BSI Connected and automated vehicles – Vocabulary
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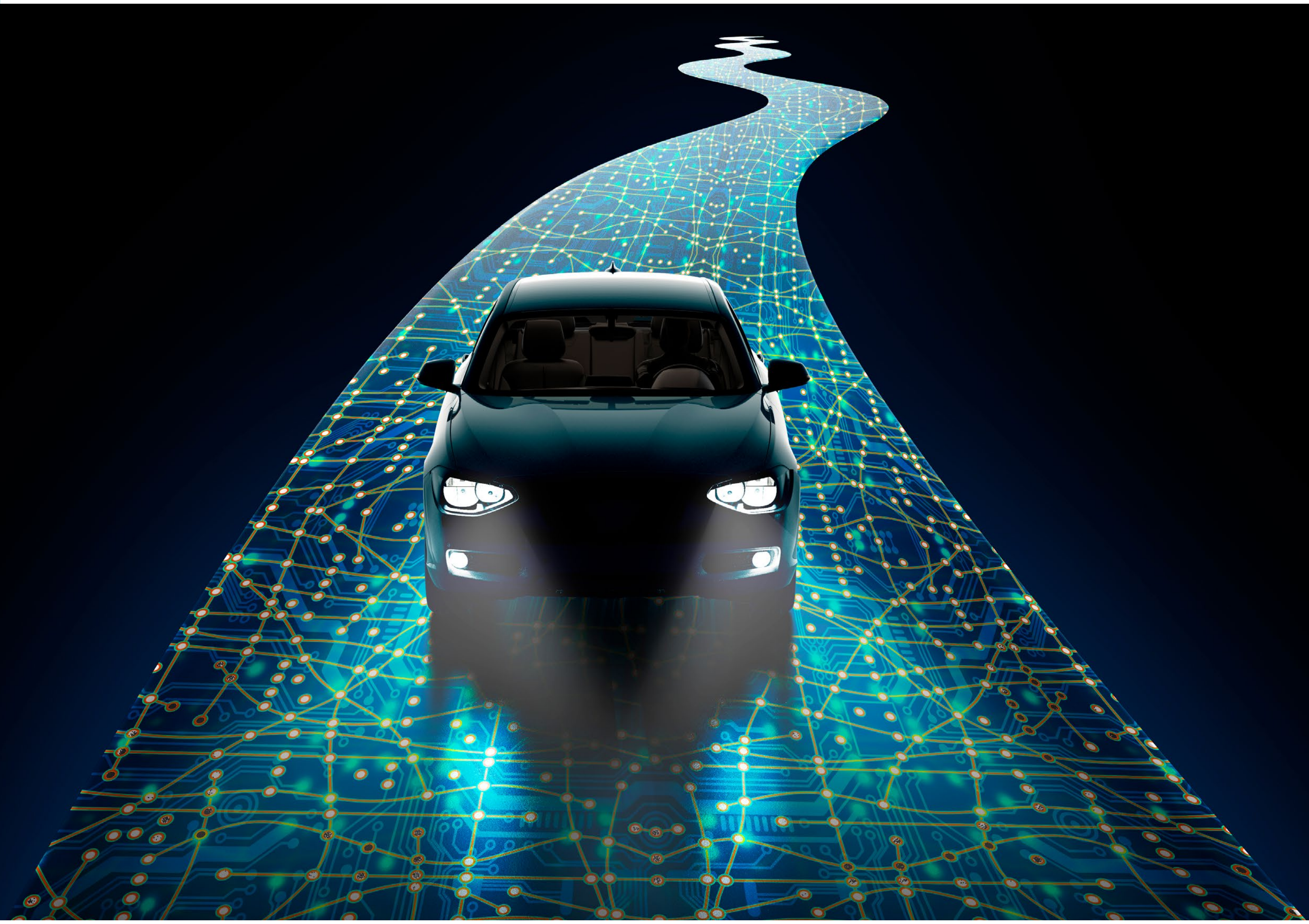

Centre for Connected & Autonomous Vehicles

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Contents

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Foreword

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Acknowledgement is given to Nick Reed, Reed Mobility, as the technical author.

