

§5.1. DDT performance

Green means text accepted by IWG.

Blue means generally accepted subject to editorial improvement.

Orange means the text has raised substantive reservations.

5.	ADS Requirements		
5.1.	ADS Performance of the DDT		
5.1.1.	The ADS shall be capable of performing the entire Dynamic Driving Task (DDT within the ODD of its feature(s).	5.1.1. The ADS shall be capable of performing the entire DDT within the ODD of its feature(s).	Sec: Use “DDT” acronym for brevity.
	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.		Not an ADS DDT performance requirement. The “process” should be included under the SMS section. The outcome of the process falls under the safety case (description of the ODD and claims that the ADS can operate the vehicle within the ODD in accordance with the ADS requirements). Scenario coverage of the ODD should be addressed under the assessment of the test environment(s). The scenarios need to be sufficient to determine whether the ADS is capable of performing the entire DDT and demonstrates behavioural competencies consistent with the DDT performance requirements.
5.1.2.	ADS Performance of the DDT under Nominal Traffic Scenarios		
5.1.2.1.	The driving behaviour of the ADS shall not cause a collision.		Agreement to keep text with the addition of a footnote. OPI suggestion Footnote: "It is

		acknowledged that establishing causation can be complex, and not always possible. However, where it is established that the behaviour of an ADS caused a collision, this is a non-compliance with this requirement."
5.1.2.2.	The ADS shall adapt its speed in line with safety risks.	
5.1.2.3.	The ADS shall maintain appropriate distances from other road users by controlling the longitudinal and lateral motion of the vehicle.	
5.1.2.4.	The ADS shall avoid unreasonable disruption to the flow of traffic in line with safety risks.	
5.1.2.5.	The ADS shall adapt its driving behaviour in line with safety risks.	
5.1.2.5.1.	The ADS shall demonstrate anticipatory behaviour to reduce the risk of encountering a critical scenario.	Principle accepted but wording awkward and unclear on performance threshold.
5.1.2.6.	The ADS shall detect and respond to objects and events relevant to its performance of the DDT.	
5.1.2.7.	The ADS shall detect and respond to priority vehicles in accordance with the applicable traffic law(s).	<p>China proposal The ADS shall detect and respond to priority vehicles in accordance with the applicable traffic law(s). Notwithstanding the paragraph above, a system-initiated deactivation of the ADS may be initiated for ADSF-1.</p> <p>China proposal Reason: Considering the requirements in the UN R157, the approaching emergency vehicles/enforcement vehicles as an unplanned event, and the ALKS could initiate a transition demand in case of an unplanned event, so the technical logic specified in the UN R157 should be reflected in the new ADS regulation. UN R157 2.5.: "Unplanned event" is a situation which is unknown in advance, but assumed as very likely in happening and which requires a transition demand. This may include: road construction,</p>

		<p>inclement weather, approaching emergency vehicles/enforcement vehicles, missing lane markings, load falling from truck.</p>
<p>5.1.2.8. The ADS shall not force other road users to take evasive action to avoid a collision with the ADS vehicle.</p>		<p>Sec: Does this relate to 5.1.2.4.? Wouldn't the ADS behaviour covered here be covered by the disruption of traffic? Wouldn't forcing a change in the nominal behaviour of another vehicle be considered "disruption of the flow of traffic"?</p> <p>SAE: Remove requirement: This is not enforceable. Whether another road user was "forced" to take evasive action or took that action unnecessarily requires detailed analysis. Moreover, sometimes this could be the safer course, e.g., where a child runs in front of the ADS vehicle, which stops immediately, causing the trailing vehicle to serve to avoid rear-ending the ADS vehicle.</p> <p>OPI: Note this is a nominal requirement and so not children will be running in front of the ADS. Would defining evasive action or emergency manoeuvre help (5mps-2 ?) and perhaps using a similar footnote 5.1.2.1</p>
<p>5.1.2.9. The ADS shall comply with traffic rules in accordance with application of relevant law within the area of operation.</p>		
<p>5.1.2.10. The ADS shall interact safely with other road users.</p>		<p>Sec: Does this provision overlap with 5.1.2.1., 5.1.2.4., 5.1.2.8.? Might this provide a high level (4-digit) requirement that could be elaborated by sub elements (5-digit)?</p>
<p>5.1.2.11. The ADS shall avoid collisions with safety-relevant objects.</p>		<p>Sec: Do we need to define/clarify "safety-relevant objects"? Might this be covered by the ODD analysis to provide an objective inventory of safety-relevant objects existing within the ODD?</p>

