Report of the preparatory meeting of the Informal Working Group on Functional Requirements for Automated and Autonomous Vehicles (IWG FRAV)	
Venue	UN Palais des Nations, Geneva (Switzerland)
Date	23 Sept. 2019, 11am – 5.30pm
Documents	Submissions for the session can be found on the FRAV-00 UNECE wiki page.
Status: Adopted	

Leadership team presented; AAPC appointed as group secretary.	The co-chairs opened the session with an introduction of the FRAV leadership: • Ms. Chunmei CHEN, Deputy Consultant, Department of Equipment Manufacturing Industry, Ministry of Industry and Information Technology (People's Republic of China) • Mr. Richard DAMM, Head of Division, Road Vehicles (Principles of Approval Processes, Quality Management, Market Surveillance and Penalties), Division StV24, Federal Ministry of Transport and Digital Infrastructure (Germany) • Mr. Ezana WONDIMNEH, Chief, International Policy, International Policy Division, National Highway Traffic Safety Administration, Department of Transportation (United States of America) The co-chairs noted the need for FRAV secretarial support. The co-chair from the United States nominated Mr. John Creamer (jcreamer@americanautocouncil.org) from the American Automotive Policy Council (AAPC) for this role, noting subsequent offers of support from the European Association of Automotive Suppliers (CLEPA), Japan, and the United Kingdom. Following a discussion of AAPC's credentials, cooperative relationship with the International Organization of Vehicle Manufacturers (OICA), and expertise in WP.29 processes and regulatory instruments, FRAV consented to the nomination. FRAV noted that the scope of its anticipated activities will likely lead to requests for additional support. The co-chairs requested that the session reports concisely document discussion points and decisions. The co-chair from Germany noted that the report should not be a transcript of the discussions.
Session goal to agree on an initial work plan	The FRAV co-chairs defined the session objective: Develop an initial draft work plan based upon the WP.29 AV Framework Document and the FRAV Terms of Reference (ToR) as adopted by WP.29 during its June 2019 session. Consequently, the co-chairs deferred the presentations submitted for the session to the first full working session scheduled for 9-10 October in Berlin. The co-chairs requested brief summaries of the presentations for information only.

Submissions from CLEPA, the EC, and Russia briefly explained for further consideration at FRAV-01.	Drawing from its direct involvement with work on low-speed, on-highway automated lane-keeping systems under the informal working group on Automatically Commanded Steering Functions (ASCF), CLEPA recommended that FRAV initially focus on: 1. Detection and Perception of the Environment 2. Driving Strategy 3. Driver/System Interaction 4. Minimum Risk Maneuver (MRM) CLEPA proposed attention to on-highway applications as a first step. (Document FRAV-00-06) The European Commission explained its Guidelines on the Exemption Procedure for EU Approval of automated vehicles as a process for dealing with new technologies outside current regulations. In this regard, the Commission offered the guidelines as a more detailed version of the WP.29 Framework Document on automated vehicles. (Document FRAV-00-04) Russia presented a "cascade of technical requirements" as a possible method for developing technical provisions. The Russian approach would begin with the definition of dynamic driving tasks and their operational domains towards considering applicable requirements for human interaction leading to provisions for HMI, MRM, emergency maneuvers, and eventually roadworthiness. Russia proposed structuring the discussions in line with SAE J3016 recommendations. FRAV would develop general requirements for Object and Event Detection and Response (OEDR) functionalities. (Documents FRAV-00-03 and -05)
No limits on initial scope; Will adapt as circumstances warrant	FRAV considered whether to restrict the scope of its efforts with regard to vehicle categories (e.g., two-three wheelers, heavy vehicles). FRAV also considered whether to focus its initial work based on parameters such as a speed range or stopping distance. FRAV saw no reason to limit its scope at this early stage of its work, particularly given its short-term goal to define common principles. Rather, FRAV agreed to begin with a broad scope and adapt as circumstances warrant. OICA noted that its experience with automated steering and lane-keeping did not raise major differences between light and heavy vehicle objectives. However, FRAV shared a common view that its work would very likely evolve in steps or phases.
FRAV reviewed the group's ToR.	FRAV considered the ToR as adopted by WP.29 (reproduced in document GRVA-04-13). In particular, FRAV noted eight items related to functionality: 1. Longitudinal control (acceleration, braking and road speed) 2. Lateral control (lane discipline) 3. Environment monitoring (headway, side, rear) 4. Minimum/minimal risk maneuver (MRM) 5. Transition demand 6. Internal HMI (driver/user information) 7. External HMI (information to other road users) 8. Driver monitoring