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Use of this document

As a vocabulary, this BSI Flex takes the form of terms and definitions. These terms and definitions are derived from a variety of sources. Please note that the content in this release is part of an iterative process and changes from time to time with subsequent iterations.

Relationship with other publications

This document is part of a two-year Connected and Automated Vehicles programme which aims to develop a suite of technical standards and guidance to help promote the design, testing and safe deployment of automated vehicles on UK roads. This document is issued as a vocabulary document that underpins the suite of CAV-related publications. It is intended to be read in conjunction with:

- publications on system safety, including PAS 1880, PAS 1881, PAS 1883 and PAS 11281;
- publications on safety-critical data, including PAS 1882;
- safety and stakeholder requirements, including the Department for Transport's Code of practice: Automated vehicle trialling, Transport for London's Connected and autonomous vehicles: Guidance for London trials, and Highways England's GG104: Requirements for safety risk assessment; and
- existing legislation for UK vehicles and roads.

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Introduction

This document has been created in response to industry calls for a consistent, reliable set of terms and definitions in the Connected and Automated Vehicles (CAV) sector. It has been developed via a new iterative method, which relies on a team of industry experts working virtually to agree on content to release to the marketplace quickly. This method permits a rapid response to industry changes and can result in the release of several document iterations a year.

Therefore, by its nature, the content released in the iteration of this document will change from time to time with subsequent iterations. Offered as a free-to-use central resource, this document is intended to supplement and support other related BSI PAS projects including PAS 1880, 1881 and 1883. Every attempt has been made to incorporate terms already defined within related BSI publications.

This content has undergone technical review, a consensus building process and public consultation. All subsequent versions will go through this review process.

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1 Scope

This document defines terms, initialisms and acronyms for the connected and automated vehicle (CAV) sector, focused on those relating to vehicles and associated technologies.

It covers terms relating to connectivity and automation of roadgoing, land-based vehicles and their users. It does not cover terms that are manufacturer-specific.

This document is for use by insurers, regulators, legislators and organizations involved in CAV infrastructure, as well as CAV manufacturers and consumers.

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2 Terms, definitions, initialisms and acronyms

2.1 Terms and definitions

2.1.1 active safety system

entity consisting of interdependent components that uses sensor input and processing to detect impending collisions and takes preventative or mitigating action

*NOTE Preventative action may take the form of providing an advanced warning or providing the human driver with assistance in vehicle (**2.1.60**) control; for example, by applying the brakes*

2.1.2 adaptive cruise control (ACC)

system that attempts to maintain the vehicle (**2.1.60**) at a driver-selected target speed and following distance, using sensors and automation to regulate vehicle speed

NOTE 1 The purpose is to keep a safe distance relative to other slower moving vehicles ahead before reverting to the set speed when the lane clears

NOTE 2 Some early adaptive cruise control systems, especially those vehicles with manual transmission, are not capable of bringing the vehicle to a complete stop and require the human driver to intervene to do so. Systems that are capable of controlling the vehicle to a stop have a variety of additional names such as 'Stop & Go'.

2.1.3 advanced driver assistance system (ADAS)

entity consisting of interdependent components that supports human drivers by performing a part of the dynamic driving task (**2.1.22**) or providing safety relevant information

NOTE Examples include adaptive cruise control (2.1.2) and automatic emergency braking.

2.1.4 automated driving

when the full function of the dynamic driving task (**2.1.22**) is performed by the automated driving system (**2.1.5**) within its operational design domain (**2.1.43**)

*NOTE 1 An automated vehicle (**2.1.8**) driving itself is performing automated driving.*

*NOTE 2 Automated driving may operate for some or all of a journey depending on the capabilities of the system, the suitability of infrastructure, any other constraints on its operational design domain (**2.1.43**) and the preferences of the user-in-charge (**2.1.58**)*

2.1.5 automated driving system (ADS)

hardware and software that are collectively capable of performing the dynamic driving task (**2.1.22**) on a sustained basis, regardless of whether it is limited to a specific operational design domain (**2.1.43**)

NOTE 1 his definition is adapted from SAE J3016 (2018) and is used specifically for driving automation systems that can deliver SAE level 3, 4, or 5 driving.

