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

Part 9:

Remote digital tachograph monitoring

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

Partie 9: Monitorage du tachygraphe électronique à distance (RTM)

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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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of 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 www.iso.org/iso/foreword.html.

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

This first edition of ISO 15638-9 cancels and replaces ISO/TS 15638-9:2013, which has been technically revised. The main changes compared to the previous edition are as follows:

 Inclusion of remote inspection using short-range wireless interrogator for enforcement inspection purposes.

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Many ITS technologies have been embraced by commercial transport operators and freight owners in the areas of fleet management, safety and security. On-board applications have also been developed for governmental use. Such regulatory services in use or being considered vary from jurisdiction to jurisdiction, but include electronic on-board recorders, digital tachograph, on-board mass monitoring, 'mass' data for regulatory control and management weigh-in-motion, vehicle access methods, hazardous goods tracking and eCall. Additional applications with a regulatory impact being developed include fatigue management, speed monitoring and vehicle penalties imposed based on location, distance and time.

In such an emerging environment of regulatory and commercial applications, it is timely to consider an overall architecture (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 of new applications that build upon the functionality of a generic specification platform. A series of standards deliverables is required to describe and define the framework and requirements so that the on-board equipment and back office systems can be commercially designed in an open market to meet common requirements of jurisdictions.

The ISO 15638 TARV series addresses and defines the framework for a range of cooperative telematics applications for regulated vehicles (e.g. access methods, driver fatigue management, speed monitoring, on-board mass monitoring, Remote Tachograph Monitoring, ADR management). The overall scope includes the concept of operation, legal and regulatory issues, and the generic cooperative provision of services to regulated vehicles, using an on-board ITS platform. The framework is based on a (multiple) service provider-oriented approach with provisions for the approval and auditing of service providers.

The ISO 15638 series provides both the means to achieve current requirements for telematics applications for regulated vehicles and the basis for future development of cooperative telematics applications for regulated vehicles.

The ISO 15638 series 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.

This document provides specifications for weigh-in-motion and on-board weighing monitoring and supports several defined communication profiles in which this function may be performed.

NOTE 1 The definition of what comprises a 'regulated' vehicle is regarded as an issue for national decision and can vary from jurisdiction to jurisdiction. This series does not impose any requirements on nations in respect of how they define a regulated vehicle.

NOTE 2 The definition of what comprises a 'regulated' service is regarded as an issue for national decision and can vary from jurisdiction to jurisdiction. This series does not impose any requirements on nations in respect of which services for regulated vehicles jurisdictions they will require, or support as an option, but will provide standardized sets of requirements descriptions for identified services to enable consistent and cost-efficient implementations where implemented.

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

Part 9:

Remote digital tachograph monitoring

1 Scope

This document addresses the provision of 'Remote Digital Tachograph Monitoring' and specifies the form and content of the transmission of such data required to support such systems, and access methods to that data.

This document provides specifications for common communications and data exchange aspects of the application service remote digital tachograph monitoring that a jurisdiction regulator can elect to require or support as an option, including:

- a) High level definition of the service that a service provider provides. The service definition describes common service elements but does not define the detail of how such an application service is instantiated, nor the acceptable value ranges of the data concepts defined.
- b) Means to realize the service. // Standards.iteh.ai)
- c) Application data naming, content and quality that an IVS delivers, including a number of profiles for data (noting that requirements and constraints of what can/cannot be transmitted over the air can vary between jurisdictions).
- d) Support for a number of defined communication profiles to enable remote inspection.

This document is not applicable for analogue tachograph equipment/systems.

This document provides specifications for the following communication profiles:

 Communication Profile C1: Roadside inspection using a short-range wireless communication interrogator instigating a physical roadside inspection (master<>slave)

Profile C1a: via a hand aimed or temporary roadside mounted and aimed interrogator

Profile C1b: via a vehicle mounted and directed interrogator

Profile C1c: via a permanent or semi-permanent roadside or overhead gantry

 Communication Profile C2: Roadside inspection using a short-range wireless communication interrogator instigating a download of data to an application service provider via an ITSstation communication (master<>slave + peer<>peer)

Profile C2a: via a hand aimed or temporary roadside mounted and aimed interrogator

Profile C2b: via a vehicle mounted and directed interrogator

Profile C2c: via a permanent or semi-permanent roadside or overhead gantry

 Communication Profile C3: Remote inspection addressed via an ITS-station instigating a download of data to an application service provider via a wireless communications interface (as defined in ISO 15638-2). It is possible that subsequent versions of this document will support additional communication profiles.

