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Intelligent transport systems — Information interface framework between automated driving systems and users

Systèmes de transport intelligents — Cadre d'interface d'information entre les systèmes de conduite automatisée et les utilisateurs

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Foreword

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This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems.*

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.

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Introduction

Automated driving systems (ADS), which are expected to become increasingly popular in the future, can need to convey situation-specific information to or from users.

For example, when it becomes necessary to lower the level of driving automation or cancel it for a given reason, it is important to notify the user of this change and to prompt the user to monitor the surroundings or take a certain action. Additionally, when the system executes a certain function, it can be necessary for the user to confirm the intention.

ADS can receive supplementary information from users through nomadic devices (if these are paired to the ADS) in addition to onboard devices. As users of ADS level 3 or higher are allowed to use certain nomadic devices (such as smartphones) to perform secondary tasks while in the driver seat, a problem can potentially arise where the ADS needs to inform the user of a critical message through a nomadic device currently being used.

Examples of information exchanged between the ADS and the user include:

— ADS prompting action by the user;

— ADS informing the user about the need for action in the near future;

— ADS informing the user about a change in operational status;

— user's nomadic device informing ADS about the user's current condition.

NOTE 1 The user is primarily the person sitting in the driver's seat, but also includes the passengers in a driverless vehicle.

This document provides a review of ideas and policies on this subject that have gained international consensus. Information to be provided to the user is stratified and aspects such as priority and content are described. Within each classification, this document defines information attributes.

A primary classification of notifications to users is based on two broad criteria, which lead to differences in the type of information provided to users:

a) degree of safety criticality: the user needs to take action or provide a response, the user needs to be aware of a change, or user information is provided only for comfort or convenience;

b) time criticality.

ISO/SAE PAS 22736 discusses relevant terminology definitions as well as important concepts concerning ADS design.

NOTE 2 Several documents have been published concerning an ergonomic approach to transport information and control systems. See References [2], [3], [4] and [5].

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Intelligent transport systems — Information interface framework between automated driving systems and users

1 Scope

This document describes the classification of notifications provided to and from users and automated driving systems (ADS) of level 3 or higher.

This document does not include recommendations on how to provide information.

This document also includes information on transmission between nomadic devices and ADS in the context where the user is concentrating on a device such as a smartphone, and the smartphone is able to monitor the user's condition.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Abbreviated terms

ADS automated driving system

DDT dynamic driving task

ODD operational design domain

FRU fallback ready user

MRM minimal risk manoeuvre

MRC minimal risk condition

5 System image

While the ADS system is used at automated level 3 or higher, the system asks the driver to take the wheel or perform some action, such as when the system is about to exit the ODD. In such cases ADS conveys some information or messages to users to prompt them for appropriate actions.

For notifications, it selects a means of transmission according to its purpose and considers the degree of importance/urgency and whether there is a user action request. In such cases, prompting messages are conveyed through various onboard visual, acoustic and haptic devices such as an instrument panel or navigation display.

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