*NOTE 2 An automated driving system differs from a driving automation system (**2.1.21**) in that the former enables the vehicle (**2.1.60**) to deliver the full function of the dynamic driving task (**2.1.22**) within the defined operational design domain (**2.1.43**) whereas the latter covers systems that partially or fully cover the dynamic driving task.*

2.1.6 automated driving system entity (ADSE)

organization or individual that puts an automated driving system (**2.1.5**) forward for authorization for use and is responsible for its safety

*NOTE This may be the vehicle (**2.1.60**) manufacturer or software designer or a joint venture between the two.*

[SOURCE: Law Commission / The Scottish Law Commission, Automated Vehicles: Consultation Paper 2 on Passenger Services and Public Transport A joint consultation paper, 2019]

2.1.7 automated lane keeping system (ALKS)

hardware and software for low speed application which is activated by the driver and which keeps the vehicle (**2.1.60**) within its lane for travelling speed of 60kph or less by controlling the lateral and longitudinal movements of the vehicle for extended periods without the need for further driver input

[SOURCE: UNECE/TRANS/WP.29/2020/81 2020]

2.1.8 automated vehicle (AV)

vehicle (**2.1.60**) designed or adapted to be capable, in at least some circumstances or situations, of safely driving itself that may lawfully be used when driving itself, in at least some circumstances or situations, on roads or other public places in Great Britain

[SOURCE: Automated and Electric Vehicles Act, 2018]

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2.1.9 automatic emergency braking (AEB)

vehicle system that uses sensors and computer processing to detect when the ego vehicle (**2.1.24**) could collide with an object in its path and applies the brakes automatically attempting to mitigate or avoid the collision, even if the driver takes no action

*NOTE AEB systems may use different sensor types (e.g. camera, radar, lidar), work in different driving conditions (e.g. highways, urban) and act on the ego vehicle in different ways (e.g. only slow the vehicle (**2.1.60**) or bring it to a complete stop).*

2.1.10 automatic emergency steering (AES)

vehicle system that uses sensors and computer processing to detect when the ego vehicle (**2.1.24**) could collide with an object in its path and applies steering inputs automatically attempting to mitigate or avoid the collision, even if the driver takes no action

NOTE 1 AES systems may use different sensor types (e.g. camera, radar, lidar), work in different driving conditions (e.g. highways, urban) and act on the ego vehicle in different ways depending on the situation.

NOTE 2 AES systems should consider the ego vehicle's surroundings and other objects and their trajectories to determine a predicted minimal risk steering trajectory.

NOTE 3 AES systems are distinct from steering support systems which augment a driver's steering input to avoid a collision only when the driver has initiated a steering movement.

2.1.11 automatically commanded steering function (ACSF)

electronic control system where actuation of the steering system can result from automatic evaluation of signals initiated on-board the vehicle (**2.1.60**), possibly in conjunction with passive infrastructure features, to generate continuous control action in order to assist the driver

[SOURCE: UNECE/TRANS/WP.29/2017/10]

2.1.12 blind spot monitoring

vehicle system that warns of the presence of other vehicles (**2.1.60**) in areas that a human driver might have difficulty observing and that could present a hazard if the ego vehicle (**2.1.24**) were to execute a lane change or sudden turn

2.1.13 cellular vehicle-to-everything (C-V2X)

communication with and between vehicles (**2.1.60**) using 4G and 5G cellular networks

*NOTE Cellular V2X (C-V2X) is a 3GPP standard describing a technology to achieve the V2X requirements. C-V2X is an alternative to ITS-G5 (**2.1.36**) 802.11p, the IEEE specified standard for V2V and other forms of V2X communications*

2.1.14 connected and automated vehicle (CAV)

automated vehicle (**2.1.8**) equipped with communications technology that enables data transfer with other vehicles (**2.1.60**), infrastructure or other networks

