

Consolidated Comments on the FRAV safety topics (based on FRAV-09-08)

This document consolidates the comments received on the interpretation of the safety topics in FRAV-09-08.

(Derived from ADS should drive safely)

1. The ADS should perform the entire Dynamic Driving Task.

Comment	Source
The ADS should be capable of performing the entire Dynamic Driving Task.	(SAE) FRAV-09-06
The ADS should perform the entire Dynamic Driving Task safely.	(MLIT) FRAV-09-07
<p>When specifying criteria for Automated Driving Systems, it is most important to leave the behavior itself to the manufacturer and NOT specify exact driving maneuvers that are considered safe in the first place, but make it impossible to achieve the most safest behavior.</p> <p>The regulator cannot specify what is a safe behavior due to lack of data and disambiguity of situations (more than one behavior is safe). Since this is not possible, the regulator should rather specify “guardrails” for safe behavior, not the behavior itself. The guardrails promoted by Germany are the following, and specifically in this order:</p> <ul style="list-style-type: none"> • Follow traffic regulations • Do not cause accidents • Iron out mistakes of others as good as (physically/technically/logically in the sense of anticipation/whichever is safer) possible <ul style="list-style-type: none"> ○ Define “as good as physically/technically/logically possible” by determining which collisions caused by mistakes of others have to be avoided and which just mitigated. This should be done by using physical parameters like TTC, distance, speed, etc. <p>The ADS should iron out the mistakes of other road users to the greatest extent possible. This requires the identification of relevant accident scenarios, definition of performance requirements for pass/fail-tests for these scenarios.</p>	(Germany) FRAV-10-07
Order of topics should be consistent with the real DDT: OEDR → ODD → operate and control.	(CATARC) FRAV-10-08
The ADS should smoothly run through the specified traffic scenarios.	(Russia) FRAV-10-10
The ADS should ensure the safe execution of standard maneuvers: starting and accelerating, driving at a constant speed, braking, reversing, turning right and left, U-turning, changing lanes, merging lanes (roads), overtaking and avoiding obstacles.	(Russia) FRAV-10-10
The Dynamic Driving Task should be performed safely at different traffic intensity and under different conditions (when driving on highways, country roads, city streets and avenues, in residential areas and on infrastructure facilities such as multi-level parking lots, gas stations, etc.).	(Russia) FRAV-10-10
Safe speeds, distances and lateral intervals should be maintained, taking into account the anticipated trajectory of the motion, the condition of the road surface, including its slipperiness, unevenness, the presence of puddles, snow, etc.	(Russia) FRAV-10-10

Comment	Source
The ADS should ensure cybersecurity of operation, electromagnetic compatibility with other road users and infrastructure.	(Russia) FRAV-10-10
Various scenarios for resolving emergency situations, including accidents, as well as the occurrence of malfunctions of individual elements of the ADS, vehicle or infrastructure should be provided.	(Russia) FRAV-10-10
The ADS should ensure ride comfort of the passengers, as well as the integrity and safety of the goods.	(Russia) FRAV-10-10
Real-time diagnostics of vehicle components that are critical from the road safety point of view should be provided.	(Russia) FRAV-10-10
The ADS should not rely on the human being responsible for oversight of the ADS or for correcting the errors of the ADS.	(Netherlands) FRAV-10-11
DDT = OEDR + Control longitudinal & Lateral. This performance topic is the header of the all the following topics.	(France) FRAV-12-09

2. The ADS should control the longitudinal and lateral motion of the vehicle.

Comment	Source
The ADS should control the longitudinal and lateral motion of the vehicle safely .	(MLIT) FRAV-09-07
This includes the “entire DDT” topic from above. It is NOT necessary to define criteria for how exactly the vehicle should drive, because this would limit the manufacturers in inventing the best possible strategies. It should rather define “guardrails” (see introduction), between which the vehicle performance may be set, by defining WHAT kind of accidents should NOT happen.	(Germany) FRAV-10-07
The ADS should control the longitudinal and lateral motion simultaneously of the vehicle.	(CATARC) FRAV-10-08
The ADS should smoothly run through the specified traffic scenarios.	(Russia) FRAV-10-10
The ADS should smoothly run in the traffic flow.	(Russia) FRAV-10-10
The ADS should not achieve non-comfort levels of longitudinal and lateral acceleration and longitudinal deceleration (except for the case of the emergency braking)	(Russia) FRAV-10-10
The correct determination of a vehicle speed should be confirmed.	(Russia) FRAV-10-10
This item should concentrate on maneuver execution by the ADS: <ul style="list-style-type: none"> • In an understandable way for other road users • Smooth • Safely (Some standard maneuvers are defined in NHTSA Testable Framework)	(France) FRAV-12-09

