PD ISO/SAE PAS 22736:2021



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Taxonomy and definitions for terms related to driving automation systems for on-road motor vehicles

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee AUE/15, Safety related to vehicles.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Published by BSI Standards Limited 2021

ISBN 978 0 539 19104 2

ICS 01.040.35; 35.240.60; 03.220.20; 01.040.03

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This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 October 2021.

Amendments/corrigenda issued since publication

Date	Text affected

PD ISO/SAE PAS 22736:2021

PUBLICLY AVAILABLE SPECIFICATION

ISO/SAE PAS 22736

First edition
2021-08

Taxonomy and definitions for terms related to driving automation systems for on-road motor vehicles

Taxonomie et définitions des termes relatifs aux systèmes de conduite automatisée des véhicules routiers à moteur

Reference number
ISO/SAE PAS 22736:2021(E)

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Foreword

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This document was jointly prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*, and SAE *On-Road Automated Driving Committee, Definitions Task Force*.

This document and its counterpart document published by SAE (SAE J3016 APR2021) are technically equivalent. The only difference between the documents is the standard number and name and minor editorial elements.

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. Alternatively, to provide feedback on this document, please visit https://www.sae.org/standards/content/j3016_202104/.

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PUBLICLY AVAILABLE SPECIFICATION **ISO/SAE PAS 22736:2021(E)**

Taxonomy and definitions for terms related to driving automation systems for on-road motor vehicles

1. SCOPE

This document describes [motor] *vehicle driving automation system*s that perform part or all of the *dynamic driving task* (*DDT*) on a *sustained* basis. It provides a taxonomy with detailed definitions for six levels of *driving automation*, ranging from no *driving automation* (Level 0) to full *driving automation* (Level 5), in the context of [motor] *vehicles* (hereafter also referred to as "*vehicle*" or "*vehicles*") and their *operation* on roadways:

Level 0: No Driving Automation

Level 1: Driver Assistance

Level 2: Partial Driving Automation

Level 3: Conditional Driving Automation

Level 4: High Driving Automation

Level 5: Full Driving Automation

These level definitions, along with additional supporting terms and definitions provided herein, can be used to describe the full range of *driving automation features* equipped on [motor] *vehicles* in a functionally consistent and coherent manner. "On-road" refers to publicly accessible roadways (including parking areas and private campuses that permit public access) that collectively serve all road *users*, including cyclists, pedestrians, and *users* of *vehicles* with and without *driving automation features*.

The levels apply to the *driving automation feature*(s) that are engaged in any given instance of on-road *operation* of an equipped *vehicle*. As such, although a given *vehicle* may be equipped with a *driving automation system* that is capable of delivering multiple *driving automation features* that perform at different levels, the level of *driving automation* exhibited in any given instance is determined by the *feature*(s) that are engaged.

This document also refers to three primary actors in driving: the (human) *user*, the *driving automation system*, and other *vehicle* systems and components. These other *vehicle* systems and components (or the *vehicle* in general terms) do not include the *driving automation system* in this model, even though as a practical matter a *driving automation system* may actually share hardware and software components with other *vehicle* systems, such as a processing module(s) or *operating* code.

The levels of *driving automation* are defined by reference to the specific role played by each of the three primary actors in performance of the *DDT* and/or *DDT fallback*. "Role" in this context refers to the expected role of a given primary actor, based on the design of the *driving automation system* in question and not necessarily to the actual performance of a given primary actor. For example, a *driver* who fails to monitor the roadway during engagement of a Level 1 adaptive cruise control (ACC) system still has the role of *driver*, even while s/he is neglecting it.

Active safety systems, such as electronic stability control (ESC) and automatic emergency braking (AEB), and certain types of *driver* assistance systems, such as lane keeping assistance (LKA), are excluded from the scope of this *driving automation* taxonomy because they do not perform part or all of the *DDT* on a *sustained* basis, but rather provide momentary intervention during potentially hazardous situations. Due to the momentary nature of the actions of *active safety systems*, their intervention does not change or eliminate the role of the *driver* in performing part or all of the *DDT*, and thus are not considered to be *driving automation*, even though they perform automated functions. In addition, systems that inform, alert, or warn the *driver* about hazards in the driving environment are also outside the scope of this *driving automation* taxonomy, as they neither automate part or all of the *DDT*, nor change the *driver*'s role in performance of the *DDT* (see 8.13).

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