2.1.15 connected vehicle (CV)

vehicle (**2.1.60**) equipped with wireless communications technology that enables data transfer with other vehicles, infrastructure or other networks

2.1.16 cooperative

two or more roadside or vehicle systems that communicate to facilitate transportation

*NOTE Term is defined in relation to CAVs. Examples of cooperative systems in road transport include those providing communication with vehicles (**2.1.60**) upstream of hazardous conditions such as a collision or extreme weather conditions*

2.1.17 corner case

rare but plausible combination of two or more independent parameter values within a scenario (**2.1.53**)

*NOTE Contrast with edge case (**2.1.23**) which represents a single rare but plausible independent parameter value.*

2.1.18 cross traffic alert (CTA)

vehicle (**2.1.60**) system that uses sensors and computer processing to detect hazards approaching from the side of the vehicle and warns the human driver of a potential collision

*NOTE Front cross traffic alert systems relate to hazards approaching from the side as the ego vehicle (**2.1.24**) pulls forward into moving traffic; rear cross traffic alert systems relate to hazards approaching from the side as the ego vehicle reverses into moving traffic.*

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2.1.19 dedicated short range communication (DSRC)

one- or two-way short to medium range wireless communications using a corresponding set of protocols and standards designed for automotive use

NOTE In Europe, standards for DSRC have been developed by CEN (TC278) and test specifications have been developed by ETSI.

2.1.20 driver monitoring system (DMS)

entity consisting of interdependent components for assessing the state of the human driver with respect to their ability to engage with the dynamic driving task (**2.1.22**)

NOTE Typically camera based, might also play a role in occupant recognition for identity / security purposes.

2.1.21 driving automation system (DAS)

hardware and software that are collectively capable of performing part or all of the dynamic driving task (**2.1.22**) on a sustained basis

NOTE 1 This definition is adapted from SAE J3016 (2018) and is used specifically to describe systems that can deliver SAE level 1 to 5 driving.

*NOTE 2 A driving automation system differs from an automated driving system (**2.1.5**) in that the latter enables the vehicle (**2.1.60**) to deliver the full function of the dynamic driving task (**2.1.22**) within the defined operational design domain (**2.1.43**) whereas the former covers systems that partially or fully cover the dynamic driving task.*

2.1.22 dynamic driving task (DDT)

real-time operational and tactical functions required to operate a vehicle (**2.1.60**) safely in on-road traffic

NOTE Michon (1985) defines operational driving functions as those delivered over a time constant of milliseconds and include tasks such as steering inputs to keep within a lane or braking to avoid an emerging hazard; tactical driving functions are those delivered over a time constant of seconds and include tasks such as lane choice, gap acceptance and overtaking. The DDT excludes strategic functions, which are those delivered over a longer time constant and include tasks such as trip scheduling and selection of destinations and waypoints.

2.1.23 edge case

rare but plausible independent parameter value within a scenario (**2.1.53**)

*NOTE Contrast with corner case (**2.1.17**) which represents a combination of two or more rare but plausible parameter values.*

2.1.24 ego vehicle

subject connected and/or automated vehicle (**2.1.8**), the behaviour of which is of primary interest in testing, trialling or operational scenarios (**2.1.53**)

NOTE Ego vehicle is used interchangeably with subject vehicle and vehicle under test (VUT).

2.1.25 electronic stability control (ESC)

vehicle (**2.1.60**) system that continuously monitors steering and vehicle direction and compares intended direction to the vehicle's actual direction and intervenes by applying the brakes independently to each of the wheels to correct loss of control much faster than a typical human driver

NOTE Also referred to as electronic stability program (ESP) or dynamic stability control (DSC). Intended direction is determined by measuring steering wheel angle; the vehicle's actual direction is determined by measuring lateral acceleration, vehicle rotation and individual road wheel speeds.