3. The ADS should recognize the ODD conditions and boundaries of the ODD of its feature(s).

Comment	Source
Recognizing alone is no statement at all. I can recognize that I leave the ODD and still do it.	(Germany) FRAV-10-07
The ADS should recognize the ODDs conditions and boundaries of the ODDs.	(CATARC) FRAV-10-08
The ADS feature should operate safely within its ODD boundaries.	(Netherlands) FRAV-10-11 based on (Japan) FRAV-09-07
The ODD conditions and boundaries (measurable limits) should be established by the manufacturer.	(Russia) FRAV-10-10
The ODD conditions to be recognized by the ADS should include: <ul style="list-style-type: none"> • Precipitation (rain, snow) • Time of day (light intensity, including the case of the use of lighting devices) • Visibility (visibility distance - at least 1.5 braking distance) • Adhesion to the road surface • Possibility of recognition of the road marking line 	(Russia) FRAV-10-10
All boundaries of the ODD should be described, even attribute not in the ODD (in order to detect and respond in a sufficient timeframe before ODD exit) The ODD shall be described and provided to audit of homologation process. The ADS shall detect all ODD attributes.	(France) FRAV-12-09

4. The ADS should detect, recognize, classify, and prepare to respond to objects and events in the traffic environment.

The ADS should detect, recognize, classify, and prepare to respond to objects and events in the traffic environment safely.	(MLIT) FRAV-09-07
This is not compatible with the “guardrails”-approach since no quality of the response is required. The response is important, not the preparations and calculations the vehicle performs without responding.	(Germany) FRAV-10-07
The objects, which the ADS should recognize, and at which distance: <ul style="list-style-type: none"> • Stationary vehicle • Relatively short and narrow object, compared to the width of the traffic lane • Car, motorcycle, bicycle, pedestrian moving in the same direction • Car, motorcycle, bicycle, pedestrian moving in the transverse direction • Merging traffic • Vehicles cutting-in from the left and from the right • Road accidents 	(Russia) FRAV-10-10
All Objects and Events should be described, and associated response should also be described. (For us, NHTSA document describing OEDR process (Testable Framework..., sept.2019), is the standard to use to answer this topic) Should include self-check (incl. DSSAD) or auto diagnosis	(France) FRAV-12-09

5. The ADS should respect traffic rules.

The ADS should comply with traffic rules.	(MLIT) FRAV-09-07
The ADS should comply with traffic rules unless emergently necessary for avoiding accidents . Japan understands that complying with traffic rules does not need to be strictly applied when the imminent collision risk is observed and can be prevented by breaking traffic rules. (Some countries may have a provision like “Traffic rules may not be applied if it is necessary for avoiding accident”, but some countries do not.) Japan would like to reserve this topic since MLIT is having discussion with police agency internally. At the same time, this issue should be considered with WP.1 and it may be preferable that WP29 or FRAV ask a question to WP.1.	(Japan) FRAV-10-06
This is already a verifiable requirement, given that for any given situation, it should be possible to find a Boolean result to whether the vehicle respects traffic rules. Further work is just defining assessment methods could be done within VMAD.	(Germany) FRAV-10-07
The ADS should respect local traffic rules, laws, and regulations (Take traffic laws’ difference between regions and areas into consideration).	(CATARC) FRAV-10-08
<ul style="list-style-type: none"> • Immediate stop in the case of a road accident • Giving way to special services vehicles • Giving way to pedestrians • Follow the traffic lights • Follow the gestures of the traffic controller • Use the lights including the emergency lights • Staring motion and maneuvering on the road • Keeping the lane • Maintaining the allowed speed • Overtaking, advancing, passing of oncoming traffic • Stopping • Crossing intersections (regulated and non-regulated) • Crossing railways • Moving in living areas • Giving priority to public transport • Use the audible warning signal 	(Russia) FRAV-10-10
An item should concentrate on: <ul style="list-style-type: none"> • A list of traffic rules to respect in the ODD should be defined (<i>should be done by each country</i>) • Identify common traffic rules, and differences, and propose common requirements. • Some will be objective, but other will be subjective 	(France) FRAV-12-09

