

English Version

Intelligent transport systems - Urban-ITS - 'Controlled Zone' management for UVARs using C-ITS

Systèmes de transport intelligents - ITS urbains -
Gestion des zones contrôlées à l'aide du système C-ITS

Intelligente Verkehrssysteme - Urbane ITS - Urbane
ITS - Steuerung in einer "kontrollierten Zone" unter
Verwendung von C-ITS

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Contents

Page

European foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Symbols and abbreviations	6
5 'Controlled Zone' management	6
6 Use cases.....	13
7 Elements of the CZRTM data dictionary.....	15
8 Messages and related security	18
Annex A (normative) ASN.1 module of the CZ data dictionary	19
Annex B (normative) Service announcement for the ITS application “CZ Management”	24
Annex C (normative) LDM data objects for CZ management	25
Bibliography.....	26

European foreword

This document (CEN/TS 17380:2019) has been prepared by Technical Committee CEN/TC 278 “Intelligent transport systems”, the secretariat of which is held by NEN.

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Introduction

This document is part of a set of standards related to Urban ITS (U-ITS). An overview on U-ITS requirements is provided in CEN/TR 17143 [3], which was developed under the European Commission's mandate M/456 [1]. Technologies already developed for Cooperative ITS (C-ITS) under the European Commission's mandate M/453 [2] are applicable for U-ITS.

Management of traffic in a “Controlled Zone” (CZ) is relevant for at least the following reasons:

- Movement of vehicles in cities producing traffic congestion and overcrowding on public transport at peak periods are issues that a jurisdiction may wish to control in order to allow cities to better manage the flow of traffic.
- As cities and urban complexes expand, and there is a significant trend from rural areas to cities around the world, pollution and congestion in these urban areas becomes an ever more significant problem. Traffic, i.e. vehicle movements within the urban complex, is not the only polluter but is considered to be a source of pollution; other causes are e.g. air conditioning, central heating systems, coal and wood burning heating, factories.

A CZ, also referred to as an “Urban Vehicle Access Restriction” (UVAR) zone, is the enactment of a traffic restriction to adhere to a permanent or temporary regulation applicable in a defined area.

It is recognized that different jurisdictions will design and introduce their own CZ paradigms of different method and construct. However, independent of the goal to be achieved or the political objective, the basic technical requirements to manage road traffic in a CZ is similar, and the basic methodologies are the same.

The methodology specified in this document is referred to as geofencing, i.e. the creation of a virtual geographic boundary, which, in a strict sense, is part of “Access Control and Enforcement Systems” (ACES).

1 Scope

This document provides information and specifications enabling management of road traffic in controlled zones applying geofencing. Specifically, this document provides

- a “Controlled Zone Data Dictionary” (CZDD) for management of controlled zones providing an extendible toolkit that regulators can use e.g. to inform potential CZ users, e.g. vehicles, about
 - the CZ area, i.e. the geographical boundaries of the CZ;
 - CZ access conditions including exemptions;
 - time windows indicating when these CZ access conditions are applicable, allowing the potential CZ users to select an appropriate routing, either by pre-trip planning or ad hoc re-routing,
 - and illustrations and guidelines on how to use this toolkit.

The toolkit is designed in compliance with the general ITS station and communications architecture specified in ISO 21217, and optionally applicable C-ITS protocols and procedures, e.g. ISO 22418:2018 ^[8] on “Service Announcement”, EN ISO 18750 on the “Local Dynamic Map”, and EN ISO 17419 ^[5] on globally unique identifiers.

Enforcement is out of scope of this document.

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.

EN ISO 18750:2018, Intelligent transport systems — Co-operative ITS — Local dynamic map

ISO 21217:2014, Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture

CEN ISO/TS 21177¹, Intelligent transport systems — ITS station security services for secure session establishment and authentication between trusted devices

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:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

controlled zone

area for which access conditions are applicable

¹ Under preparation. Stage at the time of publication: FprCEN ISO/TS 21177

3.2

CZ area

geographical location of a CZ in terms of precisely defined boundaries

Note 1 to entry: In the context of this document, a CZ area not necessarily is a two-dimensional area, but may be a location identified with any kind of location referencing method (linear, two-dimensional, three-dimensional).

3.3

CZ user

physical entity, typically a vehicle, that intends operating in a CZ or is already operated in a CZ

3.4

geofencing

creation of a virtual geographic boundary by applying information and communication technologies such as specified for ITS

3.5

in-vehicle system

ITS-station unit or a navigation device or mobile phone application used in a vehicle being capable to handle the control zone system transactions

4 Symbols and abbreviations

C-ITS	cooperative ITS
CZ	controlled zone
ITS	intelligent transport systems
ITS-SU	ITS station unit
IVI	in-vehicle information
IVS	in-vehicle system
NOTE	Examples are ITS station units or navigation devices
U-ITS	urban its
UVAR	urban vehicle access restriction

5 'Controlled Zone' management

5.1 General

Central management of traffic flows in a “Controlled Zone” (CZ) is complex, and to date has proven difficult, and may technically involve downloading data to an “In-Vehicle System” (IVS), e.g. an ITS station unit (ITS-SU) specified in ISO 21217 or a navigation device, or may be undertaken by control of traffic signals (for example in a ferry: boarding and customs-controlled zone), or by a combination of both.

Controlling access to urban zones, i.e. applying respective access restrictions, is also referred to as “Urban Vehicle Access Restriction” (UVAR).

At the time of writing this document, the European Commission is developing a Delegated Regulation that, for reasons of safety of life issues, will enable or enforce new vehicles to be equipped with ITS-SUs, from which point ACES geofencing becomes a practical and cost-effective option.