

# 14<sup>th</sup> Session Status Review and Session Orientation

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Web Conference

20 May 2021



# Adoption of the agenda

Agenda item	Documentation
1. Adoption of the agenda	12:45-12:55 FRAV-14-01/Rev.1
2. FRAV status and session reports	12:55-13:10 FRAV-14-03
3. Guardrails approach to ADS safety requirements	13:10-13:40 FRAV-10-07 (Germany)
4. FRAV consensus 4.1. Other Road Users 4.2. ADS users 4.3. DDT functions	13:40-14:30 FRAV-14-06 (China) FRAV-14-07 (SAE) FRAV-14-08 (RWS)
5. Data collection for ADS vehicles	14:30-15:00 (FRAV-13-08)
6. FRAV status and next steps 6.1. Parallel tasks 6.2. Next sessions: 8 June, 6 July	15:00-15:15

- Aim to address safety across all ADS applications
  - ADS differ in configurations, intended uses, user roles and limitations on use
  - Application of requirements depends on understanding of ADS
- FRAV-12-08 consolidated comments on the safety topics
  - 43 safety elements cross-referenced with stakeholder comments
  - 16 references to “DDT”
  - 71 references to “User”
  - Seven references to “other road users”
- Elaboration of safety topics requires understanding of DDT, user roles, and nature of other road users
  - Three workstreams provided initial input during the last session

- Common understanding of DDT, ADS users, and ORU
  - Frameworks for understanding DDT, users and ORU
- Consensus on related (and interrelated) safety needs
  - How does the DDT factor into meeting the safety objectives indicated by the safety topics?
  - What safety needs arise in the various ways ADS may interact with users?
  - What might be the safety needs of the various ORU based on their common properties and their special properties?
- Requirements to address safety needs
  - Mapping of general safety requirements

- Germany offered a concept for a “Guardrails approach” to ADS safety requirements (FRAV-10-07)

## Statement of the Issue

*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 safest behavior.*

- **An ADS drives on a highway in the center lane, overtaking occasionally vehicles on the slower lane. The faster lane is empty. It could be considered safe if the ADS is centered in its own lane, associated criteria being a tolerance of X cm with respect to the center. This also fixes the lateral safety distance to the vehicles being overtaken. It could also be considered safe if the speed of the ADS is maintained at the allowed speed limit and is not changing.**
- **An advanced ADS may be in a position to determine that some vehicles are more likely to cut into the ego lane and thus might want to increase the safety distance by positioning itself more on the far side of its own lane. It could also come to the conclusion that the speed difference to the possible threats should be lower to decrease the risk when approaching, it could on the other hand increase the speed just after the critical point (e.g., passing the front edge of the possible threat) to decrease the risk until the other vehicle is overtaken.**
- **It should NOT be required by the regulator that the ADS user's acceleration level is comfortable – this is a criterion for user acceptance of the ADS and will be the aim of the vehicle manufacturer to be better than the competition.**
- **There will be an infinite number of situations where the most obvious safe behavior is probably not the safest when rethinking, such as discussed in this example. A safe behavior requires a large amount of data to learn from, which certainly cannot be achieved by the regulator.**

**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:**

- **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**
  - **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.**

**The regulator should stop after this.**

- Other road users (FRAV-14-06)
  - ORU have different physical, functional, and behavioral properties
  - Safety needs and nature of interactions depend on these properties
  - Requirements to ensure safe interactions and ADS responses
- ADS users (FRAV-14-08)
  - Different user roles depending upon ADS vehicle configuration and relationship to user(s)
  - Role of user may vary even during a single trip
  - Requirements to ensure correct use and prevent misuse
- DDT functions (FRAV-14-07)
  - Framework based on categories: Perception, Planning and Decision, and Control



- EDR/DSSAD informal group request
  - Data collection requirements for ADS vehicles
- Account for diversity of ADS configurations
  - ADS performance data
  - ADS user roles and interactions
- Account for different purposes/uses of data
  - Crash event analysis and reconstruction
  - ADS performance data for research, NATM development (in-service pillar)
- Account for technical aspects
  - Data locked on board vehicle
  - Data transmitted for analysis and reporting



Purpose of Data Collection	Applicability of Data	Data Set	General Description
Accident analysis/ reconstruction	All vehicles	A	Data on vehicle state/performance
	Conventional vehicles (no ADS)	B	Data on actuation of manual driver controls
	Vehicles equipped with an ADS	C1	ADS data on DDT performance
	Vehicles equipped with an ADS designed to interact with a user	C2	Data on user behavior/interactions with ADS
Evaluation of system operations/research/ assistance with accident analysis ( L3-L5)	Vehicles equipped with an ADS	D1	Non-crash ADS operational performance data
	Vehicles equipped with an ADS designed to interact with a user	D2	Non-crash user interactions with ADS

Elements in the data sets are mutually exclusive (i.e., no duplication) and may be combined depending upon the vehicle configuration, for example:

- Conventional (manual only) vehicle → A + B
- ADS with human driver controls → A + B + C1 + C2 + D1 + D2
- Driverless passenger vehicle → A + C1 + C2 + D1 + D2
- Driverless commercial vehicle (no occupants) → A + C1 + D1

- GRVA-10: FRAV status report
- Upcoming FRAV sessions
  - Session 15 (8 June): Safety needs/topics
  - Session 16 (6 July): General requirements
- Draft general safety requirements, justifications, terms and definitions by July
- Two months to prepare submission to GRVA-11 (27 September-1 October)
- Four months to prepare submission to GRVA-12 (February 2022)

**Are we on task? Any course corrections?**