6. The ADS should interact safely with other road users.

Comment	Source
According to the “guardrails”, “safely” should be interpreted as “irons out mistakes of others to the largest possible extend” and “does not CAUSE accidents”. There should not be specific artificial requirements for the behavior itself.	(Germany) FRAV-10-07
The ADS should be identified in the traffic flow at the conditions, when: <ul style="list-style-type: none"> the ADS is active, the ADS is inactive, a minimum risk maneuver (MRM) is performed, an emergency maneuver (EM) is performed. 	(Russia) FRAV-10-10
Already taken into account above requirements.	(France) FRAV-12-09

7. The ADS should adapt its behavior in line with safety risks.

Comment	Source
No, because this is not verifiable, and to our understanding it will not be possible to define the one safe set of requirements for this. There is a plethora of methods the ADS could use to increase the level of safety that we cannot foresee at this stage. (An example: we could come to the conclusion that staying in the center of the lane would be considered safe. But when overtaking other vehicles in adjacent lanes, drifting to the own lane’s edge will increase the lateral safety distance and thus increase safety.)	(Germany) FRAV-10-07
The ADS should ensure its behavior better than the average expectation of proficient human drivers in order to in line with safety risks. (above avg)	(CATARC) FRAV-10-08
The ADS should smoothly run through the specified traffic scenarios.	(Russia) FRAV-10-10

8. The ADS should adapt its behavior to the surrounding traffic conditions.

Comment	Source
What is the difference between adapting in line with safety risks and to surrounding traffic conditions?	(MLIT) FRAV-09-07
Not compatible the guardrails. Needs further specification to become verifiable. And these specifications should not aim to specify a certain behavior of the vehicle.	(Germany) FRAV-10-07
The ADS should smoothly run through the specified traffic scenarios.	(Russia) FRAV-10-10

9. The ADS driving behavior should not disrupt the flow of traffic.

Comment	Source
At least in Germany, this aspect is already included in “follow traffic rules” – there is a set of rules which states you should not drive too slow unnecessarily, and you should maintain the distance. We need to avoid redundant requirements.	(Germany) FRAV-10-07
The ADS should smoothly run through the specified traffic scenarios.	(Russia) FRAV-10-10

10. The ADS behavior should not be the critical factor in causation of a collision.

Comment	Source
The ADS should not cause collisions. For any given accident, it is possible to determine who was at fault. And the answer should be that it was NOT the ADS.	(Germany) FRAV-10-07
The ADS should smoothly run through the specified traffic scenarios.	(Russia) FRAV-10-10

<p>(Comments covering items 7-10 above)</p> <ul style="list-style-type: none"> • This compliance should be verified in a Risk Analysis <p>The vehicle shall manage risks according to the following rules:</p> <ul style="list-style-type: none"> • Vehicle shall not create accident by its own • Vehicle shall be robust, as far as reasonably possible, to risks caused by others • Vehicle shall comply with applicable driving rules (including those applicable to human drivers) unless it is the only way to avoid an accident <p>This rule shall be fulfilled:</p> <ul style="list-style-type: none"> • wherever the vehicle is driving (e.g. country, road, ...) <p>whenever the vehicle is driving (e.g. despite dynamic lane assignment; time dependent rule, introduction of a new type of traffic sign; rule change ...)</p>	(France) FRAV-12-09
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(Derived from the ADS should interact safely with the user)

(Russia) FRAV-10-10: What kinds of users are involved in an automated vehicle operation, their functions and expected performance? (from SAE J3016: Conventional Driver (term 3.29.1.1), Remote Driver (term 3.29.1.2), Passenger (term 3.29.2), DDT Fallback-Ready User (term 3.29.3) and Driverless Operation Dispatcher (term 3.29.4))

