

PAS 1883:2020

Operational Design Domain (ODD) taxonomy for an automated driving system (ADS) – Specification



Centre for Connected
& Autonomous Vehicles

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Contents

Foreword	ii
Introduction	iv
1 Scope	1
2 Normative references	1
3 Terms, definitions, and units	2
4 ODD requirements and application	4
5 ODD taxonomy	5
Annexes	
Annex A (informative) Examples of ODD definitions	12
Bibliography	18
List of figures	
Figure 1 – Top level taxonomy with ODD attributes	5
Figure 2 – Drivable area geometry configurations	7

Foreword

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Acknowledgement is given to Siddhartha Khastgir of WMG, University of Warwick, as the technical author, and the following organizations that were involved in the development of this PAS as members of the steering group:

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Relationship with other publications

PAS 1883 has been developed as part of a wider programme sponsored by CCAV in conjunction with the Department for Transport (DfT), Innovate UK and Zencic. This PAS is for use by various stakeholders to define the Operational Design Domain (ODD) of the automated driving system (ADS). The ODD definition is an essential step in defining the safe and legal operation of the ADS and in the development of the safety case for the ADS. This PAS, therefore, facilitates the implementation of PAS 1880 and PAS 1881.

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The provisions of this PAS 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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In particular, attention is drawn to the following specific regulations:

- The Road Traffic Regulation Act 1984 [1];
- The Road Vehicles (Construction and Use) Regulations 1986 [2];
- The Road Traffic Act 1988 [3];
- The General Data Protection Regulation [4];
- The Data Protection Act 2018 [5];
- The Automated and Electric Vehicles Act 2018 [6]; and
- The Road Vehicles (Approval) Regulations 2009 [7].

Introduction

The move towards an automated driving system (ADS) is being driven by the many potential benefits of the technology, such as increased safety, reduced traffic congestion, lowered emissions and potentially increased mobility for those unable to drive. In order to realize these benefits, it is essential that the ADS technology is introduced safely.

There has been significant industry and UK government investment in the development of automated vehicle technology, demonstrating the UK's intention of becoming a leader in this field. The UK government is committed to:

- ensuring that the introduction of an ADS for testing/trialling purposes and for commercial operations is done safely, securely and legally; and
- building public and consumer trust and acceptance of the technology.

A key aspect of the safe use of automated vehicle technology is defining its capabilities and limitations and clearly communicating these to the end user, leading to a state of "informed safety". The first step in establishing the capability of an ADS is the definition of its Operational Design Domain (ODD). The ODD represents the operating environment within which an ADS can perform the dynamic driving task (DDT) safely and this PAS focuses on a taxonomy for the definition of the ODD for a given ADS.

It is intended that this PAS is read in conjunction with PAS 1880, which describes how the control system design in an ADS is influenced by the ODD definition, and PAS 1881, which specifies requirements for safety cases for automated vehicle trials and development testing, and which outlines the relationship between the ODD definition and the safety case requirements. Test scenarios used for the evaluation of the ADS as part of the safety evidence may be derived from the ODD definition of the ADS.

The ODD taxonomy specified in this PAS for the ODD definition will enable ADS manufacturers to specify and implement minimum safety requirements in their designs, and allow end users, operators and regulators to reference a minimum set of ODD attributes and performance requirements in their procurements. It will also enable ADS manufacturers, developers and suppliers of components and subcomponents to define the operating capability and assemble sets of evidence that will improve confidence in the safety of the resulting product (such as component specifications) and in the data obtained from appropriate test and verification activities.

While there are a number of different testing and trialling environments within the UK, with varying levels of controllability, this PAS provides a generic taxonomy for defining all environments where an ADS is being tested, trialled or deployed.

1 Scope

This PAS provides requirements for the minimum hierarchical taxonomy for specifying an Operational Design Domain (ODD) to enable the safe deployment of an automated driving system (ADS). The ODD comprises the static and dynamic attributes within which an ADS is designed to function safely.

This PAS is applicable to Level 3 and Level 4 ADS.

NOTE 1 For more information on Level 3 and Level 4 ADS see SAE J3016:2018.

NOTE 2 This PAS may also be relevant for Level 1 and Level 2 ADS.

This PAS is intended for trialling organizations developing safety cases for automated vehicle trials and testing, manufacturers and developers of Level 3 and Level 4 ADS and suppliers of components and subcomponents.

This PAS is also of interest to insurers, regulators, service providers, and national, local and regional government to enable them to understand possible ADS deployments and capabilities.

This PAS does not cover:

- the basic test procedures for attributes of the ODD;
- the monitoring requirements of the ODD attributes; and
- the format of the ODD definition.

2 Normative references

There are no normative references in this PAS.