
Cooperative intelligent transport systems (C-ITS) — Position, velocity and time functionality in the ITS station

*Systèmes de transport intelligents coopératifs (STI-C) –
Fonctionnalités de position, de vitesse et de temps dans la station STI*

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Foreword

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Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Context of C-ITS

This document is part of a family of deliverables from Standard Development Organizations (SDOs) for Cooperative Intelligent Transport Systems (C-ITS), a subset of standards for Intelligent Transport Systems (ITS).

ITS aims at improving surface transportation in terms of:

- **safety**, e.g. crash avoidance, obstacle detection, emergency call, dangerous goods;
- **efficiency**, e.g. navigation, green wave, priority, lane access control, contextual speed limits, car sharing;
- **comfort**, e.g. telematics, parking, electric vehicle charging, infotainment;

by applying information and communication technologies (ICT).

To support interoperability, C-ITS specifications are developed to exchange and share information within a given ITS application domain, or between ITS application domains.

C-ITS services are based on the exchange of data between vehicles of any category, the roadside and urban infrastructure (e.g. traffic lights, road tolls, variable message signs), control and services centres (e.g. traffic control centre, map providers), and other road users (e.g. pedestrians, cyclists).

Many ITS services require the cooperation of vehicles with their surrounding environment (e.g. other vehicles, other road users, roadside and urban infrastructure), whilst other services require connectivity to remote service platforms (e.g. road traffic control centres, map providers, service providers, fleet managers, equipment manufacturers).

In order to support:

- a large variety of C-ITS services with diverging requirements, and
- efficient sharing of information maintained by individual service applications,

it is necessary to combine multiple access technologies and communication protocols with distinct performance characteristics (communication range, available bandwidth, end-to-end transmission delay, quality of service, security, etc.).

Combining multiple access technologies and communication protocols requires a common approach to the way communications and data are managed in a secure way. A functional architecture (the ITS station architecture) has therefore been specified to manage security, communications and data related to C-ITS services.

For more detail on C-ITS, see the ITS station and communication architecture specified in ISO 21217, and the multi-part technical report CEN/TR 21186 providing guidelines on the usage of C-ITS; see also <https://www.itsstandards.eu/cits>.

Need for position, velocity and time (PVT) information in C-ITS

Many ITS services, particularly those where vehicles or other mobile devices such as smartphones are involved, require position, velocity and time (PVT) information. Such PVT information is needed for various purposes. It is notably used by navigation systems, any related ITS service where position is needed (e.g. car-sharing, taxi ride booking, fleet management), advanced driver assistance or automated driving systems. The information transmitted between ITS stations or between components of an ITS station can be required to be marked with position or time information (geo- or time stamping).

PVT-related information can originate from various sources, such as a global navigation satellite system or systems (GNSSs). Accuracy and reliability can be improved by usage of several sources, such as anti-spoofing flags used for GNSS signal authentication, inertial measurement units (IMUs), light detection