11. Activation of an ADS feature should only be possible when the conditions of its ODD have been met.

Comment	Source
<ul style="list-style-type: none"> • The ODD conditions and boundaries (measurable limits) should be established by the manufacturer. • The ODD conditions to be recognized by the ADS should include: <ul style="list-style-type: none"> ○ Precipitation (rain, snow) ○ Time of day (light intensity, including the case of the use of lighting devices) ○ Visibility (visibility distance - at least 1.5 braking distance) ○ Adhesion to the road surface ○ Possibility of recognition of the road marking line 	(Russia) FRAV-10-10
<ul style="list-style-type: none"> • The vehicle shall not be in AD mode out of its ODD • Manufacturers and other entities should develop tests and standards to establish a safe ODD 	(France) FRAV-12-09

12. The ADS should provide for specific measures allowing safe transportation of passengers (e.g., in a driverless shuttle)

Comment	Source
<p>Proposal for additional topic.</p> <ul style="list-style-type: none"> • To provide stops in the places required by the route. • To provide opening the service doors at the bus stop and closing them before motion after a stop. • To provide audio messages to passengers about approaching a stop and start motion after a stop. • To provide a possibility for the emergency stop of a vehicle by passengers («emergency brake»). • To ensure passengers' comfort during normal acceleration and deceleration of a vehicle and its lateral acceleration at cornering. • To provide audible (sound) notification of passengers during emergency braking. 	(Russia) FRAV-10-10

13. The ADS should signal when conditions indicate a probable ODD exit.

Comment	Source
The ADS should signal to the driver with sufficient lead time (e.g. 10 seconds) in advance when an ODD exit is probable.	(Germany) FRAV-10-07
The ADS should keep the operation mode aware to users all time along the driving task, include but not limited to Activated\Deactivated\ODD Exit.	(CATARC) FRAV-10-08
A manufacturer should specify actions of the ADS after reaching the boundaries of the ODD (e.g., executing a minimum risk maneuver).	(Russia) FRAV-10-10
The HMI should inform timely the user when the ADS feature is approaching its ODD boundaries or when the conditions indicate a probable ODD exceedance of the ADS feature.	(Netherlands) FRAV-10-11
An HMI should be triggered to alert the driver, with a sufficient timeframe The driver shall be clearly informed of: <ul style="list-style-type: none"> the vehicle behavior in AD mode and the limits of this behavior His own responsibilities, the procedures to comply with (e.g. takeover procedure) and possible consequences if he does not comply. 	(France) FRAV-12-09

14. The user should be permitted to override the ADS to assume full control over the vehicle.

Comment	Source
The user should be permitted to override the ADS to assume full control over the vehicle if the ADS is designed to request and enable intervention by a human driver . (It's important to distinguish between an ADS designed to request human intervention and one that is not.)	(SAE) FRAV-09-06
Any overruling should lead to ADS deactivation with the relevant safety measures (e.g. control handover after a specific time, or when the handover is considered safe). It should not be possible to cancel the deactivation. Possibly define the lead time and require the vehicle to be able to fully perform the DDT in that time.	(Germany) FRAV-10-07
Override should be conditional. The user should be permitted to override the ADS to assume full control over the vehicle according to requirements for transfers of control below.	(CATARC) FRAV-10-08
A manufacturer should specify actions that allow deactivating an automated vehicle and/or the ADS by a person directly in the vehicle and a remote operator.	(Russia) FRAV-10-10
Whatever the situation, nominal driving, MRM, of EM, the user should be able to override the the ADS.	(France) FRAV-12-09

15. The ADS should safely manage transitions of control to the user.

Comment	Source
The ADS should safely manage transfers of full control to the user if the ADS is designed to request and enable intervention by a human driver.	(SAE) FRAV-09-06
Unspecific – further specifications needed (e.g. transition time, traffic related situation for the transition).	(Germany) FRAV-10-07
A manufacturer should set up the conditions and the process of transmitting the vehicle control from the ADS to the human user.	(Russia) FRAV-10-10
The ADS should provide a harmonized transition of control with harmonized defined states and interaction	(Netherlands) FRAV-10-11

16. Prior to a transition of control to the user, the ADS should verify the availability of the user to assume control.

Comment	Source
Prior to a transfer of control to the user, the ADS should verify the availability of the user to assume control.	(SAE) FRAV-09-06
Prior to a transition of control to the user, the ADS should verify the availability of the user all the time to assume control and support the driver in resuming manual control at any time.	(MLIT) FRAV-08-09
Availability of the user should be verified continuously during ADS operation	(Germany) FRAV-10-07
A manufacturer should provide the means for detection of the availability of the user.	(Russia) FRAV-10-10

