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| Transmitted by the expert from EC and CLEPA for VMAD SG2 |  |

**Meeting of the VMAD SG2 on Virtual/Simulation Testing**

Date/Time: 03 March 2021. 13:00-14:00 (CEST)

Attendance: SG2 chairs (EC, CLEPA), SG2 Members (~40 attendees)

**Summary**

* Presentations from CITA on requirements for virtual validation
* JRC provided a summary of the different stakeholder’s input.
* The output will be taken into consideration for the latest draft of Chapter 6.

**Minutes**

Actions from the last meeting

* [Barnaby/CLEPA and Biagio/EC] Update the next version of Chapter 6 with input from the group.

Virtual validation (CITA)

* Highlighted potential issues with virtual testing:
	+ Wrong models used
	+ Configure simulation tool in the wrong way
	+ Incorrect models or tools
* All aspects of the tool should be validated according to state of the art research.
* Simulation models need dedicated scenarios and metrics for validation
* The virtual testing tool should fill a number of requirements:
	+ Reproducibility
	+ Feasibility
	+ Traceability
	+ Environment scalability
* Need to check additional risks are not caused by using the tool via tool qualification e.g. ISO 26262-8:2018
* Need to check the tool is fit for purpose. E.g. reliable quality and suitable for the intended function.
* Technical service shall perform spot checks for correlation between virtual and real results.
* scenarios for ADS and virtual testing validation should be the same
* Test track results must not be resimulated to avoid manipulation of simulation results.
* Validation scenarios should not match training scenarios for the simulation.
* CLEPA: is ISO26262 sufficient for HIL testing?
* CITA: the standard is important for software tools, not clear about if it can be used for HIL.
* WMG: ISO26262 is not sufficient for the complete virtual testing toolchian
* CITA: it is more focused on standardizing the developer’s safety report.
* FR: ISO 26262 may be too specific for virtual testing tool validation
* CLEPA: is it clear that scenarios for validating ADS and validating the tool may not be the same.
* AVL: 3 sets of scenarios may be required. Scenarios for: model training/validation, tool validation and ADS validation.

JRC Presentation

* Described the virtual testing pipeline
* Compared the input from different stakeholders
* Validating vehicle models is a familiar concept
* There are several sensor model concepts, each carries different validation procedures.
* World models cover many aspects to be addressed in the validation strategy.
* Some computations tools include
	+ Graphical comparison
	+ Scalar data
	+ Times series (upon synchronization) computations
* Virtual testing should be subjected to a controllable degree of stochasticity which arises due to:
	+ Parameterization and calibration
	+ Artificial injection of noise
	+ Etc
* It is important to separate the validation of the testing systems and the system under test.
* WMG: should the regulation prescribe a specific solver or should manufacturers declare which solvers are used?
* JRC: We do not suggest that a specific solver is needed, but manufacturers should take into consideration the impact on the solver for each tool and components.

Revised Next Steps

* Meeting 2021-03- (10+17)
	+ Additional input
* Meeting 2021-03-31
	+ Co-chairs will present a first updated document with all new additions:
		- Toolchain example
		- Examples of model fidelity levels
		- More details to the validation of the co-simulation platform / complete integrated tool.
		- Explain appropriate KPIs
		- More detail on the complete credibility assessment
		- Methods for scenario validation

**Next meeting**

* Time: 10th March 2021, 13:00 - 14:00 CET
* Venue: Webex (see meeting invitation)