



SLOVENSKI STANDARD
oSIST prEN ISO 13141:2023
01-september-2023

Elektronsko pobiranje pristojbin - Lokalizacija povečane gostote komunikacije za avtonomne sisteme (ISO/DIS 13141:2023)

Electronic fee collection - Localisation augmentation communication for autonomous systems (ISO/DIS 13141:2023)

Elektronische Gebührenerhebung - Kommunikation zur genauen Ortsbestimmung für autonome Systeme (ISO/DIS 13141:2023)

Perception de télépéage - Communications d'augmentation de localisations pour systèmes autonomes (ISO/DIS 13141:2023)

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35.240.60	Uporabniške rešitve IT v prometu	IT applications in transport

oSIST prEN ISO 13141:2023

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Electronic fee collection — Localisation augmentation communication for autonomous systems

Perception de télépéage — Communications d'augmentation de localisations pour systèmes autonomes

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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).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 278 *Intelligent transport systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition replaces ISO 13141:2015 and the amendment ISO 13141:2015/Amd1:2017, which have been technically revised.

The main changes are as follows:

- addition of [clause 6](#) on the conformance requirements;
- updating of terms, including the reference to ISO/TS 17573-2 as the primary source;
- updating of data definitions, including the reference to ISO 17573-3 as the primary source;
- use of imported ASN.1 types with successors (i.e. including all future minor versions);
- changes as result of updates and revisions in underlying EFC standards;
- revision of the informative [Annex G](#) following the evolution of the EETS; and
- editorial and formal corrections as well as changes to improve readability.

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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 localisation 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 localisation information be available in a standardized way. This document specifies requirements for localisation augmentation by dedicated short-range communication (DSRC) between roadside equipment (RSE) and OBE. This document makes no assumptions about the operator of the 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 document has been prepared considering the following requirements:

- the localisation augmentation communication (LAC) serves to transmit localisation information to passing OBE without identifying individual OBE;
- the localisation information contains both geographical location independent of charging context, and context-dependent identification of charge objects;
- a single roadside installation is able to provide localisation augmentation for several overlapping EFC contexts;
- this document is based on the EFC architecture specified in ISO 17573;
- the communication applies to all OBE architectures;
- this document 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 document specifies 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 specified as a self-contained DSRC application with its own application identifier (AID). Regarding the DSRC communications stack, this document provides specific definitions regarding the CEN DSRC stack as specified in EN 15509, and [Annexes C, D](#) and [E](#) provide for use of the Italian DSRC as specified in ETSI/ES 200 674-1, ISO CALM IR, ARIB DSRC and WAVE 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 the geographic coordinates (latitude, longitude and altitude) and the identification of a specific charge object. All elements of LacData are mandatory, but Null values are specified to allow LAC installations to transmit only a selection of all specified 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 specified can be used to provide for data origin authentication, data integrity and non-repudiation for LacData. There are two separate authenticator fields specified to allow for separate authentication and non-repudiation, if required by the institutional arrangements of a toll system.

This document 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 13141 is specified in the corresponding edition of ISO 13140. This test suite will be updated to reflect the changes incorporated into this second edition of ISO 13141.

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Electronic fee collection — Localisation augmentation communication for autonomous systems

1 Scope

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

The localisation augmentation communication (LAC) takes place between an OBE in a vehicle and fixed RSE. This document is applicable to OBE in an autonomous mode of operation.

This document specifies attributes and functions for the purpose of localisation 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 specified on the level of Application Data Units (ADUs, see [Figure 1](#)).