2.1.26 emergency lane keeping (ELK)

vehicle system that attempts to prevent the vehicle (**2.1.60**) from crossing a lane marking into a lane where there is an obstruction or risk of collision, irrespective of whether the human driver has operated the direction indicator

2.1.27 fallback

process by which the full function of the dynamic driving task (**2.1.22**) is delivered when a driving automation system or systems (**2.1.21**) cease to operate

*NOTE 1 Fallback may be required due to mechanical breakdown, driving automation system failure, departure from the operational design domain (**2.1.43**) for the driving automation system (**2.1.21**) or failure of the human driver to respond to a request to resume the full function of the dynamic driving task.*

*NOTE 2 Fallback performance in automated vehicles (**2.1.8**) is delivered by the automated driving system (**2.1.5**); for vehicles (**2.1.60**) with less capable driving automation systems, the human driver delivers some or all of the fallback process.*

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*NOTE 3 If a trip cannot be completed, fallback requires a minimal risk manoeuvre (**2.1.41**) to achieve a minimal risk condition (**2.1.40**). These may be delivered by the human driver or automated driving systems, depending on the capabilities of the vehicle and extent of any system failure.*

2.1.28 forward collision warning (FCW)

vehicle system that uses sensors and computer processing to detect when the ego vehicle (**2.1.24**) might collide with an object in its path and provides warnings for the human driver to prompt avoiding action

2.1.29 fully automated vehicle

vehicle (**2.1.60**) equipped with an automated driving system (**2.1.5**) that operates without any operational design domain (**2.1.43**) limitations for some or all of the journey, without the need for human intervention as a fallback (**2.1.27**) to ensure road safety

[SOURCE: UNECE/TRANS/WP.1/165, 2018]]

2.1.30 green light optimized speed advisory (GLOSA)

vehicle (**2.1.60**) system that receives upcoming traffic signal cycle information over V2X communication channels and uses relative vehicle position to compute and display a speed recommendation that, if adopted by the driver, would allow the vehicle to pass the upcoming traffic lights during a green interval, thereby reducing stops at red lights

2.1.31 handover

process by which the sustained dynamic driving task (**2.1.22**) function transitions either from a human driver to an automated driving system (**2.1.5**) or from an automated driving system to a human driver

2.1.32 highly automated road passenger service (HARPS)

supply of journeys on roads to passengers using automated vehicles (**2.1.8**) without a human driver or user-in-charge (**2.1.58**)

NOTE This term and definition is adapted from the UK Law Commission and Scottish Law Commission joint consultation paper (2019): Automated Vehicles: Consultation Paper 2 on Passenger Services and Public Transport

2.1.33 highly automated road passenger service operator

business which carries passengers for hire or reward using automated vehicles (**2.1.8**) on the road without the services of a human driver or user-in-charge (**2.1.58**)

NOTE This term and definition is adapted from the UK Law Commission and Scottish Law Commission joint consultation paper (2019): Automated Vehicles: Consultation Paper 2 on Passenger Services and Public Transport

2.1.34 highly automated vehicle

vehicle (**2.1.60**) equipped with an automated driving system (**2.1.5**) that operates within a specific operational design domain (**2.1.43**) for some or all of the journey, without the need for human intervention as a fallback (**2.1.27**) to ensure road safety

[SOURCE: UNECE/TRANS/WP.1/165, 2018]]

2.1.35 intelligent speed adaptation (ISA)

vehicle (**2.1.60**) system that supports drivers in complying with legally enforced speed limits

NOTE Systems can use satellite-based positioning and tracking the position against a database of speed limits and/or cameras to detect speed limits shown on road signs (including electronic signs amd signals); speed limits may also be broadcast from infrastructure to vehicles to communicate relevant speed limits to the ISA system. Some systems provide a human driver with warnings of excessive speed while others actively moderate vehicle speed to comply with limits.

2.1.36 ITS-G5

protocol stack for supporting vehicle-to-vehicle (**2.1.65**) communications in an ad hoc network based on IEEE 802.11-2012 and ANSI/IEEE Std 802.2

NOTE ITS stands for intelligent transport systems; G5 is derived from the frequency band (5.9GHz) upon which it was designed to operate.

