

**List of open issues**

Topic	Sub-topic	Open issue(s)	Positions	OICA/CLEPA Position	Possible solution(s) and conclusions	Status	Text proposal	Reference
	1. How to regulate vehicle behaviour in nominal/complex situations?	Current approach in UN R 157 for <b>minimum headway/safety distance</b> appropriate?	(JP)The table should not be deleted because the requirement like "the vehicle shall not cause collision" is ambiguous and considered differently between TSs, and the minimum requirements for important parameters are effective in order to ensure safety. Without table, there is some concern for approval of ADS with substandard level. Therefore, minimum headway/safety distance should be decided in a same manner as <60km/h. Notwithstanding this requirement, appropriate following distance for complying other requirements (e.g. traffic rules, avoid collisions) should be maintained.	Industry believes the safety distance is influenced by the collision avoidance requirements. We hoped ALKS would establish an understanding that permitted the ALKS to drive at smaller following distances when able to provide the necessary level of safety and understood the table therefore to describe the actual minimum for ALKS, regardless of human-driver centered traffic rules. When this understanding is overturned, the table is of no benefit and could be removed, as safety is already ensured by the following provisions on collision avoidance with stationary obstacles.	New approach: generic requirement based on traffic rules, amendment table, preventing collision, RSS, 2 seconds, etc.?	TBD		
		Current approach in UN R 157 for <b>minimum detection range</b> appropriate?	(JP)Minimum detection range should not be deleted and should be decided in a same manner as <60km/h. (Distance after 0.5s and 3.7m/s <sup>2</sup> deceleration.)	3.7m/s <sup>2</sup> were used out of context for ALKS and are the wrong basis as Industry has argued throughout the drafting process of ALKS already. The minimum detection range is that at which the system has to generate a control output at the very latest. Any system fulfilling the requirement will likely detect an obstacle sooner than that, because detection doesn't go from 0 to 100% from one meter to the next. In order to ensure safety, this value must be chosen to ensure the vehicle can safely be brought to standstill. As data shows that even on wet road surfaces the adhesion will permit a deceleration of 5m/s <sup>2</sup> this is the appropriate threshold, because any maneuver requiring a higher deceleration would potentially exceed adhesion limits. That's why maneuvers requiring more than 5m/s <sup>2</sup> are considered an Emergency Maneuver. Pedestrians on the road are an absolute exception when travelling at 130km/h and should therefore not be required to trigger a "comfort system reaction" as that would likely not be the case with a human driver either.		TBD		
		How should the <b>speed limit</b> , which varies in each country, be treated under the Regulation? (JP)	(JP)No need to modify UNR157 text because compliance to speed limit is covered by "traffic rule requirement".	Agree with Japan, this is covered by traffic rules.		TBD		
		No negative effect of the safety distance on traffic flow (EC)		As long as the provisions on collision avoidance remain as they are there will be little freedom for lower following distances anyway.		TBD		
		Line between type approval/traffic rules (JP: Are there any cases where following traffic law could cause danger? If so, how should we treat those cases in regulation)		A potential scenario that leads to this conflict could be a situation where an evasive maneuver crossing lane markings could avoid a potential collision, but the lane is marked by a solid line prohibiting lane crossing. In general, traffic rules usually already contain that type of exceptions to these rules. As suggested by EC in ACSF-24-08 a provision like this could be included: "5.1.2. The activated system shall comply with traffic rules relating to the DDT in the country of operation <b>unless there is no other way to avoid an accident.</b> " Note: What about violating ALKS requirements in order to avoid a collision?		TBD		
Speed increase	2. Expected reaction of the vehicle to critical situations	Any differences with ALKS low speed which need particular consideration?				TBD		
		<b>Cut in scenarios</b> as defined currently in UN R 157 appropriate for higher speeds (> 60 km/h)?	(JP)Scenarios should be added considering the speed range extension.	Industry believes the identified relevant scenarios are applicable also for speeds up to 130km/h. The parameters for the test cases will vary, but as they are described in a flexible manner, no amendments are necessary.		TBD		
