Minutes of the 3rd session of VMAD IWG

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

**Venue**: JRC, Ispra, Italy

**Participants**: Canada (TC), China (CATARC), EC (DG Grow/JRC), France (UTAC), Germany (BASt), Japan (MLIT/NTSEL/JASIC), Korea (KATRI), the Netherlands (RDW), the Russian Federation (NAMI), UK (VCA/Mclaren), US (DoT), AAPC, CIECA, CITA, CLEPA, EGEA, ETSC, OICA, SAE, AAPC (Total: 43 participants)

Day 1: July 1 (Monday) 9:00 – 17:00

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

* Co-Chair/J thanked JRC to host the meeting.
* EC asked if there were any agenda items to discuss multi-pillar approaches.
* Co-chair/J replied that multi-pillar approached would be discussed at agenda item 5 (presentation by JRC) and agenda item 7.
* OICA requested to discuss document GRVA-03-23 “The safety elements and the multi-pillar approach” submitted by OICA.
* OICA document was added to agenda item 5.
* Self-introduction followed because some new faces were seen.

**Agenda item 2. Adoption of the report of the 2nd VMAD IWG meeting**

* The report (VMAD-03-01) was approved without any modifications.

**Agenda item 3. Report on the 3rd GRVA and the 178th WP.29 session**

* The Co-Chair/J briefed the highlights of the 178th WP.29 session regarding automated vehicles.
* Framework document on automated/ autonomous vehicles was approved.
* ToRs for the three IWGs under GRVA, i.e., FRAV, VMAD and EDR/DSSAD IWGs were also approved.
* CS/OTA and ACSF IWGs would continue the current activities
* New request for VMAD IWG is to evaluate new validation methods for ALKS before GRVA February 2020 session.

**Agenda item 4. ToR for VMAD IWG**

* USA stated that sub-paragraph c, paragraph 6 of VMAD ToR (WP.29-178-17-rev.1) shown on UNECE website was further amended.
* AAPC pointed out that the words “OD” and “ODD” (sub-paragraph e, paragraph 4 of Framework document) have different meaning. “OD” would be decided by regulators whereas “ODD” would be decided by manufacturers.
* AAPC also pointed out that sub-paragraph c, paragraph 6 of VMAD ToR was not identical to corresponding part of Framework document. Therefore, it would be necessary to amend Framework document in line with VMAD ToR.
* Co-Chair/J replied that WP.29 had the same argument in the previous week. WP.29 decided to revisit this issue when framework document would be subject to annual review in the following year. He added that sub-paragraph c, paragraph 6 meant evaluation of the developed new validation methods using ALKS as a trial case.
* Canada pointed out that the task on OEDR (sub-paragraph d, paragraph 4 of Framework document) was allocated to both of FRAV and VMAD IWGs and asked whether this would be redundant or not.
* Co-Chair/J replied that FRAV IWG would consider functional requirements for OEDR whereas VMAD IWG would consider new assessment methods for OEDR. Anyway, GRVA should manage both IWGs to avoid any redundancy of work.

**Agenda item 5. New validation methods**

1. Safety Criteria Study for New Assessment/ Test Methods of AD System (VMAD-03-05)

* Co-Chair/J supplemented the presentation by Japan/JASIC saying 32 scenario patterns to be considered for highway chauffeur would be reduced to only 4 scenario patterns in case of ALKS.
* OICA asked about computer language used.
* Japan/JASIC replied that XML format and the other language were used. He hoped to have open scenario in the future.
* OICA asked how many parameters were necessary. The parameters suggested by Japan/JASIC might be insufficient to be applied to urban scenarios.
* Japan/JASIC responded that the scenarios presented covered only highway chauffeur. He continued that it was necessary to start consideration of urban scenarios as well.
* Canada stated that cut-in angle would differ among heavy-duty vehicles, passenger cars and two-wheelers. He asked how worst-case scenario would be assumed?
* Japan/JASIC replied that heavy-duty vehicle models were not developed yet.
* Canada also pointed out the steady cut-in speed was unrealistic. In fact, human driver would easily change the speed during cut-in.
* Japan/JASIC admitted that there was much room to develop human driver model. However, at the outset, the targeted level of human driver skill must be decided.
* Canada stated that human behavior was under discussion by WP.1.
* EC asked whether highway scenarios included construction workers in their scope.
* Japan/JASIC replied that highway scenario assumed only ego vehicle and surrounding vehicles. It would be just the issue which VMAD IWG should discuss.
* EC also asked about the timeline of Japanese project to develop highway chauffeur scenario.
* Japan/JASIC replied that it would come soon.

