

As a follow-up to the 9<sup>th</sup> FRAV informal group meeting, FRAV stakeholders are kindly requested to comment on the discussion topics derived from the five starting points. During the session, FRAV agreed and the secretary was directed to prepare a single document to gather comments for further FRAV consideration.

The aim of the following table is to gather stakeholder views on the meaning or underlying safety goals related to and/or derived from the performance topics. Based on those views, the table further requests stakeholder views on criteria, metrics, and performance indicators that might be used to define safety requirements that can be measured and/or verified.

The following example for filling in the table illustrates the desired level of detail (it does not propose comments for stakeholder response). The “Interpretation/Goals” column should be used to comment on the performance topic and views on its significance to the development of safety requirements. The “Measurable/Verifiable Criteria” column should be used to suggest indicators or performance metrics for safety goals proposed under the “goals” column. The intention is not to request technical proposals for requirements, limits, or values. The aim is to identify factors that might be useful in defining measurable/verifiable requirements to ensure desirable safety outcomes.

Performance Topic	Interpretation/Goals	Measurable/Verifiable Criteria
The ADS should control the longitudinal and lateral motion of the vehicle.	<ul style="list-style-type: none"> <li>• The ADS should smoothly execute maneuvers.</li> <li>• The ADS driving behavior should meet public expectations.</li> <li>• The vehicle movements should be safe.</li> <li>• The ADS driving behavior should not cause collisions or disrupt traffic.</li> <li>• This topic should not be considered.</li> <li>• This topic should focus on safety.</li> <li>• This topic should include the impact on other road users and traffic flows.</li> <li>• ....</li> </ul>	<ul style="list-style-type: none"> <li>• Relative speed and distance from a preceding vehicle should be sufficient to avoid a collision.</li> <li>• Relative speed and distance from a preceding vehicle should be consistent with safe human driving performance data.</li> <li>• Lane positioning should ensure a safe lateral distance from an adjacent vehicle (consistent with safe human driving performance data).</li> <li>• Lane changes should be smooth with lateral acceleration compatible with/comparable to safe human driving.</li> <li>• ....</li> </ul>

Performance Topic	Interpretation/Goals	Measurable/Verifiable Criteria
(Derived from ADS should drive safely)		
The ADS should perform the entire Dynamic Driving Task.	•	•
The ADS should control the longitudinal and lateral motion of the vehicle.	•	•
The ADS should recognize the ODD conditions and boundaries of the ODD of its feature(s).	•	•
The ADS should detect, recognize, classify, and prepare to respond to objects and events in the traffic environment.	•	•
The ADS should respect traffic rules.	•	•
The ADS should interact safely with other road users.	•	•
The ADS should adapt its behavior in line with safety risks.	•	•
The ADS should adapt its behavior to the surrounding traffic conditions.	•	•
The ADS driving behavior should not disrupt the flow of traffic.	•	•
The ADS behavior should not be the critical factor in causation of a collision.	•	•

Performance Topic	Interpretation/Goals	Measurable/Verifiable Criteria
(Derived from the ADS should interact safely with the user)		
Activation of an ADS feature should only be possible when the conditions of its ODD have been met.	•	•
The ADS should signal when conditions indicate a probable ODD exit.	•	•
The user should be permitted to override the ADS to assume full control over the vehicle.	•	•
The ADS should safely manage transitions of control to the user.	•	•
Prior to a transition of control to the user, the ADS should verify the availability of the user to assume control.	•	•
Pursuant to a transition, the ADS should verify full control of the vehicle by the user prior to deactivation.	•	•
The ADS should tolerate user input errors.	•	•
The ADS should provide feedback to the user on its operational status.	•	•
The ADS should warn the user of failures to fulfill user roles and responsibilities.	•	•
The user should be provided with information regarding user roles and responsibilities for the safe use of the ADS.	•	•
ADS vehicles that may operate without a user-in-charge should provide means for occupant communication with a remote operator.	•	•
Upon completion of an MRM, a user may be permitted to assume control of the vehicle.	•	•

Performance Topic	Interpretation/Goals	Measurable/Verifiable Criteria
(Derived from the ADS should manage safety-critical situations)		
The ADS should recognize and respond to road-safety agents.	•	•
The ADS should mitigate the effects of road hazards.	•	•
The ADS should execute a safe fallback response as conditions warrant.	•	•
In the absence of a fallback-ready user, the ADS should automatically achieve a Minimal Risk Condition (MRC).*	•	•
The ADS should place the vehicle in an MRC in the event of a failed transition of full control to the user.*	•	•
The ADS should achieve a Minimal Risk Condition (MRC) prior to deactivation.*	•	•
The ADS should signal its intention to place the vehicle in an MRC.*	•	•
The ADS should safely manage short-duration ODD exits.	•	•
Pursuant to a collision, the ADS should stop the vehicle and deactivate.	•	•

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\* These topics were modified from the original proposals in response to the 7<sup>th</sup> session discussion on minimal risk maneuvers.

Performance Topic	Interpretation/Goals	Measurable/Verifiable Criteria
(Derived from the ADS should safely manage failure modes)		
The ADS should detect system malfunctions and abnormalities.	•	•
The ADS should execute a safe fallback response upon detection of a failure that compromises performance of the DDT.	•	•
Provided a failure does not compromise ADS performance of the entire DDT, the ADS should respond safely to the presence of a fault in the system.	•	•
The ADS should signal faults and resulting operational status.	•	•
(Derived from the ADS should maintain a safe operational state)		
The ADS should be permanently disabled in the event of obsolescence.	•	•
Pursuant to a collision and/or a failure detected in DDT-related functions, ADS activation should not be possible until the safe operational state of the ADS has been verified.	•	•
The ADS should signal required system maintenance to the user.	•	•
The ADS should be accessible for the purposes of maintenance and repair to authorized persons.	•	•
ADS safety should be ensured in the event of discontinued production/support/maintenance.	•	•