Minutes of the 2nd session of VMAD IWG

**Date**: April 1-2, 2019

**Venue**: Walter E. Washington Convention Center (Room 103A), Washington, DC

**Participants**: Canada (TC), China (CATARC), EC (JRC), Japan (MLIT/NTSEL/JASIC), Korea (KATRI), the Netherlands (RDW), Sweden (Transport Authority),

UK (VCA/Mclaren/Transport Systems Catapult), US (DoT) AAPC, CIECA, CITA, CLEPA, EGEA, ETSC, OICA, SAE (Total: 53 participants)

Day 1: April 1 (Monday) 9:00 – 17:00

* Co-chair/Japan introduced the second session of VMAD. Please note, the documents posted to the VMAD wiki pages.

**Agenda Item 1: Adoption of the agenda**

* Co-technical secretary introduced and reviewed the items in the provisional agenda.
* Regarding Agenda Item 5, OICA requested that their presentation be postponed to the day two, to allow for additional preparation time.
* Additionally, Joint Research Center (JRC) on behalf of European Commission requested to present under Agenda Item 7, New Validation Methods.
* Co-chair/J announced the adoption of the provisional agenda with the modifications noted above with unanimous consensus.

**Agenda Item 2: Adoption of the report of the 1st VMAD meeting.**

* Co-technical secretary gave a brief summary, which was posted in February to the VMAD wiki pages. No comments or proposed edits were received. The report was adopted by unanimous consensus.

**Agenda Item 3: Report on the 177th WP.29session and next steps for ToR of VMAD IWG**

* Co-chair/J gave a brief report of the 177th WP.29 Session (reference WP.29-177-19). WP.29 agreed to the general approach outlined in WP.29-177-19 “Framework document on automated / autonomous vehicles”. New Assessment and Test Methods is one of the priorities listed and this category maps to VMAD Group. This document, shown to VMAD, will be considered again at the June 25-28 session of WP.29.
* The World Forum agreed to the general approach to document 19 and directed GRVA to use the content in the document as guidance for the GRVA efforts. There will be an additional GRVA session, June 3,4. The structuring of GRVA’s work will be the meeting focus. The future activities of VMAD may be affected by the June 3,4 GRVA session and June 25-28 WP.29 session. VMAD may have some additional or altered activities. Until then, we proceed as planned and will wait for further direction by WP.29.
* There were no comments or questions on the report on WP.29/GRVA meetings.
* Regarding the next steps for the Terms of Reference (ToR) of VMAD IWG, the draft ToR was submitted to GRVA, but it, as well as other informal working groups’ ToRs, was not considered at the previous GRVA January 28 - February 1. WP.29 has directed GRVA to draft the full ToR’s of all the informal working groups including VMAD. Potentially, the AC.2 will engage with the allocation of resources. In the interim, the VMAD leadership proposes further discussion of ToR for VMAD be postponed till after the next GRVA and WP.29 as these meetings are leading in the decision of the scope.
* Question from AAPC for clarification- that Contracting Parties will finalize the informal working groups’ ToR’s at GRVA and WP.29?
* Co-chair/J stated that the WP.29 wanted a top down approach for the ToR’s of informal working groups under GRVA. The draft ToR’s will be reviewed by GRVA in June, and then, WP.29 will endorse these at the June meeting. At the next meeting of VMAD (July 3,4), suggestions for edits/modifications to the VMAD draft ToR can be discussed.
* USA commented that as of today, report of WP.29 March session has not been posted. The next GRVA agenda has not been posted yet.
* OICA asked which documents will be the base for the ToR, ECE/TRANS/WP.29/2019/2 or WP.29-177-19?
* Co-chair/J replied that document WP.29-177-19 would be the base.
* Co-chair/the Netherlands agreed that there are a variety of groups, with many documents, and that even though, we do not have an adopted ToR, but we work towards what is identified in the draft, as the major items listed in the draft are generally accepted and that the group should work on these, which are reflected in the presentations in the provisional agenda for the 2nd VMAD IWG meeting.
* There was general discussion regarding the ALKS work, extension of the ACSF, and informal groups under GRVA that potentially have overlapping areas pertaining to automated driving. The scope of this group is validation methods in general and not detailed requirements for a specific automated function. In addition, VMAD should work broadly, supporting both the 1958 and 1998 Agreements, with regulatory work, and guideline work (non-agreement specific activities). We should continue in our draft direction and be aware that some modifications may be made by higher authorities later in June. We have several presentations today under Agenda Item 7 that may clarify further.

**Agenda Item 4: Comparison of Guidelines for Automated Driving Systems in terms of items related to VMAD IWG.**

* *Note to Contracting Parties, by the next session of VMAD meeting, please check the content of informal document VMAD-02-06 for completeness and accuracy, and report at latest two weeks prior to that meeting to Technical Secretary.*

***Action by Contracting Parties who issue Guidelines for ADS***

* There was discussion of the scope of the overall content of each CP’s guidelines and the comprehensive information contained in VMAD-01-03, the overall summary drafted by OICA.

