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Intelligent transport systems (ITS) — Nomadic device service platform for micro-mobility —

Part 1: General information and use case definitions

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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).

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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 22085 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

ISO/TC 204/Working Group 17, *Nomadic Devices in ITS systems*, is designed to facilitate the development, promotion and standardisation of the use of nomadic and portable devices to support ITS service provisions and multimedia use, e.g. passenger information, automotive information, driver advisory and warning systems, and entertainment system interfaces to ITS service providers and motor vehicle communication networks. This document fosters the introduction of nomadic devices in the public transport and automotive world.

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Intelligent transport systems (ITS) — Nomadic device service platform for micro-mobility —

Part 1: General information and use case definitions

1 Scope

This document provides the service framework to identify the connectivity between nomadic devices, cloud servers and micro-mobility in pre-trip, en-route and post-trip. The service framework can promote micro-mobility as a new type of urban and rural transport mode and increase the possibility to be included in an integrated mobility system.

Micro-mobility can be defined as a small or compact sized electric vehicle. Normally, it is designed to be used as a first-mile and last-mile service connecting public transit routes or to provide personal mobility with one or two passengers for a short distance trip. The vehicle types of micro-mobility are very wide, including three or four wheeled micro electric vehicle, electric utility task vehicle, electric bike, electric kick scooter, electric skateboard, and electric self-balancing unicycles. This document focuses on three or four wheeled micro electric vehicle.

The nomadic device service framework aims to accommodate the specific needs of integrated mobility services for either urban or rural areas. The service framework focuses on the use of data exchange interface standards between micro-mobility and nomadic devices to enable the development of cloud-based intelligent transport systems (ITS) using wireless networks.

A nomadic device needs to be connected with micro-mobility reliably and consistently. In addition, it is necessary to provide power supply interface for stable nomadic device operation.

The service framework and use cases described in this document include:

— The service framework architecture between nomadic devices, micro-mobility and cloud servers.

— Use cases that are are divided into three categories including pre-trip, en-route, and post-trip:

  — Pre-trip service configuration: the pre-trip use cases provide micro-mobility information, on-demand navigation service with charging station and available parking lots, and reserving micro-mobility car sharing services.

  — En-route service configuration: the en-route use cases provide ITS information, e.g. traffic conditions, safety information, and toll service. The use cases also provide information on available parking lots and charging stations when the micro-mobility vehicle approaches a destination.

  — Post-trip service configuration: the post-trip use cases provide micro-mobility driving records, battery level, parking location information, and a return service for shared micro-mobility.

— Guidance documents to facilitate the practical implementation of diverse ITS service providers including related use cases.

This work includes the identification of existing ISO/TC 204 International Standards in ITS and existing vehicle communication network access standards.

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2 Normative references

There are no normative references in this document.

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions 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/

3.1.1
nomadic device
ND
implementation of a personal ITS station which provides communication connectivity via portable equipment, e.g. cellular telephones, wireless communication networks (3G, 4G and 5G), mobile wireless broadband (WIMAX, HC-SDMA), IEEE 802.11, and includes short range links, e.g. IEEE 802.15.1, IEEE 802.15.4, to connect portable devices to the motor vehicle communications system network

3.1.2
micro-mobility
MM
new concept of eco-friendly personal electric vehicles for one or two passengers

3.1.3
in mobility network
IMN
local network bus among electrical control units (ECUs) in *micro-mobility* (MM) (3.1.2), providing diagnostics information to *nomadic device* (ND) (3.1.1) through short-range links, e.g. IEEE 802.15.1, IEEE 802.15.4

3.1.4
micro-mobility service provider
MMSP
vendor or organization that provides IT solutions and/or services related with public transportation to end users

3.1.5
micro-mobility cloud server
MMCS
network server between the *nomadic device* (ND) (3.1.1) and the *micro-mobility service provider* (MMSP) (3.1.4)

3.1.6
micro-mobility communication network
MMCN
communication network between the *nomadic device* (ND) (3.1.1) and the *micro-mobility cloud server* (MMCS) (3.1.5)

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3.1.7
public communication network
PCN
communication network between the *micro-mobility cloud server* (MMCS) (3.1.5) and the service providers which provides various *micro-mobility* (MM) (3.1.2) information services, e.g. charging stations, parking lots, traffic congestion

3.2 Abbreviated terms

ARMS	adaptive route management service
BMS	battery management system
CSLPS	charging station location providing service
ECU	electrical control unit
IMN	in mobility network
ITIPS	interconnected transfer information providing service
KGSSMM	keyless go service for shared micro-mobility
MM	micro-mobility
MMCN	micro-mobility communication network
MMCS	micro-mobility cloud server
MMDB	micro-mobility database
MMIMS	micro-mobility as an integrated mobility service
MMIPS	micro-mobility information providing service
MDPS	motor driven power steering-wheel
MMFMS	micro-mobility fault management service
MMG	micro-mobility gateway
MMSS	micro-mobility sharing service
MMTIPS	micro-mobility trip information providing service
MTS	mobile tolling service
ND	nomadic device
PAPSS	pre-scanning available parking space service
PCN	public communication network
PMMPPS	parked micro-mobility position providing service
SAPSS	searching available parking space service on the way
SMMRS	shared mico-mobility return service

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