



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 13141:2014**  
**01-februar-2014**

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**Elektronsko pobiranje pristojbin - Lokalizacija povečane gostote komunikacije za avtonomne sisteme (ISO/DIS 13141:2013)**

Electronic fee collection - Localisation augmentation communication for autonomous systems (ISO/DIS 13141:2013)

Elektronische Gebührenerfassung - Genauere Ortsbestimmung für autonome Systeme (ISO/DIS 13141:2013)

Perception de télépéage - Communications d'augmentation de localisations pour systèmes autonomes (ISO/DIS 13141:2013)

**Ta slovenski standard je istoveten z: prEN ISO 13141**

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**ICS:**

03.220.20	Cestni transport	Road transport
35.240.60	Uporabniške rešitve IT v transportu in trgovini	IT applications in transport and trade

**oSIST prEN ISO 13141:2014**

**en,fr,de**



# DRAFT INTERNATIONAL STANDARD

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## Electronic fee collection — Localisation augmentation communication for autonomous systems

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

[Revision of first edition (ISO/TS 13141:2010) and ISO/TS 13141:2010/Cor.1:2013]

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### ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

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## Foreword

- upgrade of the first edition from a Technical Specification to an International Standard
- editorial and formal corrections as well as changes to improve readability

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 13141 was prepared by Technical Committee ISO/TC 204, *Intelligent Transport Systems*, Subcommittee SC , and by Technical Committee CEN/TC 278, *Intelligent Transport Systems* in collaboration.

This second edition cancels and replaces the first edition (ISO/TS 13141:2010) which has been technically revised. The main changes comprise

- conversion from a Technical Specification to an International Standard
- editorial and formal corrections as well as changes to improve readability
- detailed reference to the WGS84 definition
- correction of regimeld format

## Introduction

On-board equipment (OBE) working with satellite-based positioning to collect data required for charging for the use of roads operate in a so-called autonomous way (i.e. generally without relying on dedicated road-side infrastructure). However, these autonomous systems can, in particular places, need some road-side 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 International Standard defines requirements for localisation augmentation by dedicated short-range communication (DSRC) between road-side equipment and on-board equipment. This International Standard makes no assumptions about the operator of the road-side equipment, in terms of his role according to ISO 17573, i.e. whether the road-side equipment 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 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 road-side installation is able to provide localisation augmentation for several overlapping EFC contexts;
- this International Standard is according to the EFC architecture specified in ISO 17573;
- the communication applies to all OBE architectures;
- this International Standard is applicable to various DSRC media, including 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 roadside 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 the Annexes C, D and E demonstrate the use of ISO CALM IR, UNI DSRC 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 all road-side equipment, and always signed as a whole. LACData can transport both geographic coordinates (Lat, Long, Alt) 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 road-side equipment. LACData are critical for charge determination and need to have evidentiary quality. 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 minimal, in order to be able to cover what is required by operational EFC systems and systems planned in the foreseeable future.

# 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 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 International Standard specifies the provision of location and heading information and security means to protect from the manipulation of the OBE with false road-side equipment (RSE).

The localisation augmentation communication takes place between an OBE in a vehicle and fixed road-side 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 localisation augmentation, by making use of the 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 ADUs (Application Data Units, 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 localisation augmentation communication is suitable for a range of short-range communication media. This International Standard gives specific definitions regarding the CEN DSRC stack as used in EN 15509, and Annexes C, D and E give the use of ISO CALM IR, UNI DSRC and ARIB DSRC.

This International Standard contains a protocol implementation conformance statement (PICS) proforma and informative transaction examples. This International Standard is not applicable to test specifications.