17. Pursuant to a transition, the ADS should verify full control of the vehicle by the user prior to deactivation.

Comment	Source
Pursuant to a transfer of control , the ADS should verify full control of the vehicle by the user prior to deactivation.	(SAE) FRAV-09-06
Full control by the user should be specified with regard to Situation Awareness	(Germany) FRAV-10-07
A manufacturer should provide the means for the confirmation by the user on taking control over the vehicle (e.g., a button or a command in the interface).	(Russia) FRAV-10-10
The ADS should remain active as long as the user has not taken over, or the ADS has reached a Minimal Risk Condition (MRC).	(Netherlands) FRAV-10-11

18. The ADS interface should enable interaction between the human user and the ADS.

Comment	Source
Proposal for additional topic A manufacturer should provide the HMI allowing all required interactions between the human user and the ADS.	(Russia) FRAV-10-10

<p>(Comments concerning items 15-18 above)</p> <p>The AD mode deactivation (end of vehicle longitudinal and lateral control) shall only be performed when system has verified that the driver has taken over vehicle control. This verification shall at least include a criterion on vehicle lateral control (except if the vehicle is already stopped).</p> <p>When the driver takes over vehicle control on her/his own (without prior system request), the vehicle shall not disturb the driver takeover by an inappropriate action (e.g. by switching headlamps off, at night).</p> <p>When the driver takes over after a system request, the system shall give back the control to the driver with a vehicle configuration maximizing driver controllability (e.g. wipers ON in case of rain, headlamps ON by night).</p> <p>UN R157: 5.1.3. The activated system shall exercise control over systems required to support the driver in resuming manual control at any time (e.g., demist, windscreen wipers and lights).</p>	(France) FRAV-12-09
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19. The ADS should tolerate user input errors.

Comment	Source
The ADS should safely respond to user input errors.	(SAE) FRAV-09-06
Should not only tolerate but implement an adequate coping strategy for input errors	(Germany) FRAV-10-07
<p>The ADS should be capable of dealing with user input errors.</p> <p>Depends on the severity and number of user's errors, the ADS should not only tolerate or ignore it.</p> <p>The ADS should be capable to distinguish an intended override signal from override signal by error.</p>	(CATARC) FRAV-10-08
The HMI should distinguish the unintentional actions by the user.	(Russia) FRAV-10-10

20. The ADS should provide feedback to the user on its operational status.

Comment	Source
Feedback should be provided continuously Feedback should make changes in the situation clear to the driver	(Germany) FRAV-10-07
Clarify what operational status refers to? (AD mode, manual mode; or normal operation, operation with failure)	(CATARC) FRAV-10-08
The HMI should provide the information for the user about the ADS operational status.	(Russia) FRAV-10-10
The HMI should always clearly inform the user about the current operational status (operational, failure, etc.) in an unambiguous, salient and harmonized manner. The HMI should clearly and unambiguously inform the user on the availability of the ADS (feature) to be switched ON. The HMI should only allow the user to activate the ADS (features) when the conditions of its ODD are met. The HMI should continuously inform the user of the ADS capability to perform the driving task.	(Netherlands) FRAV-10-11
The driver shall be clearly informed that the vehicle is in AD mode or not.	(France) FRAV-12-09

21. The ADS should warn the user of failures to fulfill user roles and responsibilities.

Comment	Source
ADS should warn the user in case he/she is detected unavailable to take over control	(Germany) FRAV-10-07
The HMI should provide the information for the user about the ADS failures	(Russia) FRAV-10-10
The ADS should inform the user of the appropriateness of non-driving-related activities and, where feasible, manage the availability of such activities.	(Netherlands) FRAV-10-11
The driver shall be clearly informed of: <ul style="list-style-type: none"> the vehicle behavior in AD mode and the limits of this behavior (and particularly in case of failure) his own responsibilities, the procedures to comply with (e.g. takeover procedure) and possible consequences if he does not comply. 	(France) FRAV-12-09