		To what level should <b>pedestrian crossing</b> be covered? (it could be difficult to avoid a collision in a high-speed area but what should be the level required under the Regulation?) (JP)	(JP)Collision to a pedestrian in the same lane shall be avoided. ADS should avoid collision in front of the ego vehicle as safe as a human driver. If necessary, we can accept to discuss amendments to current test procedure from the point of view above.	There is two different requirements related to pedestrians currently: - collision avoidance with a pedestrian inside the lane - collision avoidance with a pedestrian crossing into the lane  While a collision with a pedestrian inside the lane shall be avoided up to the maximum operational speed, this approach cannot be applied similarly to a crossing pedestrian. In order to achieve collision avoidance with a crossing pedestrian at 130km/h the ALKS would need to start decelerating when the pedestrian is still several meters away from the lane. The risk of false activations and their potential negative effects would by far outweigh the safety benefit.  While collision avoidance may not always be reasonably achievable, the manufacturer will implement strategies to lower the risk, e.g. reducing the vehicle speed when a pedestrian is detected near the lane or moving the vehicle to the opposite side of the lane to create more distance.	(JP)5.2.5.3. The activated system shall avoid a collision with an unobstructed crossing pedestrian in front of the vehicle. In a scenario with an unobstructed pedestrian crossing with a lateral speed component of not more than 5 km/h where the anticipated impact point is displaced by not more than 0.2 m compared to the vehicle longitudinal center plane, the activated ALKS shall avoid a collision <b>up to the maximum operational speed of the system.</b> (note: the red part should not be deleted)	5.2.4. The activated system shall be able to bring the vehicle to a complete stop behind a stationary vehicle, a stationary road user or a blocked lane of travel to avoid a collision. This shall be ensured up to the maximum operational speed of the system.	TBD	

Is it necessary to consider situations where <b>lane marking is not visible</b> ?	(JP)No need to modify UNR157 text because it is obvious that the vehicle should keep control until the transition to the driver even if the lane marking is disappeared suddenly. (During MRM, the case when the lane marking is not visible is already described (5.5.1.))	ALKS was written in the sense that as long as it is defined what safe operation and safe transition is, there is no need to regulate behavior related to different system boundaries. Therefore "missing lane markings" do not need to be specifically addressed.  Additionally Annex 5, Par. 5.3. (g) already assesses the system behavior in case of faded/erased/hidden lane markings.		TBD		5.4.4.1. In case the driver is not responding to a transition demand by deactivating the system (either as described in paragraph 6.2.4. or 6.2.5.), a minimum risk manoeuvre shall be started, earliest 10 s after the start of the transition demand.
Is <b>evasive emergency manoeuvre required</b> ? Distinction < 80 km/h and above?	(JP)The function of evasive emergency manoeuvre should be optional (i.e. not mandatory but may be fitted). If the function of evasive emergency manoeuvre is fitted, it is necessary that the function can only be activated when the braking is not capable of avoiding accidents.	In principle, the ALKS should be permitted to cross lane markings in a safe manner during an evasive maneuver. The assumption that an evasive maneuver should only be permitted when a collision cannot be avoided by braking goes against normal driving behavior. When there is sufficient free space no other driver following behind would expect the ALKS vehicle to brake to standstill when an obstacle could be safely steered around.		TBD		
During evasive emergency manoeuvre, is it <b>permitted to cross lane marking</b> ?	(JP)The function of evasive emergency manoeuvre should be optional (i.e. not mandatory but may be fitted). If the function of evasive emergency manoeuvre is fitted, it is necessary that the function can only be activated when the braking is not capable of avoiding accidents.	As there is only little available space in the ego lane when steering around an obstacle and aiming to keep a minimum lateral distance to that obstacle, an evasive maneuver should also be permitted to cross lane markings.		TBD		
Is it required to react appropriately to "wrong way driver"?		If "wrong way driver" is considered a scenario to be assessed this should be added to section 5.3. of Annex 5, because there is no clear pass/fail criteria. While braking is usually an appropriate response, an attempt at evasive steering could potentially lead to an even more devastating accident, when vehicles collide at a small overlap or when both vehicles steer to the same direction.		TBD		
Shall <b>different types of lane change</b> be defined (nominal, during MRM and evasive)?	(JP) "during MRM", "evasive manoeuvre", "regular lane change" should be clearly differentiated. (see UNR157-02-05)	Industry believes MRM and regular lane changes could be addressed on the basis of one set of provisions with slightly different parameters for the assessment of a critical situation. Additionally separate provisions for an evasive maneuver crossing lane markings should be introduced.		TBD		
