

**UN/UNECE/WP29/GRVA  
VMAD-SG1 (scenario) 13<sup>th</sup> meeting**

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March 29<sup>th</sup>, 2021 (13:30–15:30 CEST)

Prepared by SG1 leader

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# Provisional Agenda

1. Introduction (13:30-13:40)  
→ Background and purpose of this meeting
2. Abstract scenario (13:40-14:00)  
→ Presentation and questions
3. Outstanding issues (14:00-15:25)  
→ Discussion and revision of the open issues
4. Any other business  
→ No issues at this moment
5. Next meeting

## [Background]

- NATM MD (New Assessment/Test Method Master Document) was reported to WP29 on March (WP29-183-05).
- NATM MD includes what SG1 had discussed (scenario concepts and functional scenarios, which was agreed during the last SG1 meeting on 13<sup>th</sup> January) and outstanding issues (VMAD-15-05-rev.1) includes open issues of SG1.
- Task of SG1 for next year is to continue discussion for remaining open issues and provide update to NATM MD.

## [Today]

- Discuss the suggestion from SAFE (adding “abstract scenario” concept)
- Confirm the status of current “outstanding issues”
- Update “Outstanding issues” for future discussion

# Outstanding issues (copy from VMAD-15-05-rev.1)

Outstanding questions/issues/activities to address/develop	Target Completion date
1. Initiate the development of illustrative examples of functional scenarios for divided highway driving to inform the development of other aspects of the scenarios catalogue and the NATM pillars.	March 2021 ->Completed
2. Determine the scope/level of abstraction of the scenarios required for the broader VMAD catalogue (e.g., functional, logical, concrete).	March 2021 ->Completed
3. Determine methods/best practices for identifying scenarios (e.g. derived from collision data, etc.).	March 2021 ->Completed
4. Determine methods for categorizing scenarios and develop timeline for further catalogue development (e.g., based on the ODD, such as highway driving, urban/rural, complex situations, such as construction zones, and edge cases, and micro ODDs).	March 2021 ->Completed
5. Leverage existing scenarios resources and develop a VMAD engagement strategy to inform the development and maintenance of the catalogue (e.g., identify work by other organizations that can be used to assist VMAD to develop a scenarios catalogue. Establish partnerships with other organizations – where feasible).	March 2021 ->Completed
6. Develop a common dictionary of terms used to describe scenarios (e.g., the various aspects of the operational design domain) and the elements that compose the scenario.	March 2021 continued if necessary
7. Determine how scenarios can be applied within the NATM process (simulation, test track, real-world). <i>Work to be done in consultation with SG2,3,4</i>	after March 2021
8. Develop common metrics to apply to the elements examined in scenario testing. <i>Work to be done in consultation with SG2,3,4 and FRAV</i>	after March 2021
9. Identify who is the owner/curator of the scenario catalogue? Determine the methods for inputting scenarios into a potential scenario catalogue, if appropriate. What are the best practices for informing/updating the scenario catalogue?	after March 2021
10. Determine how best to demonstrate sufficient coverage of critical scenarios. Should scenarios focus on the system as a whole or should it also include scenarios for specific component? How do we test vehicles based on varying levels of perception?	after March 2021
11. Determine which scenarios are required to validate the functional safety requirements established by FRAV (see sections 4.4 to 11 in FRAV-02-05) (e.g., system safety, operational design domain, object and event detection and response (OEDR), human-machine interface). <i>Work to be done in consultation with SG2,3,4 and FRAV</i>	after March 2021
12. Determine how other permutations of the base-line scenarios in the catalogue can be applied. <i>Work to be done in consultation with SG2,3,4 and FRAV</i>	after March 2021
13. Determine methods for assessing the validity and reliability of scenarios. <i>Work to be done in consultation with SG2,3,4 and FRAV</i>	after March 2021
14. Determine methods for dealing with the possible risk of training/overfitting an ADS to pass limited number of predefined scenarios. <i>Work to be done in consultation with SG2,3,4</i>	after March 2021
15. Determine methods/best practices to develop scenarios suggested by members in order to enhance to identify scenarios (e.g., the Pegasus 6 layer, three aspects based on factors interfering DDT).	after March 2021
16. Determine how unusual situations (e.g. wrong way driver) are dealt with in the scenario catalogue.	after March 2021

# Outstanding issues

## [Background]

- The “outstanding issues” mostly developed based on “VMAD-06-04 NATM Workplan” and some issues were added based on the SG1 and VMAD discussion.
- Since there were much discussion about scenarios, outstanding issues should be updated based on the current understanding of SG1 members.
- In addition, some open issues were not reflected to outstanding issues and should be added to the list.
- SGs are requested to submit updated outstanding issues and completion date to VMAD co-chairs by early April.