FRAV agreed that its initial elements need to be refined and structured. *FRAV co-chairs will propose a structure for defining functionalities at the next FRAV session.*	FRAV concluded that the items represent diverse concepts. Longitudinal and lateral control cannot be separated from environment monitoring in the execution of dynamic driving tasks. MRM and transition demands respond to particular road conditions and involve interactions with the user. HMI appears to be a distinct subset related to communicating with users inside the vehicle and with road users outside the vehicle. Driver monitoring is not a driving function in the strict sense but may be considered a separate function. In some cases, the items are not functions in and of themselves, but rather elements of functional capabilities. Generally, the items established by the ToR are interdependent and depend upon traffic situations and conditions as well as automation levels and operational design domains. FRAV highlighted that its ToR focuses on requirements for the "combination of the different functions for driving". FRAV also noted diversity in the application of automated driving technologies, including unconventional vehicles and various systems (such as ALKS) that cross levels of automation. This diversity complicates the definition of functional requirements since not all requirements will be applicable to all applications of automation. Consequently, FRAV identified a need to reconcile the various elements and expressions of automation under a structure that would facilitate its work. The FRAV co-chairs agreed to provide direction and requested participants to prepare for a formal discussion and decisions at the next FRAV session.
FRAV will review national and regional guidelines, data, research, and voluntary standards towards defining common functional requirements by March 2020. *FRAV requested stakeholders to provide input for the next FRAV session.*	During the discussion of the ToR, Japan directed FRAV's attention to the Framework Document (WP.29/2019/34/Rev.1) and its links with the group's ToR. The Framework Document and ToR identify four "corresponding principles/elements" for consideration under "functional requirements": 1. System safety 2. Failsafe Response 3. HMI /Operator information 4. OEDR (Functional Requirements) Japan further noted that the document effectively assigns a task for delivery of "Common functional requirements [based] on existing national/regional guidelines and other relevant reference documents (1958 and 1998 Agreements)" by March 2020. Therefore, FRAV agreed that its immediate task would involve a review of the various guidelines and related documents issued by Contracting Parties, including attention to "existing data, research and voluntary standards" per the ToR. The co-chair from Germany cited an industry paper, "Safety First for Automated Driving", as an example of research that may be useful in FRAV's deliberations. At the same time, FRAV agreed that the foundations provided by the ToR's "combination of the different functions" and the Framework Document's "principles/elements" would require refinement. These high-level elements will need to be developed into functional requirements applicable to the diverse applications of automated driving technologies. Nonetheless, FRAV agreed that its starting point should be the definition of generic functions applicable across most, if not all, applications of driving automation.

