

Chapter 3. Definitions

Green means no change to the text (including no numbering change)

Blue means an editorial proposal.

Orange means an open issue or proposal for substantive amendment.

Original text and its status. Orange cells require IWG discussion/decision	Proposals for change. Editorial in blue cells. Substantive proposals in orange cells.	
3. Definitions		
3.1. “Automated Driving System (ADS)” means the vehicle hardware and software that are collectively capable of performing the entire Dynamic Driving Task (DDT) on a sustained basis. ¹		Discussion: Should the explanatory footnotes and examples be moved to the technical appendix?
3.6. “ADS vehicle” means a vehicle equipped with an ADS.	3.2.	
3.8. “Dynamic Driving Task (DDT)” means the real-time operational and tactical functions required to operate the vehicle.	3.3. “Dynamic Driving Task (DDT)” means the real-time operational and tactical functions required to operate the vehicle.	Numbering. “DDT” is necessary to understand the preceding definition of “ADS”.
When the ADS is in operation, the DDT is always performed in its entirety by the ADS which means the whole of the tactical and operational functions		“in its entirety” has raised interpretation issues.

¹ This definition is based on SAE J3016 and ISO/PAS 22736 (Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles). These standards define levels of driving automation based on the functionality of the driving automation system feature as determined by an allocation of roles in DDT and DDT fallback performance between that feature and the (human) user (if any). The term “Automated Driving System” is used specifically to describe a Level 3, 4, or 5 driving automation system.

<p>necessary to operate the vehicle (i.e., the ADS performs “the entire DDT” as stated in the definition of an “Automated Driving System” under para. 3.2.). These functions can be grouped into three interdependent categories: sensing and perception, planning and decision, and control.</p>		
<p>3.8.1. Sensing and perception include:</p>	<p>3.3.1. Sensing and perception include:</p>	
<p>(a) Monitoring the driving environment via object and event detection, recognition, and classification.</p>		<p>Does this still hold true given discussions on strategies that do not strictly use the “detection, recognition, classification” concept?</p>
<p>(b) Perceiving other vehicles and road users, the roadway and its fixtures, objects in the vehicle’s driving environment and relevant environmental conditions.</p>		
<p>(c) Sensing the ODD boundaries, if any, of the ADS feature.</p>		
<p>(d) Positional awareness.</p>		
<p>3.8.2. Planning and decision include:</p>	<p>3.3.2. Planning and decision include:</p>	
<p>(a) Predicting actions of other road users.</p>		
<p>(b) Response preparation.</p>		
<p>(c) Manoeuvre planning.</p>		
<p>3.8.3. Control includes:</p>	<p>3.3.3. Control includes:</p>	
<p>(a) Object and event response execution.</p>		
<p>(b) Lateral vehicle motion control.</p>		

(c) Longitudinal vehicle motion control.		
(d) Enhancing conspicuity via lighting and signalling.		
3.8.4. The DDT excludes strategic functions.	3.3.4. The DDT excludes strategic functions.	
3.23. “Real time” means the actual time during which a process or event occurs.	3.4.	
3.4. “ADS function” means an ADS hardware and software capability designed to perform a specific portion of the DDT.	3.5.	Numbering. “Function” is necessary to understand the preceding definition of “DDT”.
3.4.3. “Operational function” means a capability to control the real-time motion of the vehicle. ²	3.5.1.	Numbering. “Operational function” is necessary to understand the preceding definition of “DDT”. “Operational function” comes first in definition of DDT.
3.4.2. “Tactical function” means a capability to perceive the vehicle environment and control real-time planning, decision, and execution of manoeuvres, including conspicuity of the vehicle and its motion. ³	3.5.2.	Numbering. “Tactical function” is necessary to understand the preceding definition of “DDT”. Needs discussion. Grammar: “perceive”, “control”, “decision”, “execution” inconsistent. Operational function is specific performing motion control. Needs discussion.
3.4.1. “Strategic function” means a capability to issue commands, instructions, or guidance for execution by an ADS. ⁴	3.5.3.	Numbering. “Strategic function” mentioned in 3.2.4. as excluded from the DDT.
3.3. “ADS feature” means an application of an ADS designed specifically for use	3.6. “(ADS) feature” means an application of an ADS designed specifically for use	JRC: In the document, the term "feature" appears 69 times, while "ADS feature" only appears 45 times. It's obvious that there are some clauses where only

² Operational functions involve executing micro-changes in steering, braking, and accelerating to maintain lane position or proper vehicle separation and immediate responsive actions to avoid crashes in critical driving situations.

