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

Part 2: Common platform parameters using CALM

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

Partie 2: Paramètres de plate-forme commune utilisant CALM

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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. www.iso.org/directives

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The committee responsible for this document is 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*

— *Part 2: Common platform parameters using CALM*

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

— *Part 5:Generic vehicle information*

— *Part 6: Regulated applications* [Technical Specification]

— *Part 7: Other applications*

— *Part 8: Vehicle access monitoring (VAM)* [Technical Specification]

— *Part 9: Remote electronic tachograph monitoring (RTM)* [Technical Specification]

— *Part 10: Emergency messaging system/eCall (EMS)* [Technical Specification]

— *Part 11: Driver work records (work and rest hours compliance) (DWR)* [Technical Specification]

— *Part 12: Vehicle mass monitoring (VMM)* [Technical Specification]

— *Part 14: Vehicle access control (VAC)* [Technical Specification]

— *Part 15: Vehicle location monitoring (VLM)* [Technical Specification]

— *Part 16: Vehicle speed monitoring (VSM)* [Technical Specification]

— *Part 17: Consignment and location monitoring (CLM)* [Technical Specification]

— *Part 18: ADR (Dangerous Goods) transport monitoring (ADR)* [Technical Specification]

— *Part 19: Vehicle parking facilities (VPF)* [Technical Specification]

The following parts are under preparation:

— *Part 4: System security requirements* [Technical Specification]

— *Part 13: Mass Penalties and Levies (VMC)*

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, 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 operate 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 suite 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.

This suite of standards addresses and defines the framework for a range of cooperative telematics applications for regulated commercial freight vehicles (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, using an on-board ITS platform. The framework is based on a (multiple) service provider oriented approach provisions for the certification and auditing of service providers.

This suite of standards deliverables will:

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

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 ISO 15638 provides definition and specification of the wireless communications media and related aspects required to support *TARV* and therefore the other parts of ISO 15638 by adherence to the 'CALM' *ITS-station* wireless communication and networking International Standards. This ensures a stable and interoperable communications architecture between a vehicle and an application service provider, and is also capable of vehicle-vehicle communications, and enables the same in-vehicle system (IVS) to support other standardised cooperative ITS systems using the same communications platform(s)

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 will 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 may vary from country to country. This suite of standards deliverables will not impose any requirements on nations in respect of which services for regulated vehicles countries will require, or support as an option, but will provide standardised sets of

requirements descriptions for identified services to enable consistent and cost efficient implementations where implemented.

NOTE 3 Cooperative ITS applications, in this context, is defined as the use of ITS to meet both commercial and regulatory needs from a single on-board platform.

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

Part 2: Common platform parameters using CALM

1 Scope

This part of ISO 15638 defines a generic cooperative *ITS service* (4.3) platform for *TARV* using CALM, including protocol of coding, timing, and performance and support interfaces (such as driver ID card/USB or similar etc.).

2 Conformance

This part of ISO 15638 defines requirements for wireless communications within the *TARV* context, 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 that are normatively referenced in this part of ISO 15638.

Conformance to any other International Standard or specification 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, 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.

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 andlogical link control*

EN 12834 *Road Transport and Traffic Telematics — Dedicated Short-Range Communication (DSRC) — DSRC application layer*

ISO/TR 12859 *Intelligent transport systems — System architecture — Privacy aspects in ITS standards and systems*

ISO 13183 *Intelligent transport systems — Communications access for land mobiles (CALM) — Broadcast communications*

ISO 15628 *Road transport and traffic telematics — Dedicated short range communication (DSRC) — DSRC application layer*