NOTE 1 The definition of what comprises a 'regulated' service is regarded as an issue for national decision and can vary from jurisdiction to jurisdiction. This document does not impose any requirements on nations in respect of which services for regulated vehicles jurisdictions will require, or support as an option, but provides standardized sets of requirements descriptions for identified services to enable consistent and cost-efficient implementations where instantiated.

NOTE 2 The ISO 15638 series has been developed for use in the context of regulated commercial freight vehicles (hereinafter referred to as 'regulated vehicles'). However, there is nothing to prevent a jurisdiction from extending or adapting the scope to include other types of regulated vehicles, as it deems appropriate.

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.

 $ISO\ 14906,\ Electronic\ fee\ collection\ --\ Application\ interface\ definition\ for\ dedicated\ short-range\ communication$

ISO 15638-1, Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 1: Framework and architecture

ISO 15638-2, Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 2: Common platform parameters using CALM

ISO 15638-3, Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 3: Operating requirements, 'Approval Authority' procedures, and enforcement provisions for the providers of regulated services

ISO/TS 15638-4, Intelligent transport systems — Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) — Part 4: System security requirements

ISO 15638-5:2013, Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 5: Generic vehicle information

ISO 15638-6:2014, Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 6: Regulated applications

ERC 70-03, ERC RECOMMENDATION 70-03 Relating To The Use Of Short Range Devices (Srd)

ETSI EN 300-674-1, V1.2.1:2004-08, Electromagnetic compatibility and Radio spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Dedicated Short Range Communication (DSRC) transmission equipment (500 kbit/s / 250 kbit/s) operating in the 5,8 GHz Industrial, Scientific and Medical (ISM) band; Part 1: General characteristics and test methods for Road Side Units (Interrogator) and On-Board Units (OBU)

ETSI ES 200-674-1, V2.2.1:2011-02, Intelligent Transport Systems (ITS); Road Transport and Traffic Telematics (RTTT); Dedicated Short Range Communication (DSRC); Part 1: Technical characteristics and test methods for High Data Rate (HDR) data transmission equipment operating in the 5,8 GHz Industrial, Scientific and Medical (ISM) band

ETSI TS 102-792, V1.2.1:2015-06, Intelligent Transport Systems (ITS); Mitigation techniques to avoid interference between European CEN Dedicated Short Rang Communication (CEN DSRC) equipment and Inteligent Transport Systems (ITS) operating in the 5 GHz frequency range

EN 12253, Road transport and traffic telematics — Dedicated short-range communication — Physical layer using microwave at 5,8 GHz

EN 12795, Road transport and traffic telematics — Dedicated Short Range Communication (DSRC) — DSRC data link layer: medium access and logical link control

EN 12834, Road transport and traffic telematics — Dedicated Short Range Communication (DSRC) — DSRC application layer

EN 13372, Road transport and traffic telematics (RTTT) — Dedicated short-range communication — Profiles for RTTT applications

ARIB STD-T75, Dedicated Short-Range Communication

TTAS KO-06.0025, Standard of *DSRC* Radio Communication between Road-side Equipment and Onboard Equipment in 5,8GHz band

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15638-1 and the following 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 http://www.electropedia.org/

3.1

app

small (usually) $Java^{m1}$ (3.21) applets, organized as software bundles, that support *application services* (3.2) by keeping the *data pantry* (3.14) provisioned with up to date data

3.2

application service

service provided by a service provider (3.32) enabled by accessing data from the IVS (3.18) of a regulated vehicle (3.30) via a wireless communications network

3.3

application service provider

ASP

https: party that provides an *application service* (3.2) 5 = 2 - 596 = 400a - 8653 - d884654d0 cf3/iso - 15638 - 9 - 2020

3.4

app library

separately secure area of memory in *IVS* (3.18) where apps are stored with different access controls to *data pantry* (3.14)

3.5

approval

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

3.6

approval agreement

written agreement made between an *approval authority (regulatory)* (3.7) and a *service provider* (3.32)

Note 1 to entry: An *approval authority (regulatory)* (3.7) approval agreement recognizes the fact that a *service provider* (3.32), having satisfied the *approval authority's* requirements for appointment as a *service provider*, is appointed in that capacity, and sets out the legal obligations of the parties with respect to the on-going role of the *service provider*.

