
**Intelligent transport systems —
Communications access for land
mobiles (CALM) — CoAP facility**

*Systèmes intelligents de transport — Accès aux communications des
services mobiles terrestres (CALM) — Équipements CoAP*

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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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

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

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Introduction

The set of International Standards that collectively refer to communications access for land mobile (CALM) focus on the specification of open interfaces regarding the functionality required by all relevant layers and entities of a Standard ITS station reference architecture.

These International Standards are designed to allow interoperable instantiations of ITS stations, which are based on the concept of abstracting applications and services from the underlying communication layers. This abstraction makes the ITS station architecture described herein ideally suited to the development and deployment of Cooperative ITS applications and services.

The set of CALM International Standards include specifications for security in ITS communications, ITS-S management, distributed ITS-S implementations, legacy communication media interfaces, legacy application interfaces and new communication interfaces specifically designed for ITS applications, such as those designed for safety of both life and property.

The fundamental advantage of the CALM concept with respect to traditional systems is the ability to support vertical handovers between the various media that can be included in a CALM system. Handover mechanisms are defined within the CALM architecture International Standard (ISO 21217), the CALM medium service access points International Standard (ISO 21218) and the CALM communication and station management International Standard (ISO 24102).

At network layer, CALM IPv6 networking ISO 21210 and CALM 6LoWPAN networking ISO 19079 determine the network protocols to support reachability at a global IPv6 address for Wireless Sensor Networks (WSNs) based on the IEEE 802.15.4 access medium.

CALM compliant networks (both in-vehicle and off-vehicle) are expected to interact with each other to seamlessly exchange information. This should be true also for information retrieved from WSN to be dispatched to any ITS-Station. As WSNs are largely based on low-cost Component of The Shelf (COTS), IETF has started the standardization of a set of protocols at network and facility layer suited for constrained devices (in terms of capability of processing, storage or communication) based on low-rate wireless personal area networks (LR-WPANs) technologies. An important candidate at application layer in this sense is the IETF Constrained Application Protocol (CoAP) (IETF RFC 7252), an optimized Representational State Transfer (REST) protocol built on top of the UDP transport protocol, and implementing a subset of HTTP specifications. This document specifies some facility protocols by leveraging the reachability of the WSN nodes guaranteed by the adoption of 6LoWPAN at the Network Layer, and describes how to use CoAP protocol specified by IETF in the context of C-ITS.

For a general introduction to CALM architecture, IPv6 networking and 6LoWPAN networking, the reader is referred to ISO 21217, ISO 21210 and ISO 19079, respectively.

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Intelligent transport systems — Communications access for land mobiles (CALM) — CoAP facility

1 Scope

This document describes the CoAP facilities between two or more ITS stations communicating over the global internet communication network.

It is assumed that the reader is familiar with IETF specifications found in request for comments (RFCs) of individual CoAP and 6LoWPAN protocol blocks used within this document. This document does not define a new protocol, a new exchange of messages at the CoAP layer, or new data structures. It defines how protocols standardized by IETF are combined so that ITS stations can communicate with one another using CoAP. Procedures defined to share information between the CoAP layer and other components of the ITS station architecture are defined in ISO 24102 series (Management). In addition to the requirements specified within this document, a number of notes and examples are provided to illustrate CoAP main facilities.

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 21217:2014, *Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture*

ISO 24102-6¹⁾, *Intelligent transport systems — Communications access for land mobiles (CALM) — ITS station management — Part 6: Path and flow management*

IETF RFC 6690, *The Constrained RESTful Environments (CoRE) Link Format*

IETF RFC 7252:2014, *The Constrained Application Protocol (CoAP)*

IETF RFC 7641, *Observing Resources in the Constrained Application Protocol (CoAP)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 19079, ISO 21210, ISO 21217, ISO 21218, ISO 24102-3 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at <http://www.electropedia.org/>

— ISO Online browsing platform: available at <http://www.iso.org/obp>

NOTE Most of the definitions are taken from IETF RFC 7252, IETF RFC 7228 and IETF RFC 6690.

3.1

ITS-S CoAP node

device/node that implements CoAP protocol

[SOURCE: IETF RFC 7252]

1) To be published.