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Vägtrafikinformatik – Elektronisk vägavgiftsupptagning – Kommunikation för positioneringsstöd för autonoma system (ISO 13141:2015)

**Electronic fee collection – Localisation augmentation
communication for autonomous systems (ISO 13141:2015)**



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EUROPEAN STANDARD

EN ISO 13141

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2015

ICS 03.220.20; 35.240.60

Supersedes CEN ISO/TS 13141:2010

English Version

Electronic fee collection - Localisation augmentation communication for autonomous systems (ISO 13141:2015)

Perception de télépéage - Communications
d'augmentation de localisations pour systèmes
autonomes (ISO 13141:2015)

Elektronische Gebührenerfassung - Genauere
Ortsbestimmung für autonome Systeme (ISO
13141:2015)

This European Standard was approved by CEN on 24 October 2015.

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European foreword

This document (EN ISO 13141:2015) has been prepared by Technical Committee ISO/TC 204 "Intelligent transport systems" in collaboration with Technical Committee CEN/TC 278 "Intelligent transport systems" the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2016, and conflicting national standards shall be withdrawn at the latest by June 2016.

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This document supersedes CEN ISO/TS 13141:2010.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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Endorsement notice

The text of ISO 13141:2015 has been approved by CEN as EN ISO 13141:2015 without any modification.

Introduction

On-board equipment (OBE) that uses satellite-based positioning technology to collect data required for charging for the use of roads operates in a so-called autonomous way (i.e. generally without relying on dedicated roadside infrastructure). However, these autonomous systems can, in particular places, need some roadside infrastructure support for proper identification of charge objects. Such assistance might be required at places where satellite-based localization accuracy or availability is insufficient or at places where the OBE is directly informed about the identity of the relevant charge object.

In an interoperable environment, it is essential that this localization information be available in a standardized way. This International Standard defines requirements for localization augmentation by dedicated short-range communication (DSRC) between roadside equipment and on-board equipment. This International Standard makes no assumptions about the operator of the roadside equipment (RSE), in terms of his role according to ISO 17573, i.e. whether the RSE is operated by an entity in the service provision role or in the toll charging role.

This International Standard has been prepared considering the following requirements:

- the localization augmentation communication (LAC) serves to transmit localization information to passing OBE without identifying individual OBE;
- the localization information contains both geographical location independent of charging context, and context-dependent identification of charge objects;
- a single roadside installation is able to provide localization augmentation for several overlapping EFC contexts;
- this International Standard is based on the EFC architecture specified in ISO 17573;
- the communication applies to all OBE architectures;
- this International Standard is applicable to various DSRC media, especially the CEN DSRC stack;
- the communication supports security services for data origin authentication, integrity and non-repudiation.

This International Standard defines an attribute, LACData, which is communicated from the RSE to the OBE by means of an acknowledged writing service, which is implemented through the SET service of DSRC Layer 7 (ISO 15628 and EN 12834). The LAC application is defined as a self-contained DSRC application with its own application identifier (AID). Regarding the DSRC communications stack, this International Standard gives definitions for the CEN DSRC stack, as used in EN 15509 and [Annexes C, D and E](#) demonstrate, respectively, the use of ISO CALM IR, the use of Italian DSRC as specified in ETSI/ES 200674-1 and ARIB DSRC.

All data relevant for the LAC application have been put into the attribute LACData, in order to create a single standard communications content transmitted by LAC RSE, and always signed as a whole. LACData can transport both geographic coordinates (latitude, longitude and altitude) and the identification of a specific charge object. All elements of LACData are mandatory, but Null values are defined to allow LAC installations to transmit only a selection of all defined data elements.

Access credentials are mandatory for writing LACData in order to protect OBE from non-authentic RSE. LACData are critical for charge determination and for providing evidence. For these purposes, the authenticators which are defined can be used to provide for data origin authentication, data integrity and non-repudiation for LACData. There are two separate authenticator fields defined to allow for separate authentication and non-repudiation, if required by the institutional arrangements of a toll system.

This International Standard is “minimalist” in the sense that it covers what is required by operational systems and systems planned in the foreseeable future.

A test suite for checking an OBE or RSE implementation for compliance with the ISO/TS 13141 is defined in the corresponding edition of ISO/TS 13140-1 and ISO/TS 13140-2. This test suite is currently being updated to reflect the changes incorporated into this first edition of ISO 13141.

Electronic fee collection — Localisation augmentation communication for autonomous systems

1 Scope

This International Standard establishes requirements for short-range communication for the purposes of augmenting the localization in autonomous electronic fee collection (EFC) systems. Localization augmentation serves to inform on-board equipment (OBE) about geographical location and the identification of a charge object. This International Standard specifies the provision of location and heading information and security means to protect from the manipulation of the OBE with false roadside equipment (RSE).

The localization augmentation communication takes place between an OBE in a vehicle and fixed roadside equipment. This International Standard is applicable to OBE in an autonomous mode of operation.

This International Standard defines attributes and functions for the purpose of localization augmentation, by making use of the dedicated short-range communications (DSRC) communication services provided by DSRC Layer 7, and makes these LAC attributes and functions available to the LAC applications at the RSE and the OBE. Attributes and functions are defined on the level of Application Data Units (ADUs, see [Figure 1](#)).

As depicted in [Figure 1](#), this International Standard is applicable to:

- the application interface definition between OBE and RSE;
- the interface to the DSRC application layer, as specified in ISO 15628 and EN 12834;
- the use of the DSRC stack.

The localization augmentation communication is suitable for a range of short-range communication media. This International Standard gives specific definitions regarding the CEN DSRC stack as specified in EN 15509, and [Annexes C, D and E](#) give the use of the Italian DSRC as specified in ETSI/ES 200 674-1, ISO CALM IR, and ARIB DSRC.

This International Standard contains a protocol implementation conformance statement (PICS) proforma in [Annex B](#) and informative transaction examples in [Annex F](#). The informative [Annex G](#) highlights how to use this International Standard for the European electronic toll service (as defined in Commission Decision 2009/750/EC).

Test specifications are not within the scope of this International Standard.