**Agenda Item 5:** Request by OICA and consensus of the VMAD group, this item moved till later on April 2.

**Agenda Item 6: Audit of Electronic Systems**

* Reference, informal document VMAD-02-03 provided by the Chair of Complex Electronic WG.
* At the January/ February session of GRVA, the UK / DfT leading group on ALKS (Automated Lane Keeping System) submitted a document to this 2nd session of GRVA that had been drafted with the intent of defining the audit necessary to support the approval of an ALKS. However, GRVA advised that the group’s scope is limited to amending UN Regulation 79 (i.e. driver assistance systems only), and that this work should be a task of VMAD.
* UK/VCA presented an overview of this document.
* Co-chair/J stated that GRVA had not reached an agreement about which IWG would be responsible for the assessment of Complex Electronic Vehicle Control Systems.
* Co-chair/N commented that there are elements of this relevant to VMAD, regarding during the product design and development process; and therefore, is of value to VMAD as a source, but is missing information regarding in use. For VMAD, references to e.g. Regulations should be avoided in order to be “agreement neutral”. Under 3.3.5.1, altering the function, and not listed, “safeguarding” a function, and the security part of the system. Language pertaining to protection from “tampering” will be added to the text as amendments are performed.
* Co-chair/J suggested that the assessment portions of the document be considered by VMAD.
* As suggested in the WP.29 Guidelines for Cyber security (Part A. Examples of vulnerability or attack method related to the threats), Korea recommended, if possible, that Appendix 6 provides a separate table of severe risks and their impacts, so that they can be referred when reviewing the Guidelines.

**Agenda Item 7: New Validation Methods** – series of four presentations by UK, Japan, and EC experts.

* 1st presentation: Multi-User Scenario Catalogue for Connected and Autonomous Vehicles presented by Transport Systems Catapult for UK/DfT, VMAD-02-04. DfT is encouraging industry to assist with collaboration and sharing important safety related scenarios.
* OICA commented regarding the importance of doing this in an open standard, OPENDrive.
* The presenter stated indeed, that the critical issue is to have a standardized method to describe the scenarios and is a goal of MUSICC.
* The Netherlands commented that Pass/fail criteria are mentioned in the presentation but are not really filled in from the project.
* However, with scenario’s and the possibility to manipulate the scenario’s with parameters, it is possible to find the boundaries of the ODD in the simulation scenario’s. The boundaries of the ODD and the gradually increasing unreliability of the automated function, while moving towards this boundary is actually one of the interesting objectives of simulation tests. The vehicle needs to be aware of running out of its ODD before its reliability drops below a certain value. The MUSICC-database is made to be enriched with future new scenario’s that proof to be useful. These scenario’s will evolve over time. This implicates that vehicles that are yet in the field have not been submitted to these scenario tests and might not pass them. If this might be the case, there should be an obligation to improve the vehicle performance. The improvement of vehicles in the field is implicitly in the concept. This requires a reconsideration of safety in relation to foreseeable and reasonable, because what is unforeseeable today might have happened tomorrow.
* EC/JRC asked when will the database be ready.
* Per slide 5, about to embark on some testing of the system later this month with some sample scenarios, and to also accept additional scenarios. Over the next twelve months, the goal is to validate interoperability with other stakeholders.

*Lunch break*

**Agenda Item 7: continued:**

Japan/JASIC presented “How to Consider Innovative Safety Validation Methods of Automated Driving” VMAD-02-05

* Question from UK/Mclaren, regarding slide 8 – is there a probability of Scene.1 vs Sene.2 occurring given a sudden deceleration event with following vehicles?
* The expert replied that this is an example of possibilities, but not calculated probability.
* Co-chair/N, asked the VMAD delegates, also referencing the potential incident scenarios shown on slide 8: Are there catalogues existing that describe incident/crashes that can be used to prioritize. What statistical information may be available? *A group action is for participants to share studies that have identified crash scenarios with probabilities.*

***Action by VMAD IWG members***

“Safety Measurement Principles for Validation of Automated Driving” VMAD-02-07, by UK/Meridian.

* OICA commented on the scope of the multi-tier measurement, and what the scope might entail, particularly pertaining to physical tests. OICA expressed its concern that it would be time consuming if not only decisions by the system but also the data used for these decisions would be part of the validation as presented.
* The Netherlands indicated the importance to validate the objectivity of decisions by the system.
* UK/VCA replies that there is a need to have a minimum level for validation.
* There was extensive discussion regarding clarifying the scope envisioned given the complexity of validating in balance with not restricting safety technology deployments.

European Commission/JRC, presented VMAD-02-08, “Safety Assessment of Automated Vehicles.