ISO 15638 -1	*Intelligent transport systems — Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) — Part 1: Framework and architecture*
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 15638 -4	*Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 4: System security requirements*
ISO 15638 -5	*Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 5: Generic vehicle data*
ISO 15638 -6	*Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 6: Regulated applications*
ISO 15638 -7	*Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 7: Other applications*
ISO 21210	*Intelligent transport systems — Communications access for land mobiles (CALM) — IPv6 Networking*
ISO 21212	*Intelligent transport systems — Communications access for land mobiles (CALM) — 2G Cellular systems*
ISO 21213	*Intelligent transport systems — Communications access for land mobiles (CALM) — 3G Cellular systems*
ISO 21214	*Intelligent transport systems — Communications access for land mobiles (CALM) — Infrared systems*
ISO 21215	*Intelligent transport systems — Communications access for land mobiles (CALM) — M5*
ISO 21216	*Intelligent transport systems — Wireless communications — CALM using millimetre communications — Air interface*
ISO 21217	*Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture*
ISO 21218	*Intelligent transport systems — Communications access for land mobiles (CALM) — Access technology support*
ISO 24102	*Intelligent transport systems — Communications access for land mobiles (CALM) — Management*
ISO 25111	*Intelligent transport systems — Communications access for land mobiles (CALM) — General requirements for using public networks*
ISO 25112	*Intelligent transport systems — Communications access for land mobiles (CALM) — Mobile wireless broadband using IEEE 802.16*
ISO 25113	*Intelligent transport systems — Communications access for land mobiles (CALM) — Mobile wireless broadband using HC-SDMA*
ISO 26683-2	*Intelligent transport systems — Freight land conveyance content identification and communication — Part 2: Application interface profiles*
ISO 29281-1	*Intelligent transport systems -- Communication access for land mobiles (CALM) — Non-IP networking — Part 1: Fast networking & transport layer protocol (FNTP)*
ISO 29281-2	*Intelligent transport systems -- Communication access for land mobiles (CALM) — Non-IP networking — Part 2: Legacy system support*
ISO 29282	*Intelligent transport systems — Communications access for land mobiles (CALM) — Satellite networks*
ISO 29283	*ITS CALM Mobile Wireless Broadband applications using Communications in accordance with IEEE 802.20*
ITU-R BS.1194-2	*Systems for multiplexing frequency modulation (FM) sound broadcasts with a sub-carrier*

	data channel having a relatively large transmission capacity for stationary and mobile reception
ITU-R BO.1408-1	*Transmission system for advanced multimedia services provided by integrated services digital broadcasting in a broadcasting-satellite channel*
ITU-R BO.1516	*System D, Digital multiprogramme television systems for use by satellites operating in the 11/12 GHz frequency range*
ITU-R BT.1306-3	*System C, Error correction, data framing modulation and emission methods for digital terrestrial television broadcasting*
ITU-R BT.1833	*Multimedia System C, Broadcasting of multimedia and data applications for mobile reception by handheld receivers*
ITU-R BS.1114-6	*System F, Systems for terrestrial digital sound broadcasting to vehicular, portable and fixed receivers in the frequency range 30-3 000 MHz*
IEEE 802.11	*IEEE Standard for Information technology — Telecommunications and information exchange between systems — Local and metropolitan area networks — Specific requirements — Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications*
IEEE 1609.4	*Wireless Access in Vehicular Environments (WAVE) — Multi-channel operation*
IEEE 802.16e	*Part 16: Air interface for fixed and mobile broadband wireless access systems: Amendment for physical and medium access control layers for combined fixed and mobile operation in licensed bands*
IEEE 802.16g	*Part 16: Air interface for fixed and mobile broadband wireless access systems: Management plane procedures and services*
IEEE 802.20	*Part 20: Air Interface for Mobile Broadband Wireless Access Systems Supporting Vehicular Mobility - Physical and Media Access Control Layer Specification*
IETF RFC 2461	*Neighbor Discovery for IPv6*
IETF RFC 2462	*IPv6 Stateless Address Auto-configuration*
IETF RFC 3963	*NEMO Basic Support protocol*
IETF RFC 4294	*IPv6 Node Requirements*
3GPP/3GPP2	*3GPP/3GPP2 Standards as they relate to 2G/2.5G and 3G*
TIA-95-B	*Mobile Station-Base Station Compatibility Standard for Wideband Spread Spectrum Cellular Systems (cdmaOne)*
ANSI/TIA-136-A	*Mobile Station-Base Station Compatibility Standard for Wideband Spread Spectrum Cellular Systems*
TIA/EIA/IS-54-C	*Cellular System Dual-Mode Mobile Station--Base Station Compatibility Standard*
ARIB PDC RCR Standard No.27	*Personal Digital Cellular Telecommunication System Fascicle 1*
ARIB STD-T75	*Dedicated Short-Range Communication (Japan);*
ITU-R M.1801	*Radio interface standards for broadband wireless access systems, including mobile and nomadic applications, in the mobile service operating below 6 GHz.* *ANSI ATIS HC-SDMA is described in ITU-R document in this Recommendation ("RecDoc. 8/167(Rev.1) Annex 4 III")*
TTAS.KO-06.0025	*Standard of DSRC Radio Communication between Road-side Equipment and On-board Equipment in 5.8GHz band (Korea);*

4 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15638-1 and the following apply.