---------------------------------------------------- Lunch break----------------------------------------------------------------------

* UK stated that the performance level of ADV must be further improved.
* Japan/JASIC replied that the performance of ADV system covered the skill of 95% tile human driver. There was no clear answer as to what % tile human driver should covered.
* Co-Chair/N stated the necessity of ODD boundary recognition and the importance to define the expert driver.
* USA asked how ADS would react to unforeseeable events, which might draw ADS out of its ODD.
* Japan/JASIC replied ADS would make best efforts to avoid accidents. Japanese proposal considers traffic disturbance but does not consider recognition limitation or vehicle disturbance. If ODD is concerned, all of traffic disturbance, recognition limitation and vehicle disturbance should be taken into consideration.
* EC/JRC asked whether not any combination of the four scenario patterns applicable to ALKS was considered. EC/JRC also asked how to choose critical scenarios.
* Japan replied simplified scenarios (ego vehicle and the other vehicle concerned) were considered at the moment. Consideration of combined scenarios would be necessary to make scenarios more realistic at a later stage. As for selection of critical scenarios, VMAD IWG should decide the border between “preventable” and “unpreventable” first.
* CIECA raised the issue how to share traffic data collected country by country.
* Japan/JASIC responded that it would be helpful if Japan could have access to traffic data with vehicle speed of 120 - 130 km/h.
* OICA touched on its project to establish traffic scenario database.
* Co-Chair/J stated that the discussion would be continued by Subgroup “1a” at agenda item 7.

1. Identified Crash Scenarios with Probabilities Study in China (VMAD-03-07)

* EC asked whether the database included only fatality accidents or both of fatality and injury accidents.
* China replied both fatality and injury accidents were included.
* EC also asked whether preventable and unpreventable accidents could be distinguished.
* China replied that such information was not included in the data.
* EC/JRC asked how the database would be used.
* China replied that the database would be used as the validation test scenarios.
* Japan/JASIC asked whether the database could be divided into highway cases and urban cases.
* China replied that the database included both cases but it would be difficult to divide them.

1. Provisions of Guidelines in China (VMAD-03-08)

* China explained the provisions of Guidelines in China related to VMAD IWG. The provisions specify 34 test scenarios for the 14 validation test items implementing them on the proving ground to verify the safety capability of AD vehicles before being tested on public roads.
* EC asked whether the guidelines were for ADVs in experimental phase or those for sale.
* China replied that the Guidelines were to verify the safety capability of AD vehicles before being tested on public roads.

1. JRC Proposal for Safety Assessment of Automated Vehicles (VMAD-03-06)

* USA made some observations;

-The fourth pillar “In-use data reporting” was not discussed yet.

-The multi-pillar approach should be made applicable to both the 1958 and 1998 Agreement.

-Collaboration between FRAV IWG considering functional requirements and VMAD IWG considering new validation methods is necessary.

* Canada brought up some questions;

-Would it be necessary to define the terms “automated” and “autonomous”?

-Should an approval authority have an ability to perform simulation testing by itself?