## [Current status of original “outstanding issues”]

- P.6,7 describe current status based on SG1 leader’s view.
- SG1 leader will answer the questions from members.
- The status is not official agreement. If members consider that additional discussion is necessary, members should raise the point during “update of outstanding issues”.

## [Update of outstanding issues]

- Considering the current status, the draft version of “outstanding issues” and “target completion date” is described in P.8.
- Draft version of outstanding issues includes “issues from current outstanding issues” and “new issues that require discussion” based on the past discussion.
- Regarding draft target completion date, June for items that seem to solve early, and September for other issues. The description of “Need FRAV input” as necessary.
- Considering the request from VMAD co-chairs, the outcome of today’s discussion will be submitted to VMAD co-chairs.

## [Next step]

- Considering the new issues cannot be covered by today’s discussion, SG1 members are requested to **submit additional issues by 13<sup>th</sup> April**. SG1 will discuss the proposals in order to update the outstanding issues list. (These items will not be submitted to VMAD co-chairs, but SG1 can discuss the items.)
- Regarding each outstanding issues, SG1 members are requested to **submit any comments by 20<sup>th</sup> April**. 5 (The format of the submission (excel sheet) will be uploaded to UNECE website.)

# Status of current outstanding issues

Outstanding questions/issues/activities to address/develop	Status
1. Initiate the development of illustrative examples of functional scenarios for divided highway driving to inform the development of other aspects of the scenarios catalogue and the NATM pillars.	Examples of functional scenarios for divided highway are described in NATM MD Annex 2. COMPLETED.
2. Determine the scope/level of abstraction of the scenarios required for the broader VMAD catalogue (e.g., functional, logical, concrete).	Concept of functional/logical/concrete scenarios is described in section 5 of NATM MD. COMPLETED.
3. Determine methods/best practices for identifying scenarios (e.g. derived from collision data, etc.).	Some methods of identifying scenarios are described in section 5 of NATM MD. Indeed, NATM MD Annex2 was developed based on various ways(inputs from several members). Also, SG1 agreed that scenarios can be added anytime if necessary. COMPLETED.
4. Determine methods for categorizing scenarios and develop timeline for further catalogue development (e.g., based on the ODD, such as highway driving, urban/rural, complex situations, such as construction zones, and edge cases, and micro ODDs).	Categorization is dealt with abstraction of scenarios. For catalogue development, SG1 agreed that SG1 can add scenarios anytime for Annex2 of NATM MD. COMPLETED.
5. Leverage existing scenarios resources and develop a VMAD engagement strategy to inform the development and maintenance of the catalogue (e.g., identify work by other organizations that can be used to assist VMAD to develop a scenarios catalogue. Establish partnerships with other organizations – where feasible).	SG1 delivered literature review (VMAD-15-15) to leverage existing scenario resources. Development and maintenance of the catalogue is mentioned above. COMPLETED.
6. Develop a common dictionary of terms used to describe scenarios (e.g., the various aspects of the operational design domain) and the elements that compose the scenario.	SG1 will discuss the definition of terms if necessary. (We should aware that definition discussion is difficult to conclude without detailed discussion.)
7. Determine how scenarios can be applied within the NATM process (simulation, test track, real-world). <i>Work to be done in consultation with SG2,3,4</i>	This issue can be interpreted as “Which pillars (simulation, track test, real-world test, audit) should be used to assess scenarios?”. SG1 have not discussed and should discuss this issue but the scope is overlapping with other SGs and VMAD.
8. Develop common metrics to apply to the elements examined in scenario testing. <i>Work to be done in consultation with SG2,3,4 and FRAV</i>	This issue seems to be included in issue 7.

