

DDT FRAV/VMAD guidelines converted to regulatory language

| Current Text | Proposals and comments | Meeting comments |
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| 4. General Requirements | | |
| 4.2. ADS Performance of the DDT Introduction The following subsections recommend criteria for validating the safety of ADS and/or ADS vehicles. Annex 2 contains a matrix linking these criteria with recommended test methods. | | |
| 4.2.1. As a general concept, The safety level of ADS shall be at least to the level at which a competent and careful human driver could minimize the unreasonable safety risks to the ADS vehicle user(s) and other road users. The subsections below concern ADS performance of the DDT. The recommended requirements have been drafted for worldwide application. These requirements, therefore, do not specify technical performance limits due to the diversity of ODD specific conditions and requirements that may influence safe performance of the DDT. | OPI: Open item Significant further discussion is required to explain what is meant by competent and careful human driver in this context | |
| 4.2.2 The ADS shall be capable of performing the entire Dynamic Driving Task (DDT) within the ODD of its feature(s); | | |
| Scenario generation and behavioural competencies Driving involves real time risk management under prevailing traffic conditions. Therefore, safe ADS performance of the DDT depends upon the conditions presented under each individual scenario. The manufacturer shall use a process to derive behavioural competencies and scenarios that are ODD-relevant. The methodology used in Annex [x] can be used or alternative methods providing they are equally comprehensive. | OPI: Open Item changed the reference to regulatory language to refer to the ODD Framework (Integration document Annex 3) Further discussion needed on this issue, particularly whether the use of behavioural competencies is mandated. | |
| Annex [] provides a recommended approach to scenario generation and to the establishment of ADS behavioural competencies to be demonstrated under | | |

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| <p>these scenarios. Each scenario is associated with one or more behavioural competencies.</p> | | |
| <p>The ODD based approach to scenario generation provides analytical methods to ensure that the scenarios cover the ODD of the ADS feature(s). These scenarios address nominal, critical, and failure situations to enable assessments in accordance with the WP.29 Framework Document on Automated Vehicles (FDAV). The behavioural competencies define ADS responses that comply with the following global requirements (Subsection 5.3) within the bounds of a relevant safety model quantifying dimensions for assessment of ADS performance (as described in Annex []). The behavioural competencies align with the layer of abstraction of the scenario to provide verifiable criteria at the functional layer down to measurable criteria at the concrete layer of abstraction.</p> | | |
| <p>Compliance with the recommended requirements under the following subsection 5.3 is determined by verifying that the ADS demonstrates the behavioural competencies associated with the scenarios relevant to the ODD of its features. These requirements shall be applied in the definition of behavioural competencies to be demonstrated under traffic scenarios.</p> | | |
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| <p>5. Requirements/Specifications</p> | | |
| <p>5.3. ADS Performance of the DDT</p> | | |
| <p>5.3.1. ADS Performance of the DDT under Nominal Traffic Scenarios</p> <p>The following recommendations address the Framework document on automated/autonomous vehicles (ECE/TRANS/WP.29/2019/34/Rev.2) guidance that ADS vehicles shall not cause traffic accidents or disrupt traffic. Compliance with this broad objective can be verified by subjecting the ADS and/or ADS vehicle to nominal traffic scenarios representing usual and expected traffic conditions and behaviours. By minimizing risk factors outside the ADS nominal performance of the DDT, the impact of the ADS driving behaviour on other road users and the flow of traffic can be isolated. This section recommends requirements for assessing ADS performance of the DDT under normal operational and driving conditions.</p> | | |

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| 5.3.1.1. The ADS shall operate the vehicle at safe speeds; | OPI Open item Clarity required on meaning of “safe speeds” | |
| 5.3.1.2 The ADS shall maintain appropriate distances from other road users by controlling the longitudinal and lateral motion of the vehicle; | | |
| 5.3.1.3. The ADS shall adapt its driving behaviour to the surrounding traffic conditions in order to (e.g., by avoid disruption to the flow of traffic); | OPI: Open item What should be done when nominal requirements conflict? e.g. other traffic is speeding and the ADS avoiding doing so would disrupt the flow of traffic. OPI: Linked Open item Clarity on definitions of nominal and critical scenarios is needed to be clear which requirements apply. e.g. would the above scenario be critical? | |
| 5.3.1.4. The ADS shall adapt its driving behaviour in line with safety risks (e.g., by giving all road users and passengers the highest priority); | OPI: Removed unclear language | |
| 5.3.1.5. The ADS shall detect and respond to objects and events relevant to its performance of the DDT; | | |
| 5.3.1.6 The ADS shall detect and respond to priority vehicles in-service in accordance with the relevant traffic law(s); | OPI: Concept of “in service” is covered by the definition of priority vehicles | |
| 5.3.1.7 Under nominal traffic scenarios, The driving behaviour of the ADS shall not force other road users to take evasive action to avoid a collision with the ADS vehicle; | OPI: Removed unnecessary language as this is the nominal scenario section Open Item definition required for evasive action | |