22. The user should be provided with information regarding user roles and responsibilities for the safe use of the ADS.

Comment	Source
<p>Term ‘information’ should be specified (e.g. what kind of information? User Manual, Display Information, Warnings, etc.?)</p> <p>Depending on the piece of information that is to be provided, the way of “providing” those information needs to be adapted, e.g. general information on user roles should be provided prior to the ride, whereas hints/alerts addressing specific undesired behavior should be given upon occurrence</p>	(Germany) FRAV-10-07
<p>ADS operation modes in the ADS operation manual</p> <p>The user should be provided for the information on the peculiarities of the ADS and about the functions, which it performs.</p>	(Russia) FRAV-10-10
<p>The driver shall be clearly informed of:</p> <ul style="list-style-type: none"> • the vehicle behavior in AD mode and the limits of this behavior (and particularly in case of failure) • his own responsibilities, the procedures to comply with (e.g. takeover procedure) and possible consequences if he does not comply. 	(France) FRAV-12-09

23. ADS vehicles that may operate without a user-in-charge should provide means for occupant communication with a remote operator.

Comment	Source
<p>ADS vehicles that may operate without an in-vehicle driver should provide means for occupant communication with remote assistance personnel.</p>	(SAE) FRAV-09-06
<p>The presence end efficiency of the means for occupant communication with a remote operator</p>	(Russia) FRAV-10-10
<p>The global system should be described including the different components and their interactions. (e.g. Vehicle, Infrastructure, Supervision, ...)</p>	(France) FRAV-12-09

24. Upon completion of an MRM, a user may be permitted to assume control of the vehicle.

Comment	Source
<p>Upon completion of an MRM, the user may be permitted to assume control of the vehicle if the ADS is designed to request and enable intervention by a human driver.</p>	(SAE) FRAV-09-06
<p>Availability of the control transfer mode from the ADS to the user after performing an MRM</p>	(Russia) FRAV-10-10
<p>Included in item 14: “The user should be permitted to override the ADS to assume full control over the vehicle.”</p>	(France) FRAV-12-09

(Derived from the ADS should manage safety-critical driving situations)

25. The ADS should recognize and respond to road-safety agents.

Comment	Source
This requirement is already included in the traffic rule requirement	(MLIT) FRAV-08-09
Unspecific. Recognizing itself should not be a relevant criterion for performance since it is ALWAYS redundant to the action/intervention and thus provides no safety benefit.	(Germany) FRAV-10-07
Cannot interpret	(Russia) FRAV-10-10

26. The ADS should mitigate the effects of road hazards.

Comment	Source
The ADS should mitigate the effects of road hazards and collisions . (Collision seems to be different from road hazards. This includes emergency maneuver for mitigating collisions.)	(MLIT) FRAV-08-09
Road hazards being mistakes of other vehicles: OK, needs further specs. Road hazards such as weather, potholes: No, it should not mitigate these, it should avoid accidents due to these.	(Germany) FRAV-10-07
Cannot interpret	(Russia) FRAV-10-10
Already included in Safety Analysis.	(France) FRAV-12-09

27. The ADS should execute a safe fallback response as conditions warrant.

Comment	Source
The ADS should execute a safe fallback response in the event of a failure of the ADS and/or other vehicle system that prevents the ADS from performing the DDT .	(SAE) FRAV-09-06
How should the ADS respond to a user override input during MRM (fallback response)?	(CATARC) FRAV-10-08
A manufacturer should set up the conditions and the process of transmitting the vehicle control from the ADS to the human user. In the absence of a fallback-ready user, the ADS should automatically achieve a Minimal Risk Condition (MRC).	(Russia) FRAV-10-10
Already included in ODD and OEDR response	(France) FRAV-12-09

28. In the absence of a fallback-ready user, the ADS should automatically achieve a Minimal Risk Condition (MRC).

Comment	Source
In the absence of a fallback-ready user, the ADS should fall back directly to a Minimal Risk Condition if a failure of the ADS and/or other vehicle system prevents the ADS from performing the DDT.	(SAE) FRAV-09-06
The ADS should respond to the absence of necessary input from the user. If the driver is not attentive in the ADS that require driver to be attentive, the given trip should not be completed and become MRC, therefore, this aspect should be described here.	(Japan) FRAV-10-06
In the absence of a fallback-ready user, the ADS should automatically achieve a Minimal Risk Condition (MRC).	(Russia) FRAV-10-10
MRC shall be defined and described MRM to reach MRC shall be defined and describe	(France) FRAV-12-09