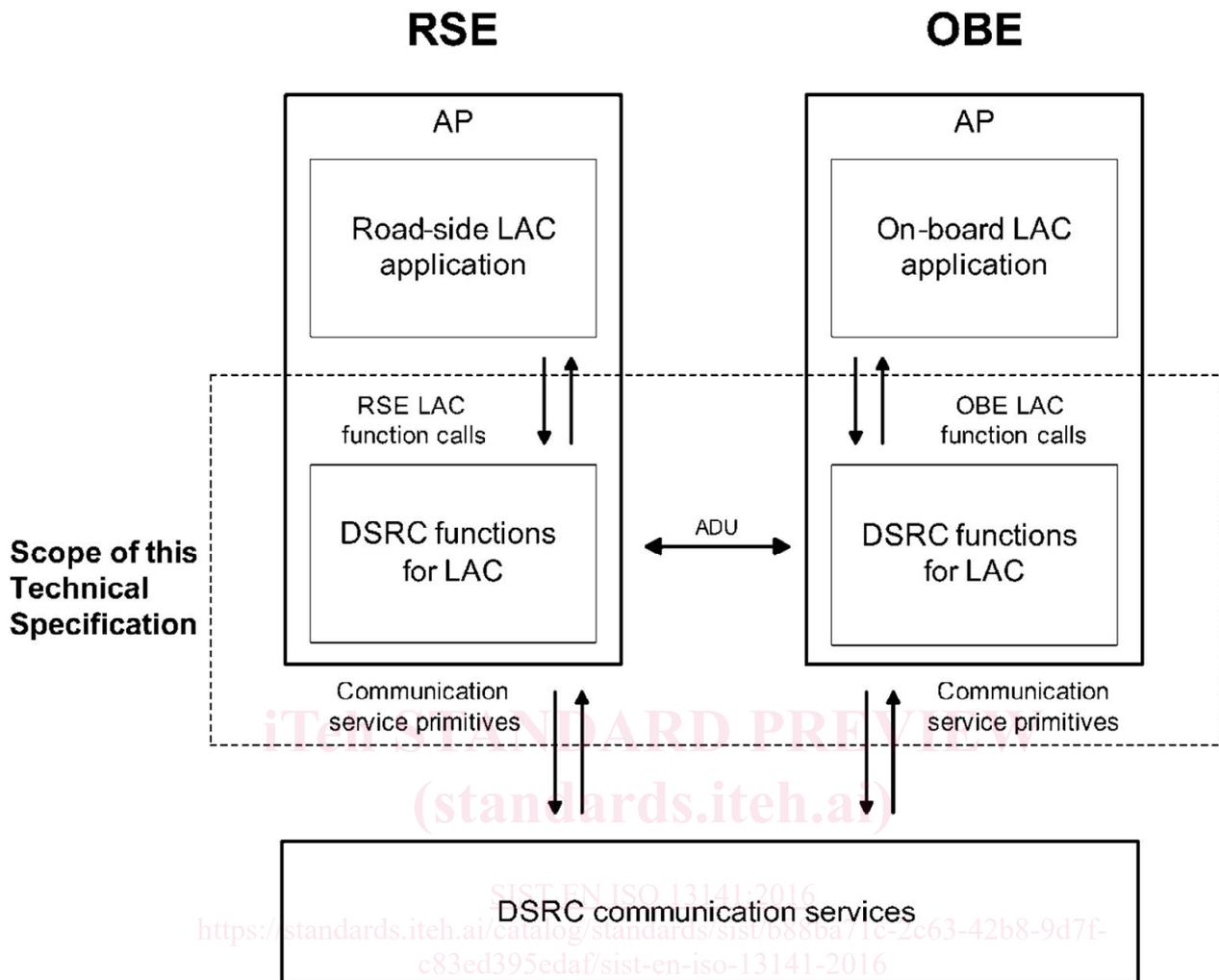


Figure 1 — The LAC application interface

## 2 Normative references

The following referenced documents are indispensable for the application 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.

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

ISO 14906:2011, *Electronic fee collection — Application interface definition for dedicated short-range communication*

ISO 15628:2007, *Road transport and traffic telematics — Dedicated short range communication (DSRC) — DSRC application layer*

ISO/IEC 8824-1:2002, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation — Part 1*

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

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

EN 15509:2013, *Electronic fee collection — Interoperability application profile for DSRC*

NIMA Technical Report TR8350.2, *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.

