

## **WMG and international experts developed the foundational ISO standard for the safety of self-driving vehicles**

A new international standard has been published laying the foundations for safe deployment of self-driving vehicles by creating a common approach to define the operating conditions of self-driving vehicles, which is also known as the Operational Design Domain (ODD) (i.e., operating conditions).

Led by Professor Siddhartha Khastgir from WMG, University of Warwick, UK, and supported by an international group of experts, the very first international standard for safe operation of self-driving vehicles, [Road Vehicles – Test scenarios for automated driving systems – Specification for operational design domain – ISO 34503](#), has been published. This standard will be relevant to every self-driving vehicle developed and manufactured anywhere in the world. The new standard is based on BSI PAS 1883, developed by BSI the UK National Standards Body.

In simplistic terms, ODD is a definition of where your self-driving vehicle is going to operate. This standard provides specifications for defining these operating conditions in a common manner.

The standard classifies ODD into three key categories:

- Scenery elements: non-movable elements (e.g., roads, bridges, traffic lights),
- Environment conditions: weather and other atmospheric conditions; and
- Dynamic elements: all movable objects and actors.

The importance of the concept of ODD is highlighted in the latest European Union's Act on Automated Driving System (adopted in Aug 2022) which puts the concept of ODD as a cornerstone of the safety assurance process of an automated vehicle. Similar approaches are being considered at the upcoming regulations at United Nations Economic Commission for Europe.

This international standard is a big step to facilitate the commercialisation of self-driving vehicles in a wider global society while also safeguarding the safety of this emerging technology. International organisations and local governments or regulatory agencies can use this standard as a guide to develop their regulations and policies on self-driving vehicles. Autonomous vehicle developers and manufacturers around the world can now design and test their technology based on internationally aligned safety benchmarks, create accurate marketing and communication materials, and build societal trust in the technology.

WMG in collaboration with BSI committee AUE/15 Safety related to vehicles, worked with global partners in countries such as United States, Germany, Japan, China, France, Austria, Canada, Israel, Sweden, Finland, South Korea, Australia, to develop and finalise the ISO standard for the safety of automated vehicles.

### **Professor Siddhartha Khastgir, Head of Verification & Validation, Intelligent Vehicles said:**

*“Defining the Operational Design Domain is the first step in designing a safe self-driving vehicle. Furthermore, due to the diversity in stakeholders in this ecosystem (e.g., developers, regulators, local authorities etc.), it is essential we have a common way to define such a fundamental concept of safety.*

*“Successful standardisation efforts are only possible with true international collaboration. I am grateful to experts from various countries worldwide who have engaged and contributed actively to this standard. I am pleased to see more efforts kick-starting which building on the concept of ODD and this standard.”*

This standardization activity is underpinned by strong research outcomes from the CCAV and Innovate UK funded OmniCAV research project by WMG; and also, by the research conducted as part of Professor Khastgir's UKRI Future Leaders Fellowship.

**Nick Fleming, Associate Director, Transport and Mobility, BSI said:**

*"It's exciting to see the launch of this new international standard, given the potential benefits that can be realized by testing automated vehicles so they can operate safely on our roads. Having a common language to describe the Operational Design Domain (ODD) of an automated vehicle, with the ODD effectively describing the environment and conditions that an automated vehicle is capable of operating in, will be valuable to test and deploy these vehicles safely."*

*"This new ISO standard has been inspired by the UK document, BSI PAS 1883:2020, the first taxonomy for ODDs developed in conjunction with UK experts and the government's Centre for Connected and Automated Vehicles (CCAV)."*

*"BSI would like to thank Professor Khastgir for his effort in helping to lead this work at the international level which, along with BSI PAS 1883, shows the leadership the UK is having in the development of global standardization for automated or self-driving vehicles."*

**Dr Biagio Ciuffo, Project Leader, Connected, Automated and Smart Mobility, European Commission Joint Research Centre, said:**

*"ODD is fundamental to any approval process of Automated Driving Systems, as illustrated in the EU ADS Act 2022. From scenario generation to safety thresholds for automated driving, everything is derived from ODD. As a result, it becomes crucial to have a robust and a common way to define ODD. ISO 34503 publication is extremely timely as the industry has matured and this standard provides guidance to both developers and authorities on implementing the EU regulation, thus enabling real-world deployment. Congratulations to Siddartha and the team for championing the ODD concept and on the publication of this international standard".*

**Sarah Gates, Director of Public Policy at Wayve, said:**

*"We're pleased to see the launch of this new international standard. The concept of ODDs is the basis of deploying self-driving vehicles safely. A common way of describing ODDs across industry is therefore vital for creating the highest safety standards, bolstering public trust and supporting the regulatory frameworks required to commercially deploy self-driving technology on a global scale."*

*"We look forward to continuing to work closely with WMG to ensure that safety standards for self-driving technology are rigorous, and to increase confidence in the exciting technology we're developing here at Wayve, which will unlock a safer, smarter and more sustainable transport system."*

ISO 34503 was developed by ISO technical committee ISO/TC 22/SC 33 Vehicle dynamics, chassis components and driving automation systems testing.

It can be purchased from your national standardisation body or through the [ISO Store](#).

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## **About WMG**

WMG is an academic department at the University of Warwick and is the leading international role model for successful collaboration between academia and the public and private sectors, driving innovation in science, technology and engineering, to develop the brightest ideas and talent that will shape our future. WMG is one of the seven UK High Value Manufacturing Catapult centres, leveraging research expertise to help drive innovation in UK manufacturing. [www.warwick.ac.uk/fac/sci/wmg](http://www.warwick.ac.uk/fac/sci/wmg)

### **NOTE TO EDITORS:**

Link to ISO 34503: <https://www.iso.org/standard/78952.html>

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Images:



(Photo caption: Some of the international experts of ISO TC 22 SC33 WG9 from Japan, Germany, China, UK, Finland, the Netherlands who contributed to the creation of ISO 34503.



(Photo caption: A variety of ODD conditions for self-driving vehicle)