ADS IWG Working Document
Change Proposal Form
One major comment per form
(Shaded blocks for use by the IWG Secretariat)

Document Reference	ADS-08-15/Rev.1	Date	11 April 2025
Agenda item	Testing provisions		

Proposed by European Commission Joint Research Centre and Rijkswaterstaat as OPIs for the Credibility Requirements and Testing provisions

The following changes are the results of the discussions had in the Credibility and Testing subgroups during the meetings held on 27 March and 03 April

Need to clarify and fine tune the text, ensure consistency with different parts of the Regulation and add an Annex on Scenarios

Location	6.2, 7.2 and a new Annex on Scenarios

6.2.1.2. The manufacturer shall demonstrate that the simulation toolchain(s) is suitable to use for virtual testing by: a) performing a criticality analysis that evaluates the potential risk and consequences of using the simulation toolchain(s) for the assessment of the ADS safety case and functional/user requirements. b) demonstrating that the simulation toolchain(s) fulfils the credibility requirements corresponding to the identified criticality as per the requirements listed in this section.	6.2.1.2. The manufacturer shall demonstrate that the simulation toolchain(s) is suitable to use for virtual testing by: a) performing a criticality analysis that evaluates the potential risk and consequences of using the simulation toolchain(s) ~~for the assessment of the ADS~~ **to produce evidence to support the** safety case [and for the assessment functional/user requirements]. b) demonstrating that the simulation toolchain(s) fulfils the credibility requirements corresponding to the identified criticality as per the requirements listed in this section.	Rationale The simulation toolchain are not assessing the safety case. They produce evidence as part of the testing strategy. [Note 6.2.2.1 on Physical testing has the phrase "to conduct testing and gather evidence to support the safety case".]
6.2.1.11.3. The manufacturer shall provide information on any sanity/consistency checking procedures that are used.	6.2.1.11.3. The manufacturer shall ~~provide information on any~~ **undertake** sanity and consistency checking procedures ~~that are used.~~ and provide information on the results to show that the simulation toolchain(s) is robust.	Rationale It is needed to require to perform sanity checks rather than just providing information about whether this has been carried out.
6.2.1.14.11. The manufacturer shall demonstrate it has techniques to estimate each simulation toolchain's critical inputs.	6.2.1.14.11. The manufacturer shall demonstrate it has techniques to estimate each simulation toolchain's critical inputs and that they have been applied and the results documented	Rationale The manufacturer has to have techniques and that they have been used
6.2.2.1. The manufacturer shall demonstrate that the physical testing facilities (proving ground and/or public roads) and environments are suitable to conduct testing and gather evidence to support the safety case. In particular the manufacturer shall demonstrate that:	6.2.2.1. The manufacturer shall demonstrate that the physical testing facilities (proving ground and/or public roads), ~~and~~ environment **and capabilities** are suitable to conduct testing and gather evidence to support the safety case. In particular the manufacturer shall demonstrate that:	Rationale Included also "capabilities" here and removed a lower level requirement.
6.2.2.1.1. the physical testing facilities includes static and dynamic elements representative of the ODD and the expected operating conditions and as relevant to the tests being performed;	6.2.2.1.1. the physical testing facilities include~~s~~ static and dynamic elements representative of the ODD [and the expected operating conditions and ~~as~~ **are** relevant to the tests being performed];	Rationale To be further discussed whether reference to the expected operating conditions adds anything here
6.2.2.1.2. the facilities and capabilities are suitable to assess the aspects of the safety case under test;	~~6.2.2.1.2. the facilities and capabilities are suitable to assess the aspects of the safety case under test;~~	Rationale: Included capabilities in the higher level requirement and removed this to avoid duplications