#### 3.1

##### **access credentials**

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

[ISO 14906:2011]

#### 3.2

##### **attribute**

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

#### 3.3

##### **authentication**

provision of assurance that a claimed characteristic of an entity is correct

[ISO 27000]

#### 3.4

##### **authenticator**

data, possibly encrypted, that is used for authentication

#### 3.5

##### **charge object**

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

#### 3.6

##### **integrity**

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

[ISO/TS 17574:2009]

#### 3.7

##### **on-board equipment**

equipment located on-board a vehicle including nomadic devices with the function of exchanging information with external systems

[ISO 14906:2011]

#### 3.8

##### **road side equipment**

equipment located along the road, either fixed or mobile

[ISO/TS 17574:2009]

#### 3.9

##### **EFC service**

##### **toll service**

service for electronic payment offered by a payment service provider

**ISO/DIS 13141****3.10****service primitive****service primitive communication**

elementary communication service provided by the application layer protocol to the application processes

[ISO 14906:2011]

**3.11****toll context**

logical view as defined by attributes and functions of the basic elements of a toll scheme consisting of a single basic tolling principle, a spatial distribution of the charge objects and a single behavior of the related front end

[ISO/TS 17575-3:2011]

**3.12****toll regime**

set of rules, including enforcement rules, governing the collection of toll in a toll domain

[ISO 17573:2009]

**3.13****transaction**

whole of the exchange of information between two physically separated communication facilities

**4 Abbreviated terms**

For the purposes of this document, the following abbreviated terms apply.

ADU	Application data unit (see ISO 14906)
AID	Application identifier (see ISO 15628 and EN 12834)
ASN.1	Abstract syntax notation one (see ISO/IEC 8824-1:2002)
BST	Beacon service table (see ISO 14906)
CCC	Compliance check communication
DSRC	Dedicated short-range communication (see ISO 14906)
EID	Element identifier (see ISO 15628 and EN 12834)
EFC	Electronic fee collection (see ISO 14906)
IR	Infrared
IUT	Implementation under test
LAC	Localisation augmentation communication
MAC	Media Access control (see ISO 14906) or Message authentication code
OBE	On-board equipment (see ISO 14906)
PICS	Protocol implementation conformance statement
RSE	Road-side equipment (see ISO 14906)
VST	Vehicle service table (see ISO 14906)
WGS84	World Geodetic System 1984

## 5 Application interface architecture

### 5.1 General

This clause gives an insight into the LAC architecture by identifying the functions, the use of DSRC communication primitives, and the attributes addressed. A detailed description of the functions is given in Clause 6, while details of the attributes are in Clause 7.

The LAC application interface has been designed to make use of the CEN DSRC communication stack, via the application layer as specified in ISO 15628 and EN 12834. For other identified DSRC communication media, detailed mappings to corresponding services are given in the annexes.

### 5.2 Services provided

The LAC application interface offers the following services to LAC applications:

- writing of data in order for the RSE to communicate location data to the OBE;
- authentication of the RSE by the OBE by means of access credentials.

There is no read service provided within the LAC communication. The RSE transmits data to the OBE using the underlying acknowledged communication services, in order to verify that the data indeed are properly transmitted over the DSRC interface.

The above services are realized by means of protocol exchanges performed by means of communication services and transactions as described in Clause 8.

The services are provided by the following functions:

- the “Initialise communication” function, which is used to establish the LAC communication link between the RSE and OBE;
- the “Write data” function, which is used to send LAC attributes to the OBE;
- the “Terminate communication” function, which is used to terminate the LAC communication.

### 5.3 Attributes

There is a single attribute defined for localisation augmentation. This attribute contains a set of data in order for the OBE to be able to determine its localisation with better accuracy and availability or to directly receive a charge object identification related to the local toll context. This set of data contains:

- geographic coordinates (latitude, longitude and altitude);
- charge object reference.

When the RSE writes this attribute to the OBE, it shall transmit geographic coordinates or charge object reference or both.

### 5.4 Contract and toll context

Regarding LAC, the OBE shall identify itself in the initialisation phase with a single LAC Context Mark in the VST. This Context Mark identifies the user contract in terms of the service provider, type of contract and version information. This information enables the RSE to decide whether the OBE carries a contract which it can support, and if so, to choose the corresponding security elements.

A RSE can provide the OBE with localisation augmentation for several overlapping contexts simultaneously, by writing the LAC attribute (which includes the applicable toll context) several times in one transaction.