Report of the 33rd meeting of the Informal Working Group on Functional Requirements for Automated and Autonomous Vehicles (IWG FRAV)	
Venue	Tokyo (Japan)
Date	12-13 December 2022
Documents	Submissions can be found on the FRAV wiki page for the session.
Status: Draft	

Agenda adopted.	With the FRAV co-chair from the United States of America presiding, FRAV adopted the draft agenda (FRAV-33-01) without change.
FRAV conducted a review of its draft submission for the June 2023 WP.29 session based on a consolidated table of amendment proposals in FRAV-33-38.	The FRAV secretary reviewed the status of work. In November 2022, WP.29 directed FRAV to provide "guidelines for regulatory requirements and for verifiable criteria for ADS safety validation" for its June 2023 session (WP.29-188-12). During the 32nd session, FRAV received FRAV-32-04 as a first draft prepared by the secretary towards this end. FRAV requested that the section on user interactions be replaced by the content in FRAV-32-06 provided by the FRAV User Interactions workstream. This change resulted in FRAV-32-04/Rev.1. At the end of the session, FRAV experts were asked to review the document and submit comments and proposals for amendments. During the 32nd session, FRAV further requested that the numbering in FRAV-33-04/Rev.1 be replaced with a hierarchical structure. This change resulted in FRAV-33-04 distributed prior to the 33rd session. The secretary posted the experts' input on the 33rd session UNECE wiki page and consolidated the proposals for amendments in FRAV-33-38. The presiding co-chair proposed that FRAV use FRAV-33-08 to reach decisions on changes to the FRAV-33-04. FRAV noted that Canada's input (FRAV-33-40 to 42) submitted on 9 December (i.e., the Friday before the session start on Monday) was not included in the consolidated table of proposals.
FRAV shaded discussed text in green or blue based on the outcome.	FRAV considered proposals in FRAV-33-38 paragraph-by-paragraph. For instances where FRAV reached agreement on acceptable text, the resulting text was shaded in green. For instances where FRAV decided the paragraph and input needed further consideration, the text was shaded in blue. Paragraphs that were not considered during the session remained unshaded. The secretary noted comments and outcomes during the session, resulting in FRAV-33-38/Rev.1.
FRAV partially reviewed the introductory section.	FRAV began with the introductory section. Canada raised concerns on the structure of the document, including the length and content of the introductory section. The secretary explained that the introductory section was based on GRVA-09-28 submitted by FRAV to the February 2021 GRVA session. FRAV submitted this document to explain the research and concepts underpinning its understanding of ADS and approach to establishing requirements, including terms and definitions. FRAV agreed that this background information provided readers with context summarising the rationale behind key concepts and the recommended terms and definitions, requirements, and approaches to defining assessment criteria.
FRAV jumped from para. 1.5.5. to Section 2.	During consideration of the introductory section, the UK proposed that FRAV interrupt consideration of the section and move to the section on ADS safety requirements. Canada seconded this proposal and FRAV agreed to defer further discussion from para. 1.5.5. and resume the review from Section 2 ("Purpose").

FRAV agreed to further consider options to ensure an accurate and complete understanding of the term "Dynamic Driving Task".	FRAV reached agreement on acceptable text for paragraphs 2 through 3.6. On para. 3.7. providing a definition for the term "Dynamic Driving Task", SAE referred to FRAV-14-07/Rev.1 where FRAV agreed on its understanding of the DDT. The expert proposed to include this content in its entirety in the definition. The secretary explained that the draft aimed to provide the full explanation of the DDT in the background section while providing a concise definition suitable for use across WP.29 (and potentially other) activities. SAE noted that FRAV had devoted significant time and effort to reach a clear understanding of the DDT. The expert expressed concern that this understanding, which is necessary to interpret the requirements concerning DDT, would be lost by placing the explanation in the introductory section. FRAV agreed that the DDT explanation is essential to fully understanding the definition and recommended requirements. FRAV considered two options without reaching a decision. The first option would position the complete explanation of the DDT in the definition. The second option would append the explanation in FRAV-14-07/Rev.1 to the submission and reference the appendix as part of the definition in para. 3.7. (i.e., DDT means the tactical and operational functions required…as defined in appendix X).
