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Intelligent transport systems — Use of nomadic and portable devices to support ITS service and multimedia provision in vehicles

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TECHNICAL REPORT

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Intelligent transport systems — Use of nomadic and portable devices to support ITS service and multimedia provision in vehicles

Systèmes intelligents de transport — Utilisation des dispositifs nomades et portables pour la prise en charge des services ITS et des provisions multimédia dans les véhicules

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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.

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In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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ISO/TR 10992 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

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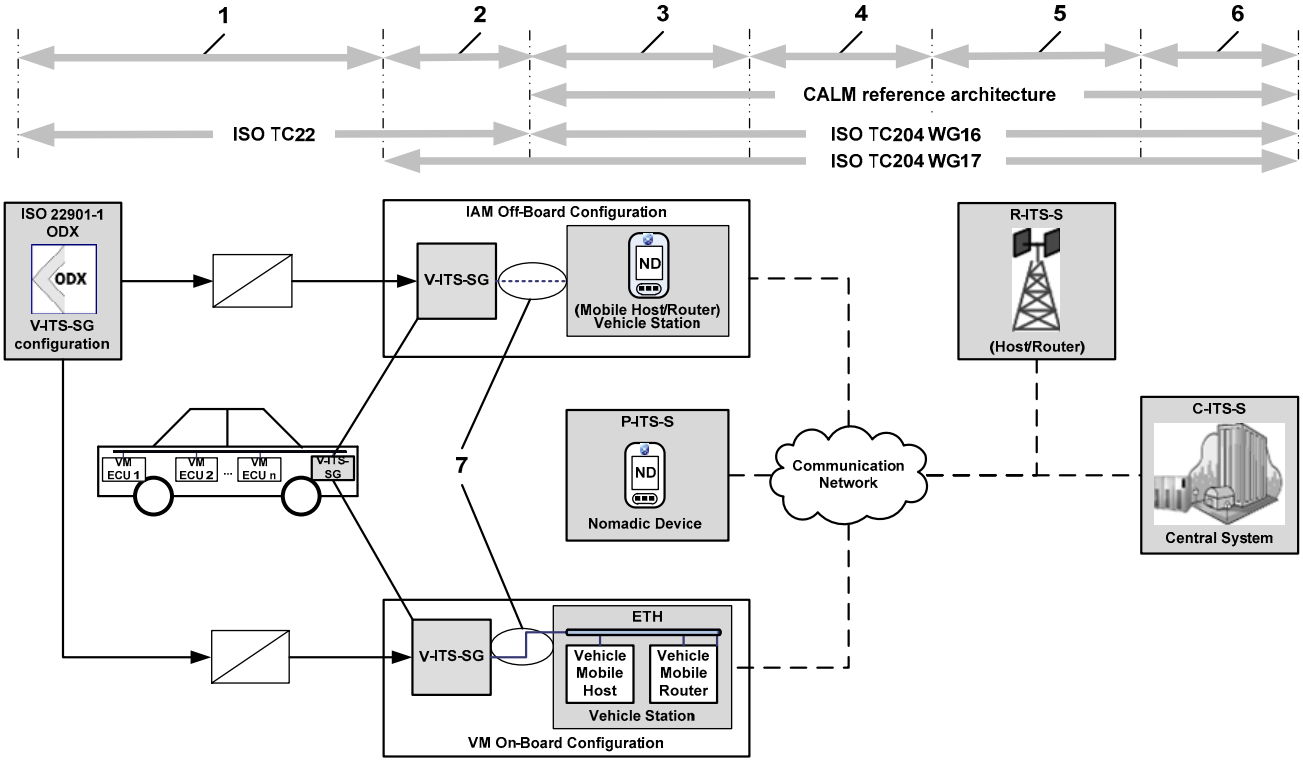
Introduction

International Standards on nomadic and portable devices for intelligent transport systems (ITS) services are designed to facilitate the development, promotion and standardization of the use of nomadic and portable devices to support ITS service provisions and multimedia use such as passenger information, automotive information, driver advisory and warning systems, and entertainment system interfaces to ITS service providers and motor vehicle communication networks. This Technical Report fosters the introduction of multimedia and telematics nomadic devices in the public transport and automotive world.

