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

## Part 23: Tyre pressure monitoring (TPM)

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

*Partie 23: Suivi de la pression des pneus*

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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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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*.

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.

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# 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 jurisdiction to jurisdiction, but include electronic on-board recorders, digital tachograph on-board mass monitoring, "mass" data for regulatory control and management, tyre pressure monitoring, vehicle access methods, hazardous goods tracking and eCall. Additional applications with a regulatory impact currently under development include fatigue management, speed monitoring and vehicle penalties imposed based on location, distance and time.

The ISO 15638 series addresses and defines the framework for a range of cooperative telematics applications for regulated vehicles such as access methods, driver fatigue management, speed monitoring, on-board mass monitoring, remote tachograph monitoring, ADR (agreement concerning the international carriage of dangerous goods by road) management, etc. 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 a basis for the future development of cooperative telematics applications for regulated vehicles.

The ISO 15638 series has been developed over several years with the objective of enabling telematics applications with whatever wireless communications are available at a given time and location, and providing a migration path to the cooperative ITS technologies and techniques that are steadily emerging.

Many new freight tractors/trucks use “tyre pressure monitoring systems” (TPMSs) to inform the operator of whether or not tyres on the vehicle are properly inflated (or are missing entirely). However, older freight tractors/trucks and most trailers do not use this technology. As a result, many freight vehicles operate with underinflated or missing tyres. These vehicles are potentially unsafe as their braking performance is degraded, their stability is compromised, their fuel efficiency is reduced, thus increasing greenhouse gas emissions, and they are non-compliant with roadway and bridge weight limitations, thus reducing pavement and bridge life resulting in increased roadway infrastructure costs. This document is designed to improve freight vehicle road transport safety and timely freight delivery while reducing accidents.

This document addresses the realization of safer road transport for freight vehicles utilizing the existing ISO 15638 series basic architecture framework, together with ISO 21750 and UNECE Regulation 141.[22]

In the system described in this document, a vehicle on-board sensor identifies whether a tyre is underinflated or missing and provides these data to an in-vehicle system (IVS). Either at predetermined intervals, upon registering an anomaly, or on request from the service provider, the IVS sends the most recent TPMS data to a predetermined address provided by the service provider.

The service provider notifies vehicle operators or commercial vehicle enforcement agencies in order for corrective action to be taken to correct the tyre deficiency, as necessary.

This document provides specifications for tyre pressure monitoring and supports several defined communication profiles by which this function may be performed.

As with other parts of the ISO 15638 series, this document neither prescribes nor proscribes particular modes of operation, but instead provides a number of defined communication and data profiles within which jurisdictions and operators can achieve their objectives for tyre pressure monitoring within the objectives and constraints of their regulations. This document recognizes that those requirements and constraints will differ between jurisdictions.

NOTE 1 The ISO 15638 series has been developed for use in the context of regulated commercial freight vehicles (hereinafter referred to as "regulated 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.

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NOTE 2 The definition of what comprises a "regulated" vehicle is regarded as an issue for national decision and can vary from jurisdiction to jurisdiction. The ISO 15638 series does not impose any requirements on nations in respect of how they define a regulated vehicle.

NOTE 3 The definition of what comprises a "regulated" service is regarded as an issue for national decision and can vary from jurisdiction to jurisdiction. The ISO 15638 series does not impose any requirements on nations in respect of which services for regulated vehicles jurisdictions will require, or support as an option. Instead, it provides standardized sets of requirements for identified services to enable consistent and cost efficient implementations where implemented.

Subsequent versions of this document will potentially be able to support additional communication profiles.

NOTE 4 Jurisdictions requiring and regulating the use of remotely-monitored TPM systems are recommended to specifically regulate to determine which communications profiles are required to be supported, and can also wish to regulate regarding which application profiles are required to be supported. It is further recommended (but not required) that jurisdictions whose regulations require support of Communication profile C3 for regulatory enforcement purposes also at least encourage the ability to technically support Communication profile C1 in addition (for later potential migration purposes).

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

## Part 23:
## Tyre pressure monitoring (TPM)

### 1 Scope

This document addresses the provision of tyre pressure monitoring (TPM) services. It specifies the form and content of the transmission data required to support TPM systems (TPMS) and the access methods for these data.

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

a) a high-level definition of the service that a service provider has to provide [the service definition describes common service elements (SEs), but does not specify the detail of how such an application service is instantiated, nor the acceptable value ranges of the data concepts defined];

b) the means to realize the service;

c) application data naming, content and quality that an in-vehicle system (IVS) has to deliver, including a number of TPM profiles or 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 provides specifications for the following application profiles:

— Application profile A1: the cyclical initiation of TPM message by on-board equipment (TPM-C).

— Application profile A2: the exceptional initiation of TPM message by on-board equipment (TPM-E).

— Application profile A3: the provision of TPM data as the result of an off-board request (TPM-R).

— Application profile A4: The provision of TPM data as the result of an off-board reading of tyre pressures of vehicles which can potentially be unequipped (TPM-O).

### 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 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*

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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 vehicles (TARV) — 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, *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 6: Regulated applications*

ISO 21177, *Intelligent transport systems — ITS station security services for secure session establishment and authentication between trusted devices*

UN Regulation No. 141 Tyre Pressure Monitoring Systems (TPMS): Uniform provisions concerning the approval of vehicles with regard to their Tyre Pressure Monitoring Systems (TPMS)

3GPP 21.101 Technical Specifications and Technical Reports for a UTRAN-based 3GPP system (Release 8)

3GPP 36 300 LTE; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN) (Release 10)

3GPP 23.501 System architecture for the 5G System (5GS) (Release 17)

## 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 terminology 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**
**app**
small (usually) Java™ applets, organized as software bundles, that support application services by keeping the data pantry provisioned with up to date data

Note 1 to entry: Java™ 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.

**3.2**
**application profile**
characteristics and specification of the information and transaction detail required to meet a set of user needs

Note 1 to entry: Within the common high-level framework of this document, the application profile allows different jurisdictions to receive different details of transactions or to specify a particular communications means.

**3.3**
**application service**
service provided by a service provider enabled by accessing data from the in-vehicle system (IVS) of a regulated vehicle via a wireless communications network

**3.4**
**application service provider**
**ASP**
party that provides an application service

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