# Status of current outstanding issues

Outstanding questions/issues/activities to address/develop	Status
9. Identify who is the owner/curator of the scenario catalogue? Determine the methods for inputting scenarios into a potential scenario catalogue, if appropriate. What are the best practices for informing/updating the scenario catalogue?	Considering the present status of Annex2 of NATM MD, the answer seems to be “Scenario catalogue is owned by WP29 as a document. If there is any necessity to update scenario catalogue, it should be discussed in appropriate body in WP29.”
10. Determine how best to demonstrate sufficient coverage of critical scenarios. Should scenarios focus on the system as a whole or should it also include scenarios for specific component? How do we test vehicles based on varying levels of perception?	“coverage” includes various discussion points(e.g. How do we evaluate coverage? What is “sufficient” coverage? How do we achieve sufficient coverage?). Coverage is mentioned in the functional scenario, but not fully discussed. NEED TO DISCUSS.
11. Determine which scenarios are required to validate the functional safety requirements established by FRAV (see sections 4.4 to 11 in FRAV-02-05) (e.g., system safety, operational design domain, object and event detection and response (OEDR), human-machine interface). <u>Work to be done in consultation with SG2,3,4 and FRAV</u>	NEED TO DISCUSS. This question depends on the requirements.
12. Determine how other permutations of the base-line scenarios in the catalogue can be applied. <u>Work to be done in consultation with SG2,3,4 and FRAV</u>	The concept “base-line scenarios” was deleted by past discussion (VMAD-SG1-10-05). SG1 should discuss how to deal with “scenarios not covered by scenario catalogue”.
13. Determine methods for assessing the validity and reliability of scenarios. <u>Work to be done in consultation with SG2,3,4 and FRAV</u>	This issue seems to be included in issue 10.
14. Determine methods for dealing with the possible risk of training/overfitting an ADS to pass limited number of predefined scenarios. <u>Work to be done in consultation with SG2,3,4</u>	This issue was discussed with “random sampling” and the discussion was postponed(VMAD-SG1-08-07). NEED TO DISCUSS.
15. Determine methods/best practices to develop scenarios suggested by members in order to enhance to identify scenarios (e.g., the Pegasus 6 layer, three aspects based on factors interfering DDT).	Scenario catalogue can be updated if necessary based on the proposals from SG1 members (VMAD-SG1-12-01).
16. Determine how unusual situations (e.g. wrong way driver) are dealt with in the scenario catalogue.	This issue was raised during developing functional scenarios(VMAD-16-10). NEED TO DISCUSS.

# Possible new issues for outstanding issues

	Possible new issues	Target Completion date
1	Which pillars (simulation, track test, real-world test, audit) should be used to assess scenarios? [7*][8]	2021.9
2	What is "coverage" of scenario? What is "sufficient" coverage? How to ensure sufficient coverage? [10][13]	2021.9
3	Which scenarios are required to validate the functional safety requirements established by FRAV?[11]	2021.9 Need FRAV output
4	Scenarios not covered by scenario catalogue (Should authority require evaluation of scenarios that are not covered by scenario catalogue?)[12]	2021.6
5	How to deal with "overfitting" problem?[14]	2021.9
6	Should scenario catalogue includes unusual situations (e.g. wrong way driver)?[16]	2021.6
7	What aspect should be dealt with functional/logical scenarios?	2021.9
8	How to deal with various parameters (e.g. perception, vehicle disturbance(e.g. road surface condition, slope, wind)) during certification?	2021.9 Need FRAV output
9	How to deal with different scenarios for different countries/regions?	2021.6
10	What is pass/fail criteria for scenario-based testing?	2021.9 Need FRAV output
11	Update of functional scenarios (i.e. Annex2 of NATM MD).[15]	Anytime

\*number with square brackets indicates the reference to the original outstanding issues.



# Next Meeting

[Meeting date]

27<sup>th</sup> April 13:30-15:30 (CEST)

[Provisional agenda]

1. Introduction
2. Update of “Outstanding issues” (discussion based on input of additional discussion points)
3. Discussion of each “Outstanding issues” (discussion based on input for each outstanding issues)
4. Discussion of “abstract scenario”
5. Any other business
6. Next meeting

[Request to SG1 members]

- SG1 members are requested to **submit additional issues by 13<sup>th</sup> April.**
- Regarding each outstanding issues, SG1 members are requested to **submit any comments by 20<sup>th</sup> April.** (The format of the submission (excel sheet) will be uploaded to UNECE website.)