³ Examples include deciding whether to overtake a vehicle or change lanes, signalling intended manoeuvres, deciding when to initiate the manoeuvre, choosing the proper speed, and executing the manoeuvre.

⁴ Examples include setting the starting point, destination, route, and way points to be used by an ADS during a trip.

<p>within an Operational Design Domain (ODD).</p>	<p>within an Operational Design Domain (ODD).</p>	<p>"feature" is used instead of "ADS feature". In order to facilitate the reading and use of regulations, it is recommended that both "ADS features" and "Features" be used as terms.</p> <p>Add parentheses around "ADS". For clarity, every use of "feature" in the text should align with this definition (i.e., the text should not use "feature" to mean something else). If this is a problem, the IWG needs to discuss solutions. "ADS feature" is an acceptable use of "feature" in the text, so "(ADS)" makes that clear.</p>
<p>3.3.1. "ADS feature of type 1 (ADSF-1)" means an ADS1 feature which includes an ADS fallback response requiring a fallback user</p>	<p>3.6.1.</p>	
<p>3.3.2. "ADS feature of type 2 (ADSF-2)" means an ADS feature which does not include an ADS fallback response requiring a fallback user.</p>	<p>3.6.2.</p>	
<p>3.17. "Operational Design Domain (ODD)" means the operating conditions under which an ADS feature is specifically designed to function.</p>	<p>3.7. "Operational Design Domain (ODD)" means the operating conditions under which an ADS feature is specifically designed to perform the DDT.</p>	<p>Numbering. "ODD" is necessary to understand the preceding definition of "feature". Sec: this use of "function" might raise interpretation questions. Proposal to clarify that the ODD refers to conditions under which a feature is designed to perform the DDT.</p>
<p>3.17.1. "ODD exit" means:</p>	<p>3.7.1. "ODD exit" means:</p>	<p>Numbering. "ODD exit" is a complementary term under "ODD" and necessary to understand the following definition of "DDT fallback".</p>
<p>(a) the presence of one or more ODD conditions outside the limits defined for use of the ADS feature, and/or</p>		

<p>(b) the absence of one or more conditions required to fulfil the ODD conditions of the ADS feature.</p>		
<p>3.16. [<i>“Occurrence”</i> means a safety-relevant event during which at least one of the following criteria is fulfilled:</p>	<p>3.8.</p>	
<p>(a) Collision involving the ADS vehicle</p>		
<p>(b) ADS vehicle system/component failure</p>		
<p>(c) ADS vehicle produces a noncompliance with respect to the requirements of this regulation</p>		
<p>(d) Injury/fatality as a result of being in the ADS vehicle or being involved in the event</p>		
<p>(e) Normal operations which are relevant to argument specific ADS design choices and/or the safety case.]</p>		
<p>3.16.1. <i>“Significant Occurrence”</i> means occurrences which are not <i>“Critical Occurrences”</i>, but require to be reported on short term basis due to their relevance on safety</p>	<p>3.8.1.</p>	
<p>3.16.2. <i>“Critical Occurrence”</i> means an occurrence during which at least one of the following criteria is fulfilled:</p>	<p>3.8.2.</p>	
<p>(a) At least one person suffers an injury that requires medical attention or dies as a result of</p>		

