



European Transport Safety Council

ETSC COMMENTS

ON THE PROPOSED REQUIREMENTS FOR AUTOMATED DRIVING SYSTEMS (ADS)

This document sets out feedback from the European Transport Safety Council (ETSC) on the draft Commission Implementing Regulation laying down the procedures and specifications for the type-approval of fully automated vehicles with regards to their automated driving system (ADS).

GENERAL COMMENTS

1. Interaction with different types of vulnerable road users in urban environments is insufficiently covered in Annex 3

The implementing act's compliance assessment requirements and procedures (Annex 3), and notably the tests listed in its third part, are primarily focused on the performance of the vehicle with the ADS vis-a-vis other vehicles. However, with the inclusion of urban environments in the use cases covered by the implementing act, this is not sufficient. While pedestrians and cyclists are occasionally explicitly considered as well, they are not taken into account sufficiently, as can be seen by the comments on the specific provisions in the next section.

ETSC furthermore feels that the provisions on the compliance assessment in general, and the first and third part of Annex 3 in specific, fail to systematically include other road users that are commonly encountered in urban areas, such as wheel chair users and personal light electronic vehicles (PLEVs, e.g. e-scooters), amongst others.

While on paper these should be considered as part of Appendix 1 to Part 1 of Annex 3 on the principles to be followed to derive scenarios relevant for the ODD of the ADS, the lack of explicit provisions (in part 3) to validate the performance in situations when such other types of common road users could be encountered is from ETSC's point of view insufficient to guarantee the operational safety of the vehicles in urban environments.

2. Assessment of compliance with other countries' traffic rules is unclear

It remains unclear how type approval authorities or their technical services would validate the compliance with the performance requirements in the context of the vehicles designed to also operate in other countries, and in particular compliance with the other country's/countries' traffic rules. If this is merely verified through the audit process, then ETSC considers this as insufficient, as it should be verified on the ground as well, notably in real driving conditions of the other country/countries covered by the design and type approval. Moreover, vehicles that have the possibility to cross borders should be subjected to physical assessments that verify that the vehicle correctly recognises the crossing of the border and adapts accordingly.

3. A lack of assessment of the vehicle's/ADS' anticipatory behaviour

While anticipatory behaviour by the vehicle/system is required, which is warmly welcomed by ETSC, it is not (explicitly) part of the requirements and parameters for the minimum tests as set out in Part 3 of Annex 3. It could be considered as a general requirement to be validated during all tests and in particular as part of the assessment of the vehicle's overall behaviour during real driving conditions (as per point 4.1.1. of Part 2 of Annex 3). However, the lack of provisions/requirements for the real world testing aspect, as well as the lack of a dedicated test (in Part 3 of Annex 3) on this topic, means that it is not assured that the vehicle will be assessed based on its anticipatory behaviour during the physical testing process, as there is no guarantee that the vehicle will encounter a scenario that would allow for such assessment. ETSC therefore calls for further provisions to set out how the compliance with the requirement to demonstrate anticipatory behaviour should be assessed during real world driving, and for tests to be included that are specifically designed to assess the anticipatory behaviour of the automated vehicles as part of track testing, prior to commencing any on road verification.

This point also highlights that the implementing act's provisions on the testing in real world conditions are not sufficient and should be further elaborated upon, in order to ensure that the overall behaviour of the automated vehicle in traffic can be satisfactorily assessed.

4. Acceptable safety levels should be set by authorities

ETSC is concerned about the provision (Annex 2, point 7.1.1) that allows manufacturers to define the acceptance criteria – and thereby the accepted safety levels – for their own vehicles. ETSC understands that any defined acceptance criteria would be assessed and approved of by the type approval authorities. However, ETSC considers that as a principle, acceptable safety levels should be set by regulators, and it should be up to manufacturers to demonstrate their compliance with it. ETSC therefore calls for this provision to be revised accordingly.

SPECIFIC COMMENTS

Annex II – Performance Criteria

- 1.1.3. See the third general comment above on the lack of compliance verification of this provision on anticipatory behaviour.
- 1.3 See the second general comment above on the assessment of compliance with traffic rules in countries other than the type-approval authority's country.
3. In particular points 3.1, 3.1.3. and 3.1.5. which require the ADS to recognise and anticipate ODD boundaries, and if such boundary is reached, to perform a minimum risk manoeuvre. Similar to the comment raised to 1.1.3. and the third general comment, while the requirements are set, the verification and testing provisions do not explicitly require checks to verify compliance with these requirements. While such assessment is allowed (for example as part of point 3 on environmental conditions of Part 3 of Annex 3) and while it is presented as one possible checks regarding OEDR performance verification (Point 4.1.2.1 in Part 2 of Annex 3), from ETSC's perspective the minimum list of tests to be conducted should include a test that verifies the correct behaviour of the vehicle when reaching different types of ODD boundaries and, as part of that test, the correct execution of a minimum risk manoeuvre.
- 7.1 ETSC underlines that the provisions on defining the acceptance criteria as referenced in 7.1.1. should take into account not merely *existing* accident data, but *recent* accident data for the given operational area and service. For example, using decades old aggregated national data on different vehicle categories to determine the acceptance criteria of valet parking applications risks a deterioration of the road safety level for a number of different reasons.

