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Intelligent transport systems — Cooperative ITS

Part 10: Driver distraction and information display

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National foreword

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TECHNICAL REPORT

ISO/TR 17427-10

First edition
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Intelligent transport systems — Cooperative ITS —

Part 10: Driver distraction and information display

Systèmes intelligents de transport — Systèmes intelligents de transport coopératifs —

Partie 10: Distraction du conducteur et affichage des informations

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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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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*.

ISO 17427 consists of the following parts, under the general title *Intelligent transport systems — Cooperative ITS*:

— *Part 2: Framework Overview* [Technical Report]

— *Part 3: Concept of operations (ConOps) for 'core' systems* [Technical Report]

— *Part 4: Minimum system requirements and behaviour for core systems* [Technical Report]

— *Part 6: 'Core system' risk assessment methodology* [Technical Report]

— *Part 7: Privacy aspects* [Technical Report]

— *Part 8: Liability aspects* [Technical Report]

— *Part 9: Compliance and enforcement aspects* [Technical Report]

— *Part 10: Driver distraction and information display* [Technical Report]

The following parts are under preparation:

— *Part 1: Roles and responsibilities in the context of co-operative ITS architecture(s)*

— *Part 5: Common approaches to security* [Technical Report]

— *Part 11: Compliance and enforcement aspects* [Technical Report]

— *Part 12: Release processes* [Technical Report]

— *Part 13: Use case test cases* [Technical Report]

— *Part 14: Maintenance requirements and processes* [Technical Report]

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This Technical Report provides an informative 'driver distraction and information display aspects' for Cooperative Intelligent Transport Systems (*C-ITS*). It is intended to be used alongside ISO 17427-1, ISO/TR 17465-1 and other parts of ISO 17465, and ISO 21217. Detailed specifications for the application context will be provided by other ISO, CEN and SAE deliverables, and communications specifications will be provided by ISO, IEEE and ETSI.

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Introduction

Intelligent transport systems (*ITS*) are transport systems in which advanced information, communication, sensor and control technologies, including the Internet, are applied to increase safety, sustainability, efficiency, and comfort.

A distinguishing feature of '*ITS*' is its communication with outside entities.

Some *ITS* systems operate autonomously, for example, 'adaptive cruise control' uses radar/lidar/ and/or video to characterize the behaviour of the vehicle in front and adjust its vehicle speed accordingly. Some *ITS* systems are informative, for example, 'Variable Message Signs' at the roadside, or transmitted into the vehicle, provide information and advice to the driver. Some *ITS* systems are semi-autonomous in that they are largely autonomous but rely on 'static' or 'broadcast' data, for example, *GNSS* (2.5) based 'SatNav' systems operate autonomously within a vehicle but are dependent on receiving data broadcast from satellites in order to calculate the location of the vehicle.

Cooperative Intelligent Transport Systems (*C-ITS*) are a group of *ITS* technologies where service provision is enabled by, or enhanced by, the use of 'live', present situation related, dynamic data/information from other entities of similar functionality [for example, from one vehicle to other vehicle(s)], and/or between different elements of the transport network, including vehicles and infrastructure [for example, from the vehicle to an infrastructure managed system or from an infrastructure managed system to vehicle(s)]. Effectively, these systems allow vehicles to 'talk' to each other and to the infrastructure. These systems have significant potential to improve the transport network.

A distinguishing feature of '*C-ITS*' is that data are used across *application*/service boundaries.

It will be immediately clear to the reader that such systems present the possibility of driver *distraction* (2.4), both through visual overload (display presentation and visual or oral provision of information and/or via instructions or advice). The purpose of this Technical Report is to identify potential critical driver distraction and information display issues that *C-ITS* service provision may introduce, to consider how to control, limit or mitigate such issues.

Existing *rules* (2.12) govern the use of technology inside vehicles to reduce driver *distraction* (2.4). This Technical Report identifies and discusses how *C-ITS applications* may fit within these existing rules and discusses whether they may raise additional risks.

This Technical Report is a 'living document' and as our experience with *C-ITS* develops, it is intended that it will be updated from time to time, as and when we see opportunities to improve this Technical Report.

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TECHNICAL REPORT ISO/TR 17427-10:2015(E)

Intelligent transport systems — Cooperative ITS —

Part 10: Driver distraction and information display

1 Scope

The scope of this Technical Report is, as an informative document, to identify potential critical driver *distraction* (2.4) and information display issues that *C-ITS* service provision may introduce, to consider strategies for how to identify, control, limit or mitigate such issues. The objective of this Technical Report is to raise awareness of and consideration of such issues and to give pointers, where appropriate, to existing standards deliverables that provide specifications for all or some of these aspects. This Technical Report does not provide specifications for solutions of these issues.

Existing *rules* (2.12) govern the use of technology inside vehicles to reduce driver distraction.

NOTE The issues of driver *distraction* (2.4) and information display affect the design of all aspects of *C-ITS* service provision and are a critical factor in *C-ITS* system design and instantiation. However, while the general issues that affect *C-ITS* system design and implementation and related issues of what and how data in a *C-ITS* assisted *application service* provides and is realized and is therefore developed within ISO TC 204/CEN TC 278, most of the detailed aspects of physical presentation and human factors within the vehicle are standardized within ISO TC 22.