2.1.37 lane centring

vehicle (**2.1.60**) system that uses cameras or other inputs and automated controls to help the vehicle stay in the centre of the driven lane

NOTE Unlike lane-keeping assist, this system operates continuously, applying steering controls to keep the vehicle in the centre of the lane whilst in operation. Current systems rely on lane markings of sufficient quality and visibility to support the function. The system can be cancelled by use of the turn signals.

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2.1.38 lane departure warning (LDW)

vehicle (**2.1.60**) system that uses cameras or other inputs to detect impending lane exceedances by the vehicle and provide visual, auditory or haptic feedback to the human driver

NOTE *Unlike lane centring (**2.1.37**) and lane-keeping assist (**2.1.39**) this system does not actively apply any control inputs to the vehicle. Current systems rely on lane markings of sufficient quality and visibility to support the function. The system can be cancelled by use of the turn signals.*

2.1.39 lane-keeping assist (LKA)

vehicle (**2.1.60**) system that uses cameras or other inputs and automated controls to direct the vehicle away from the edges of the driven lane

NOTE *Unlike lane-centring, this system operates exceptionally when it detects that the vehicle is about to depart from the driven lane. Some systems allow a degree of line crossing before directing the vehicle back into the lane from which it is departing. Current systems rely on lane markings of sufficient quality and visibility to support the function. The system can be cancelled by use of the turn signals.*

2.1.40 minimal risk condition (MRC)

stable, stopped condition to which a human driver or automated driving system (**2.1.5**) brings a vehicle (**2.1.60**) after performing the dynamic driving task (**2.1.22**) fallback (**2.1.27**) in order to reduce the risk of a crash when a given trip cannot be continued

NOTE 1 *Examples of reasons for which a trip cannot be completed include mechanical breakdown, automated driving system failure, departure from the operational design domain (**2.1.43**) for an automated driving system or failure of the human driver to respond to a request to resume the full function of the dynamic driving task.*

NOTE 2 *The form of the MRC will be highly dependent on the operational design domain (**2.1.43**) of the automated vehicle (**2.1.8**) and the reason for which the MRC was required. For example, the MRC for an automated vehicle on a highway with a minor sensor fault may be to manoeuvre to the hard shoulder, decelerate gently to a stop and activate the hazard warning lights; the MRC for a low speed automated shuttle operating in an urban environment with a damaged forward lidar system might be to come to an immediate halt.*

2.1.41 minimal risk manoeuvre (MRM)

tactical or operational manoeuvre triggered and executed by the automated driving system (**2.1.5**) or the human driver to achieve the minimal risk condition (**2.1.40**)

NOTE 1 *Michon (1985) defines operational driving functions as those delivered over a time constant of milliseconds and include tasks such as steering inputs to keep within a lane or braking to avoid an emerging hazard; tactical driving functions are those delivered over a time constant of seconds and include tasks such as lane choice, gap acceptance and overtaking.*

NOTE 2 *The form of the MRM will be highly dependent on (and should be within) the operational design domain (**2.1.43**) of the automated vehicle (**2.1.8**); for example, the MRM performed by a vehicle (**2.1.60**) performing automated driving (**2.1.4**) at free flow speed on a highway may be very different to that performed by a low speed automated shuttle operating in an urban environment.*

2.1.42 on-board diagnostics (OBD)

vehicle (**2.1.60**) system for checking and reporting specific faults

NOTE *The OBD-II / EOBD (European on-board diagnostics) regulations have standardized connections, format and messaging for this capability for M1 category cars since 2001 (petrol) and 2004 (diesel).*

2.1.43 operational design domain (ODD)

operating conditions under which a given driving automation system (**2.1.21**) or feature thereof is specifically designed to function

[SOURCE: SAE J3016 JUN2018, **3.22**]

NOTE 1 *Including, but not limited to, environmental, geographical, and time-of-day restrictions, and/or the requisite presence or absence of certain traffic or road characteristics.*

NOTE 2 *For further information refer to PAS 1883 - Specification for Operational Design Domains*

2.1.44 over-the-air (OTA)

wireless transmission of information often used to deliver software, firmware or configuration updates