		SAE: Are we going to define safety relevant object?
5.1.2.12.	The ADS shall signal its operational status if required by applicable laws.	
5.1.2.13.	Pursuant to a passenger request under para. 5.2.4.1., the ADS shall bring the vehicle to a safe stop. ¹	
5.1.2.14.	The ADS shall have strategies in place to appropriately detect and respond to instructions from road safety agents.	“appropriately” needs objective criteria.
5.1.3.	ADS Performance of the DDT under Critical Traffic Scenarios	
5.1.3.1.	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 safety risks.	
5.1.3.2.	In the event of a collision involving the ADS vehicle, if required to stop by applicable law, the ADS shall stop or fall back to an MRC as appropriate. During this process the user may initiate deactivation of the ADS if the design of the ADS allows.	Discussed during ADS-07 but needs confirmation due to new text. The second sentence probably should be 5.1.3.2.1. (i.e., subsidiary to the requirement to initiate the fallback). “stop” is a fallback to an MRC (assuming no other option than to simply stop).
5.1.3.2.1.	The ADS shall not resume travel unless:	
	(a) The safe operational state of the ADS vehicle has been verified, and	

¹ Para. 5.2.4.1.: “The ADS shall provide the passenger(s) with means to request to stop the vehicle.”

(b) It is permissible under the applicable law.		
---	--	--

<p>5.1.3.2.2. Notwithstanding 5.1.3.2.1., if possible, the ADS [may move the vehicle if this is required/ shall move the vehicle, if technically possible and safe] in order to appropriately respond to a road safety agent.</p>		<p>OPI: Discussion required on this point, see ADS-07-21 for some options.</p> <p>UK proposal 5.1.3.2.2. Notwithstanding para. 5.1.3.2.1., the ADS may move the vehicle if directed to do so by a roadsafety agent.</p> <p>Or Australia proposal 5.1.3.2.2. If directed by a road safety agent, the ADS shall move the vehicle in accordance with the conditions of 5.1.3.2.1 and if the manoeuvre does not otherwise pose a risk to human safety.</p>
<p>5.1.4. ADS Performance of the DDT under Failure Scenarios</p>		
<p>5.1.4.1. 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 safety risks.</p>		
<p>5.1.4.2. The ADS shall detect faults, malfunctions, and abnormalities that compromise its capability to perform the DDT within the ODD.</p>		<p>The SMS provisions should require processes to identify these faults, etc. The safety concept provisions should require documentation of the means to detect these faults, etc. per the outcomes of the SMS analysis. The safety case provisions should require evidence that the means used to detect the faults is effective.</p>
<p>5.1.4.3. In response to a fault, the ADS shall either:</p>	<p>5.1.4.3. In response to a fault, the ADS shall</p>	<p>“either” not necessary given “or” in 5.1.4.3.(a)</p>
<p>(a) Execute a fallback response and prohibit activation of the impacted feature(s) if the fault prevents the ADS from performing the DDT in</p>		

	accordance with the requirements of 5.1., or		
	(b) Adapt its performance of the DDT in accordance with the severity of the fault provided the resulting performance complies with the requirements of section 5.1.		
5.1.4.4.	The ADS shall be capable of remote termination.		
5.1.4.4.1.	Remote termination for an ADS performing the DDT shall be capable of triggering an ADS fallback response.		
5.1.4.4.2.	Remote termination of an ADS or ADS feature(s) shall render it unable to be activated by a user until such time as the remote termination is rescinded.		
5.1.5.	ADS Performance of the DDT at ODD Boundaries		
5.1.5.1.	The ADS shall recognise the conditions and boundaries of the ODD of its feature(s).		
5.1.5.2.	The ADS shall be able to determine when the conditions are met for activation of each feature.		
5.1.5.3.	The ADS shall prevent activation of a feature unless the ODD conditions of the feature are met.		
5.1.5.4.	The ADS shall execute a fallback response when one or more ODD conditions of the feature in use are no longer met.		

5.1.5.5.	The ADS shall be able to anticipate and safely respond to foreseeable exits from the ODD of each feature.		
5.1.6.	Mitigated Risk Condition Requirements		Review: Does this section set requirements for the MRC (the criteria for determining whether the scenario outcome achieves a stopped stable condition that reduces the risk of a crash) or for fallbacks to an MRC (requirements for the safety of the fallback process to achieve the MRC)?
5.1.6.1.	In an ADS vehicle that does not require the presence of a fallback user, the ADS fallback response shall be to place the vehicle in an MRC.	5.1.6.1.	For ADS features of type 2, the ADS fallback response shall be to place the vehicle in an MRC.
5.1.6.2.	If it has not been possible to complete a system-initiated deactivation process, the ADS shall execute a fallback to an MRC.	5.1.6.2.	For ADS feature of type 1, if it has not been possible to complete a system-initiated deactivation process, the ADS shall execute a fallback to an MRC.
5.1.6.4.	Upon completion of an ADS fallback to an MRC, a user may be permitted to assume control of the vehicle.		

	The ADS shall be able to determine whether itself is unmanned when performing the DDT.		German proposal made in August, has not had substantial discussion yet.
	The ADS shall adapt its performance of the DDT in accordance if it is unmanned.		German proposal made in August, has not had substantial discussion yet.