6.2.2.1.3. the facilities have all the relevant equipment and accreditations;	~~6.2.2.1.3. the facilities have all the relevant equipment and accreditations;~~	Rationale Equipment is covered by the point below
6.2.2.1.4. the equipment undergoes periodic calibrations to ensure that the measurements are characterized by sufficient accuracy and precision.	6.2.2.1.2.~~4.~~ the equipment undergoes periodic **inspection, maintenance and** calibrations to ensure that the measurements are characterized by sufficient accuracy and precision.	Rationale this stretches the manufacturer's obligations to activities they should be conducting and would be covered under a more general laboratory accreditation (ISO 17020 / 25).
7.1.2. The auditor shall verify that the manufacturer has used suitable and documented processes to derive behavioural competencies and scenarios that are ODD-relevant and are relevant to the ADS safety case.	~~7.1.2. The auditor shall verify that the manufacturer has used suitable and documented processes to derive behavioural competencies and scenarios that are ODD-relevant and are relevant to the ADS safety case.~~	Rationale Agreed to remove 7.1.2 and 7.1.3. from the audit of the SMS in Petten. These provisions are present in 7.3.2.
7.1.2.1. The auditor may refer to the methodology outlined in the Annex [ODD framework annex] as a suitable approach against which to review the approach adopted by the manufacturer.	~~7.1.2.1. The auditor may refer to the methodology outlined in the Annex [ODD framework annex] as a suitable approach against which to review the approach adopted by the manufacturer.~~	
7.1.2.2. The auditor shall verify that the manufacturer's approach and processes to identify and generate scenarios: (a) covers the necessary nominal, critical and failure scenarios (b) takes into account data driven, knowledge driven and stochastic approaches to systematically identify hazardous events and other occurrences used to develop scenarios (c) properly maps and characterises the behaviour of all the elements included in the scenarios.	~~7.1.2.2. The auditor shall verify that the manufacturer's approach and processes to identify and generate scenarios:~~ ~~(a) covers the necessary nominal, critical and failure scenarios~~ ~~(b) takes into account data driven, knowledge driven and stochastic approaches to systematically identify hazardous events and other occurrences used to develop scenarios~~ ~~(c) properly maps and characterises the behaviour of all the elements included in the scenarios.~~	
7.1.2.3. The auditor shall verify that the manufacturer has used sampling techniques when selecting parameters to be used in creating logical and concrete scenarios used as evidence supporting the ADS safety case to avoid the ADS being optimized for a set of known test cases.	~~7.1.2.3. The auditor shall verify that the manufacturer has used sampling techniques when selecting parameters to be used in creating logical and concrete scenarios used as evidence supporting the ADS safety case to avoid the ADS being optimized for a set of known test cases.~~	

7.1.3.	The auditor shall verify that the manufacturer has suitable processes, resources and competent personnel in place for the testing that has been undertaken to demonstrate the ADS safety case.	~~7.1.3.~~	~~The auditor shall verify that the manufacturer has suitable processes, resources and competent personnel in place for the testing that has been undertaken to demonstrate the ADS safety case.~~	
7.1.3.1.	The auditor shall verify that the manufacturer has suitable processes and competent personnel to assess the behavioural competencies demonstrated by the ADS under each scenario against requirements for performance of the Dynamic Driving Task (DDT).	~~7.1.3.1.~~	~~The auditor shall verify that the manufacturer has suitable processes and competent personnel to assess the behavioural competencies demonstrated by the ADS under each scenario against requirements for performance of the Dynamic Driving Task (DDT).~~	
7.1.3.2.	The auditor verify that the manufacturer has suitable processes and competent personnel to assess the capability of the ADS to ensure the safety of users and their use of ADS vehicles.	~~7.1.3.2.~~	~~The auditor verify that the manufacturer has suitable processes and competent personnel to assess the capability of the ADS to ensure the safety of users and their use of ADS vehicles.~~	
7.1.3.3.	The auditor shall verify that the manufacturer has suitable processes in place to identify the set of scenarios to be tested via track-testing.	~~7.1.3.3.~~	~~The auditor shall verify that the manufacturer has suitable processes in place to identify the set of scenarios to be tested via track-testing.~~	
7.1.3.4.	The auditor shall verify that the manufacturer has suitable processes in place to identify test routes that capture predictable aspects of the ODD (e.g., road types and geometries), elements found in the related nominal scenarios (e.g., other road users, signs, and signals), and typical dynamic conditions (e.g., high/low traffic densities). The test routes shall also enable verification of nominal requirements for the safety of user interactions, including prior to, at the time of, and after entering and exiting the ODD of an ADS feature.	~~7.1.3.4.~~	~~The auditor shall verify that the manufacturer has suitable processes in place to identify test routes that capture predictable aspects of the ODD (e.g., road types and geometries), elements found in the related nominal scenarios (e.g., other road users, signs, and signals), and typical dynamic conditions (e.g., high/low traffic densities). The test routes shall also enable verification of nominal requirements for the safety of user interactions, including prior to, at the time of, and after entering and exiting the ODD of an ADS feature.~~	
7.2.1.	Appraisal of the physical testing facilities and environment	7.2.1.	~~Appraisal~~ **Assessment** of the physical testing facilities and environment	Rationale: Assessment judged to be more appropriate in this context
7.2.1.1.	The assessor shall appraise the physical testing (proving ground and/or public road) facilities and environment for their suitability to conduct the testing and gather evidence to support the safety case. In particular the assessor shall verify that:	7.2.1.1.	The assessor shall appraise the physical testing (proving ground and/or public road) facilities**,** ~~and~~ environment **and capabilities** for their suitability to conduct the testing and gather evidence to support the safety case. In particular the assessor shall verify that:	Rationale To align it with the requirement for the manufacturer included in 6.2.2.1 and sub-paragraphs