<p>being in the vehicle or being involved in the event.</p>		
<p>(b) The ADS vehicle, other vehicles or stationary objects sustain physical damage that exceeds a certain threshold.</p>		
<p>(c) Any vehicle involved in the event experiences a deployment of any non-reversible occupant restraint system, vulnerable road user secondary safety system or the delta-V thresholds to be met, whichever occurs first.</p>		<p>Definitions for VRU and VRU secondary safety system. Clarification: Where are the “delta-V thresholds to be met” found?</p>
	<p>3.9. “<i>DDT fallback</i>” means the fallback response of a user or an ADS to an ODD exit or a DDT-relevant failure.</p>	<p>ADS-07 raised question on the use of the undefined term “DDT fallback” in the definition of “driver”. One option was to add the term and definition of “DDT fallback”. J3016 definition: “The response by the user to either perform the DDT or achieve a minimal risk condition after occurrence of a DDT performance-relevant system failure(s) or upon operational design domain (ODD) exit, or the response by an ADS to achieve minimal risk condition, given the same circumstances.” Sec: Proposal to reduce the J3016 to the essential definition of “DDT fallback” as a user or ADS response to an ODD exit or DDT-relevant failure because the text has terms such as “ADS fallback response” to differentiate the user and ADS responses and to clarify meanings.</p>
<p>3.2. “<i>ADS fallback response</i>” means a system-initiated deactivation of the ADS or an ADS-controlled procedure to place the vehicle in a minimal risk condition.</p>	<p>3.9.1. “<i>ADS fallback response</i>” means a system-initiated deactivation of an ADS feature or an ADS-controlled procedure to place the vehicle in a mitigated risk condition (MRC).</p>	<p>“feature” added since the system-initiation deactivation enables the user to perform the DDT or achieve an MRC. The deactivation is not of the ADS; it’s of the feature performing the DDT.</p>

		Is “system-initiated deactivation” correct? The definition of this deactivation only refers to <u>initiating</u> the transfer, not the entire process from start to finish.
3.34. “System-initiated deactivation of the ADS” means a procedure by which the ADS initiates the transfer of performance of the DDT from the ADS to a vehicle fallback user.	3.10.	Issues: Deactivation of a feature (i.e., ADS performance of the DDT), not of the ADS? “Transfer” undefined. “vehicle fallback user” should be “fallback user”. Text refers to deactivation process (start to finish) while this definition only refers to initiating.
3.37. “User-initiated deactivation of the ADS” means a procedure by which the user initiates the transfer of performance of the DDT from the ADS to the vehicle user.	3.11.	Why “vehicle user” instead of fallback user? Is user deactivation of a feature always a fallback to the user?
3.24. “Remote termination” means the act of remotely disabling one or more ADS features of one or more vehicles.	3.12.	
3.14. “Minimal Risk Condition (MRC)” means a stable and stopped state of the vehicle that reduces the risk of a crash.	3.13. “Mitigated Risk Condition (MRC)” means a stable and stopped state of the vehicle that reduces the risk of a crash.	Proposal to change “minimal” to “mitigated”. Numbering: “MRC” definition needed to understand preceding “ADS fallback response”.
3.5. “ADS user” means a human user of an ADS vehicle.	3.14.	Numbering: “User” definitions needed to understand “system-initiated deactivation...”
	3.14.1. “Occupant” means an ADS user located inside an ADS vehicle.	See ADS-08-17.
	3.14.2. “Remote user” means a user located outside the ADS vehicle who can provide inputs to support the ADS, which is performing the entire DDT	See ADS-08-16 (EC/France) Sec: Propose to omit “inputs” clause (“Remote user” means an ADS user located outside the ADS vehicle.) See ADS-08-17. Variations on “remote user” could be added to address the degree of involvement in driving functions (strategic, tactical, operational) and whether the relationship is with a