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| <p>5.3.1.8 Under nominal traffic scenarios, The driving behaviour of the ADS shall not cause a collision;</p> | <p>OPI: Removed unnecessary language as this is the nominal scenario section</p> <p>OPI: Open Item This requirement needs to be considered with 5.3.1.11 whether there is overlap and if nominal scenarios is the correct placement</p> | |
| <p>5.3.1.9 The ADS shall comply with traffic rules in accordance with application of relevant law within the area of operation;</p> | | |
| <p>5.3.1.10 The ADS shall interact safely with other road users;</p> | | |
| <p>5.3.1.11 The ADS shall avoid collisions with safety-relevant objects where possible;</p> | <p>OPI: Consider with 5.3.1.8 above</p> | |
| <p>5.3.1.12 The ADS shall signal intended changes of direction;</p> | <p>OPI: Open item Clarity required on whether this is talking about more than just indicators (if not then is it necessary given 5.3.1.9?)</p> | |
| <p>5.3.1.13 The ADS shall signal its operational status in accordance with national rules;</p> | <p>OPI: Clarity required on meaning, could us “if required by” to replace “with”</p> | |
| <p>5.3.1.14 Pursuant to a passenger request under para. [7.5.5 a)], the ADS shall bring the vehicle to a safe stop.</p> | | |
| <p>5.3.2. ADS Performance of the DDT under Critical Traffic Scenarios</p> <p>The following recommendations address the Framework document on automated/autonomous vehicles (ECE/TRANS/WP.29/2019/34/Rev.2) guidance that ADS vehicles shall not cause any traffic accidents resulting in injury or death that are reasonably foreseeable and preventable.</p> <p>Compliance with this broad objective can be verified by subjecting the ADS and/or ADS vehicle to critical traffic scenarios representing unusual or unexpected traffic conditions, objects, and/or object behaviours that elevate road safety risks. By introducing foreseeable external risk factors into scenarios, the</p> | <p>OPI: removed justification</p> | |

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| capability of the ADS to manage safety critical events that may arise within its ODD can be assessed. | | |
| 5.3.2.1 The requirements for DDT performance under nominal scenarios shall continue to apply during critical scenarios as far as is reasonably practicable under the specific circumstances with the aim of minimising overall risk; | | |
| 5.3.2.2 In the event of a collision, the ADS shall stop the vehicle in an MRC and/or in accordance with applicable traffic laws; | OPI: Open item Define Collision thresholds, consider “in the event of a collision” is not specific to the ADS | |
| 5.3.2.2.1 The ADS shall not resume travel until: a) the safe operational state of the ADS vehicle has been verified, b) it is permissible under the applicable <u>law</u> / traffic rule(s), c) there are no other safety considerations; | OPI: Grouped into one requirement to avoid inconsistent wording Open Item is b necessary give 5.3.1.9 ,? what other safety considerations does c refer to? | |
| 5.3.2.2.2 The ADS may resume the trip where permissible under the applicable traffic rule(s) and other safety considerations. | OPI: Merged into 5.3.2.2.1. | |
| 5.3.3. ADS Performance of the DDT under Failure Scenarios The following recommendations address the Framework document on automated/autonomous vehicles (ECE/TRANS/WP.29/2019/34/Rev.2) guidance regarding the assurance of system safety and responses to system failures that compromise the capability of the ADS to perform the entire DDT: | OPI: Removed justification There should be a link from this section to the relevant safety concept section for failure analysis | |
| 5.3.3.1 The requirements for DDT performance under nominal scenarios shall continue to apply during failure scenarios as far as is reasonably practicable under the specific circumstances with the aim of minimising overall risk; | | |
| 5.3.3.2 The ADS shall detect faults, malfunctions, and abnormalities that compromise its capability to perform the entire DDT within the ODD of its feature(s) per the manufacturer’s documentation under Section [] above; | OPI: ODD is not linked to documentation elsewhere. According to the definition 3.11.1 whenever DDT is mentioned it refers to the entire DDT so no need to specify here | |