7.2.1.1.1. the physical testing facilities used by the manufacturer includes static and dynamic elements representative of the ODD and the expected operating conditions and as relevant to the tests being performed;	7.2.1.1.1. the physical testing facilities used by the manufacturer include~~s~~ static and dynamic elements representative of the ODD [and the expected operating conditions and ~~as~~ **are** relevant to the tests being performed];	Rationale To align it with the requirement for the manufacturer included in 6.2.2.1 and sub-paragraphs
7.2.1.1.2. the facilities and capabilities are suitable to assess the aspects of the safety case under test;	~~7.2.1.1.2. the facilities and capabilities are suitable to assess the aspects of the safety case under test;~~	Rationale To align it with the requirement for the manufacturer included in 6.2.2.1 and sub-paragraphs
7.2.1.1.3. the facilities have all the relevant equipment and accreditations;	~~7.2.1.1.3. the facilities have all the relevant equipment and accreditations;~~	Rationale To align it with the requirement for the manufacturer included in 6.2.2.1 and sub-paragraphs
7.2.1.1.4. the equipment undergoes periodic calibrations to ensure that the measurements are characterized by sufficient accuracy and precision.	7.2.1.1.2.~~4.~~ the equipment undergoes periodic **inspection, maintenance and** calibrations to ensure that the measurements are characterized by sufficient accuracy and precision	Rationale To align it with the requirement for the manufacturer included in 6.2.2.1 and sub-paragraphs
NEW	7.2.1.1.3. [Placeholder for a paragraph related to the assessment of accreditations]	Rationale To align it with the requirement for the manufacturer included in 6.2.2.1 and sub-paragraphs
7.2.1.2. The assessor may request to witness the execution of some of the physical tests performed by the manufacturer to verify their suitability to conduct the testing and gather evidence to support the safety case as well as to verify that the manufacturer is following the agreed processes for doing the physical testing.	7.2.1.2. The assessor may request to witness the execution of some of the physical tests performed by the manufacturer to verify their suitability to conduct the testing ~~and gather~~ **to provide** evidence to support the safety case as well as, to verify that the manufacturer is following the agreed processes for doing the physical testing.	Rationale The amendment followed a discussion aimed at clarifying the intentions of the text
7.2.2. Appraisal of the credibility framework developed by the manufacturer for virtual testing	7.2.2. ~~Appraisal~~ **Assessment** of the credibility framework developed by the manufacturer for virtual testing	Rationale To ensure consistency with 7.2.1. **OPI**: We can amend this text to include an explanation of credibility framework as requested by industry. E.g. " Assessment of the credibility framework developed by the manufacturer to demonstrate that the simulation toolchain(s) is suitable for conducting virtual tests"

