to install and commission the *IVS* (3.23)

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3.33
regulated application
regulatory application
application arrangement using TARV utilised by *jurisdictions* (3.28) for granting certain categories of commercial vehicles rights to operate in regulated circumstances subject to certain conditions, or to permit a vehicle to operate within the *jurisdiction* (3.28)

Note 1 to entry: It may be mandatory or voluntary at the discretion of the *jurisdiction* (3.28).

3.34
regulated application service
TARV application service (3.3) that meets the requirements of a regulated application (3.33) that is mandated by a regulation imposed by a *jurisdiction* (3.28), or is an option supported by a *jurisdiction* (3.28)

3.35
regulated vehicle
vehicle that is subject to regulations determined by the *jurisdiction* (3.28) as to its use on the road system of the *jurisdiction* in regulated circumstances, subject to certain conditions, and in compliance with specific regulations for that class of regulated vehicle

3.36
regime for open application management
ROAM
facilities layer for *TARV*, within the ISO 15638 series of standards, providing an open access, yet secure runtime environment for *TARV* and other applications, including cooperative vehicle applications, on top of the *CALM* communications environment

3.37
roadside sensor
device installed at or near the roadside or above the road or embedded into the road that either:

a) collects data concerning the vehicle (e.g. licence plate, vehicle speed, vehicle emission data, etc.) and passes that data to the vehicle *IVS* (3.23),

b) provides other dynamic data to the vehicle *IVS* (3.23) (e.g. temporary or permanent speed limits or other restrictions or informative data), and

c) Requests the *IVS* (3.23) to take some action as a result of sensed information

for use in support or execution of a TARV application

3.38
sensor
device that receives a signal or stimulus and responds to it

3.39
service provider
party which is certified by a *certification authority (regulatory)* (3.13) as suitable to provide regulated or commercial ITS *application services* (3.3)

3.40
session
wireless communication exchange between the *ITS-station* (3.25) of an *IVS* (3.23) and the *ITS-station* (3.25) of its *application service provider* (3.39) to achieve data update, data provision, upload *apps* (3.2), or otherwise manage the provision of the *application service* (3.3), or a wireless communication provision of data to the *ITS-station* (3.25) of an *IVS* (3.23) from any other *ITS-station* (3.25)

3.41
specification
explicit and detailed description of the nature and functional requirements and minimum performance of equipment, service or a combination of both

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3.42
tampering action
action conducted towards *IVS* (3.23) or a service provider's system which is intended to prevent the *IVS* (3.23) or the *service provider's* (3.39) system from functioning correctly

3.43
telematics
use of wireless media to obtain and transmit (data) from a distant source

3.44
Unified Modeling Language
UML
graphical language for visualizing, specifying, constructing, and documenting the artifacts of a software-intensive system which 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

Note 1 to entry: UML is standardised as ISO/IEC 19501 [Unified Modeling Language (UML)].

3.45
user
individual or party that enrols in and operates within a regulated or *commercial application* (3.14) *service* (3.3)

EXAMPLE *Driver* (3.19), transport *operator* (3.31), freight owner, etc.

4 Abbreviated terms

app applet (JAVA™ application or similar)

ASD file application service data file (3.6)

ASP application service provider (3.39)

CALM communications access for land mobiles

C-ITS cooperative intelligent transport system

CONOPS concept of operations

DSRC dedicated short range communication

GNSS global navigation satellite system (3.22)

HGV heavy goods vehicle

HV heavy vehicle

Hz Hertz

ID identity

ITS-S ITS station (3.25)

IVS In-vehicle system (3.23)

LDM local dynamic map

LDT local data tree (3.30)

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