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| <p>5.3.3.3 The ADS shall execute a fallback response in the event of a failure in the ADS and/or other vehicle system that prevents the ADS from meeting the requirements of this regulation performing the DDT;</p> | <p>OPI: Open Item</p> <p>There are a variety of ways that the concept of the ADS being unable to perform the DDT anymore is described. Consistent language should be used.</p> | |
| <p>5.3.3.4 The ADS may continue to operate in the presence of faults that do not prevent that the ADS from fulfilling the safety requirements of this regulation applicable to the ADS;</p> | <p>OPI: See open item 5.3.3.3</p> | |
| <p>5.3.3.4.1 In response to a fault, the ADS may permit activation and use of a feature impacted by the fault provided that the ADS continues to provide the functions necessary to perform the entire DDT;</p> | <p>OICA-CLEPA: Prefer this wording to the above 'meeting requirements of the regulation</p> | |
| <p>5.3.3.4.2 The ADS shall adapt its performance of the DDT in accordance with the severity of the fault to ensure road safety;</p> | <p>OPI: Open item</p> <p>Some of the subpoints to 5.3.3.4 seem redundant, perhaps this requirement should be rewritten to avoid duplication</p> | |
| <p>5.3.3.4.3 The limited operation of the ADS should shall comply with the normally applicable safety requirements of this regulation;</p> | <p>OPI: See open item 5.3.3.3 and 5.3.3.4.2</p> | |
| <p>5.3.3.4.4 The ADS shall prohibit activation of an ADS feature in the presence of a fault in an ADS function that compromises the ADS capability to comply with the requirements of this regulation. perform the entire DDT within the ODD of the feature;</p> | <p>OPI: See open item 5.3.3.3 and 5.3.3.4.2</p> | |
| <p>5.3.3.5 Remote termination of individual or multiple ADS or feature(s) by the manufacturer and/or service operator shall be possible when requested by Authorities;</p> | | |
| <p>5.3.3.5.1 Remote termination for an ADS performing the DDT shall be capable of triggering an ADS fallback response;</p> | <p>OPI: Open item should it be be capable of vs shall trigger?</p> <p>Consider connectivity issues</p> | |
| <p>5.3.3.5.2 Remote termination of an ADS or ADS feature(s) shall render them it unable to be activated by a user.</p> | <p>OPI: Editorial change</p> | |
| <p>5.3.4 ADS Performance of the DDT at ODD Boundaries:</p> | | |

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| 5.3.4.1 | The ADS shall recognise the conditions and boundaries of the ODD of its feature(s) pursuant to the manufacturer's description of the ODD as described under [Documentation requirement ref]Chapter 5; | OPI: ODD will be defined in the documentation section | |
| 5.3.4.2 | The ADS shall be able to determine when the conditions are met for activation of each feature; | | |
| 5.3.4.3 | The ADS shall prevent activation of a feature unless the ODD conditions of the feature are met; | | |
| 5.3.4.4 | The ADS shall execute a fallback response when one or more ODD conditions of the feature in use are no longer met; | | |
| 5.3.4.5 | The ADS shall be able to anticipate and safely respond to foreseeable exits from the ODD of each feature. | OPI: Without "respond" this is not requiring the ADS to do anything. | |
| 5.3.5 | Minimal Risk Condition Requirements: | | |
| 5.3.5.1 | The ADS shall signal its intention to place the vehicle in an MRC; | OPI: Clarify does this refer to ORU? | |
| 5.3.5.2 | In the absence of a fallback- ready user, the ADS fallback response shall be to fall back directly to an place the vehicle in a MRC; | OPI: Fallback ready user is not a defined term | |
| 5.3.5.3 | If the ADS feature is designed to request and enable intervention by a fallback user human driver , the ADS should shall execute a fallback to an MRC in the event of a failure in the transition of control to the user; | OPI: Open Item it would be useful to have a term to refer to these systems without having to explain them every time, suggest this is covered by user group and TF AVC | |
| 5.3.5.4 | Upon completion of a fallback to an MRC, a user may be permitted to assume control of the vehicle. | | |
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