* AAPC asked for elaboration of Item 8 on slide 15.
* EC/JRC explained that item 8 is related to documents developed in 7 and previous steps.
* There was further discussion of what might be considered by OEM certification, that a combination of approaches is suggested. The 8 approaches were identified by the 16 experts pooled in the project, which included manufacturers, member states and technical service organizations.
* EC/JRC emphasized that the presentation approaches are a “work in process” based upon the experts pooled and not what the EC is planning to execute. There is no liaison yet, with VMAD, and Co-Chair/N asked how this may take place to be supported.
* Co-chair/J gave a brief overview of the four-presentation subject areas and asked the VMAD for any summary thoughts relating to this agenda item and the delivered presentations such as elements for further consideration by the VMAD IWG.

**Agenda Item 10: Upcoming meetings.**

* Co-chair/N announced that the meeting is set in July at Ispra. Plans for the future meetings; the meeting hosted by Canada in Ottawa, on October9/10 may not be possible at this time, but perhaps in 2020. Co-chair/N asked or an alternative host/venue on October 9/10, 2019. For next year, the dates selected at this time are January 14/15 by JASIC in Tokyo, proposed for 2nd, April 14/15, 3rd for September 8/9, and the 4th meeting on November3/4 with locations for 2nd, 3rd, 4th to be determined. These dates do not conflict with both GRVA and WP.29. (see also report on agenda item 8 for last status at the end of the meeting)

*End of Day 1*

* Co-chair/N called the meeting to order. Discussed plans for today regarding schedule and presentations.
* Co- technical secretary made announcements regarding registrations for Mobility Talks and SAE Government Industry.

Day 2: April 2 (Tuesday) 9:00 – 13:00

**Agenda Item 5: How OICA Envisions the Work of VMAD IWG**

* OICA delivered the joint OICA / CLEPA presentation “New Assessment & Test Methods clarification of (new) tasks assigned to VMAD and the way forward” (VMAD-0-09).
* The Co-chair/N asked the IWG VMAD for questions and comments.
* OICA elaborated on the content of the “Transition Phase” as shown on slide 7 as there were extensive comments on this slide’s content. OICA reiterated that their position is to rely on the UK group CEL. The concept of a “discussion document” being started that would capture the ongoing work, building upon the presentations and deliberations of group and to be used as a reference paper for VMAD, not for reporting to GVRA/WP.29.
* There was discussion regarding the work ongoing in the IWG ACSF and what then IWG VMAD will cover.
* The Co-chair/N summarized the discussion, in that a proposal to use CEL step 2 document as a basis for new methods for validation of automated systems. That the identified “transition phase” is not to be addressed by this VMAD; that the CEL step 2 lacks some and ACSF should continue their work on ALKS and not up to VMAD to influence. Therefore, ACSF will find a solution and VMAD will extract generic elements for general automation.
* The Co-chair/ Japan suggested that slide 7 without blue part could explain the role of VMAD more clearly.

**AD HOC Agenda Item: Group Discussion**

* Based on discussions last evening between the Co-chairs and Technical secretaries, and other comments from the IWG VMAD, in the past meetings, we’ve gathered valuable elements of information.
* The Co-chair/N asked the IWG VMAD to break into sub groups this morning to discuss four questions and come back with added developments/details and share later today, with a spokesperson, for plenary VMAD discussion. The four questions are:

1. Describe as many objectives for validation methods as possible and if possible, organize these in subgroups/levels
2. Describe all relevant assessment methods including the essential characteristics
3. The current safety strategy for validation methods is to prevent foreseeable and preventable crashes. Work out the criteria for foreseeable and preventable.
4. Describe a minimum set of relevant test scenarios and if possible, indicate for which assessment method(s) scenarios and be applied.

* The IWG VMAD split into three groups as no volunteers chose to address the fourth topic. The IWG VMAD reconvened in plenary for discussion.

Group 1: “Objectives for Validation Methods – an exercise in multicultural brainstorming”, presented by AAPC.

Group 2 “Relevant Assessment Methods” slides were presented by UK/VCA.

Group 3 “Current Safety Strategy for Validation Methods”, presented by OICA (Auto Alliance). In addition, Group 3 did discuss question 4, albeit briefly. The results will be transferred into a document which will be shared with all participants. A number of participants enjoyed this working method as part of our meeting and asked to repeat this at next meetings.

**Agenda Item 8: Update of roadmap and working schedule for VMAD IWG**

* Co-chair/N proposed to make the update after the June meetings of GRVA and WP29 as by that time the ToR should be clearer. The meeting dates for the next VMAD is July 1,2 Ispra, October 9,10, Ottawa (pending confirmation). The Co-chairs welcome options should the Canada location not be confirmed and for 2020 meetings.
* For 2020: January 14,15, Tokyo, April 14,15 location to be determined (tbd), September 8,9 location tbd, November 3,4, location tbd.

**Agenda Item 9: Preparation for Report to GRVA Next Session**

* Co-chair/N announced that a draft GRVA progress report will be prepared and distributed for comments to the IWG VMAD, prior to delivery at the June 3,4 GRVA session.
* Following this, Co-chair/N adjourned the meeting and thanks both AAPC and SAE for their support to host this meeting as well as for the opportunity to join the Washington Autoshow