29. The ADS should place the vehicle in an MRC in the event of a failed transition of full control to the user.

Comment	Source
If the ADS is designed to request and enable intervention by a human driver, the ADS should execute an MRM in the event of a failure in the transition of full control to the user.	(SAE) FRAV-09-06
If the fallback-ready user did not take the full control over the vehicle (what does that mean?), the ADS should automatically achieve a Minimal Risk Condition (MRC).	(Russia) FRAV-10-10
The procedure shall be described, and a test shall verify the conformity.	(France) FRAV-12-09

30. The ADS should achieve a Minimal Risk Condition (MRC) prior to deactivation.

Comment	Source
Specify the reasons for the ADS deactivation: <ul style="list-style-type: none"> • Reaching ODD boundaries • ADS failure not allowing performing the DDT • Remote deactivation by the Driverless Operation Dispatcher • Etc. 	(Russia) FRAV-10-10
MRC shall be specified, with criteria regarding its termination	(France) FRAV-12-09

31. The ADS should signal its intention to place the vehicle in an MRC.

Comment	Source
Signal to whom? How? If to other road users, use of directional signals and flashers may be contemplated. If to users, an indicator may be contemplated.	(SAE) FRAV-09-06
Signal to other road users (The ADS should interact safely with other road users)	(Russia) FRAV-10-10

Signal to the vehicle user (The HMI should inform the user about the ADS operational status)	
MRC shall be specified, with criteria regarding its intention	(France) FRAV-12-09

32. The ADS should safely manage short-duration ODD exits.

Comment	Source
(Delete)	(MLIT) FRAV-08-09
Is this a) a quick reaction to an ODD exit? Then OK, ODD exit procedures apply Is this b) an off-on-situation for the ODD (e.g. shortly driving through a non-ODD condition being still active)? Then not OK. Any ODD exit shall lead to deactivation with the relevant procedures.	(Germany) FRAV-10-07
Short duration is not acceptable unless we could give some clear definitions about: 1. How long a short duration should be? 2. In principle, ADS must transfer control to the user upon an ODD exit; 3. If an accident occurs during this duration, who should be responsible for it? (ADS/user) According to the above, we suggest deleting.	(CATARC) FRAV-10-08
If the ODD boundaries are set, the ADS may be allowed to operate outside the ODD boundaries for [X minutes] after which the MRC should be achieved.	(Russia) FRAV-10-10
In AD mode, if situation would be difficult to control by the driver (taking into account vehicle technical status and urgency level) the vehicle: <ul style="list-style-type: none"> • shall manage the situation at best effort without requesting the driver to takeover, • shall inform the driver. 	(France) FRAV-12-09

33. Pursuant to a collision, the ADS should stop the vehicle and deactivate.

Comment	Source
Pursuant to a collision, the ADS should stop the vehicle and inhibit ADS reactivation until its capability to proceed has been verified.	(SAE) FRAV-09-06
After detection of a first significant shock while driving (e.g. frontal collision with airbags triggering or lateral collision during an insertion), the vehicle shall: <ul style="list-style-type: none"> • inhibit AD mode reactivation until proper operation has been verified, • perform predefined MRM in the best possible way, according to vehicle operational status and current situation • Vehicle could also, simultaneously, request the driver to takeover vehicle control if vehicle and current situation are sufficiently controllable by the driver. 	(France) FRAV-12-09

(Derived from the ADS should safely manage failure modes)

(CATARC) FRAV-10-08: Clarify the relationship between failure modes and safety-critical situations below. In our opinion, safely manage failure mode is closely connected with safety critical situations, namely it should be categorized as a subtopic under “failure modes”. (Response: “Failure modes” refers to internal system failures such as loss of the capability to perform a DDT function. “Safety-critical events” refers to external events in the roadway such as a collision between preceding vehicles.)