FRAV shared views on the balance between broadly applicable generic requirements and specifications applicable to particular technologies and/or road conditions.	FRAV encountered some difficulties in defining its longer-term objectives and deliverables, particularly in relation to the work of the informal working group on Validation Methods for Automated Driving (VMAD). Some stakeholders proposed that FRAV build upon the work of the ACSF informal group. FRAV anticipates that ACSF will deliver a UN Regulation for the approval of vehicles with regard to low-speed (up to 60 kph), on-highway ALKS. Without duplicating the ACSF work, FRAV would seek to develop functional requirements and test methods applicable to other applications of automated driving technologies, including at higher speeds and/or in other traffic environments. The German co-chair cautioned that ACSF had encountered its own challenges in addressing the diversity of conditions even with its focus on the divided highway environment. The co-chair did not believe it would be helpful to generate 700-800 pages of technical provisions in an effort to address every technology at a detailed level. The co-chair suggested that some responsibilities for demonstrating performance across all variables and conditions would have to fall to manufacturers. OICA agreed that it will be challenging to find a balance between generic and specific technical requirements.
FRAV agreed that the description of high-level functional requirements addressing basic performance needed to come first.	The European Commission proposed to avoid going deeply into technical issues in these early discussions. The Commission suggested focusing on the Framework Document with attention to defining what constitutes reasonable and unreasonable risk. Japan noted that the document refers to the concept of tolerable risk and provides a high-level threshold in its "Safety Vision" section, broadly stating that automated driving systems must not cause events resulting in injury or death. The US co-chair agreed that FRAV must first define its high-level goals from which the group could then proceed logically towards more specific outcomes. The China co-chair noted that SAE Level 4-5 automation involves combinations of functions which suggests an initial need to define basic performance requirements.
FRAV shared differing views on its roles and responsibilities vis-à-vis the VMAD group. *The FRAV co-chairs agreed to seek more clarity from their VMAD peers and GRVA.*	This discussion revealed a lack of clarity concerning the boundaries between the FRAV and VMAD efforts. Some stakeholders suggested that FRAV should define generic functional requirements and limited conventional test procedures[1] to determine compliance with those requirements. FRAV agreed that existing regulations address the principal vehicle functionalities such that their provisions may be adapted or updated to extend to the assessment of automated systems. Under this approach, VMAD would define "new assessment/test methods" (per the Framework Document) to avoid the need for hundreds of pages of technical provisions addressing variations on the generic requirements. Other stakeholders suggested that FRAV should focus more narrowly on defining functional requirements to ensure safety while VMAD developed all the methods and procedures to determine compliance with those requirements (i.e., conventional and new assessment methods). The FRAV co-chairs agreed to discuss this concern with the VMAD co-chairs and GRVA towards clarifying their respective roles and deliverables.

---

[1] i.e., repeatable and reproducible laboratory and/or track tests designed for worldwide use by independent third-party services

Secretarial note	*During the 4th GRVA session immediately following the FRAV preparatory session, a similar issue came up concerning ACSF and VMAD. GRVA agreed that both groups would develop assessment methods. GRVA anticipated that ACSF and VMAD would provide conventional and new methods such that GRVA could establish a balance between generic and specific technical requirements.*
FRAV noted interest in vehicle diagnostics and in-use performance.	Several stakeholders, notably Finland and Sweden, raised interest in issues related to in-use performance, including roadworthiness assurance and diagnostic or "health check" systems. FRAV noted that such issues are complex while acknowledging that they have implications for automated vehicle functional requirements. OICA affirmed that diagnostic systems to monitor key vehicle operating systems and alert users to maintenance needs are a standard element in vehicle design.
Six actions items were agreed to prepare for the next FRAV session.	FRAV agreed upon six action items to prepare for the next FRAV session: A-1. The co-chairs will propose a structure for a work plan to develop the elements defined by the FRAV ToR. A-2. The co-chairs will seek clarification of FRAV and VMAD synergies and boundaries. A-3. FRAV would like to receive input towards establishing a list of research relevant to its work. A-4. FRAV would like to receive input towards establishing a list of national and regional guidelines relevant to its work. A-5. FRAV would like to receive input towards establishing a list of industry and voluntary standards and of national or regional regulations relevant to its work. A-6. FRAV would like to receive input towards defining the concepts of tolerable/acceptable/reasonable risk.
The next FRAV session will be held in Berlin during 9-10 October.	Germany will host the first full working session of FRAV in Berlin during 9-10 October. The draft agenda and logistical information concerning the location, accommodations, and travel can be found on the UNECE wiki page for FRAV-01. FRAV will also look for opportunities to coordinate its sessions with the VMAD informal group. VMAD has sessions tentatively scheduled in Tokyo during 14-15 January 2020 and in Paris during 14-15 April 2020.