What are the items that need to be strengthened when <b>compared to ACSF category C</b> ?	(JP)[REGULAR] Lv3 Lane change during normal driving (not emergency situation) should consider the situation around the ego vehicle including forward and side (including 2 lane next). These requirements should be discussed in FRVAV. (note: Detection of forward and side are not required in ACSF provisions.) [MRM] The requirements for Lane change during MRM should be discussed based on ACSF category C (can be based on category E but the requirements are not yet specified). [EVASIVE] The requirements for evasive manoeuvre is difficult to define because the impact of secondary accident (i.e. collision to vehicle passing the next lane) should be considered. The function of evasive emergency manoeuvre should be optional (i.e. not mandatory but may be fitted). If the function of evasive emergency manoeuvre is fitted, it is necessary that the function can only be activated when the braking is not capable of avoiding accidents.	<b>Regular:</b> - Lane change timing should be permitted to be flexible in according with local traffic rules - no need to define distances to the front, as the ALKS will need to fulfill collision avoidance requirements also in the target lane  <b>MRM:</b> - Parameters for a critical situation should be revisited under the assumption that the emergency situation has already been indicated to other road users through the hazard warning lights - it should be considered that the can be hard shoulders not wide enough to fit the entire vehicle, still moving off the live lane of traffic would be beneficial, so the maneuver should not require to fit the vehicle fully into the new lane as is currently the case for lane change according to Cat. C  <b>Evasive steering:</b> - the definition of "sufficient free space" is most relevant, as if the gap is too large, evasive steering will never be possible, while at the same time other traffic participants should not be "scared" by such a maneuver - it should be considered if indication of such a maneuver to other road users is useful or harmful		TBD		

Lane change		Should criteria for permitting lane change be defined? If so, what should be the criteria?	(JP) See above.	Situations, that require the ALKS to leave its own lane should be defined as proposed in column "H". Additionally a regular lane change, should only be executed, when necessary.		5.2.1. The activated system shall keep the vehicle inside its lane of travel and ensure that the vehicle does not cross any lane marking (outer edge of the front tyre to outer edge of the lane marking), <b>except during manoeuvres described (below/in paragraph xx).</b> The system shall aim to keep the vehicle in a stable lateral position inside the lane of travel to avoid confusing other road users. <b>Manoeuvres where it is deemed justified that the ALKS crosses a lane markings are:</b> <ul style="list-style-type: none"> <li>• A lane change manoeuvre as part of the lane change procedure</li> <li>• A lane offset in order to form a corridor for emergency vehicles</li> <li>• [An evasive manoeuvre as part of the emergency manoeuvre]</li> <li>• A lane offset manoeuvre during an MRM</li> </ul>	
		Need to define what is a safe lane change (parameters or general principles?)	(JP) See above.	Industry in principle supports the approach proposed by Germany. We should be careful not to overregulate AD Lane Change, as this could make the ALKS unable to adapt to changing traffic situations and behave naturally with other road users.		TBD	
		Need to define triggering conditions for lane change. Should aim to prevent erratic lane change. (NO)	(JP) See above.	See above. No need to define specific trigger conditions, as the individual parameters could be very well situation dependent. As long as we define what a safe lane change is, there is no need to define what causes the ALKS to change lanes in any more detail.		TBD	
		Shall driver interruption (over ride) during auto lane change be acceptable? What kind of action should be required for override during auto lane change? (JP)	(JP)No special modification to present text is needed.	Agree with Japan, that no special provisions for override during lane change are needed. The system is already permitted to adapt its thresholds to specific situations.		TBD	
		Is there any other additional requirement necessary for the Level 3 lane change function? (JP)				TBD	
		Is it necessary to decide a minimum detection range for directions other than forward (side, diagonal)? (JP)		The detection ranges as currently proposed by Germany are reasonable to address also lane changes during ALKS operation.		TBD	
Both	1. Traffic situations	Any additional traffic situations which need particular attention and possibly need to be introduced? (based on VMAD input)		All relevant scenarios are in principle already addressed. If there is a need for an assessment of more specific situations these should be added under Annex 5 Par. 5.3. as proposed in UNR157-02-08		TBD	