		In this way the scope of the credibility framework should become clear.
7.2.2.1. The assessor shall verify that the simulation toolchain(s) used by the manufacturer in the assessment of the safety case is suitable for conducting virtual tests and in compliance with requirements listed in 6.2.1. and sub-paragraphs	7.2.2.1. The assessor shall verify that the simulation toolchain(s) used by the manufacturer ~~in the assessment of the safety case~~ is suitable for conducting virtual tests and in compliance with requirements listed in 6.2.1. and sub-paragraphs	Rationale From an assessment perspective this help to limit / compartmentalise the activity. An assessor doesn't have to look at the broader picture of its application, just if it addresses the requirements.
7.2.2.3. The assessor shall review the documentation and evidence supporting the manufacturer's claims about the capability of the simulation toolchain(s), including its scope, to confirm that it can be used to perform virtual testing as part of the ADS assessment.	7.2.2.~~3.~~2.**1.** The assessor shall review the documentation and evidence supporting the manufacturer's claims about the ~~capability of the~~ simulation toolchain(s) **capability**~~, including~~ and its scope~~, to confirm that it can be used to perform virtual testing as part of the ADS assessment~~.	Rationale From an assessment perspective this help to limit / compartmentalise the activity. An assessor doesn't have to look at the broader picture of its application, just if it addresses the requirements. This is a lower level provision to better reproduce the assessment flow.
7.2.3.5. The assessor may request to witness the generation of some of the virtual testing results to verify the evidence indicated in the previous points.	7.2.~~3.5.~~2.2.2. The assessor may request to witness the **execution of the simulation toolchain(s) and the** generation of ~~some of the virtual testing~~ results to verify the evidence **produced by the manufacturer and to understand the use of the simulation toolchain(s)** ~~indicated in the previous points~~.	Rationale Moved to better reproduce the assessment flow and amended to clarify the scope of this action.
7.2.2.4. The assessor shall audit the information provided by the manufacturer and may request or carry out additional physical or virtual tests. The results of these additional tests shall be reviewed and any concerns or discrepancies shall be raised and reviewed with the manufacturer.	7.2.2.~~4.~~2.3. The assessor shall audit the information provided by the manufacturer and may request additional testing to verify their claims. The results of the audit and from any additional tests shall be reviewed and any concerns or discrepancies shall be documented and reviewed with the manufacturer.	Rationale Changed the level of the provision to better reproduce the assessment flow.
7.2.3.4.1. If the results do not sufficiently replicate those of the manufacturer or raise other concerns and the manufacturer cannot provide an explanation for the discrepancies then the assessor shall inform the manufacturer that they need to undertake their own review to identify the reasons.	7.2.~~3.4.~~2.2.3.1. If the information **provided by the results** do not sufficiently ~~replicate~~ **correlate with** those of the manufacturer or raise other concerns and the manufacturer cannot provide an explanation for the discrepancies then the assessor shall inform the manufacturer that they need to undertake their own review to identify the reasons.	Rationale Fine tuned the text to better clarify the type of action
7.2.3.4.2. The manufacturer can resubmit once they have identified and resolved the issue and updated the information. The manufacturer shall explain the issue and its extent. The assessor shall conduct a further review that will include an assessment of	7.2.~~3.4.~~2.2.3.2. The manufacturer can resubmit once they have identified and resolved the issues and updated the information **and evidence**. The manufacturer shall explain the issue and its ~~extent~~ **impact**. The assessor shall conduct a further	

the additional information supplied by the manufacturer.		review that will include an assessment of the additional information supplied by the manufacturer	
NEW	**7.2.2.2.4.**	**The assessor shall document their finding and if successful the simulation toolchain(s) will be accepted as suitable to undertake virtual testing. If not and the manufacturer cannot provide an explanation for any gaps or discrepancies then the assessor shall provide their finding to the manufacturer and inform them that they need to undertake their own internal review to identify the underlying causes.**	
NEW	**Annex [].**	**Traffic scenarios**	
NEW	**[].A**	**What is a traffic scenario?**	
NEW	**[].A.1.**	**A traffic scenario is a description of one or more driving situations that may occur during a given trip . Traffic scenarios (or short scenario in this regulation) can involve many elements, such as roadway layout, types of road users, objects exhibiting static or diverse dynamic behaviours, and diverse environmental conditions (among other factors).**	
NEW	**[].B.**	**Ensuring adequate scenario coverage**	
NEW	**[].B.1.**	**The scenarios-based validation methods should include adequate coverage of relevant, nominal, failure, critical, and complex scenarios to effectively validate an ADS. "Coverage" refers to the degree to which scenarios sufficiently incorporates driving situations in order to validate the relevant requirements of this regulation. Sufficient coverage is essential to the overall effectiveness and credibility of these methodologies as a validation approach. Sufficient coverage should be with respect to the ADS feature or ODD. Coverage can be measured across**	