2.1.45 pedestrian detection

vehicle (**2.1.60**) system that uses sensors and computer processing to identify the presence of pedestrians in the path of the ego vehicle (**2.1.24**) and takes action directly or indirectly to help avoid or mitigate collisions

NOTE *The scope of pedestrian detection systems is increasing to cover vulnerable road users (**2.1.67**) beyond pedestrians.*

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2.1.46 platooning

linking of two or more vehicles (**2.1.60**) in a convoy using connectivity technology and automated driving support systems which allow the vehicles to maintain automatically a set, close distance between each other when connected for certain parts of a journey and to adapt to changes in the movement of the lead vehicle with little to no action from the drivers

[SOURCE: Regulation (EU) 2019/2144 Of The European Parliament And Of The Council of 27 November 2019 on type-approval requirements for motor vehicles and their trailers, and systems, components and separate technical units intended for such vehicles, as regards their general safety and the protection of vehicle occupants and vulnerable road users (**2.1.67**).]

2.1.47 real-time kinematics (RTK)

technique used to increase the accuracy of satellite-based positioning signals by using one or more fixed base stations that wirelessly sends out corrections to a moving receiver for reference

2.1.48 remote operator

safety operator (**2.1.52**) who oversees the operation of an automated vehicle (**2.1.8**) from a remote location

2.1.49 safety case

structured argument, supported by evidence, intended to justify that a system and activity is acceptably safe for a specific application in a specific operating environment

***NOTE** For further information refer to PAS 1881:2020 Assuring the safety of automated vehicle (**2.1.8**) trials and testing. Specification*

2.1.50 safety driver

safety operator (**2.1.52**) at the controls within an automated vehicle (**2.1.8**), observing the driving environment, enforcing the operational design domain (**2.1.43**), recognising challenging situations, detecting deviations from expected behaviour and ready and able to deliver the full function of the dynamic driving task (**2.1.22**) when needed in order to preserve safety during development, testing or trial activities, in accordance with the safety case (**2.1.49**)

2.1.51 safety of the intended functionality (SOTIF)

absence of unreasonable risk due to hazards resulting from functional insufficiencies of the intended functionality or from reasonably foreseeable misuse by persons

[SOURCE: PD ISO/PAS 21448:2019, **3.10**]

2.1.52 safety operator

person who is trained and able to supervise the function of an automated vehicle (**2.1.8**) and intervene at any time it is required

***NOTE** The safety operator is used to describe a safety driver (**2.1.50**) or remote operator (**2.1.48**). A safety driver is a safety operator who is situated within the vehicle (**2.1.60**) itself to oversee its operation. A remote operator is a safety operator who oversees the operation of the vehicle from a remote location.*

2.1.53 scenario

description of a driving situation that includes the pertinent actors, environment, objectives and sequences of events

2.1.54 sensor fusion

process of combining information from multiple sensor types in order to improve performance over that obtainable from a single sensor type

2.1.55 simulation

computer generated environments used to test components, systems or human behaviours

***NOTE** Simulation in the CAV domain can refer to a wide range of topics from microsimulation of traffic to simulation of CAV sensors and components to human-in-the-loop simulations of CAVs.*

2.1.56 software development kit (SDK)

programs and other operating information used to arrive at new applications for a specific device or operating system

2.1.57 telematics

collection and communication of vehicle (**2.1.60**) operational and status data

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2.1.58 user-in-charge

human within or in line of sight of a vehicle (**2.1.60**) who is qualified to drive it and in a position to operate the controls of the vehicle but is not actively controlling the vehicle due to it being under the control of its automated driving system (**2.1.5**)

__NOTE 1__ The role of user-in-charge is not intended for use in reference to human occupants of automated vehicles (__2.1.8__) during development, testing or trials, which may be safety drivers (__2.1.50__) or safety operators (__2.1.52__).

__NOTE 2__ The main role of the user-in-charge is to take over in planned circumstances after the vehicle has come to a safe stop. They would also have obligations to maintain and insure the vehicle and report collisions. An automated vehicle would require a user-in-charge unless it is authorised to operate without one. The user-in-charge must be in the vehicle (or in line of sight of the vehicle) and can be distinguished from a remote operator (__2.1.48__).

