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Entwurf

Einsprüche bis 2023-07-19
Vorgesehen als Ersatz für
DIN EN ISO 13141:2017-10

**Elektronische Gebührenerhebung –
Kommunikation zur genauen Ortsbestimmung für autonome Systeme
(ISO/DIS 13141:2023);
Englische Fassung prEN ISO 13141:2023**

Electronic fee collection –
Localisation augmentation communication for autonomous systems (ISO/DIS 13141:2023);
English version prEN ISO 13141:2023

Perception de télépéage –
Communications d'augmentation de localisations pour systèmes autonomes
(ISO/DIS 13141:2023);
Version anglaise prEN ISO 13141:2023

Anwendungswarnvermerk

Dieser Norm-Entwurf mit Erscheinungsdatum 2023-05-19 wird der Öffentlichkeit zur Prüfung und
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Weil die beabsichtigte Norm von der vorliegenden Fassung abweichen kann, ist die Anwendung dieses Entwurfs
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Gesamtumfang 46 Seiten

DIN-Normenausschuss Automobiltechnik (NAAutomobil)

Nationales Vorwort

Dieses Dokument (prEN ISO 13141:2023) wurde vom Technischen Komitee ISO/TC 204 „Intelligent Transport Systems“ in Zusammenarbeit mit dem Technischen Komitee CEN/TC 278 „Intelligente Verkehrssysteme“, dessen Sekretariat von NEN (Niederlande) gehalten wird, erarbeitet.

Das zuständige deutsche Normungsgremium ist der Gemeinschaftsarbeitsausschuss NA 052-00-71 GA „Gemeinschaftsarbeitsausschuss NAAutomobil/DKE: Intelligente Verkehrssysteme“ des DIN-Normenausschusses Automobiltechnik (NAAutomobil).

Dieses Dokument ist derzeit zur parallelen Abstimmung vorgelegt.

Dieses Dokument enthält unter Berücksichtigung des DIN-Präsidialbeschlusses 1/2004 nur die englische Originalfassung von prEN ISO 13141:2023.

Fahrzeuginterne Einrichtungen (OBE), die auf satellitengestützter Positionierung zur Datensammlung für Gebührenerhebung zur Straßennutzung dienen, werden autonom gegenüber der Straßenrandinfrastruktur betrieben. Die OBE zeichnet dabei die gefahrene Entfernung in einem mautpflichtigen Gebiet auf.

Dieses Dokument legt ein Attribut für erweiterte Lokalisierungskommunikationsdaten (LACData) fest, welches von einer Straßenrand-Einrichtung zur OBE als bestätigter Schreibdienst übertragen wird. Dieses Attribut ist über den SET-Dienst in DSRC (Schicht 7) implementiert (nach ISO 15628 und EN 12834).

Aktuelle Informationen zu diesem Dokument können über die Internetseiten von DIN (www.din.de) durch eine Suche nach der Dokumentennummer aufgerufen werden.

Änderungen

Gegenüber DIN EN ISO 13141:2017-10 wurden folgende Änderungen vorgenommen:

- a) Konformitätsanforderungen in Abschnitt 6 ergänzt;
- b) Überarbeitung einiger Begriffe basierend auf ISO/TS 17573-2 als primäre Quelle;
- c) einige Datenfestlegungen wurden, basierend auf ISO/TS 17573-3 als primäre Quelle, angepasst;
- d) Verwendung von importierten ASN.1-Typen inklusiven Nachfolgern (d.h. inklusiver aller zukünftigen Unterversionen);
- e) Änderungen basierend auf Aktualisierungen und Revisionen in darunterliegenden EFC-Normen;
- f) Überarbeitung des informativen Anhangs G basierend auf den Weiterentwicklungen des Europäischen elektronischen Mautsystems (EETS);
- g) redaktionelle und formale Korrekturen, sowie Änderungen, um die Lesbarkeit zu verbessern.

Nationaler Anhang NA (informativ)

Begriffe

Die Benummerung der folgenden Begriffe und Abkürzungen ist identisch mit der Benummerung in der englischen Fassung.

Für die Anwendung dieses Dokuments gelten die folgenden Begriffe.

ISO und IEC stellen terminologische Datenbanken für die Verwendung in der Normung unter den folgenden Adressen bereit:

- IEC Electropedia: verfügbar unter <http://www.electropedia.org/>
- ISO Online Browsing Platform: verfügbar unter <http://www.iso.org/obp>

3.1

Zugriffsbeglaubigung

en access credentials

vertrauliche Bescheinigung oder sicheres Modul, welches die geforderte Identität eines Objektes oder einer Anwendung schafft

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

3.2

Attribut

en attribute

adressierbares Datenpaket, welches aus einem einzelnen *Datenelement* oder strukturierten Sequenzen von Datenelementen besteht

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

3.3

Authentifizierung

en authentication

Sicherheitsmechanismus, welcher die Überprüfung der bereitgestellten Identität ermöglicht

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

3.4

Authentifikator

en authenticator

Daten, wenn möglich verschlüsselt, die zur *Authentifizierung* (3.3) verwendet werden

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

3.5

mautpflichtiges Objekt

en charge object

geographisches oder straßenbezogenes Objekt für das eine Mautgebühr angewendet wird

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

3.6

Datenintegrität

en data integrity

Eigenschaft, dass Daten nicht in unautorisierter Art und Weise verändert oder vernichtet wurden

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

3.7

fahrzeuginterne Einrichtung

en on-board equipment

alle erforderlichen Einrichtungen im Fahrzeug, die zur Durchführung notwendiger EFC-Funktionen (en: electronic fee collection, EFC) und Kommunikationsdienste benötigt werden

[QUELLE: ISO/TS 17573-2:2020, 3.126]

3.8

straßenseitige Einrichtung

en roadside equipment

festе oder mobile Einrichtung zur mobilen Gebührenerhebung (EFC) entlang oder an einer Straße

Anmerkung 1 zum Begriff: Mobile straßenrandseitige Einrichtungen (RSE) können temporär entlang oder an der Straße befestigt sein.

