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Smart community infrastructures — Guidance on smart transportation by Electric, Connected and Autonomous Vehicles (eCAVs) and its application to on-demand responsive passenger services with shared vehicles

Infrastructures urbaines intelligentes — Recommandations relatives au transport intelligent par véhicules électriques, connectés et autonomes et application aux services de transport de passagers à la demande avec des véhicules partagés

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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 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).

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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 268, *Sustainable cities and communities*, Subcommittee SC 2, *Sustainable cities and communities - Sustainable mobility and transportation*.

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

Public transport using Electric, Connected and Autonomous Vehicles (eCAVs) will be a solution to a range of problems, including passenger need for flexible, demand-responsive transport options and a shortage of drivers in ageing societies.

5G cellular and WLAN technologies provide the necessary vehicle-to-network (V2N), vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications that assist the navigation of autonomous buses.

However, autonomous buses that are wirelessly connected and driverless also address key environmental and road safety considerations in busy and polluted urban areas and therefore are likely to have a significant role in a future transport system. In particular, they can:

— provide comfortable and convenient transport for everyone, especially the young, elderly and disabled;

— reduce congestion and time lost to slow moving traffic, increasing efficiency;

— manage travel demand, relieve parking and optimise the use of road space;

— reduce carbon emissions, pollution and noise in and between cities, promoting health and well-being;

— make cities more attractive and productive places, able to grow sustainably.

Technology that supports small autonomous vehicles such as pods, one of the Low-Speed Autonomous Transport Systems (L-SATS), for intra-city passenger transport also lends itself to local delivery services. Autonomous delivery pods are designed to carry parcels, groceries and food, making local distribution faster and more cost-efficient.

Key obstacles to the introduction of autonomous bus and delivery pod services include the ability to introduce autonomous vehicles among regular bus services and manually driven vehicles. Therefore, many autonomous experiments have been increasingly sophisticated bus services on fixed, short routes around safe, off- and on-road spaces.

While trials and pilot schemes exist, they have not been at a scale that really demonstrates the extent to which eCAVs can form the basis of a genuine public transport service.

Nevertheless, a strategic city focus plus open innovation should form the basis of intelligent demand-responsive mobility that offers seamless journeys across multi-modal travel options that include autonomous buses. Key advantages of such transport systems, include:

— adaptability, i.e. eCAVs fit the environment and travel needs of passengers;

— flexible routing and demand responsive journeys;

— real-time information across transport infrastructures;

— city-scale functionality and integration;

— safer and more accessible public transportation.

Rapidly developing pilot projects on autonomous buses can serve the development of smart transportation that helps reach these goals. This document aims to signpost the way towards these goals and offer some focus for the collaborative development of international standards for autonomous public transport services.

ISO Guide 82 has been taken into account in the development of this document with regards to addressing sustainability issues.

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1 Scope

This document provides guidance on the staged implementation of Electric, Connected and Autonomous Vehicle (eCAV) passenger and delivery services, with a special focus on on-demand responsive passenger services with shared vehicles. This document aims to accelerate innovation and deliver smart transportation by eCAV, in and between cities.

Note 1 to entry This document does not designate the technical details of eCAVs, including pods, which are Low-Speed Autonomous Transport System (L-SAT) vehicles. These technical details are provided by ISO 22737.

Note 2 to entry This document targets on-demand responsive passenger services with shared vehicles. ISO 37181 also mentions the advantages of eCAV applications to public transportation.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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
autonomous bus
shared vehicle used for public transport services for passengers provided by Electric, Connected and Autonomous Vehicles (eCAVs)

Note 1 to entry: A taxi vehicle is hired and can, if local regulations permit, be shared by different passenger groups. In contrast, a bus vehicle is shared and can be chartered.

Note 2 to entry: A pod, which is a Low-Speed Autonomous Transport System (L-SAT) vehicle and is characterized by being a small vehicle with low capacity, autonomously transports passengers in different or the same groups and delivers items. Thus, a pod is a bus vehicle.

4 Common considerations for smart transportation by autonomous buses

4.1 Goals of smart transportation

Automobile transportation is on the cusp of the biggest revolution in public roads since the advent of the internal combustion engine. eCAVs will spearhead the development of radically new mobility services. Vehicle-to-everything connectivity improves road safety, enables collaboration between CAVs and allows authorities to orchestrate traffic flow in real time via wireless connectivity with strict assurance for security and privacy.