		single vehicle (one to one) or more than one (one to many). For example, a supervisor or dispatcher in an operations centre might perform strategic functions for a fleet of ADS vehicles.
3.5.1. “Driver” means a human user who performs in real time part or all of the DDT and/or DDT fallback for a particular vehicle.	3.14.3. “Driver” means a user who performs in real time part or all of the DDT and/or DDT fallback for a particular vehicle.	Numbering: “Driver” needed to understand definition of “fallback user”. Sec: Deleted “human”. Redundant since “user” already defined as human.
3.5.2. “Fallback user” means a user designated to perform the DDT pursuant to an ADS fallback response.	3.14.4. “Fallback user” means a user expected to assume the role of driver pursuant to an ADS fallback response.	Numbering: “Fallback user” definition needed to understand “system-initiated deactivation...” Sec: “perform the DDT” conflicts with the definition of “driver” (user who performs the DDT or DDT fallback). If the driver performs the DDT fallback, then the fallback user is expected to become the driver when the ADS deactivates the active feature.
	3.14.5. “Passenger” means an occupant limited to the performance of strategic functions relative to the ADS vehicle.	Sec: Proposal to address use of “passenger” in the text. See ADS-08-17.
	3.14.6. “Remote assistant” means a remote user performing one or more tactical functions.	Sec: Proposal to address use of “remote assistant” in the text. See ADS-08-17.
3.18. “Other road user (ORU)” means any entity making use of publicly accessible road infrastructure.	3.15.	
3.25. “Road-safety agent” means a human being engaged in directing traffic, enforcing traffic laws, maintaining/constructing roadways, and/or responding to traffic incidents.	3.16.	
3.21. “Priority vehicle” means a vehicle [operated while making use of] [subject to] exemptions, authorizations, and/or	3.17.	Brackets.

	right-of-way under traffic laws [while performing a specified function].		
3.7.	<i>“Behavioural competency”</i> means an expected and verifiable capability of an ADS feature to operate a vehicle within the ODD of the feature.	3.18.	
3.11.	<i>“Failure”</i> means the termination of an intended behaviour of an element or an item.	3.19.	Is there a relationship between “intended behaviour” and “behavioural competency”?
3.12.	<i>“Fault”</i> means an abnormal condition that can cause an element (system, component, software) or an item (system or combination of systems that implement a function of a vehicles) to fail.	3.20.	
3.13.	<i>“Functional safety”</i> means the absence of unreasonable risks under the occurrence of hazards caused by a malfunctioning behaviour of electric/electronic systems (safety hazards resulting from system faults).	3.21.	
3.28.	<i>“Safety Management System (SMS)”</i> means a systematic approach to managing safety that encompasses and integrates organisational, human, and technical factors.	3.22.	
	(a) Human component ensuring the ADS lifecycle is monitored by personnel with appropriate skills, training, and understanding to identify risks and appropriate mitigation measures to identify risks and appropriate mitigation		

	measures while accounting for the possibility of human errors.		
	(b) Organisational component procedures and methods that help to manage the identified risks, understand their relationships and interactions with other risks and mitigation measures, and help to ensure that there are no unforeseen consequences.		
	(c) Technical component using appropriate tools and equipment.		
3.31.	“ <i>Simulation</i> ” means the imitation of the operation of a real-world process or system over time utilizing a software implementation for some (or all) of the models, tools or test environment.	3.23.	
3.32.	“ <i>Simulation toolchain</i> ” means a simulation tool or a combination of simulation tools that are used to generate evidence for the manufacturer’s safety case.	3.24.	Sec: Define “simulation tool”. Does a “simulation toolchain” cease to be a simulation toolchain if it is used for any purpose other than to generate evidence for the safety case?
3.15.	“ <i>Model</i> ” means a description or representation of a system, entity, phenomenon, or process.	3.25.	
3.19.	“(Model) parameter” means a numerical value inferred from real-world data and used to represent a system characteristic.	3.26.	
3.33.	“ <i>Stochastic model</i> ” means a model involving or containing a random variable or variables pertaining to chance or probability.	3.27.	

