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

**Part 1:
General information and use case
definitions**

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Published in Switzerland

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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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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 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.

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 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.

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

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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

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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)

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 ISO/TR 22085-1:2019
MMIMS	micro-mobility as an integrated mobility service https://standards.iteh.ai/catalog/standards/sist/bb99a21a-808b-4000-8f17-ab4806de0b12/iso-tr-22085-1-2019
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 micro-mobility return service

SOC	states of charge
TIPS	traffic information providing service
Wi-Fi	wireless fidelity

4 Document overview and structure

This document provides all information and references required to support the implementation of the requirements related to standardized access to nomadic device service platforms for micro-mobility. The rest of the document consists of the following information.

- General information is described in [Clause 5](#).

This clause provides the purpose of this document and an overview of the nomadic device service platform for micro-mobility, which includes a service framework architecture.

- Use case overview and definitions are described [Clause 6](#).

This clause specifies all technical requirements related to nomadic device service platforms for micro-mobility to be interfaced with micro-mobility cloud servers and micro-mobility service providers. The requirements reflect the user services from the use cases as specified in this document.

5 General information

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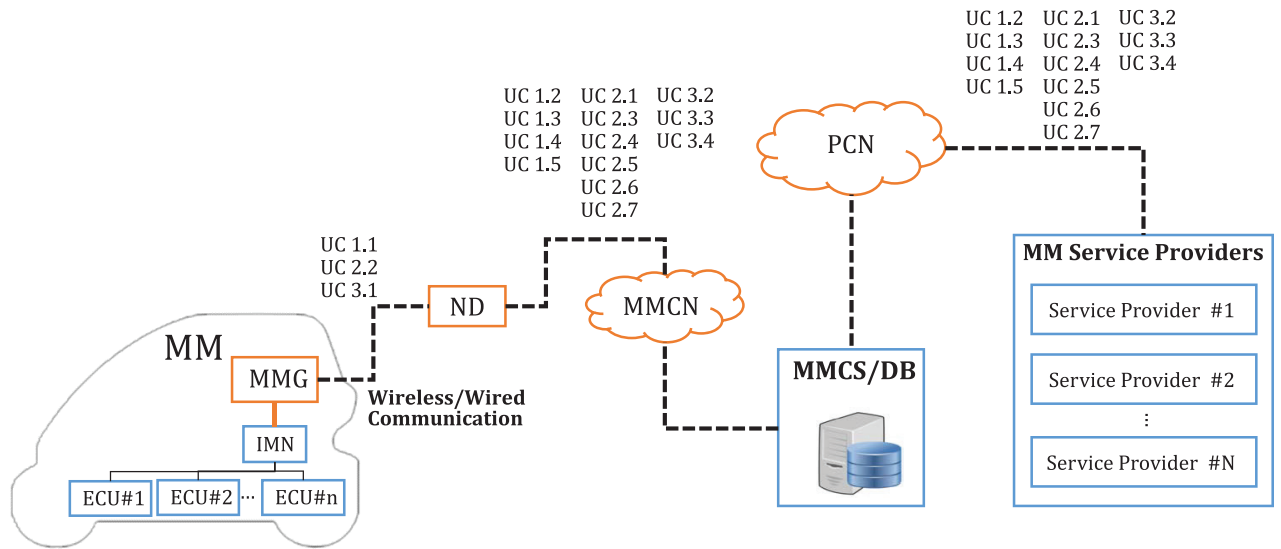
5.1 Purpose of this document

This document addresses two major areas: [ISO/TR 22085-1:2019](https://standards.iteh.ai/catalog/standards/sist/bb99a21a-808b-4000-8f17-415d946b2?inc=32085-1:2019)
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- Identifies the method to describe the ND interfaced with MMG and MMCS, and ND service platform for micro-mobility.
- Specifies the general use cases that should be included in the ND service platform for micro-mobility.

5.2 Overview of ND service platform for micro-mobility

Conceptual aspects of the general use cases should be included in the ND service platform for micro-mobility, and should be considered as illustrated in [Figure 1](#).



Key

- MM micro-mobility
- MMG micro-mobility gateway
- ND nomadic device
- IMN in mobility network
- MMCN micro-mobility communication network
- MMCS micro-mobility cloud server
- PCN public communication network

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Figure 1 — Service framework architecture

5.3 Background and challenges

The background and challenges of the ND service platform for micro-mobility are:

- various services use micro-mobility, e.g. first/last mile service and sharing service, are commercialized;
- applying micro-mobility to delivery and to postal services is considered;
- because of a battery with small capacity, micro-mobility has challenges, e.g. connection with charging stations, fault diagnosis and management, connection with public transportation, providing seamless service;
- the ND service platform for micro-mobility aims to induce the continued use of MM by providing the driver with status information about MM and status information of destination to find the optimal path of movement of MM;
- new service models and standards framework related to the ND service platform for micro-mobility would be under discussion in the existing business areas influenced by MM and information and communication technologies.