FRAV agreed to further consider terminology for ADS-initiated fallbacks and user-initiated interventions in vehicle control.	FRAV agreed on acceptable text for para. 3.8. On para. 3.9. ("fallback user" definition), FRAV considered a proposal from the UK to differentiate between "compulsory fallback user" and "discretionary fallback user". This discussion highlighted a difference between an ADS fallback and a user intervention to take control of the vehicle from the ADS. SAE noted that ADS can fall back to a user or to a minimal risk condition (MRC). A user intervention is not initiated by the ADS and therefore should not be considered an ADS fallback. The UK explained its aim to address situations where the user is expected to respond and situations that do not necessarily demand a user response. The UK further proposed that the requirements should address user interventions where the ADS has to manage the transition to the user. FRAV agreed to further consider ADS-initiated fallbacks to a user and ADS management of user-initiated interventions in vehicle control within the context of ensuring safe transitions of control from the ADS to a user. Based on these deliberations, FRAV can reconsider the relevant terms and definitions. The discussion on ADS fallbacks suggested further consideration of the draft definition for "transitions of control". Canada's comments requested further consideration to improve the wording.
FRAV agreed to further consider the definition of "other road users" with regard to the meaning of "entity capable of safety-relevant interaction" and "roadway".	FRAV accepted text for paragraphs 3.10 through 3.12. On para. 3.13. ("other road user" definition), FRAV discussed the meaning of an "entity…capable of safety-relevant interaction" with an ADS and noted that the term "roadway" may be defined differently under national traffic rules (e.g., some Contracting Parties include pedestrian walkways in the definition of "roadway"). China recalled previous FRAV discussions where an ADS would be expected not only to interact with human road users but also with other ADS-operated vehicles and possibly other objects capable of safety-relevant interactions. The "entity" clause was intended to provide a broad term beyond human interactions. Japan noted that animals would be considered as obstacles rather than as an entity capable of interacting with an ADS. FRAV agreed that ADS would be expected to have two-way interactions with entities beyond human beings and that the definition should be improved for precision. FRAV agreed that the aim is to define a term for other roads users where there is a reasonable expectation for bilateral interaction or coordination between

	the ADS and the other road user(s) and to clarify the meaning of “roadway” as used in the definition.
FRAV agreed on draft text for scenario definitions and agreed to consult with VMAD to reach a common set of definitions.	FRAV agreed on acceptable text for paragraphs 3.14 through 3.18. FRAV agreed to move the terms for nominal, critical, and failure scenarios under the definition of “traffic scenario” as subsidiary definitions. FRAV agreed that the definitions related to scenarios should be agreed with VMAD. CLEPA noted that the definitions differ from the European Commission’s Implementing Regulation 2022/1426. SAFE and China stressed that scenarios are objectively defined by their content, not by ADS behaviour or response to the scenario. FRAV agreed that “critical scenarios” do not necessarily involve emergency ADS responses. ITU noted that traffic may involve any number of unusual externalities and proposed clarification that the critical scenarios address situations presenting a danger. Germany proposed that the time component should be considered. FRAV agreed that scenarios define objective situations and that the requirements separately establish acceptable ADS behaviours and responses to these objective conditions. FRAV agreed to further consider the scenario definitions (in consultation with VMAD SG1).
FRAV agreed on the Documentation section, noting a request to clarify the intended recipients. *FRAV agreed to further consider ADS responses to unfulfilled ODD conditions.*	FRAV agreed on acceptable text for the remaining definitions and proceeded to section 4 on “documentation”. FRAV agreed on acceptable text for this section, however, Canada requested further consideration to clarify the intended recipients of the documentation. FRAV agreed on acceptable text from para. 5 through para. 5.8.4.3. Under para. 5.8., FRAV agreed to remove the subheading for “functional requirements” and “behavioural requirements”. On para. 5.8.4.4., FRAV agreed with a proposal from the Netherlands to address the clauses on ADS response when ODD conditions are not fulfilled and when ODD conditions are no longer fulfilled as separate requirements. The first clause would apply before activation of the ADS while the second concerns ADS response to conditions while in operation. The Netherlands further proposed that the two requirements should specify the ADS response. The ADS should prevent activation if the ODD conditions of the relevant feature are not fulfilled, and the ADS should initiate a fallback when ODD conditions are no longer met during operation. FRAV agreed in principle but deferred a decision pending consideration of a revised proposal that captures the discussion.