	2. MRM	During MRM, is it acceptable to stop within the lane? Or should lane change to the shoulder (lane change during MRM) be mandatory?(JP)	(JP)Having the function to change lane to the shoulder (lane change during MRM) should be mandatory for ADS with ODD higher than 60km/h because a stopped vehicle in highway without traffic jam is dangerous. (It is important to have the function of MRM lane change and it can be allowed that MRM lane change is not achieved under some conditions (e.g. when shoulder does not exist).)	ALKS was drafted under the assumption that the driver will always resume control within 10s, therefore making sure that the MRM will not lead the vehicle to standstill unless in case of a very severe medical emergency that leaves the driver physically unable to resume control. When driving at a speed of up to 130km/h it will take even longer to bring the vehicle to standstill. So what is the actual benefit of such a provision?		TBD	
	3. HMI	Any change/improvement to current HMI requirement given that more time will be spent without any intervention from the driver? Further harmonization needed?		Industry believes the HMI provisions as they currently are, are appropriate also for higher speeds/lane changes. The driver will take equally long to resume control, and the only safety relevant information to the driver is the system status and transition demand. We should ask ourselves what aspects are safety relevant, and not what we would like the vehicle to tell us just because it would be nice to know.		TBD	
	4. Test, Audit & In-service monitoring	During Type Approval, what type of tests should be conducted or provided by the documentation? (Should current requirement be further clarified?) (JP)		As explained in UNR157-02-08 Industry believes all relevant aspects are already covered by the current ALKS provisions.		TBD	
		Need to improve present test, especially track tests?		The only addition necessary is tests for lane changes, which Industry already proposed in GRVA/2021/04. Other than that Industry believes the current test section already address all relevant scenarios and as there are no specific parameters defined, any potential scenario is covered.		TBD	
		Does the audit and in-service monitoring need enhanced?		As explained in UNR157-02-08 Industry believes all relevant aspects are already covered by the current ALKS provisions.		TBD	
	1. Emergency vehicles	How should a vehicle respond? Is it with transition demand or shall it create a corridor?				TBD	

Clarifying Regulation		Does the system need to react to the direction of an <b>enforcement officer?</b> (UK)				TBD	
	2. Detectable collision	What is a detectable collision? (UK)				TBD	
Other modifications	1. Appendix3 to Annex4	<b>Should Appendix 3 to Annex4 be replaced?</b>	(JP)Current Appendix3 to Annex4 is important to assess the human driver level. Therefore, Japan suggests to keep current Appendix3 with amendment (e.g. speed extension). If other CP requests to add other requirement, we can discuss to add it as other Appendix or something else.	Industry believes a replacement of Appendix 3 to Annex 4 (recently repositioned to be Annex 3) does not need to be replaced.		TBD	
HDV ALKS below 60 km/h*		What are the items that need to be changed from M1? (JP)				TBD	
		Influence of vehicle dynamics for safety distance to the front/detection range.				TBD	
		<b>Current requirements applicable to M1 are limiting the maximum deceleration during the MRM to 4m/s²; should this value be adapted to other vehicle categories, given the lower deceleration potential of heavier categories compared to passenger cars?</b>	(JP) 4m/s² can be acceptable because no safety concern has been observed. (However, buses with standing passengers should require additional consideration.)			TBD	UNR-157-02-10(OICACLEPA) ALKS for HDV - Preliminary responses to GRVA-09-34.pdf
		<b>The requirements define a table with the minimum following distance between a passenger car equipped with an active ALKS and the preceding vehicle. Industry is expected to review whether and how the HCVs parameters impacts the values in the table.</b>	(JP)Minimum following distance should be calculated by the same method as M1 by using HDV parameters(the distance with maximum deceleration).			TBD	UNR-157-02-10(OICACLEPA) ALKS for HDV - Preliminary responses to GRVA-09-34.pdf
		<b>Minimum forward detection range for HDV</b>	(JP)The same requirements as M1 can be acceptable.			TBD	
		<b>In the section about the cutting-in scenario, should the parameter "TTCLaneIntrusion" be modified, considering the width of HDVs compared to a passenger car?</b>	(JP)No need to modify UNR157.			TBD	UNR-157-02-10(OICACLEPA) ALKS for HDV - Preliminary responses to GRVA-09-34.pdf
	Effect of the trailer.		Regardless whether the vehicle is towing a trailer or not, the ALKS has to fulfill the requirements. Therefore the manufacturer has to explain the strategy to the technical service. This is valid for all vehicle categories.			TBD	