4.1
continuous session
establishes a session as soon as the vehicle is switched on, and maintains that session, so long as it is possible, for as long as the vehicle is operating

4.2
heterogeneous handover
process by which a communication link is switched from one virtual communication interface to another one of a different medium type

4.3
ITS service
communication functionality offered by an *ITS-station* to an *ITS-station* application

4.4
ITS-station
ITS-s

entity in a communication network, comprised of application, facilities, networking and access layer components specified in ISO 21217 that operate within a bounded secure management domain

4.5
MC Mode
multi-carrier mode

NOTE: The 625k-MC mode referred to in this document is an enhancement of ANSI ATIS-0700004.2005, High Capacity-Spatial Division Multiple Access (HC-SDMA) Radio Interface Standard September, 2005.

4.6
prime mover
heavy-duty commercial vehicle tractor unit which serves as a method of moving trailers (most often semi-trailers) by coupling to the trailer using some sort of mechanical lock system, usually a fifth wheel coupling

NOTE: Tractor units can couple to different types of trailers.

4.7
time controlled session
active communication session created when the in-vehicle equipment at a time of its choosing initialises a time controlled session in order to send a message/exchange data, or it receives an inbound call, such as receipt of a safety message from the infrastructure; and the session is ended as soon as the task is achieved

4.8
user controlled session
user of the vehicle elects, for whatever reason, to connect upon the user's instruction and disconnect immediately when instructed to do so by the user

5 Symbols (and abbreviated terms)

For the purposes of this document, the general symbols and abbreviations for *TARV* are given in ISO 15638-1, and in the standards specifically reference in a Clause title. For additional symbols and abbreviated terms specific to ISO 15638-2 the following apply:

API
application programme interface

CAL
communication adaptation sub-layer

CI
communication interface

CIAC
communications interface access class

CIC
communication interface class

CoA
care of address

C-SAP
communications service access point

CVIS
Cooperative Vehicle-Infrastructure Systems (EU Project)

DAB
digital audio broadcasting

DARC
data radio channel

DNS
domain name server

DSRC
dedicated short range communication

EGPRS
enhanced *GPRS* (EDGE)

FA
facilities – applications

FDD
frequency division duplex

FSS
fixed satellite service(s)

GEO
geostationary earth orbit

GNSS
global navigation satellite system

GPRS
general packet radio service

GSM
global system mobiles

HC-SDMA
high capacity spatial division multiple access

HoA
home address

IETF
internet engineering task force

I-Mode
mobile internet (Japan)

IN
interface – network

IP
internet protocol

IPv4
internet protocol version 4

IPv6
internet protocol version 6

IR
infra-red

ISDB-TSB
Integrated services digital broadcasting-terrestrial sound broadcasting

ITS-s
ITS-station (4.4)

ITS-SCU
ITS-station (4.4) secure communication unit

IVS
in-vehicle system

LAN
local area network

LEO
low earth orbit

LLC
link layer control

MA
management – applications

MAC
media access control

MAE
management adaptation entity

MF
management – facilities

MI
management - interaction

MIH
media independent handover

MMAE
medium management adaptation entity

MN
management - network

MNN
IPv6 mobile network node (by extension an abbreviation for 'Mobile Network [*ITS-s IPv6 LAN*] Modes)

MNP
mobile network prefix

M-SAP
management service access point

MSS
mobile satellite service

MSS/ATC
mobile satellite service and ancillary terrestrial components

MWB
mobile wireless broadband

NEMO
network mobility (*IETF*)

NF
network – facilities

OSI
open systems interconnection

PHY
physical link layer

PPP
point to point protocol

RDS
radio data service

S-DMB
satellite digital multimedia broadcasting

SA
security – applications

SAE
security adaptation entity

SAP
service access point

SF
security – facilities

SI
security – interaction