__NOTE 3__ Being qualified to drive means the user-in-charge holds a current and valid driving licence to drive the relevant vehicle in the jurisdiction in which it is being operated.

__NOTE 4__ This term and definition is adapted from the UK Law Commission and Scottish Law Commission joint consultation paper (2019): Automated Vehicles: Consultation Paper 2 on Passenger Services and Public Transport

2.1.59 validation

means by which it is proven beyond reasonable doubt that an end product meets its design intent and stated performance specification

2.1.60 vehicle

motorised, wheeled conveyance that is mechanically propelled and intended or adapted for use on roads

2.1.61 vehicle control system

the combination of hardware and software responsible for enacting the outputs of the perception and decision-making entities and thereby delivering changes in lateral and / or longitudinal movement of the vehicle (**2.1.60**)

2.1.62 vehicle-to-everything (V2X)

unidirectional or bidirectional sharing of data between vehicles (**2.1.60**) and other vehicles, infrastructure, other road users or any other communications system

__NOTE__ The definition is not intended to indicate that a vehicle is necessarily connected to everything but reflects that vehicles can be connected to a broad spectrum of systems of which vehicle-to-vehicle (__2.1.65__), vehicle-to-infrastructure (__2.1.64__) and vehicle-to-grid (__2.1.63__) communications are examples.

2.1.63 vehicle-to-grid (V2G)

system that enables plug-in vehicles (**2.1.60**) to act as distributed energy storage by providing demand responsive services to the power grid

2.1.64 vehicle-to-infrastructure (V2I)

unidirectional or bidirectional sharing of data between vehicles (**2.1.60**) and infrastructure

2.1.65 vehicle-to-vehicle (V2V)

vehicles (**2.1.60**) sharing data with other vehicles

2.1.66 verification

evaluation of a system to prove that it meets all its specified requirements at a particular stage of its development

2.1.67 vulnerable road user

non-motorised road users, such as pedestrians and cyclists as well as motor-cyclists and persons with disabilities or reduced mobility and orientation

[SOURCE: Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport]

2.2 Initialisms

2.2.1 ACC

adaptive cruise control

2.2.2 ACSF

automatically commanded steering function

2.2.3 ADS

automated driving system

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2.2.4 AEB
automatic emergency braking

2.2.5 AES
automatic emergency steering

2.2.6 ALKS
automated lane keeping system

2.2.7 AV
automated vehicle

2.2.8 CPU
central processing unit

2.2.9 CTA
cross traffic alert

2.2.10 DSC
dynamic stability control

2.2.11 ELK
emergency lane keeping

2.2.12 ESC
electronic stability control

2.2.13 ESP
electronic stability program

2.2.14 FCTA
front cross traffic alert

2.2.15 GPU
graphics processing unit

2.2.16 IOT
internet of things

2.2.17 ITS
intelligent transport systems

2.2.18 OEM
original equipment manufacturer

2.2.19 OTA
over-the-air

2.2.20 RCTA
rear cross traffic alert

2.2.21 RTK
real-time kinematics

2.2.22 SAE
Society of Automotive Engineers

***NOTE** SAE is itself an abbreviation of SAE International, the full name for the U.S.-based standards and professional development organization for automotive engineering.*

2.2.23 SDK
software development kit

2.2.24 V2G
vehicle-to-grid

2.2.25 V2I
vehicle-to-infrastructure

2.2.26 V2V
vehicle-to-vehicle

2.2.27 V2X
vehicle-to-everything

2.2.28 WLAN
wireless local area network

2.3 Acronyms

2.3.1 ADAS
advanced driver assistance system

2.3.2 CAV
connected and automated vehicle

2.3.3 CAM
connected automated mobility

2.3.4 HARPS
highly automated road passenger service

2.3.5 LIDAR
light detection and ranging

2.3.6 RADAR
radio detection and ranging

2.3.7 SOTIF
safety of the intended functionality

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BSI, 389 Chiswick High Road
London W4 4AL
United Kingdom

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