		different domains, and metrics can be used to determine sufficiency.	
NEW	**[].B.1.**	**When validating the safety of an ADS, each scenario selected to test the ADS should precisely reflects the particular conditions (e.g., road configurations, direction of traffic in a given lane, etc.) that constitute the ODD in which the ADS feature is designed to operate. Scenarios should be relevant to the ADS feature being validated.**	
NEW	**[].B.3.**	**An ADS needs to be responsive to actions by other road users, which may make a crash unavoidable. Therefore scenarios should not be limited to those that are deemed preventable by the ADS. Unsafe behaviours of other road users (e.g., vehicle travelling in the wrong direction, sudden unsignalled lane changes, and exceeding the speed limit) — if reasonably foreseeable within the appropriate ODD — should be included as part of validation testing.**	
NEW	**[].B.4.**	**Consideration should be given to the many approaches that can be used to identify scenarios for safety validation purposes, including:**	
NEW	**[].B.4.1.**	**Analysing human driver behaviour, including evaluating naturalistic driving data;**	
NEW	**[].B.4.2.**	**Analysing collision data, such as law enforcement and insurance companies' crash databases;**	
NEW	**[]. B.4.3.**	**Analysing traffic patterns in specific ODD (e.g., by recording and analysing a road user behaviour at intersections);**	

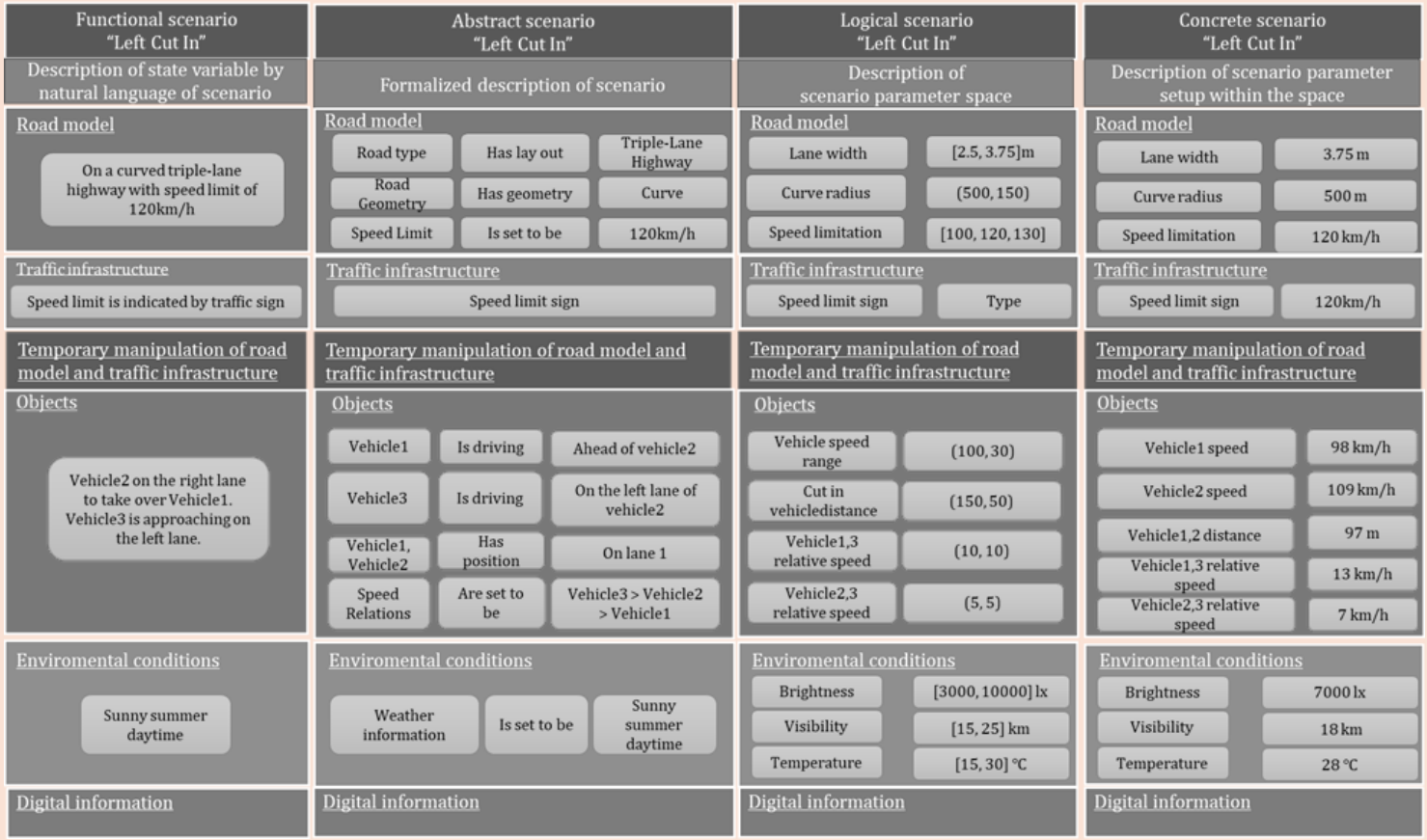
NEW	**[]. B.4.4. Analysing data collected from ADS' sensors (e.g., accelerometer, camera, radar, and global positioning systems);**	
NEW	**[]. B.4.5. Using a specially configured measurement vehicle, onsite monitoring equipment, drone measurements, etc. for collecting various traffic data (including other road users);**	
NEW	**[]. B.4.6. Knowledge/experience acquired during ADS development;**	
NEW	**[]. B.4.7. Synthetically generated scenarios from key parameter variations;**	
NEW	**[]. B.4.8. Engineered scenarios based on functional safety requirements and safety of intended functionality;**	
NEW	**[]. B.4.9. composing complex scenarios from existing catalogues of basic scenarios; and**	
NEW	**[]. B.4.10. Random variations of all scenario parameters, both for the ADS an ORUs.**	
NEW	**[].B.5. A scenario catalogue would not necessarily be exhaustive and authorities may need to consider additional scenarios as necessary to support safety validation of an ADS feature.**	
NEW	**[].C. Classifying scenarios**	
NEW	**[].C.1. The amount of information that is included in a scenario can be extensive. For example, the description of a scenario could contain information specifying a wide range of different actions, characteristics and elements[1], such as objects (e.g., vehicles, pedestrians),**	