ETSC furthermore calls for a requirement that the acceptance criteria should be set at a higher level of safety performance than currently achieved according to the recent accident data for the respective service and/or operational area. This as automated driving should contribute to the goals and targets the European Union has set for improving road safety, and not merely continue the status quo on our roads. ETSC welcomes in this regard the reference to the performances from competent and carefully driven manual vehicles and technology state-of-the-art.

In line with the European Union's targets to halve the number of road deaths and serious injuries during the decade 2021-2030, ETSC calls for the provisions to explicitly reflect that both fatalities and serious injuries should be taken into account for the minimum safety performance level.

Furthermore, with a view of contributing to the European Union's goal of achieving Vision Zero by 2050, the safety standards should become stricter over time. The implementing act should therefore include a commitment to periodically review the minimum levels of safety performance that is required from these vehicles/use cases.

See also the fourth general comment on the principle that authorities should set acceptable safety levels.

- 9.6.2 In line with the concerns expressed on the delegated act concerning event data recorders (EDR), ETSC is concerned about the prohibition to retrieve data on date, time and location. Such data is of vital importance for the usefulness of EDR data for road safety research purposes.¹

Annex III – Compliance Assessment

Part 1: Traffic Scenarios to Consider

For the following paragraphs: 1.3.1.; 1.5.3.2.1.; 1.6.1. :

These paragraphs reference UN Regulation No. 157, which in a footnote earlier in the document on the Annexes has been defined as the text of the original series of this UN Regulation by referencing the entry in the EU's Official Journal. The provisions in the original series of UN R157 are set out for vehicle speeds up to 60 km/h, on motorways only, and do not provide for provisions on lane changes. The references to UN R157 in the paragraphs listed above are therefore insufficient to cover the use cases of the implementing act, which allow for operation on non-motorways, for lane changes and for speeds over 60 km/h. (1.5.3.2.2. would provide provisions that would alleviate the issue of 60 km/h speed limit from UN R157 for paragraph 1.5.3.2.1., however by not setting expected additional avoidance or speed reduction targets, it is considered insufficient in ETSC's view.)

- 1.3.1. As mentioned above, the scenarios and parameters set out in the referenced version of UN Regulation No. 157 are designed for driving on motorways and moreover do not contain lane change scenarios. They are therefore not sufficient to cover the scenarios and parameters for lane changes in urban driving. Even if UN Regulation No. 157 would regulate lane changes, these provisions would likely be insufficient to assess lane changes in urban and sub-urban environments, given the differences in infrastructure design (e.g. operation on unseparated roads) and the different types of road users that can be expected to be encountered.

¹ <https://etsc.eu/car-black-boxes-will-be-virtually-useless-to-safety-researchers/>

Emergency manoeuvre scenarios (point 1.5 of Part 1 of Annex 3) do take into account these different road users for example, and ETSC strongly feels that the same should be done for normal/nominal lane changes. (Although the comment on different types of road users beyond pedestrians and cyclists remains equally valid for point 1.5.2 as well)

- 1.5.2. The provision uses the term 'jaywalking' to describe pedestrians crossing the road. Given the history of the term, coupled with the negative connotation it has while being a perfectly legal activity in several EU countries, ETSC recommends replacing the term, for example with "as well as with pedestrians who can start to cross the street". This wording would furthermore maintain the difference with the provisions of 1.5.3.1.1., where the pedestrian is already crossing the street.
- 1.5.2. The provision requires collisions between vehicles, pedestrians and cyclists to be avoided under the circumstances set out. However, several parameters are defined only taking into account vehicles. TTC_{cut-in} omits to reference cutting-in pedestrians. V_{rel} only references vehicles, and not cyclists (which are referenced separately from vehicles in the rest of the text as well) and pedestrians. The term 'inserting road users' and 'another road user' are used in other parts of the provision, and could be used as well in the parameter definitions.
- 1.5.3.1.1. This provision sets a velocity of max 5 km/h for pedestrians and 15 km/h for cyclists. ETSC considers that these values are rather low, and that it can reasonably be expected for pedestrians and cyclists to move at a higher speed under normal conditions and scenarios. The collision avoidance requirement with crossing pedestrians and cyclists should take this into account and be set more ambitiously than the currently proposed values.
- 1.7.1 In the context of the parameters to be used for automated valet parking, special attention should also be given to other vulnerable road users, such as users of wheelchairs.

