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Intelligent transport systems (ITS) — Urban mobility applications via nomadic device for green transport management —

Part 1:
General requirements for data exchange between ITS stations

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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.

ISO 18561-1 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems (ITS)*.

ISO 18561 consists of the following parts, under the general title Intelligent transport systems (ITS) - Urban mobility applications via nomadic device for green transport management:

— Part 1: General requirements for data exchange between ITS stations

— Part 2: Trip and modal choice applications and service requirements

Introduction

ISO/TC204/WG17, Nomadic & Portable Devices for ITS services is designed to facilitate the development, promotion and standardisation of the use of nomadic and portable devices to support ITS service provision 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 standard fosters the introduction of multimedia and telematics Nomadic devices in the public transport and automotive world.

This project provides the application and specification to identify a standard for transportation management as a way of intelligent transport systems (ITS) in urban transportation networks to improve eco-mobility and/or sustainability.

Intelligent transport systems (ITS) — Urban mobility applications via nomadic device for green transport management —

Part 1:
General requirements for data exchange between ITS stations

1 Scope

This project provides the application and specification to identify a standard for transportation management as a way of intelligent transport systems (ITS) in urban transportation networks to improve eco-mobility and/or sustainability, which would undertake joint work with ISO Technical Committee 204 (ISO/TC204) – *Intelligent Transport Systems* (ITS) to identify. These ITS technologies can increase operational efficiencies and unlock enhanced transportation safety and eco-mobility applications.

The urban mobility applications via nomadic device will build on the existing transportation planning process including trip generation, trip distribution, and modal choices with respect to an extended measures of effectiveness (MoE) in transportation models, such as being time effective, cost effective, and green(eco) effective, as well.

The nomadic device is presented as a personal ITS station in this standard in order to communicate the other stations including vehicle, roadway infrastructure, and centres for defining the requirements for interfaces between the stations in urban mobility applications to accommodate to the specific needs of eco-mobility in a smart city.

This standard aims to provide mobility information according to user preference on demand utilizing a variety of existing apps on nomadic devices related with different transport means. An integrated mobility information platform is defined in this standard as a service methodology to be integrated with a variety of mobile apps with respect to different transport modes.

The urban mobility applications described in this standard includes;

— Guidance documents to facilitate the practical implementation of identified standards in the transportation planning process including related use cases

— Urban mobility information integrated with a variety of mobile apps on nomadic devices by multiple transport modes for collecting trip production and attraction

— Modal choice data based on time-effective, cost-effective, and eco-effective manners in the trip distribution from origins to destinations.

This work includes the identification of exisiting International Standards for ITS in ISO/TC204 and existing vehicle communication network access standards.

2 Normative references

The following referenced documents are indispensable for the application 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 21217, *Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture*

ISO/CD 20529-2, *Intelligent transport systems (ITS) — Framework for green ITS(G-ITS) standards - Part 1: General information and use cases definition*

ISO 13184-2, *Intelligent transport systems (ITS) — Guidance protocol via personal ITS station for advisory safety systems — Part 2: Road guidance protocol (RGP) requirements and specification*

ISO 13185-2, *Intelligent transport systems — Vehicle interface for provisioning and support of ITS services — Part 2: Unified gateway protocol (UGP) requirements and specification for vehicle ITS station gateway (V-ITS-SG) interface*

ISO/TS 21184, *Cooperative Intelligent transport systems (C-ITS) — Global transport data management (GTDM) framework*

CEN/TS 21185, *Cooperative Intelligent transport systems (C-ITS) — Communication profiles*

ISO/TC 21177, Intelligent transport systems (ITS) — ITS-station security services for secure session establishment and authentication between trusted devices

ISO 14819, *Intelligent transport systems — Traffic and travel information messages via traffic message coding*

ISO/IEC 8825-2:2008, *Information technology-ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
Nomadic Device (ND)
implementation of a personal ITS station which provides communication connectivity via equipment such as cellular telephones, mobile wireless broadband (WIMAX, HC-SDMA, etc.), WiFi etc. and includes short range links, such as Bluetooth, Zigbee, etc. to connect portable devices to the motor vehicle communications system network.