[1] Traffic scenarios are derived by combining a number of relevant elements describing the scenario space systematically.

	roadways, and environments, as well as pre-planned courses of action and major events that should occur during the scenario. Therefore, it is critical that a standardized and structured language for describing scenarios is established to understand the intention of a scenario, each other's objectives, and the capabilities of an ADS. One tool for establishing uniform language for describing a scenario is a template, which ensures that the information to be included in the scenario is consistent and minimizes the possibility of confusion in its interpretation.	
NEW	**[].C.2. Scenarios should be described by different levels of abstraction. Abstraction supplies the ability to focus the scenario description on specific aspects, while leaving other details for further processing as needed. Four levels of abstraction are distinguished:**	
NEW	**[].C.2.1. Functional Scenario: A scenario described in natural language on a conceptional level, in general without specific physical values. These are scenarios with the highest level of abstraction, outlining the core concept of the scenario, such as a basic 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 (e.g., environmental conditions etc.). This approach uses accessible language to describe the situation and its corresponding elements.**	
NEW	**[].C.2.2. Abstract Scenario: A formalized, declarative description of the scenario derived from functional scenario.[2] The specification on the abstract level enables highlighting of the relevant aspects of the scenario while focusing**	

[2] Declarative description can include structured natural language, programming language or other forms of languages that meet the required criteria (formalized and declarative).

	on efficient description of relations (Cause-effect).	
NEW	**[].C.2.3. Logical Scenario: A scenario described with the inclusion of parameters, where the values of some of the parameters are defined as ranges. For example, building off the elements identified within the functional scenario, developers generate a logical scenario by selecting value ranges or probability distributions for each element within a scenario (e.g., the possible width of a lane in meters).**	
NEW	**[].C.2.4. Concrete Scenarios: A scenario depicted with explicit parameters values, describing physical attributes. Concrete scenarios are established by selecting specific values for each element. This step ensures that a specific test scenario is reproducible. In addition, for each logical scenario with continuous ranges, any number of concrete scenarios can be developed, helping to ensure a vehicle is exposed to a wide variety of situations.**	
NEW	**[].C.3. The following figure shows the different options of using the levels of abstractions in order to derive concrete scenarios.**	
An example of the relationship between functional scenario, abstract scenario, logical scenario and concrete scenario (ISO 34501)		



NEW	**[].D. Scenario usage**	
NEW	**[].D.1. The use of scenarios can be applied to different testing methodologies, such as virtual/simulation, track testing, and real-world testing. These methodologies provide a multifaceted testing architecture, with each methodology possessing specific strengths and weaknesses. Therefore, some scenarios may be more appropriate for certain test methodologies than for others.**	
NEW	**[].D.2. Sampling techniques should be used when selecting parameters to be used in creating logical and concrete scenarios for ADS**	

	validation for a particular ADS and its ODD to avoid the ADS being optimized for a set of known test cases. Using a maximum number of random samples is clearly preferable from a credibility perspective	