

Behaviour taxonomy for automated driving system (ADS) applications – Specification

January 2025 Version 1



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Foreword

This BSI Flex was sponsored by the Centre for Connected and Autonomous Vehicles (CCAV). Its development was facilitated by BSI Standards Limited and it was released under licence from The British Standards Institution. It came into effect on 31 January 2025.

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The content in this version is part of an iterative process. It is likely to change from time to time with subsequent iterations.

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BSI Flex 1891 v1.0 is part of BSI's CAM Standards Programme sponsored by the Centre for Connected and Autonomous Vehicles (CCAV). The CAM standards programme focusses on engaging with the UK CAM industry and developing standards for the safe development and deployment of self-driving vehicles.

Information about this document

This is Version 1 of BSI Flex 1891, which has been released to enable stakeholders to engage with the initial content and feedback comments. All comments received will be reviewed to inform the future direction of this document. However, at present there are no plans to develop further versions. Interested parties are encouraged to check the BSI website for updates regarding any future plans.

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Presentational conventions

The provisions of this BSI Flex are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the *Shorter Oxford English Dictionary* is used (e.g. “organization” rather than “organisation”).

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Particular attention is drawn to the following specific regulation:

- Automated Vehicles Act 2024 [1]

0 Introduction

0.1 Understanding behaviour and its interplay with safety of automated driving system (ADS)

For the safe and secure operation of an automated driving system (ADS), an ADS needs to execute its behaviour within its defined operational design domain (ODD). In the foreseeable future, an ADS equipped vehicle will need to navigate around a variety of other actors that exhibit their own behaviours.

In order to perform safety assurance of the ADS' behaviour in such a heterogeneous environment, it is essential to define expected behaviour of the ADS equipped vehicle and of other actors. To do this in an objective manner, it is essential to have a taxonomy for behaviour.

Two key aspects of scenario-based testing are scenario generation and scenario coverage. Both scenario generation and scenario coverage are underpinned by the ADS' ODD and behavioural competencies.

ISO 34503 mentions that understanding the desired behaviour of an ADS (i.e. its behavioural competencies together with the ODD) leads to the content for the scenarios to be tested. Each scenario includes an aspect of behavioural competency to be tested in a particular ODD condition.

ADS testing can be conducted at multiple levels, e.g. on-road testing, test-track testing simulation testing. These tests are underpinned by the ADS's ODD, behavioural competencies and other actor behaviours.

0.2 Relationship with other existing standards and guideline documents

The definitions for ODD and behavioural competency have been established in various international standards and guideline documents. ISO 34503 provides requirements for the specification of a taxonomy for an ODD, along with structured natural language specification for an ODD. *ASAM OpenODD* (in development¹⁾) is focussing on providing a programmatic language for an ODD for use in simulation activities including simulation-based testing of ADS. *ASAM OpenLABEL V1.0.0* [2] provides an initial list of manoeuvres, as labels for scenarios.

ISO 34502 provides guidance on the use of ODD and behavioural competencies as part of the scenario generation process for scenarios-based testing of an ADS.

The UNECE GRVA 18-50e [3] document provides an indication of how ADS may be regulated including use of ODD and behavioural competencies as part of the wider safety assurance process of an ADS.

¹⁾ More information available at: <https://www.asam.net/standards/detail/openodd/>

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1 Scope

This BSI Flex provides requirements for a hierarchical taxonomy of behaviours for an automated driving system (ADS), other road actors, and associated behavioural competencies within a defined operational design domain (ODD) to enable safe on-road deployment of an ADS.

The behaviours are defined as one or more of signalling, positioning, and manoeuvre aspects of the actors.

The behavioural competencies are defined as one or more of situation awareness, signalling, positioning and manoeuvre aspects of the ADS.

This BSI Flex also provides a structure/format for defining a behavioural competency for an ADS using the behaviour taxonomy definitions.

This BSI Flex is applicable to Level 3, Level 4 and Level 5 ADS.

NOTE 1 *More information on Level 3, Level 4 and Level 5 ADS is given in ISO/SAE PAS 22736.*

NOTE 2 *This BSI Flex might also be relevant for Level 1 and Level 2 advanced driver assistance systems (ADAS).*

This BSI Flex is intended for organizations and developers of Level 3 and Level 4 ADS, test houses and approval agencies.

NOTE 3 *This BSI Flex primarily supports applications on public roads, however it can be used as guidance for controlled environments in the absence of relevant standards.*

It might also be of interest to insurers, regulators, operators, and national, local and regional government to enable them to understand possible ADS deployments and capabilities.

This BSI Flex does not cover:

- the selection of behaviours and behavioural competencies to develop a scenario;
- data logging;
- remote operation; or
- test procedures of the ADS response to behaviours.