<p>3.38. <i>“Validation (of a simulation model)”</i> means the process of determining the degree to which a simulation model is an accurate representation of the real world from the perspective of its intended uses.</p>	<p>3.28.</p>	<p>Sec: Define “simulation model”. What is the relationship between a simulation model and a simulation toolchain? Is a simulation model a simulation tool?</p>
<p>3.39. <i>“Verification (of a simulation model)”</i> means the process of determining the extent to which a simulation model or a virtual testing tool is compliant with its requirements and specifications as detailed in its conceptual models, mathematical models, or other constructs.</p>	<p>3.29.</p>	<p>Sec: Define “simulation model”.</p>
<p>3.30. <i>“Sensor Stimulation”</i> means a technique whereby artificially generated signals are provided to trigger the element under testing in order to produce the result required for evaluation of the element.</p>	<p>3.30.</p>	
<p>3.35. <i>“Test method”</i> means a structured approach to consistently derive knowledge about the performance of an ADS by means of executing tests.⁵</p>	<p>2.31.</p>	
<p>3.40. <i>“Virtual testing”</i> means a type of testing that uses a simulation toolchain(s) to generate evidence for the manufacturer’s safety case.</p>	<p>3.31.1.</p>	<p>Sec: Is “to generate evidence...” pertinent? Does “virtual testing” cease to be virtual testing if used for a purpose other than to generate evidence for the safety case? “Safety case” refers to the ADS, not the manufacturer. What is the difference between “virtual testing” and “simulation toolchain”?</p>

⁵ For example, virtual testing in simulated environments, physical, structured testing in controlled test-facility environments, and real-world on-road conditions.

<p>3.22. <i>“Proving ground”</i> and <i>“Test track”</i> mean a facility closed to public traffic and designed to enable physical assessment of an ADS and/or ADS vehicle performance, e.g., via sensor stimulation and/or the use of dummy devices.</p>	<p>3.31.2.</p>	<p>Can we pick one term or the other and then use its consistently throughout the text?</p>
	<p>3.31.3. <i>“Confirmatory testing”</i> means...</p>	<p>Define explicitly as a form of independent testing to corroborate manufacturer evidence from same testing.</p>
<p>3.9. <i>“Edge Case”</i> means a low-probability occurrence that might arise within the ODD of an ADS and that warrants specific design attention due to the potential severity of outcomes that might result from encountering such a situation or condition.</p>	<p>3.32.</p>	<p>Uses <i>“occurrence”</i></p>
<p>3.26. <i>“Safety case”</i> means a structured argument supported by a body of evidence that provides a compelling, comprehensible, and valid case that the ADS is or will be free from unreasonable risk for a given application in a given environment.</p>	<p>3.33.</p>	
<p>[3.26.1. <i>“Argument”</i> means a written explanation within a safety case that captures the logical connections between a claim and the evidence for achievement of that claim.]</p>	<p>3.33.1.</p>	<p>Brackets.</p>
<p>[3.26.2. <i>“Claim”</i> means a high-level assertion that the behaviour competencies of an ADS will satisfy the DDT performance requirements applicable to one or more scenarios.]</p>	<p>3.33.2. <i>“Claim”</i> means a high-level assertion that the behaviour competencies of an ADS will satisfy the performance requirements applicable to one or more scenarios.</p>	<p>Brackets UK proposal (ADS-07-14).</p>

<p>3.26.3. <i>“Evidence”</i> means a set of results of analyses, simulations, and physical testing pertinent to demonstrating the validity of an argument within a safety case.]</p>	<p>3.33.3.</p>	<p>Brackets.</p>
<p>3.27. <i>“Safety concept”</i> means a description of the measures designed into the ADS so that it operates in such a way that it is free of unreasonable safety risks to the ADS vehicle user(s) and other road users in every operating condition relevant to the ODD.</p>	<p>3.34.</p>	
<p>New</p>	<p>3.35. <i>“(Driving) Situation”</i> means the entirety of the conditions surrounding a vehicle in use at a point in time that are relevant to performance of the DDT for that vehicle.</p>	<p>Sec: Purpose of the term is to differentiate between real-world driving “situations” and representations of those situations (“scenarios”) used to assess ADS performance.</p>
<p>3.29. <i>“(Traffic) Scenario”</i> means a description of a sequence of driving situations that may occur during a given trip.⁶</p>	<p>3.36.</p>	
<p>3.29.1. <i>“Nominal scenario”</i> means [any scenario that is not a critical or failure scenario].</p>	<p>3.36.1. <i>“Nominal scenario”</i> means a scenario entirely navigated by the ADS in accordance with the requirements for nominal performance of the DDT (para. 5.1.2.).</p>	<p>See ADS-08-35</p>
<p>3.29.2. <i>“Critical scenario”</i> means a traffic scenario [where the operating conditions or behaviour of other road users requires a prompt action of the</p>	<p>3.36.2. <i>“Critical scenario”</i> means a scenario that results in a crash, an evasive manoeuvre to avoid a crash, and/or an ADS behaviour inconsistent with the</p>	<p>See ADS-08-35</p>