Appendix 1 to Part 1 of Annex 3

- 2.1.1. Although Table 1 on dynamic elements and their properties serves merely as an example, an update of the table should be considered to better represent the wide variety of road users that are commonly encountered, especially in urban areas, including for example wheelchair users, e-scooters, e-bikes and cargo bikes.
- 2.2.3. The text quotes (albeit as examples) several safety requirements that are not included as such in the text, but are requirements as set out in work conducted at UNECE WP.29. It would be more appropriate to provide as examples the texts of the corresponding safety requirements in this implementing act, e.g. the texts of paragraphs 2.1 and 4.1, which also have further sub-requirements.

Part 2: Assessment of the ADS Safety Concept and Audit of the Manufacturer SMS

- 1.1.1. Given that the Annex has several parts and each with their own numbering, it is not fully clear nor easily understandable what is referred to with the part sentence “as specified in point 4 of this annex”. ETSC interprets it as meaning the fourth section of Part 2 of Annex 3 starting on page 31, which concerns the verification and tests. (This comment also applies to 3.1.1. (b) of Part 2)
- 4.1.2. This paragraph states that the type-approval authority shall not check the reaction of the ADS to multiple simultaneous failures of units. ETSC is unsure as to the reason why this would not be checked. From ETSC’s point of view, it should at the very least not be prohibited, as such situations could be of importance for sensor fusion systems.

Part 3: Tests

- 8.2.2. The currently listed scenarios to be tested for lane changing manoeuvres do not take into account the multitude of different road users that can be encountered during lane changes in urban areas. ETSC therefore calls for test scenarios involving cyclists and pedestrians to be included (depending on the ODD of the vehicle), as well as other modes of transport depending on the national rules of the country considered for approval (e.g. e-scooters in countries where they are required to ride on the road).
- 8.3. Also the currently listed scenarios to be tested for responses to different road geometries do not take into account other road users besides vehicles. Notably the interaction with/response to pedestrians, cyclists and other vulnerable road users on intersections or roundabouts should be validated. An example of an interaction that should be validated is a desired turn into a street on the right hand side of the automated vehicle, while a cyclist in an adjacent (cycling) lane on the right hand side is continuing straight on (the ‘right hook’ scenario). These tests should be executed on test tracks with targets, rather than during on-road testing as is the case for point 8.3, due to the potential risks posed to the vulnerable road users. Such test should therefore also precede on-road testing. (Note: the provisions of 8.4.1. sub point (c) are not sufficient to validate this.)
- 8.5.1. In line with the comment made to point 1.5.3.1.1. of Part 1 of Annex 3, the velocity used for the crossing of pedestrians (in subpoint d) and cyclists (in subpoint g) should be increased.
- 8.7 Given the urban context of the use cases, at a minimum, bicycle targets should be included as lead vehicles for the “following a lead vehicle” tests. The necessity for a vehicle to follow a bicycle or group of bicycles as a lead vehicle in urban areas is not uncommon in several European countries.

- 8.8 The provisions in paragraph 8.8 require the avoidance of a collision with a vehicle or other road user, however the provisions of paragraph 8.8.1 and 8.8.2 only refer to vehicles. As a minimum, cut-in of bicycles should be included, and consideration should be given to other modes of transport commonly encountered in urban areas (e.g. cargo bikes, (e-)scooters, etc.).
- 8.11 The test provisions do not reflect the requirements of point 1.7.(1.) (of Part 1 of Annex 3) on parameters to be used for automated valet parking of Part 1 of Annex 3, which require specific attention to be paid to children and prams according to the text, as well as wheel chair users according to ETSC's suggestion above.

Part 5: In-Service Reporting

ETSC warmly welcomes the provisions on in-service monitoring, as actively monitoring the safety performance of these automated vehicles on the road will be of vital importance to ensure their continued contribution to road safety.

ETSC however regrets that the text does not (explicitly) allow for independent in-service monitoring. Despite requirements on the possibility to request supporting data and the notification of any pre-processing of data, the in-service monitoring structure as proposed seemingly relies heavily on the goodwill of the manufacturer to provide factual data.

Keeping in mind the lessons learned from "Dieselgate", ETSC considers that the proposed approach is not sufficient for ensuring the in-service safety performance of automated vehicles and not sufficiently ambitious when considering that the introduction of automated vehicles brings about unique opportunities to significantly improve the systems implemented to protect the lives on European roads. If implemented well, in-service monitoring can be one of such paradigm changing improvements to the road safety system.

ETSC therefore calls on the European Commission to include provisions in the final implementing act that ensure that independent in-service monitoring (field monitoring) is technically possible. Said differently, the implementing act should ensure that independent third parties should be able to gather the same raw data the manufacturers use to comply with the reporting requirements, and be able to gather such data directly and without requiring any sustained assistance from, or involvement of, the manufacturers.

ETSC acknowledges that any rules on the access to the data would be set in different legislation (e.g. in national acts), however underlines the importance of including in this implementing act a requirement that such independent access should be possible from a technical perspective.

ETSC welcomes that point 9.5.1 was added to Annex 2, which states that ADS data should be available subject to Union or national requirements, however underlines that the provision itself is not sufficient for the purpose of ensuring the possibility of independent in-service/field monitoring.

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