FRAV agreed to further consider provisions regarding traffic disruption, including the impact of ADS driving behaviour on other road users.	FRAV agreed on changes to the text from para. 5.8.4.5. through 5.8.4.9. This decision included a request to the secretary to ensure that the ODD conditions listed in the draft Appendix A are copied from FRAV-30-05/Rev.1. FRAV tentatively agreed to delete para. 5.8.5.1. (“The driving behaviour of the ADS shall not disrupt the flow of traffic.”) provided confirmation that the aim of this provision is addressed elsewhere in the draft requirements. FRAV agreed to further consider para. 5.8.5.2. (“The driving behaviour of the ADS shall not require other road users to take evasive action to avoid a collision with the ADS vehicle.”). FRAV agreed in principle with the general aim to ensure that ADS behave predicably and that their behaviour does not create the kinds of situations discussed under “critical scenarios”; however, the experts questioned whether the wording establishes appropriate criteria.

FRAV agreed to further consider provisions granting exceptions to compliance with traffic rules for safety reasons.	On paragraphs 5.8.5.8. and 5.8.5.10. (the draft unintentional omitted 5.8.5.9.), FRAV agreed on the requirement that the "ADS shall comply with traffic rules and regulations relevant to its performance of the DDT. See Annex A for a method for converting traffic rules and regulations into elements applicable to scenario generation and the establishment of behavioural competencies." However, para. 5.8.5.10. aimed to accommodate instances where traffic safety needs override strict compliance. FRAV tentatively proposed that the "ADS shall comply with traffic rules and regulations except when in specific circumstances deviation is necessary to enhance the safety of the vehicle's occupants and/or other road users." FRAV agreed that the provision for exceptions to traffic-rule compliance required further consideration to establish objective criteria for determining that deviation is an acceptable ADS response.
FRAV reinserted provisions from FRAV-30-05/Rev.1 omitted in FRAV-33-04.	FRAV agreed on acceptable text for paragraphs 5.8.5.11. through 5.9.5.1. These changes included reinsertion of provisions from the table in FRAV-30-05/Rev.1 that were unintentional omitted in the transposition of requirements into FRAV-32-04. FRAV ended its review of FRAV-33-38 at paragraph 5.8.5. (i.e., at the point in the document where the above reinsertions resulted in a renumbering of 5.8.5. as 5.8.6.).
A new consolidated table will be provided for the next session.	For the next session, FRAV requested the secretary to prepare an updated consolidated table of proposals reflecting the areas of agreement, the items deferred for further consideration, and integration of any additional input provided by the experts. FRAV further requested the secretary to prepare an updated version of the draft interim submission accordingly.
FRAV considered simplified examples of safety models and agreed that an explanation on safety models and processes for their establishment should be included in the guidelines. *FRAV agreed to develop this proposal in future sessions.*	BASt provided an example for the application of safety models to define concrete and verifiable performance criteria (FRAV-33-37). The expert explained the aim to advance discussions on the use of safety models and the processes for establishing such models. The submission presented several examples (simplified for explanation) based on concepts developed under UN 131 (heavy vehicle AEBS) and UN R157 (ALKS) elaboration. The expert recalled FRAV-26-07 submitted previously by Germany and emphasized the importance of establish processes for defining performance criteria via safety models. These processes would provide the guidelines for establishing safety models as needed over time. In turn, the safety models can be refined over time. Establishing processes in the FRAV guidelines, therefore, provides a future-proof pathway for harmonization of performance criteria. FRAV welcomed the input and agreed on the importance of safety models, noting that their use was an integral part of the DDT workstream interest in behavioural competencies. The BASt contribution was consistent with the evolution of FRAV's work. The "high-level global requirements" provide "guardrails" to guide the establishment of behavioural competencies against which ADS performance can be assessed under scenarios. The safety models provide further granularity in defining these competencies and assessing ADS behaviours. Scenarios at the concrete layer of abstraction provide parameters that can be applied to the models and especially can enable determinations on thresholds between avoidable and unavoidable collisions under critical scenarios. FRAV welcomed the BASt proposal to further consider the development of an annex to the guidelines that would provide processes and examples for the development of safety models.
