TECHNICAL REPORT

ISO/TR 17424

First edition
2015-05-01

Intelligent transport systems — Cooperative systems — State of the art of Local Dynamic Maps concepts

Systèmes intelligents de transport — Systèmes coopératifs — État des connaissances des cartes dynamiques locales

Reference number
ISO/TR 17424:2015(E)

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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*.

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Introduction

Intelligent transport systems (ITS) means to apply information and communication technologies (ICT) to the transport sector. ITS can create clear benefits in terms of transport efficiency, sustainability, safety and security.

To take full advantage of the benefits that ICT-based systems and applications can bring to the transport sector, it is necessary to ensure interoperability among the different systems.

Cooperative systems are ITS (Cooperative ITS) systems based on vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I, I2V) and infrastructure-to-infrastructure (I2I) communications for the exchange of information. Cooperative systems have the potential to further increase the benefits of ITS services and applications.

Cooperative ITS is a subset of the overall ITS that communicates and shares information between ITS stations to give advice or facilitate actions with the objective of improving safety, sustainability, efficiency and comfort beyond the scope of stand-alone systems.

The European Commission issued Mandate M/453 [6] [7] to invite the European Standardization Organizations (ESOs) (CEN, CENELEC and ETSI) to prepare a coherent set of standards, specifications and guidelines to support the European Community's wide implementation and deployment of Cooperative intelligent transport systems (Cooperative ITS).

CEN and ETSI have formally accepted the Mandate and will develop standards (EN) and technical specifications and guidelines requested as far as possible within the timescale required in the Mandate. (see Reference [7])

Annex C of Reference [7] proposes a "List of minimum set of standards and allocation of responsibility between CEN and ETSI – Mandate M/453".

ISO/TC 204 decided in 2009 to join CEN's efforts and to create a new working group (WG 18) under the Vienna agreement. This Technical Report is considered by non-European NSOs as important enough to justify having it under ISO lead.

Different ITS stations (vehicle, nomadic, roadside and central) exchange geographically located information, which is of importance for the different cooperative applications (standards to be developed under the responsibility of CEN and ISO).

This Technical Report delivers information about the status at the time of publication of the Local Dynamic Map (LDM) concepts as they have been developed in the different R&D projects in Europe, Japan and the USA.

It presents different architectures, implementations, LDM functional blocks and the related standardization activities. It can identify gaps, lacks and inconsistencies between Cooperative ITS Reference Station Architecture and existing implementations. It proposes actions for future standardization activities and harmonization needs. Activities within ISO/TC 204 WG 3 and ETSI TC ITS at the time of publication are considered.

This Technical Report falls within the agreed scope of work of ISO/TC 204 WG18 and CEN TC 278 WG16.

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Intelligent transport systems — Cooperative systems — State of the art of Local Dynamic Maps concepts

1 Scope

This Technical Report surveys the status of Local Dynamic Map (LDM) regarding architecture, implementation, and standardization efforts. It summarizes the high level architectures of the most important implementations and compares it with the CEN/ETSI/ISO ITS-Station architecture.

This Technical Report derives out of the application needs the requirements for a global LDM concept in terms of functionality, technical and legal aspects.

A gap analysis with existing specification and standards will be performed and recommendations towards SDOs and decision bodies will be made.

This Technical Report does not give any decision on how or whether one of the solutions described is commercially feasible to be considered as an implementable offer to the user.

This Technical Report considers the most important documents and research projects to the knowledge of the authors, but does not claim to be complete or free of any mistakes.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable to 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/TR 24532, *Intelligent transport systems — Systems architecture, taxonomy and terminology — Using CORBA (Common Object Request Broker Architecture) in ITS standards, data registries and data dictionaries*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TR 24532 and the following apply.

3.1
Local Dynamic Map
LDM
conceptual data store which is embedded in an ITS station containing topographical, positional and status information within a dedicated geographic area of interest, relevant to ITS stations

Note 1 to entry: The LDM is supported by service functions, which ensure the accessibility, integrity, and security.

4 Abbreviated terms

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

API	Application Program Interface
BSA	Basic Set of Applications
CA	Cooperative Awareness
CAM	Cooperative Awareness Message

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