
**Smart community infrastructures —
Smart transportation for parking lot
allocation in cities**

*Infrastructures urbaines intelligentes — Transport intelligent pour
l'attribution des aires de stationnement dans les villes*



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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).

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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 1, *Smart community infrastructures*.

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

Automobiles satisfy people's desire to move by themselves at their convenience to anywhere they need or want to go, as explained in ISO 37154. Most cities, especially those that were or are being developed rapidly in a short time, have the same experiences and issues currently or in their history relating to difficulties in finding parking lots or car parks with available spaces.

The limited number of parking lots in a city should be shared by more vehicles more frequently. The low availability of parking lots has unexpectedly caused other city issues besides the difficulty in finding parking lots with available spaces in some cities. It has resulted in irritated drivers, time being wasted and increased fuel consumption. Drivers' attention is taken up while searching, causing collisions to happen more often. Such incidents and slow driving result in traffic congestion. While driving an automobile at a low speed, more pollutants, particle materials (PMs) and greenhouse gases are emitted into the atmosphere. There is nothing positive about the low availability of parking lots in a city. Citizens, including drivers and people living next to public roads, experience such situations all the time.

ITU-T Y.4456^[6] suggests ideal parking lot facilities and outlines technical aspects regarding unoccupied parking spaces, parking space reservation, vehicle automatic access control, self-service parking fee payment and vehicle reverse search, from the viewpoint of enhancement of conventional parking lot services. The concept and goals of smart transportation designated in this document to allocate parking lots to drivers are different from those of ITU-T Y.4456, which mentions parking lot reservation work but lacks the concept and procedure to increase parking lot availability that smart transportation aims at for providing more parking lots to drivers. Finding parking lots that have not yet been offered to the public and allocating to drivers all parking lots already available and recently found will basically increase the availability. ITU-T Y.4456 manages only parking lots currently available to the public. Thus, the issue of parking lot shortage cannot be completely solved. From the viewpoint of city development investments, civil engineering construction is planned, designed, arranged and operated with limited budgets. Digging up and activating unrecognized or unused or unoffered parking lots is still a realistic and easy way to increase the total capacity of parking lots in a city without additional installation. This strategy avoids capital cost preparation for unnecessary parking lot construction.

The availability of parking lots can be increased by another method that effectively allocates and reallocates parking spaces to more drivers more frequently by sharing data as described in ISO 37156 and part of ITU-T Y.4456. With data exchange networks, information on which parking lots have spaces, until what time they are available or unavailable, where they are located and so on is easily collected and immediately shared, resulting in increasing parking lot availability.

Nowadays, protection of people's privacy is a top priority in any service. This document also describes how such privacy should be protected in the services by applying high security, which is not mentioned in ITU-T Y.4456.

This document describes the concept of smart transportation to efficiently allocate parking lots to drivers in cities and outlines installation and organization of the services. This document also contributes to achieving the United Nations Sustainable Development Goals, in particular goal 3: "Good health and well-being", goal 7: "Affordable and clean energy", goal 8: "Decent work and economic growth", goal 9: "Industry, innovation and infrastructure", goal 11: "Sustainable cities and communities", goal 12: "Responsible consumption and production", goal 13: "Climate action" and goal 15: "Life on land".

In the development of this document, ISO Guide 82 has been taken into account in addressing sustainability issues.

Smart community infrastructures — Smart transportation for parking lot allocation in cities

1 Scope

This document specifies procedures for installing and organizing smart transportation for parking lot allocation for drivers in cities. It is intended to apply to cities, especially those having a shortage or low availability of parking lots. This smart transportation aims to provide a solution to the city issue of drivers having difficulty in quickly finding parking lots with available spaces. It also aims to address other city issues such as traffic accidents, congestion and energy consumption.

This document clarifies the concept and goals of smart transportation by referring to the technical aspects suggested by ITU-T Y.4456^[6].

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 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

parking lot

car park

area to park vehicles which are allowed to run on public roads

Note 1 to entry: Vehicles are listed in ISO 37154:2017, 2.5.4, but this document targets automobile-size vehicles privately or personally used (e.g. automobiles, tuk-tuks, manually driven cycle-rickshaws).

Note 2 to entry: 'Parking lot' is preferred to 'car park' in this document as it is more widely used.

3.2

parking lot allocation

suggesting spaces in *parking lots* (3.1) to drivers by finding the best match between drivers' requests or parking preferences and current or expected parking lot availability

Note 1 to entry: Drivers' requests include access routes from current locations, preferred places to park, preferred time to start parking, parking duration, the number of vehicles to be parked and vehicle characteristics, limits of parking fees payable and payment methods.

3.3

parking lot allocation system

arrangement for *parking lot allocation* (3.2) using databases to exchange and share information including parking lot location, parking time recording, navigation to *parking lots* (3.1) and suggestions for parking fee payment procedures and necessary services