These International Standards are developed for the communications architecture and generic requirements to enable the connectivity between the vehicle and the infrastructure or other vehicles by using nomadic links within the vehicle (e.g. Bluetooth) and devices introduced into the vehicle (e.g. music players, PDAs etc.) including the provision of connectivity via mobile devices (2G/3G/Mobile Wireless Broadband etc.) to the infrastructure; the support of application services within the vehicle; and integration within the CALM architecture and in vehicle gateways.

Conceptual aspects of the road vehicle to ITS technology chain are illustrated in Figure 1.



Key

1 Road vehicle technology
2 Vehicle interface technology
3 ITS host application & mobile routing technology
4 Short & wide range communication technology
5 ITS host application & mobile routing technology (Roadside-ITS-Station)
6 ITS back office technology (Central-ITS-Station)
7 Vehicle-ITS-Station Gateway protocol

Figure 1 — Road vehicle to ITS technology chain

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Six different areas of competence are part of the technology chain.

— Road vehicle technology:

  This competence is provided by the vehicle manufacturers and their electronic system suppliers. They design vehicle's domain network architecture and connected ECUs. The diagnostic communication data of each ECU might be documented according to ISO 22901, the ODX standard, or traditionally in office type documents. The vehicle manufacturer is obliged to provide the ECU's diagnostic communication data in a non-discriminatory form to any interested party.

— Vehicle interface technology:

  This competence is provided by the diagnostic tool suppliers. The V-ITS-SG has a similar type of functionality compared to today's Vehicle Communication Interfaces (VCI). Many VCIs support a wireless interface to communicate with remote Human Machine Interface (HMI) devices e.g. Nomadic Devices.

— ITS Host Applications & Mobile Routing technology (Vehicle-ITS-Station):

  This competence is provided by the IT application and communication companies.

— Short and Wide Range Communication technology:

  This competence is provided by the IT communication companies.

— ITS Host Applications & Mobile Routing technology (Roadside-ITS-Station):

  This competence is provided by the IT application and communication companies.

— ITS Back Office technology (Central-ITS-Station):

  This competence is provided by the ITS service provider companies.

The vehicle interface technology connects the road vehicle technology with the ITS technology via the Vehicle Mobile Gateway (V-ITS-SG) protocol. The V-ITS-SG protocol provides a single solution access method via standardized XML vehicle data transfer services.

The V-ITS-SG provides vehicle manufacturer/V-ITS-SG supplier controlled access to vehicle data and functions. The ND (Vehicle Station) software applications have a similar functionality compared to an Internet browser.

Work on developing these International Standards includes the identification of exisiting International Standards for nomadic devices and existing vehicle communication network access International Standards.

— ISO 15031 defines emissions-related diagnostic data supported by vehicles in all countries requiring OBD compliance.

— ISO 27145 WWH-OBD defines diagnostic data (emissions-related systems, future safety related systems, etc.) to be supported by vehicles in all countries implementing the GTR (Global Technical Regulation) into their local legislation.

— ISO 22900-2 defines the Modular Vehicle Communication Interface (MVCI) D-PDU API to separate the protocol data unit (PDU) from the vehicle specific protocols.

— ISO 22901 defines the Open Diagnostic data eXchange (ODX) format which is an XML-based standard for describing diagnostic related ECU data. This International Standard is becoming the vehicle manufacturer's choice to document vehicle system diagnostic data and protocol information.

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— ISO 22902 is a multimedia and telematics standard based on the AMI-C specification and reference documents for automotive industry. The important logical element of the architecture is a vehicle interface.

— ISO 22837 defines the reference architecture for probe vehicle systems and a basic data framework for probe data.

— ISO 29284 defines the standardization of information, communication and control systems in the field of urban and rural surface transportation, including intermodal and multimodal aspects thereof, traveller information, traffic management, public transport, commercial transport, emergency services and commercial services in the ITS field.

— SAE J2534 defines a standardized system for programming of ECUs in a vehicle.

— SAE J2735 defines the support of interoperability among DSRC applications through the use of standardized message sets, data frames and data elements.

The work also includes identifying further standardization requirements to support the provision of specific ITS services where provisions using nomadic devices have additional or different requirements than those for inbuilt communications media.

It also includes the provision of updating information from the passenger and the vehicle via nomadic devices to external service providers, and updating the nomadic device and/or the vehicle data systems, such as map updates, etc., and ensures that nomadic devices introduced into vehicles can be used safely to support ITS and multimedia services.

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