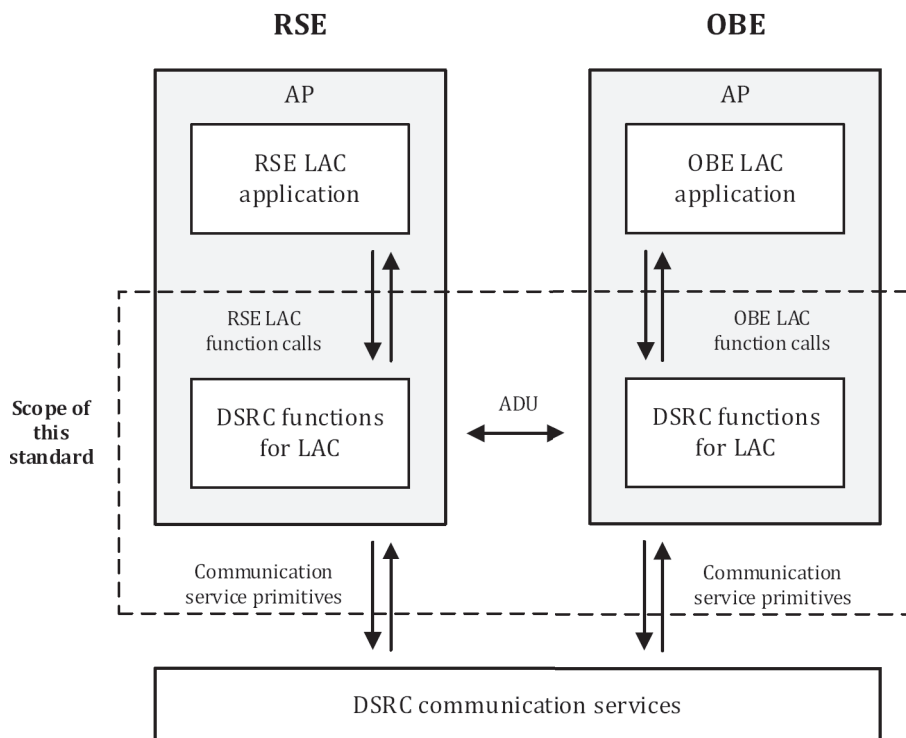
As depicted in [Figure 1](#), this document is applicable to:

- 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 LAC is suitable for a range of short-range communication media. This document 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 variant of DSRC as specified in ETSI/ES 200 674-1, ISO CALM IR, and ARIB DSRC.

This document 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 document for the European Electronic Toll Service (EETS).

Test specifications are not within the scope of this document.

**Key**

AP application process

ADU application data unit

LAC location augmentation communication

OBE on-board equipment

RSE roadside equipment

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Figure 1 — The LAC application interface**2 Normative references**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 8824-1, *Information technology — Abstract Syntax Notation One (ASN.1) — Part 1: Specification of basic notation*

ISO/IEC 8825-2, *Information technology — ASN.1 encoding rules — Part 2: Specification of Packed Encoding Rules (PER)*

ISO/IEC 9797-1:2011, *Information technology — Security techniques — Message Authentication Codes (MACs) — Part 1: Mechanisms using a block cipher*

ISO 12813, *Electronic fee collection — Compliance check communication for autonomous systems*

ISO 14906:2022, *Electronic fee collection — Application interface definition for dedicated short-range communication*

ISO 15628:2013, *Intelligent transport systems — Dedicated short range communication (DSRC) — DSRC application layer*

ISO/IEC 18033-3:2010, *Information technology — Security techniques — Encryption algorithms — Part 3: Block ciphers*

EN 12834:2003, *Road transport and traffic telematics — Dedicated Short Range Communication (DSRC) — DSRC application layer*

EN 15509:2023, *Electronic fee collection — Interoperability application profile for DSRC*

ISO/FDIS 17573-3:2023, *Electronic fee collection — System architecture for vehicle-related tolling — Part 3: Data dictionary*

NIMA Technical Report TR8350.2 version 3, *Department of Defense World Geodetic System 1984, Its Definition and Relationships With Local Geodetic Systems*

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 <https://www.electropedia.org/>

3.1

access credentials

trusted attestation or secure module that establishes the claimed identity of an object or application

[SOURCE: ISO/TS 17573-2:2020, 3.4]

3.2

attribute

addressable package of data consisting of a single *data element* or structured sequences of data elements

[SOURCE: ISO/TS 17573-2:2020, 3.13]

3.3

authentication

security mechanism allowing verification of the provided identity

[SOURCE: EN 301 175 V1.1.1:1998, 3]

3.4

authenticator

data, possibly encrypted, that is used for *authentication* (3.3)

[SOURCE: ISO/TS 17573-2:2020, 3.16]

3.5

charge object

geographic or road related object for the use of which a charge is applied

[SOURCE: ISO/TS 17573-2:2020, 3.31]

3.6

data integrity

property that data has not been altered or destroyed in an unauthorized manner

[SOURCE: ISO 7498-2:1989, 3.3.21]