⁶ Scenarios include a driving manoeuvre or sequence of driving manoeuvres. Scenarios can also involve a wide range of elements, such as some or all portions of the DDT, different roadway layouts, different types of road users and objects exhibiting static or diverse dynamic behaviours, and diverse environmental conditions (among many other factors).

	ADS to avoid or mitigate a collision with adverse consequences on human health or property damage].	requirements for nominal performance of the DDT (para. 5.1.2.).	
3.29.3.	“ <i>Failure scenario</i> ” means a traffic scenario representing a system failure that compromises the capability of the ADS to perform the entire DDT.	3.36.3. “ <i>Failure scenario</i> ” means a nominal or critical scenario during which the ADS executes a fallback in response to a fault in the system, vehicle, or other dependency necessary for performance of the DDT.	See ADS-08-35
3.9.4.	“ <i>Functional scenario</i> ” means a basic traffic scenario describing a situation and its corresponding elements at the highest level of abstraction in natural, non-technical language. ⁷	3.36.4.	
3.29.4.	“ <i>Logical scenario</i> ” means a traffic scenario elaborated at a lower level of abstraction to include value ranges or probability distributions for each element of the corresponding functional scenario. ⁸	3.36.5.	
3.29.5.	“ <i>Concrete scenario</i> ” means a traffic scenario at a level of abstraction in which specific values have been selected for each element from the continuous ranges as may be defined in the corresponding logical scenario.	3.36.6.	
3.29.6.	“ <i>Complex scenario</i> ” means a traffic scenario containing one or more situations that involve [partly dependent parameters that must be		Confirm agreement to delete from the 7 th ADS session.

⁷ For example, a description of the ego vehicle’s actions, the interactions of the ego vehicle with other road users and objects, and other elements that compose the scenario such as environmental conditions.

⁸ For example, elaborating the lane element to cover possible lane widths.

<p>taken into account by the ADS to execute the DDT of the ADS (e.g., a large number of other road users, unlikely road infrastructure, or abnormal geographic/environmental conditions)].</p>		
<p>3.20. <i>“Post-production phase”</i> means the period in which an ADS vehicle is no longer produced until the end-of-life of all ADS vehicles of the same type. The phase ends when there are no longer any operational ADS vehicles of a specific ADS type.</p>	<p>3.37.</p>	<p>Is this necessary? <i>“Post-production”</i> used twice and it only seems to mean the period during which ADS vehicles of a specific type are still in use.</p>
<p>3.36. <i>“Useful life (of an ADS vehicle)”</i> means the duration during which an ADS vehicle is in an operational state under which it may be driven on public roads regardless of the operational state of the ADS.</p>	<p>3.38.</p>	
	<p>3.xx. <i>“Manufacturer”</i> means the manufacturer of the ADS vehicle. However, in case that the ADS is not manufactured by the vehicle manufacturer itself, as long as the manufacturer of the ADS is responsible for the safety of the entire ADS vehicle including cybersecurity, this manufacturer of the ADS is also deemed as the manufacturer of the ADS vehicle.</p>	<p>Japan/SAE UK: ADS-08-10 (Alternate strategy to remove the use of “manufacturer”).</p>
	<p>3.xx <i>‘Detected objects’</i> shall mean objects detected by the perception system of the vehicle and classified by the ADS as relevant for the purpose of performing a dynamic driving task.</p>	<p>This term is being discussed by EDR/DSSAD. Given the importance of the perception-related requirements, the term is raised for IWG awareness and discussion if desired.</p>

	Objects with a negative relative velocity shall be deemed relevant.	
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