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Intelligent ~~Transport Systems~~transport systems — Performance testing for connectivity and safety functions of automated driving ~~bus~~buses in public transport~~—~~ —

Part 3~~.~~:
Service framework and use cases

~~DTR stage~~

A model manuscript of a draft International Standard (known as "The Rice Model") is available at https://www.iso.org/iso/model_document-rice_model.pdf

Systèmes de transport intelligents — Essais de performance pour les fonctions de connectivité et de sécurité des bus à conduite automatisée dans les transports publics —

Partie 3: Cadre de service et cas d'usage

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Foreword

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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 documentsdocument 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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This document was prepared by Technical Committee ISO/TC 204, *intelligentIntelligent transport systems*.

A list of all parts in the ISO 21734 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

Automated vehicle technology has been developing rapidly in recent years as one of the measures for reducing automobile accidents caused by human errors as well asand for promoting the automobile industry. The automated driving bus (ADB) is a new type of public transport mode embedded with automated vehicle technologies. The progress of the development and deployment of the ADBADBs has been accelerated in recent years that, exceeding the development speedthat of automated passenger vehicles.

From the connectivity perspective, the ADB needsto ensure its effectiveness as a public transport mode, ADBs need to connect with:

— traffic signal networks both for vehicles and pedestrians;

— the monitoring and control centre for bus operation; and

— other relevant infrastructure to ensure its effectiveness as a public transport mode.

In terms of safety, the ADB needs to:

— be embedded with automated vehicle functions to connect with the wireless signal control system; and

— be ready to respond to unexpected situations involving other road users such as pedestrians and bicyclists.

With the secured connectivity and safety, ADB could provide stable services.

With secured connectivity and safety, ADBs can provide stable services.

Along with the stable service provision, an ADB deviates its operational measuremeasures from conventional ones. This document describes basic components for providing transport services and service framework based on ADB. It also explains use-cases of ADB services, including structure of service components, operational route management, fare payment, emergency response, and provision of operational information along with service procedures for each service use-case.

Furthermore, the authorities of public transport authorities need technical referencesreference points to measure the service performance of ADB for enhancing public safety on roads.

Therefore, this document is intended to benefit public transport operators, relevant governing authorities, and industrial stakeholders.

This document provides the basis for the development of performance testing for connectivity and safety functions of ADB on a national and international level. It is intended to benefit public transport operators, relevant governing authorities, and industrial stakeholders.

Intelligent ~~Transport System~~transport systems — Performance testing for connectivity and safety functions of automated driving ~~bus~~buses in public transport —

Part 3~~.~~: Service framework and ~~uses~~use cases

1 Scope

This document specifies the general service framework and components for operating automated driving buses (ADBs) in public transport ~~network that~~networks. It includes~~,~~:

a) a description~~Description~~ of the ADB service components which consist of ADBs, the monitoring and control (MC) centre, Internet of Things (IoT) infrastructure, the smart bus stations~~,~~ and the passengers.

b) ~~Description~~a description of the use cases for the ADB service operation.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 21734-1~~:2022,~~ *Intelligent transport systems — Performance testing for connectivity and safety functions of automated driving ~~bus~~buses in public transport — Part 1: General framework*

3 Terms and definitions

For the purposes of this document, the terms~~,~~ and definitions~~, and abbreviated terms~~ given in ISO 21734-1 and the following apply.

~~3.1~~ ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 Terms and definitions

~~3.1.1~~ 3.1.1
automated driving bus
ADB
bus designed for public transport and embedded with automated driving functions based on SAE level 4 or higher

Note 1 to entry: definitions of autonomous vehicle can be found in the SAE document SAE J3016.

~~3.1.2~~

3.1.2
automated driving bus service framework
ADB service framework
framework for transport services provided by the automated driving bus (ADB) system through interactions among the system components ~~consist~~consisting of ADB, Internet of Things (IoT) infrastructure, passengers, smart bus stations~~,~~ and the monitoring and control centre

~~3.1.3~~ 3.1.3
monitoring and control centre
MC centre
system that can ensure the safety of automated driving bus (ADB) operations by monitoring and controlling the fleet ~~by collecting~~through the collection of data from the ADB system

~~3.1.4~~ 3.1.4
IoT infrastructure
sensor-equipped transport infrastructure such as traffic signals at intersections and smart bus stations that recognize road ~~traffics~~traffic conditions and ADBs

~~3.1.5~~ 3.1.5
smart bus station
facility where an automated driving bus (ADB) stops and passengers safely board, alight~~,~~ and wait for an ADB~~. It is installed with~~

Note 1 to entry: Smart bus stations include a station kiosk and Internet of Things (IoT) infrastructure to communicate with the monitoring and control (MC centre).

~~3.1.6~~

3.1.6
passenger
one of the automated driving bus (ADB) users ~~who~~ provided with ADB transport services

~~3.1.7~~ 3.1.7
operator
one of the users who is responsible for operating and managing automated driving bus (ADB) systems

~~3.1.8~~ 3.1.8
on-demand operation
operating measure with a flexible schedule and route that responds to the passengers' demand within the delineated service area

Note ~~1 to entry: Passengers' boarding and alighting~~ Passengers are ~~allowed~~ only permitted to board and alight at a smart bus station.

~~3.1.9~~ 3.1.9
station kiosk
device that is installed at a smart bus station and ~~allows passengers with their~~that provides boarding reservation ~~and the,~~ payment and billing services to passengers

~~3.1.10~~ 3.1.10
mobile application
software program supporting automated driving bus (ADB) passengers ~~to make the~~in making their boarding reservation and ~~the~~ payment with a mobile device

~~3.1.11~~ 3.1.11
operation manager
person who is responsible for monitoring the operation of the automated driving bus (ADB) fleet and responding to emergencies in the MC centre

~~3.1.12~~ 3.1.12
in-vehicle operation manager
~~one~~individual who is responsible for monitoring automated driving bus (ADB) operation and responding to emergencies in an ADB ~~vehicle~~ while it is in operation

~~3.1.13~~ 3.1.13
one-time boarding ticket
ticket used for one round trip

~~note~~ Note 1 to entry ~~1:~~: Depending on reservation methods, tickets ~~could~~can be either paper or electronic.

~~3.2 Abbreviation~~

~~ADM Automated Driving Message~~

~~ASM Automated Driving Service message~~

~~BIS Bus Information System~~

~~BSM Basic Safety Message~~

~~EEM Emergency Event Message~~

~~JPY Japan Yen~~

~~KRW Korea Won~~

~~MRT Mass Rapid Transit~~

~~SGD Singapore Dollar~~

~~T ticket~~

~~A Fare~~

~~R Deposit of calculation of purchase cost of a one- time ticket~~

~~N Deposit for the additional amount to pay when the reservation information differs from destination~~

~~TR Refund true~~

~~TF Refund false~~

3.2 Abbreviated terms and symbols

A	fare
ADM	automated driving message
ASM	automated driving service message
BIS	bus information system
BSM	basic safety message
EEM	emergency event message
IoT	Internet of Things
JPY	Japanese yen
KRW	South Korea won
MRT	mass rapid transit
N	deposit for the additional amount to pay when the reservation information differs from destination
NFC	near field communication
R	deposit of calculation of purchase cost of a one- time ticket
r_F	refund false
r_T	refund true
SGD	Singapore dollar
T	ticket