3.1.2
Personal ITS Station (P-ITS-S)
implementation of an ITS station in a personal ITS subsystem.

3.1.3
Roadside ITS station
R-ITS-S
A system that receives and processes vehicular and pedestrian information within a certain zone and determines the situation, in order to provide the safety warning and parking guide service to vehicles and pedestrians, and that is installed at the road side.

3.1.4
Green ITS (G-ITS)
a new-concept transportation system, which are expected to arise following the paradigm shift toward eco-friendly, low-carbon green growth in the transportation sector, as global policies

3.1.5
eco-mobility
eco transport systems and services based on eco vehicles and their related facilities

3.1.6
Central ITS station
ITS station assuming a central role

3.2 Abbreviated terms

CALM	communication access for land mobile
CAN	controller area network
DMB	digital multimedia broadcasting
DSRC	dedicated short range communication
ETC	electronic toll collection
EV	electric vehicle
FCEV	fuel cell electric vehicle
HMI	human machine interface
IP	internet protocol
ITS	intelligent transportation systems
MOST	media oriented systems transport
MVCI	modular vehicle communication interface
ND	nomadic device
OBE	on-board equipment
ODX	open diagnostic data exchange
OSGi	open services gateway initiative
TCP	transport control protocol
PDA	personal digital assistant
PHEV	plug-in hybrid electric vehicle
P-ITS-S	personal – intelligent transport system – station
PM	personal mobility
RSE	road side equipment
UDP	user datagram protocol
V-ITS-SG	vehicle – intelligent transport system – station gateway
WAVE	wireless access for vehicular environment
WiFi	wireless fidelity
WIMAX	worldwide interoperability for microwave access
XML	extended mark-up language

4 Document overview and structure

This international standard provides all documents and references required to support the application of conventional transportation planning process in the transportation managements with respect to eco-effective measures to improve the urban mobility by utilizing the data collected by nomadic devices. The international standard consists of the following documents.

— Part 1: General requirements for data exchange between ITS stations

This part specifies the general requirements of data exchanges between ITS stations collected by nomadic devices in urban mobility applications based on the structure along with the use cases definition and common set of resources (definitions, references) in green transportation management.

— Part 2: Trip and modal choice applications and service requirements

This part specifies all technical requirements related to the trip and modal choice applications for transportation planning process in the green transportation management utilizing nomadic devices to be used on the personal ITS station and to be interfaced with central ITS station, vehicle ITS station, and roadside ITS station. The requirements will reflect the user services in the transport management from the use cases as specified in ISO 13185, ISO 13111, and ISO 20529. The protocol shall be defined according to the requirements as specified in ISO 14817.[1]

5 General information

5.1 Purpose of this international standard

The international standard addresses two major areas:

— Identify the method to describe the general information for all subjects and use cases related to green transport management services according to the transportation planning process in urban mobility utilizing nomadic devices;

— Identify the general requirements of data exchanges utilizing nomadic devices as the personal ITS station interfaced with central ITS station, vehicle ITS station, and roadside ITS station.

— Personal ITS Station

smart mobility services on demand by the user preference to be an integrated app on mobile devices utilizing personalized data with respect to trip distance, trip schedule, personal eco mileages, weather, etc. by means of different transport modes

— Vehicle ITS Station

vehicles information to be utilized to users as a mobility service, which includes electric passenger vehicles, public transport with bus and/or metro, shared mobility with car sharing, ride sharing, bike sharing, etc.

— Central ITS Station

transportation management services to be provided to users as a variety of service apps on mobile devices by national authorities, local municipalities and/or private companies for eco-mobility management and information such as carbon free zone, electric vehicles, etc.

5.2 Overview of transport planning process

Conceptual aspects of the general process for four step transportation planning and modelling are illustrated in Figure 1.