2 Terms and definitions

2.1
application
software application

2.2
application service
service provided by a service provider accessing data from the *IVS* (2.7) within the vehicle in the case of C-ITS, via a wireless communications network, or provided on-board the vehicle as the result of software (and potentially also hardware and firmware) installed by a service provider or to a service provider's instruction

2.3
cooperative ITS
C-ITS
group of ITS technologies where service provision is enabled, or enhanced by, the use of 'live', present situation related, data/information from other entities of similar functionality [for example, from one vehicle to other vehicle(s)], and/or between different elements of the transport network, including vehicles and infrastructure (for example, from the vehicle to an infrastructure managed system or from an infrastructure managed system to vehicle(s))

2.4
distraction
something that draws the attention of a driver away from the driving task and/or divides or confuses the attention of the driver

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2.5
global navigation satellite system
GNSS
several networks of satellites that transmit radio signals containing time and distance data that can be picked up by a receiver, allowing the user to identify the location of its receiver anywhere around the globe

2.6
guideline
principle put forward to set standards or determine a course of action; usually, but not always, as a recommendation or advice without the requirement of law but adherence to published guidelines may in some circumstances become a requirement of a regulation

2.7
in-vehicle system
IVS
hardware, firmware and software on-board a vehicle that provides a platform to support C-ITS service provision, including that of the *ITS-station* (2.9) (ISO 21217), the facilities layer, data pantry and on-board 'apps'

2.8
intelligent transport systems
ITS
transport systems in which advanced information, communication, sensor and control technologies, including the Internet, are applied to increase safety, sustainability, efficiency, and comfort

2.9
ITS-station
ITS-s
entity in a communication network [comprised of *application* (2.1), facilities, networking and access layer components] that is capable of executing ITS-S application processes, comprised of an ITS-S facilities layer, *ITS-S* networking and transport layer, *ITS-S* access layer, ITS-S management entity and ITS-S security entity, which adheres to a minimum set of security principles and procedures so as to establish a level of trust between itself and other similar ITS stations with which it communicates

2.10
jurisdiction
government, road or traffic authority which makes and enforce *regulations* (2.11)

EXAMPLE Country, state, city council, road authority, government department (customs, treasury, transport), etc.

2.11
regulation
order issued by a jurisdiction having the force of law

2.12
rule
authoritative *regulation* (2.11) or direction concerning method or procedure, as for a court of law, legislative body, game, or other human institution or activity, especially any body which may exert control (e.g. an employer, a jurisdiction, a school, etc.)

3 Abbreviated terms

C-ITS cooperative intelligent transport systems, cooperative ITS

ESOP European statement of principles

IHRA International Harmonized Research Activities

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ITS intelligent transport systems (2.8)

IVS in-vehicle system (2.7)

NHTSA (US) National Highways Traffic Safety Administration

TR technical report

4 How to use this Technical Report

4.1 Acknowledgements

Much of the inspiration for this Technical Report and its considerations and content originate from the reports *"Cooperative ITS Regulatory Policy Issues"* and *"Cooperative Intelligent Transport Systems Policy Paper"* National Transport Commission, Australia. This source is acknowledged and thanked.[1][17]

Contribution from the EC project AIDE is acknowledged.

Contribution from various documents made available by UN-ECE (Nations Economic Commission for Europe) WP.29 is acknowledged and including contributions from US NHTSA.

See Bibliography for further details.

4.2 Guidance

This Technical Report is designed to provide guidance and a direction for those considering the issues concerning driver distraction and information display associated with the deployment of *C-ITS* service provision. It does not purport to be a list of all potential driver *distraction* (2.4) and information display factors which will vary according to the *application* (2.1) service being provided, the regime of the *jurisdiction* (2.10), the location of the instantiation, and to the form of the instantiation, nor does it provide definitive specification. Rather, this Technical Report discusses and raises awareness of the major driver distraction and information display issues to be considered and provides guidance and direction for considering and managing driver distraction and information display in the context of future and instantiation specific deployments of *C-ITS*.

4.3 ITS and 'driver distraction and information display'

Driver *distraction* (2.4) has become an increasing concern amongst road safety experts, with the increasing range of technologies within vehicles creating the potential for drivers to have their attention taken away from the driving task. *C-ITS* has the potential to create further distractions if not implemented appropriately.

Distraction (2.4) is when drivers divert their attention away from the driving task to focus on another activity instead. Distraction can come in several ways:[14][1]

— visual – eyes off the road (or focusing on the wrong part);

— manual – hands off the wheel;

— cognitive – mind off the road;

— biomechanical – requiring action on the part of the driver.

C-ITS have the potential to increase safety and, for example, collision warning systems will be designed to only notify a driver by exception (i.e. an alarm would be generated only when a crash was likely and the driver needed to take evasive action). These alarms should therefore not affect the general driving task the majority of time. However, designers will need to be careful to ensure that such warning alarms are sufficiently intuitive that drivers immediately know what to do; poorly designed alarms could decrease safety if they divert attention from the immediate risk or create confusion.

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