34. The ADS should detect system malfunctions and abnormalities.

Comment	Source
The ADS should detect system malfunctions/abnormalities and evaluate system’s ability to fulfill the entire DDT.	(CATARC) FRAV-10-08
A manufacturer should provide the list of ADS malfunctions and abnormalities, which are detected by the ADS and the ADS responses on each item from the list The ADS as a complex electronic system should be built in accordance with the safety concept implying the presence of design measures providing for the possibilities of switching to a backup control option or to using a backup control system that ensure the reliability of systems even in the event of damage to the electrical circuit. The ADS should provide for self-diagnosis of faults in accordance with the prescribed list (e.g. battery discharging, wheel puncturing, etc.) with communication to the Driverless Operation Dispatcher followed the execution of the minimum risk maneuver, a safe vehicle stop and disembarkation of passengers.	(Russia) FRAV-10-10
Safety concepts have to be defined regarding malfunctions and abnormalities (to address ISO 26262 and 21448).	(France) FRAV-12-09

35. The ADS should be protected from unauthorized access.

Comment	Source
Proposal for addition topic. The measures ensuring protection form an unauthorized access should be provided.	(Russia) FRAV-10-10

36. The ADS should execute a safe fallback response upon detection of a failure that compromises performance of the DDT.

Comment	Source
A manufacturer should set up the list of the ADS failures requiring safe fallback response.	(Russia) FRAV-10-10
Failure that compromise performance of the DDT shall be defined Fallback responses shall be specified	(France) FRAV-12-09

37. 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.

Comment	Source
Provided a failure does not compromise ADS performance of the entire DDT, the ADS should respond safely to the presence of a failure in the system.	(MLIT) FRAV-08-09
A manufacturer should set up the list of the ADS faults, which would lead to its limited operation and specify the ODD for the limited operation including duration of such operation.	(Russia) FRAV-10-10
Trigger a safe state until the driver takeover or the MRM is achieved	(France) FRAV-12-09

38. The ADS should signal faults and resulting operational status.

Comment	Source
The ADS should signal failures and resulting operational status.	(MLIT) FRAV-08-09
The HMI should provide the information for the user about the ADS operational faults. The HMI should provide the information for the user about the ADS operational status.	(Russia) FRAV-10-10
Shall be specified by OEM	(France) FRAV-12-09

(Derived from the ADS should maintain a safe operational state)

(CATARC) FRAV-10-08: The topics emphasize the means to ensure the safe operational state. It is recommended to highlight the means to use during the full operational life cycle.

(Russia) FRAV-10-10: A description of the checks allowing evaluating the serviceability and correctness of the operation of an ADS, including the functioning of the human-machine interface (HMI), during the periodic technical inspection shall be provided. Performing those checks shall not be costly or time-consuming. The list of considerable system failures, description of failures and relevant actions by the automated vehicle shall be established.

39. The ADS should be permanently disabled in the event of obsolescence.

Comment	Source
This topic should not be considered.	(Russia) FRAV-10-10
Shall be specified by OEM	(France) FRAV-12-09

40. 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.

Comment	Source
The manufacturer should specify how the ADS detects collisions and failures in DDT-related functions, which would not allow the further ADS activation.	(Russia) FRAV-10-10
In case of failure impacting safety in AD mode, an appropriate degradation concept shall be to inhibit AD mode until next vehicle switch off and vehicle proper operation has been verified either by self-diagnostic or by maintenance.	(France) FRAV-12-09

41. The ADS should signal required system maintenance to the user.

Comment	Source
Requirements related to maintenance is not specific to ADS and should not be described here.	(MLIT) FRAV-08-09
The ADS should provide for self-diagnosis of faults in accordance with the prescribed list (e.g. battery discharging, wheel puncturing, etc.) with communication to the Driverless Operation Dispatcher followed the execution of the minimum risk maneuver, a safe vehicle stop and disembarkation of passengers.	(Russia) FRAV-10-10
Shall be specified by OEM	(France) FRAV-12-09

42. The ADS should be accessible for the purposes of maintenance and repair to authorized persons.

Comment	Source
The ADS should be accessible for the purposes of maintenance and repair to authorized persons responsible for maintenance and repair of the ADS .	(SAE) FRAV-09-06
The manufacturer should provide the information for the ADS maintenance and repair.	(Russia) FRAV-10-10
Is the idea to protect the ADS from an un-authorized access? <i>(Secretary's note: Unauthorized access raised in item 35)</i>	(France) FRAV-12-09

43. ADS safety should be ensured in the event of discontinued production/support/maintenance.

Comment	Source
The manufacturer should ensure the ADS correct operation until the end of its service life or its failure that could not be fixed.	(Russia) FRAV-10-10
A procedure should be produced.	(France) FRAV-12-09