¹⁾ JavaTM is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

ISO 15638-9:2020(E)

3.7

approval authority

<regulatory> organization (usually independent) which conducts *approval* (3.5) and ongoing *audit* (3.9) for *service providers* (3.32) on behalf of a *jurisdiction* (3.22)

3.8

architecture

formalized description of the design of the structure of TARV and its *framework* (3.17)

3.9

audit/auditing

review of a party's capacity to meet, or continue to meet, the initial and ongoing *approval agreements* (3.6) as a *service provider* (3.32)

3.10

basic vehicle data

data that shall be maintained/provided by all IVS (3.18) regardless of jurisdiction (3.22)

3.11

communications access for land mobiles

CALM

layered solution that enables continuous or quasi continuous communications between vehicles and the infrastructure, or between vehicles, using such (multiple) wireless telecommunications media that are available in any particular location, and which have the ability to migrate to a different available media where required and where media selection is at the discretion of *user* (3.37) determined parameters by using a suite of standards based on ISO 21217 (*CALM* architecture) and ISO 21210 (*CALM* networking)

3.12

commercial application(s)

ITS applications in regulated vehicles (3.30) for commercial (non-regulated) purposes

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

3.13

core data

basic vehicle data (3.10) plus any additional data required to provide an implemented regulated application service (3.29)

3.14

data pantry

secure area of memory in *IVS* (3.18) where data values are stored with different access controls to *app library* (3.4)

3.15

driver

person driving the regulated vehicle (3.30) at any specific point in time

3.16

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

3.17

framework

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

3.18

in-vehicle system

IVS

ITS-station (3.19) and connected (TARV/RTM) equipment on board a vehicle known in EFC specific equipment as OBE (on-board equipment) or OBU (on-board unit)

Note 1 to entry: Often known in tachograph specific regulations as VU (vehicle unit).

3.19

interrogator

off-board device which can establish a wireless communications session with the IVS and request the provision of tachograph data which is often a mobile device under the control of an agent of the jurisdiction

3.20

ITS-station

ITS-s

entity in a communication network, comprised of application, *facilities* (3.16), networking and access layer components specified that operate within a bounded secure management domain

Note 1 to entry: For details, see ISO 21217.

3.21

Java™

object oriented open source operating language developed by SUN systems

3.22

jurisdiction

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

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

3.23

jurisdiction regulator

agent of the *jurisdiction* (3.22) appointed to regulate and manage TARV within the domain of the *jurisdiction* which may or may not be the *approval authority* (regulatory) (3.7)

3.24

operator

fleet manager of a regulated vehicle (3.30)

3.25

physical roadside inspection

physical inspection of the tachograph data of a stopped vehicle by agents of the application service provider (usually police or inspectors appointed by the jurisdiction)

3.26

prime service provider

service provider (3.32) who is the first contractor to provide regulated application services (3.29) to the regulated vehicle (3.30), or a nominated successor on termination of that initial contract and who is also responsible for maintaining the installed *IVS* (3.18)

Note 1 to entry: 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 (3.18).

3.27

profile

common and consistent elaboration of content and sequence of a set of chosen classes, conforming subsets, options, parameters, and/or data concepts to accomplish a particular function/specification

3.28

regulated application

regulatory application

application arrangement using TARV utilized by *jurisdictions* (3.22) for granting certain categories of commercial vehicles rights to operate in regulated circumstances subject to certain conditions, or indeed to permit a vehicle to operate within the *jurisdiction* and which may be mandatory or voluntary at the discretion of the *jurisdiction*

3.29

regulated application service

TARV *application service* (3.2) to meet the requirements of a regulated application that is mandated by a regulation imposed by a *jurisdiction* (3.22), or is an option supported by a *jurisdiction*

3.30

regulated vehicle

vehicle that is subject to regulations determined by the *jurisdiction* (3.22) 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 and which at the option of *jurisdictions* may require the provision of information via *TARV* or provide the option to do so

