TECHNICAL REPORT

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# Intelligent transport systems — Mobility integration — Role model of ITS service application in smart cities

*Systèmes de transport intelligents - Intégration de la mobilité - Schéma d'application des services ITS*



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# Contents

Page

 

# Foreword

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

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# Introduction

Currently, more than 70 % of the world's people live in cities. The proportion of people living in cities is rising around the world as civilisations develop and congregate around cities where there are more employment opportunities. Societies develop more innovatively and rapidly in cities, and they present better entertainment opportunities, adding to their attraction. *The Economist* magazine recently forecast that by 2045, an extra 2 billion people will live in urban areas[16]. The resulting concentration of population creates various issues such as road congestion due to an increase in vehicle population and environmental pollution due to exhaust gas and tyre erosion. These issues have been attributed to increases in the number of delivery trucks, taxis and town centre traffic and are further exacerbated by obstacles to the effective use of urban space due to the private ownership of cars (parking lots, street parking).

The pressures caused by scientific advice that significant action and change of behaviour is needed to ameliorate the adverse effects of climate change require a more environmentally friendly use of the transport system.

It is recognized that there is also road infrastructure deterioration, a lack of provision of information on the use of public transportation, driver shortages due to the increase in the number of elderly people and the inconvenience of multimodal fare payments, and action to improve the situation is urgently needed.

The International Data Corporation forecasts that of the USD 81 billion that will be spent on smart city technology in 2020, nearly a quarter will go into fixed visual surveillance, smart outdoor lighting and advanced public transit[17].

Eventually, this is likely to mean high speed trains and driverless cars. Consultancy McKinsey forecasts that up to 15 % of passenger vehicles sold globally in 2030 will be fully automated, while revenues in the automotive sector could nearly double to USD 6.7 trillion thanks to shared mobility (car-sharing, e-hailing) and data connectivity services (including apps and car software upgrades)[18].

Changing consumer tastes are also calling for new types of infrastructure. Today's city dwellers, for example, increasingly shop online and expect ever faster delivery times. To meet their needs, modern urban areas need the support of last-minute distribution centres, backed by out-of-town warehouses.

Therefore, in recent years, in Europe, studies on the development of mobility integration standards have been active to solve urban problems. There are various movements around the world making efforts to address these issues. In the United States, ITS technology is used to try to solve these urban problems, as in the Smart City Pilot Project. Columbus, Ohio has been selected as a smart city pilot project which is currently being designed in detail. Important key factors here are the core architectural elements of smart cities, and urban ITS sharing of probe data (also called sensor data), connected cars and automated driving. In addition, new issues have been recognized with the introduction of the connected car to the real world in respect of privacy protection, the need to strengthen security measures, big data collection and processing measures, which are becoming important considerations.

In terms of the effective use of urban space, it is hoped that the introduction of connected cars and automated driving can significantly reduce the requirements for urban parking lots (redistribution of road space). If technology can eliminate congestion, the city road area usage can also be minimized and reallocated (space utilization improvement) to improve the living environment of, and quality of life in, the city. In addition, the environment around the road will be improved by improving enforcement (e.g. overloaded vehicles). On the other hand, even in rural areas, it is possible to introduce automated driving robot taxis and other shared mobility that saves labour (and is therefore more affordable) and improves the mobility of elderly people.

To achieve this requires the realization of various issues, for example:

— cooperation with harmonization of de-jure standards such as ISO and industry de facto standards;

— recognition of the significance of international standardization (e.g. to reduce implementation costs);