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Road vehicles — Steer-by-wire systems — System safety guidelines

Véhicules routiers — Systèmes de direction électronique — Lignes directrices sur la sécurité du système

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Foreword

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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 document 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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This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 33, *Vehicle dynamics, chassis components and driving automation systems testing*.

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

Steer-by-Wire (SbW) systems represent the next generation of technology in vehicle steering. They enable new interior concepts and pave the way for further innovations in vehicle technology. In the context of automated driving, mechanical decoupling between the steering wheel and the steered wheels is becoming increasingly important. To date, there is no experience of widespread use of this technology in the market for large-series passenger cars.

Compared to conventional steering systems, SbW technology results in additional requirements for the safety concept of the vehicle for safe operation.

This document represents a description of a minimal set of safety aspects developed by vehicle manufacturers and system suppliers.

This document considers:

— the description and system boundary of an SbW system,

— basic safety goals,

— general availability requirements,

— requirements for controllability in the event of a first fault, and

— requirements for the operational behaviour after a fault event.

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Road vehicles — Steer-by-wire systems — System safety guidelines

1 Scope

This document specifies necessary but not sufficient safety requirements for the use of SbW systems in passenger cars and light commercial vehicles for series application.

This document does not replace the full application of the ISO 26262 series of standards and their implementation in safety-related measures.

This document defines requirements for manual driving where the driver holds the steering wheel.

NOTE Misuse of hands-free driving is not considered.

This document does not contain any requirements for the use of automated lateral vehicle control functions.

The requirements consider systems consisting of a road wheel actuator (RWA), hand wheel actuator (HWA), and a steering wheel for driver input. Deviating concepts need to be analysed by the user for transferability.

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 15037-1:2019, *Road vehicles — Vehicle dynamics test methods — Part 1: General conditions for passenger cars*

ISO 15037-1, *Road vehicles — Vehicle dynamics test methods — Part 1: General conditions for passenger cars*

ISO 26262-1, *Road vehicles — Functional safety — Part 1: Vocabulary*

ISO 26262-3, *Road vehicles — Functional safety — Part 3: Concept phase*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 26262-1 and the following apply.

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/

3.1
degradation
degradation stage
DEG
operating conditions of the vehicle within the framework of the *degradation concept* (3.2)

Note 1 to entry: Due to the operating condition of the steering system or supporting systems, a degradation condition can lead to restrictions in the use of the vehicle, e.g. speed limitations. Normal operation N is treated as degradation condition in this document.

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