* EC/JRC emphasized that the presentation (VMAD-03-06) was a summary of discussion in EU. It might be necessary to adjust the proposal when it would be applied to UN system. The term “automated” means level 3 whereas the term “autonomous” means level 4 or 5. Approval authorities have little experience in simulation testing. OEM performs simulation tests and evaluate the safety performance of ADVs, which could be part of audit by approval authorities.
* Co-Chair/N pointed out the necessity of onboard event data recording which could tell whether the ADV operates in good order.
* Japan/NTSEL asked the meaning of “safety envelope”.
* EC/JRC replied that it was safety distance between vehicles to avoid accidents shown at slide 14.

1. The Application of Multi-pillar Approach (GRVA-03-23)

* EC asked the reason why the fourth pillar “In-use data reporting” was missing in multi-pillar approach proposed by OICA.
* OICA replied it was because the proposed multi-pillar approach was simply based on UN framework document that did not have “In-use data reporting” as key AV principles. However, OICA planned to consider it in future.
* Co-Chair/N asked to which pillar simulation would correspond.
* OICA replied that simulation would correspond to the pillar “virtual testing”.
* EC stated that it was not necessary for VMAD IWG to wait for functional requirements completed by ACSF/FRAV IWGs before making new validation methods.
* AAPC stated that OICA document could be used for better understanding of the multi-pillar approach. It was not a “to-do” list.
* Canada stated that the bottom line was “What is a safe AV?” If this proposition was pursued, the outcome would be beneficial to both type approval and self-certification countries.

Day 2: July 2 (Tuesday) 9:00 – 15:00

**Agenda item 6. Audit of Electronic Systems**

* Agenda item 6 was skipped because no new document was submitted.

**Agenda item 7. Workshops**

* Subgroups 1a “Traffic scenario”, 2a “Audit/Virtual testing/In-use data reporting” and 2b “Test track/Real World testing” discussed concurrently. Concrete action followed by each Subgroup was instructed in document VMAD-03-09.

1. Subgroup 1a: The outcome of the discussion was reported by the Netherlands.(VMAD-03-10)

* USA and Canada noted that there were various accident data such as FARS (Fatality Analysis Reporting System) in USA and NCDB (National Collision Database).
* AAPC asked whether any recommendation on test scenarios was possible.
* The Netherlands replied that Subgroup 1a only raised the question and did not find an answer yet.
* Canada was interested not only in test scenarios themselves but also in weight (importance) of each test scenario.
* The Netherlands pointed out that perception limitation (sensor performance) should be tested separately.

1. Subgroup 2a: The outcome of the discussion was reported by UK/VCA. (VMAD-03-11)

* OICA suggested that certification approach for Cybersecurity/OTA would be a good reference for VMAD IWG.

1. Subgroup 2b: The outcome of the discussion was reported by the Netherlands. (VMAD-03-12)

* Subgroup took up the issue on the definition of OD/ODD and other questions.

**Action by each Subroup**: Each subgroup is to finalize the description of the objective, answer the questions raised related to the issues imposed on the subgroup and send them to Co-Chairs and Secretaries by September 30 (Monday)

**Agenda Item 8: Update of Roadmap and working schedule for VMAD IWG (VMAD-03-04)**

* Roadmap and working schedule for VMAD IWG was revised in accordance with the ToR for VMAD IWG (WP.29-178-17-rev.1 and its further amendment shown in Annex VI of ECE/TRANS/WP.29/1147 “Report of WP.29 178th session”)

**Action by VMAD IWG members**: VMAD IWG members are invited to check the Roadmap and working schedule for VMAD IWG by the next session in October.

**Agenda Item 9: Preparation for Report to GRVA September session**

**Action by Co-Chair**: Draft report to GRVA September session would be sent to VMAD IWG members for comments.

**Agenda Item 10: AOB, Upcoming meetings.**

- October 16-17, in Ottawa

- January 14/15, 2020, JASIC in Tokyo

- April 14-15, 2020, CCFA in Paris

- September 3-4, 2020, NVIDIA in Santa Clara (proposed)