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Intelligent transport systems — Cooperative ITS — ITS station facilities for the transfer of information between ITS stations

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National foreword

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Intelligent transport systems - Cooperative ITS - ITS station facilities for the transfer of information between ITS stations (ISO/TS 17429:2017)

Systèmes intelligents de transport - ITS coopératifs - Fonctionnalités des stations ITS pour le transfert d'information entre stations ITS (ISO/TS 17429:2017)

Intelligente Transportsysteme - Kooperative Systeme - Profile zur Informationsverarbeitung und -übertragung zwischen ITS-Stationen für Anwendungen bezogen auf das Verkehrsinfrastruktur Management, zur Steuerung und Führung (ISO/TS 17429:2017)

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European foreword

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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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The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*.

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Introduction

ITS station units compliant with the ITS station reference architecture specified in ISO 21217 may engage in Cooperative ITS (C-ITS) activities involving data exchanges between ITS stations in a variety of roles. Such data exchanges include, but are not limited to:

— data collected by the roadside infrastructure and transmitted to traffic control centers, possibly after aggregation,

— roadside equipment configured from the control centers to process a given set of data or issue messages to vehicles,

— roadside events reported to control centers, and

— broadcast transmission of vehicle status and event messages (e.g. CAM) to nearby ITS stations.

An example of an ITS station unit engaged in a C-ITS activity is a roadside ITS station unit collecting traffic-related information generated by road sensors and/or by vehicle ITS station units. The collected data can often serve other purposes than the originally intended one. For example, the cooperative awareness message (CAM) from the ETSI C-ITS message set generated for traffic safety applications can be collected by roadside ITS station units for exploitation by traffic efficiency applications in traffic control centers (e.g. central ITS stations). The same information is thus used to improve road safety, as well as traffic efficiency and also to reduce greenhouse gas emissions.

The exploitation of such exchanges for purposes not initially intended is made possible once this exchange of information is performed in a standardized way through an ITS station facilities layer that is able to recognize messages from specific message sets (e.g. DATEX II, TPEG, C-ITS message sets) with data according to data object specifications from data dictionaries (e.g. the common ETSI data dictionary) and to forward them to applications which have an interest therein and have subscribed to the delivery of such message(s) and data. A Communication Profile Handler (CPH), a Facilities Services Handler (FSH) and a Content Subscription Handler (CSH) are defined in this Technical Specification to serve this purpose.

Outside of this Technical Specification, the commonly used term “message set” is used to indicate a collection of “messages” used in the exchange of information between peer ITS station units (see ISO/TS 17419). These messages are composed of structures sometime referred to as “data frames” and/or “data objects” which are in turn composed of objects called “data elements” (see SAE J2735). Herein, a slightly different lexicon is adopted. The term “data dictionary” is used to indicate a collection of “messages”, including “data object” from which the messages are composed. Thus, herein, “data objects” are synonymous with “data frames” and “data elements”. However, in this Technical Specification, the terms are used with the precise meaning to distinguish messages and data objects from which messages are constructed.

The functionalities specified in this Technical Specification include a Communication Profile Handler (CPH), a Facilities Services Handler (FSH), and a Content Subscription Handler (CSH). These functionalities are intended to enable, and be invoked by, technology-agnostic ITS applications and to facilitate the deployment of C-ITS applications that share information. In particular, these functionalities allow an application to

— specify a set of facilities layer services to be applied to its data units (ADUs),

— allow ITS station management to select the optimum communication profile (as a function of time) for any or all of its data flows, and

— publish information to and subscribe to information from a central repository (the CSH) in a standardized way that enables sharing of information between applications (the definition of C-ITS).

These functionalities provide a toolkit facilitating the specification of standards and the development of ITS applications [e.g. In-Vehicle Signage (ISO/TS 17425), Contextual Speed (ISO/TS 17426), Point of

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Interest, Probe Data, IVI, LDM synchronization, remote ITS station configuration, and ITS applications for freight, logistics, public transportation, etc.] complying with the set of Cooperative ITS standards.

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Intelligent transport systems — Cooperative ITS — ITS station facilities for the transfer of information between ITS stations

1 Scope

This Technical Specification specifies generic mechanisms enabling the exchange of information between ITS stations for applications related to Intelligent Transport Systems. It complies with the ITS station reference architecture (ISO 21217) and defines the following ITS station facilities layer functionalities:

— Communication Profile Handler (CPH);

— Content Subscription Handler (CSH);

— Facilities Services Handler (FSH).

These functionalities are used by ITS-S application processes (ITS-S-AP) to communicate with other ITS-S application processes and share information. These functionalities describe

— how lower-layer communication services assigned to a given data flow are applied to the service data units at the various layers in the communication protocol stack (CPH, see 6.2.3),

— how content from data dictionaries can be published and subscribed to by ITS-S application processes (CSH, see 6.2.5),

— how well-known ITS station facilities layer and management services can be applied to application process data units (FSH, see 6.2.4), relieving (ITS-S) application processes from having to implement these services on their own,

— how service access points (SAP) primitives specified in ISO 24102-3 are used,

— service primitives for the exchange of information between ITS-S application processes and the ITS station facilities layer (FA-SAP), and

— a set of communication requirements and objectives (profiles) using the methods defined in ISO/TS 17423 to select the level of performance (best effort or real-time, etc.), confidence and security (authentication, encryption, etc.) for information exchange between ITS stations, such as data provision, event notification, roadside configuration, map update.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 17419, *Intelligent transport systems — Cooperative systems — Classification and management of ITS applications in a global context*

ISO/TS 17423, *Intelligent transport systems — Cooperative systems — ITS application requirements and objectives for selection of communication profiles*

ISO 21217, *Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture*

ISO 24102-3, *Intelligent transport systems — Communications access for land mobiles (CALM) — ITS station management — Part 3: Service access points*

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