3.31

remote tachograph monitoring

RTM

collection, collation, and transfer of data from an on-board electronic *tachograph* (3.35) system to an *application service provider* (3.3)

3.32

service provider

party which is certified by an approval *authority (regulatory)* (3.7) as suitable to provide regulated or commercial ITS *application services* (3.2)

3.33

session

wireless communication exchange between the *ITS-station* (3.19) of an *IVS* (3.18) and the *ITS-station* of its *application service provider* (3.3) to achieve data update, data provision, upload apps, or otherwise manage the provision of the *application service* (3.2), or a wireless communication provision of data to the *ITS-station* of an *IVS* (3.18) from any other *ITS-station*

3.34

specification

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

3.35

tachograph

sender unit usually mounted to a vehicle gearbox, a tachograph head and a digital driver card, which records the *regulated vehicle* (3.30) speed and the times at which it was driven and aspects of the *driver's* (3.15) activity selected from a choice of modes

3.36

telematics

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

3.37

user

individual or party that enrols in and operates within a regulated or *commercial application* (3.12) *service* (3.2)

EXAMPLE *Driver* (3.15), transport *operator* (3.24), freight owner.

4 Symbols and abbreviated terms

ADU Application Data Unit

APDU application protocol data unit

App applet (JAVATM application or similar)

ASN.1 Abstract Syntax Notation One

ASP application service provider

BER Bit Error Rate

BLE Bluetooth Low Energy

BST Beacon Service Table

CALM communications access for land mobiles

CAN controller area network

CRC cyclic redundancy check

DSRC Dedicated Short-Range Communication

Element Identifier Teh Standards

EFC Electronic Fee Collection and ard sitch ai

EN European Norm (Standard)

GNSS Global Navigation Satellite System

ID Identity 150 15038-9:2020

ITS-s ITS station

IVS In-vehicle system

Layer 7 of DSRC (Application Layer Core of DSRC)

LID logical link control identifier

LLC logical link control

LPDU link layer protocol data unit

MAC Media Access Control (Media Access Layer Core of DSRC)

MA-DATA MAC sublayer primitive to the LLC sublayer

OBE On-board equipment (EFC term for IVS)

OBU On-board unit (EFC term for IV unit)

PrWA private uplink window allocation

PuWA public uplink window allocation

RR response request

ISO 15638-9:2020(E)

RSU Road-side unit (EFC term for roadside interrogator)

RTM remote tachograph monitoring

SAP Service access point

SE service element

T-APDU Transfer-Application Protocol Data Unit

TARV telematics applications for regulated vehicles

VST vehicle service table

VU vehicle unit (EU regulatory term for tachograph IVS)

WGS84 World Geodetic System 1984

Ms Microsecond

5 Conformance

Requirements to demonstrate conformance to any of the general provisions or specific application services described in this document shall take into consideration the data requirements imposed by the jurisdiction where they are instantiated.

Systems claiming conformance with this document may support one or more of Communication Profiles C1, C2 and C3 as defined in <u>Clause 1</u>, but shall support at least one of these options.

Systems that wish to claim conformance with TARV ITS-station<>ITS station communications, shall support at least communication profile C3, together with conformance to ISO 15638 Parts 1 to 6.

Jurisdictions requiring and regulating the use of remotely monitored tachographs are recommended to specifically regulate in the case of the use of Profile C1 and/or Profile C2. It is further recommended (but not required) that jurisdictions whose data requirements require support of Profile C1 for regulatory enforcement purposes also at least encourage the ability to technically support Profiles C2 and C3 in addition (for later potential migration purposes).

6 General overview and framework requirements

6.1 General

This document addresses the provision of 'Remote Digital Tachograph Monitoring' and specifies the form and content of the transmission of such data required to support such systems, and access methods to that data.

This document is appropriate for digital tachograph systems. It is not appropriate for analogue tachograph systems.

ISO 15638-1 provides a framework and architecture for TARV. It provides a general description of the roles of the actors in TARV and their relationships.

For a clear understanding of the TARV framework, architecture and detail and specification of the roles of the actors involved, the reader is referred to ISO 15638-1.

ISO 15638-6 provides the core requirements for all regulated applications. For a clear explanation of the general context into which the provision of this application service is provided, the reader is referred to ISO 15638-6.