FRAV received a draft text for an annex on	The UK introduced a proposal for an annex to the FRAV guidelines on an approach to defining codified rules of the road (FRAV-33-39). FRAV welcomed the proposal, noting previous presentations from the UK and input

codification traffic rules. *FRAV agreed to address this in the guidelines and referred the proposal for further consideration.*	from the DDT workstream. FRAV agreed that the guidelines should include an explanation of this traffic-rule conversion concept consistent with the DDT workstream recommendations. FRAV further noted the outcomes of the exchange of information with the Informal Group of Experts on Automated Driving (IGEAD). The discussion generated a concept for an international database which could contain codified traffic rules designed to support ADS development and validation. FRAV referred the proposed annex to the DDT workstream for further consideration and agreed to consider a draft text for inclusion in the FRAV guidelines in future sessions.
FRAV received a presentation on coordinated between FRAV and VMAD in preparing a joint submission for 2024. *The FRAV and VMAD leaderships have agreed on a matrix to track and facilitate progress on the joint submission.* *The matrix supports an iterative process of collaboration to ensure alignment and consistency between safety requirements and validation methods.*	FRAV discussed coordination with VMAD towards meeting the WP.29 mandate to provide a consolidated set of guidelines (including requirements and assessments) for consideration during its June 2024 session. The FRAV and VMAD leaderships presented FRAV-33-36. The presentation introduced a matrix for managing coordination between the informal groups and their subsidiary bodies. The matrix would provides a framework for an iterative process of coordination between the groups. Under the matrix, FRAV would provide its recommended requirements for ADS safety with a request for VMAD to determine the assessment method(s) for verification of compliance. Based on the FRAV 2023 submission to WP.29, VMAD would confirm its understanding (or lack thereof) of the requirements and assessment criteria. VMAD might request clarification of certain requirements which would support FRAV refinements to its sections of the joint 2024 submission to WP.29. Once VMAD and FRAV reach a common understanding of the requirements and criteria (duly written into the joint draft text), VMAD would determine the assessment method(s) and procedures for assessing fulfilment (again, written into the joint submission). FRAV would review the VMAD method(s) to confirm that the method(s) or combinations of methods capture the safety objectives of the requirements. Questions or comments from FRAV would support VMAD refinements if needed. The aim of this process is to enable tracking of progress towards aligning FRAV requirements and VMAD methods in a consolidated text. Given the conceptual goal to provide WP.29 with a “blueprint” for future work on regulatory texts, the leaderships expect this process to ensure consistency across the consolidated submission while providing visibility over elements that may require special attention. The leaderships noted the “division of labour” where FRAV and VMAD activities overlap, especially with regard to the role of traffic scenarios. They further recognized the ground-breaking nature of the FRAV and VMAD work. The leaderships noted the role of processes for the establishment of elements such as traffic scenarios, safety models, and codified rules of the road factors into this work. The leaderships also highlighted the relevance of the FRAV/VMAD work to other WP.29 activities and to WP.1. The leaderships urged FRAV (and indirectly VMAD) to complete work on their respective 2023 submissions, keeping in mind this second collaborative phase and the importance of these documents to other efforts related to vehicle driving automation.
Next session on 10 January via web conference.	FRAV agreed to hold its 34th session via web conference on 10 January. FRAV noted the January calendar of events within GRVA and elsewhere. GRVA will meet during 23-27 January. FRAV noted the possible availability of experts for further web conferences on 19 and/or 20 January.