[QUELLE: ISO/TS 17573-2:2020, 3.161]

3.9

Dienstprimitive

en service primitive

elementarer Kommunikationsdienst, der durch die Anwendungsschicht den Anwendungsprozessen zur Verfügung gestellt wird

[QUELLE: ISO/TS 17573-2:2020, 3.173]

3.10

Mauterheber

en toll charger

Instanz die Maut (3.193) erhebt, um ein Fahrzeug in einem *Mautgebiet* zu nutzen

[QUELLE: ISO/TS 17573-2:2020, 3.194]

3.11

Mautkontext

en toll context

logischer Blick auf ein *Mautschema*, das anhand von *Attributen* (3.2) und Funktionen eines Basiselements definiert ist und aus einem einzelnen Basismautprinzip, der räumlichen Verteilung eines *Abrechnungsobjektes* (3.5) und dem einzelnen Verhalten des betroffenen *Front Ends* besteht

[QUELLE: ISO/TS 17573-2:2020, 3.196]

3.12

Mautdienstanbieter

en toll service provider

Organisation, die *Mautdienste* in einem oder mehreren *Mautgebieten* anbietet

[QUELLE: ISO/TS 17573-2:2020, 3.206]

3.13

Transaktion

en transaction

Gesamtheit eines Informationsaustausches zwischen zwei physisch getrennten Kommunikationseinheiten

[QUELLE: ISO/TS 17573-2:2020, 3.211]

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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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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.

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.

– *Entwurf* –

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).

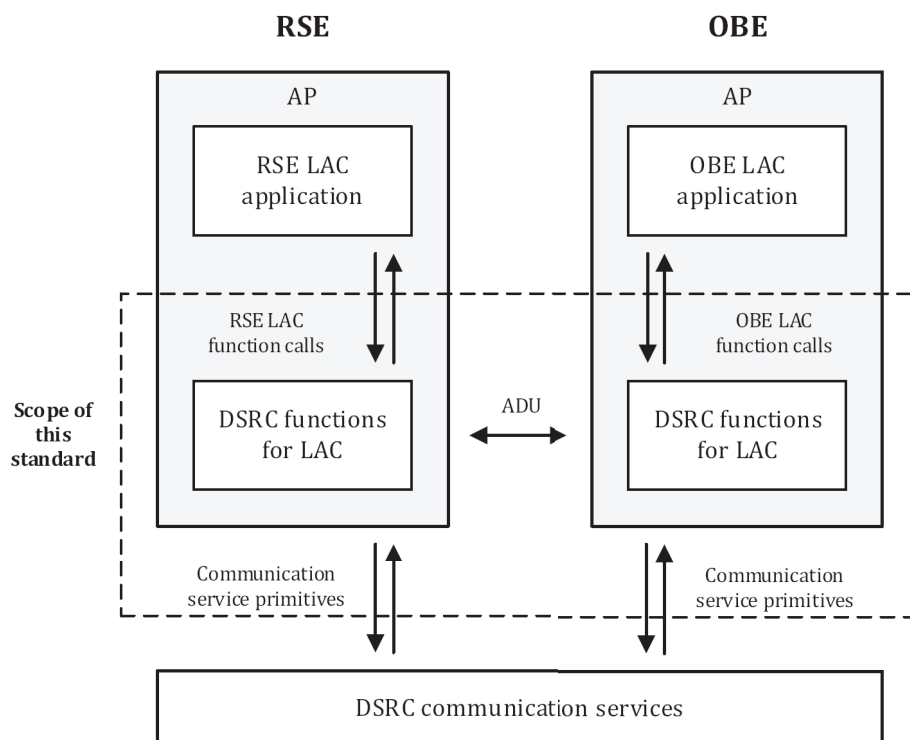
As depicted in Figure 1, this document is applicable to:

- 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

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]

3.7

on-board equipment

all required equipment on-board a vehicle for performing required *electronic fee collection (EFC)* functions and communication services

[SOURCE: ISO/TS 17573-2:2020, 3.126]

3.8

roadside equipment

fixed or movable *electronic fee collection (EFC)* equipment located along or on the road

Note 1 to entry: Movable RSE can be mounted temporarily along the road or in a vehicle.

[SOURCE: ISO/TS 17573-2:2020, 3.161]

3.9

service primitive

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

[SOURCE: ISO/TS 17573-2:2020, 3.173]

3.10

toll charger

entity which levies toll (3.193) for the use of vehicles in a *toll domain*

[SOURCE: ISO/TS 17573-2:2020, 3.194]

3.11

toll context

logical view as defined by *attributes* (3.2) and functions of the basic elements of a *toll scheme* consisting of a single basic tolling principle, a spatial distribution of the *charge objects* (3.5) and a single behaviour of the related *front end*

[SOURCE: ISO/TS 17573-2:2020, 3.196]

3.12

toll service provider

entity providing *toll services* in one or more *toll domains*

[SOURCE: ISO/TS 17573-2:2020, 3.206]

3.13

transaction

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

[SOURCE: ISO/TS 17573-2:2020, 3.211]

4 Abbreviated terms

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

AC-CR	access credentials
ADU	application data unit
AID	application identifier
ASN.1	abstract syntax notation one