

Report on the work of VMAD SG2 on Simulation/Virtual Testing

VMAD-18

18 May 2021

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List of outstanding issues

Subgroup	Outstanding questions/issues/activities to address/develop	Target Completion date
Subgroup 2 (Simulation and virtual testing)	1. Provide an example of a simulation toolchain for virtual testing	January 2021
	2. Define requirements and methods for simulation tool-chain validation. This includes: i) defining different approaches for ADAS and ADS (in case SG2 will also need to deal with ADAS virtual testing); ii) defining appropriate metrics evaluating toolchain accuracy; and iii) defining the type of scenarios used for toolchain validation	April 2021
	3. Define documentation requirements for vehicle manufacturers and ADS developers (including the establishment of a clear link with the audit pillar)	June 2021
	4. Define standardization requirements to allow authorities performing in-house virtual testing (following activities carried out by ASAM and other associations)	December 2021+

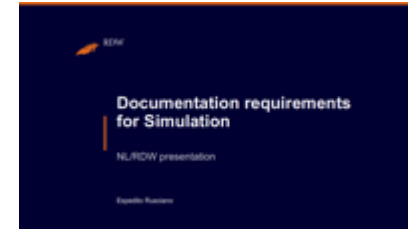
SG2 High Level Work-Plan

- Definition of a **credibility assessment framework** for using virtual testing in ADS validation -> **06/2021**
- First complete amendment of NATM Chapter 6 -> **09/2021**
- **Finalisation** of the new version of NATM Chapter 6 following WP29 comments -> **12/2021**

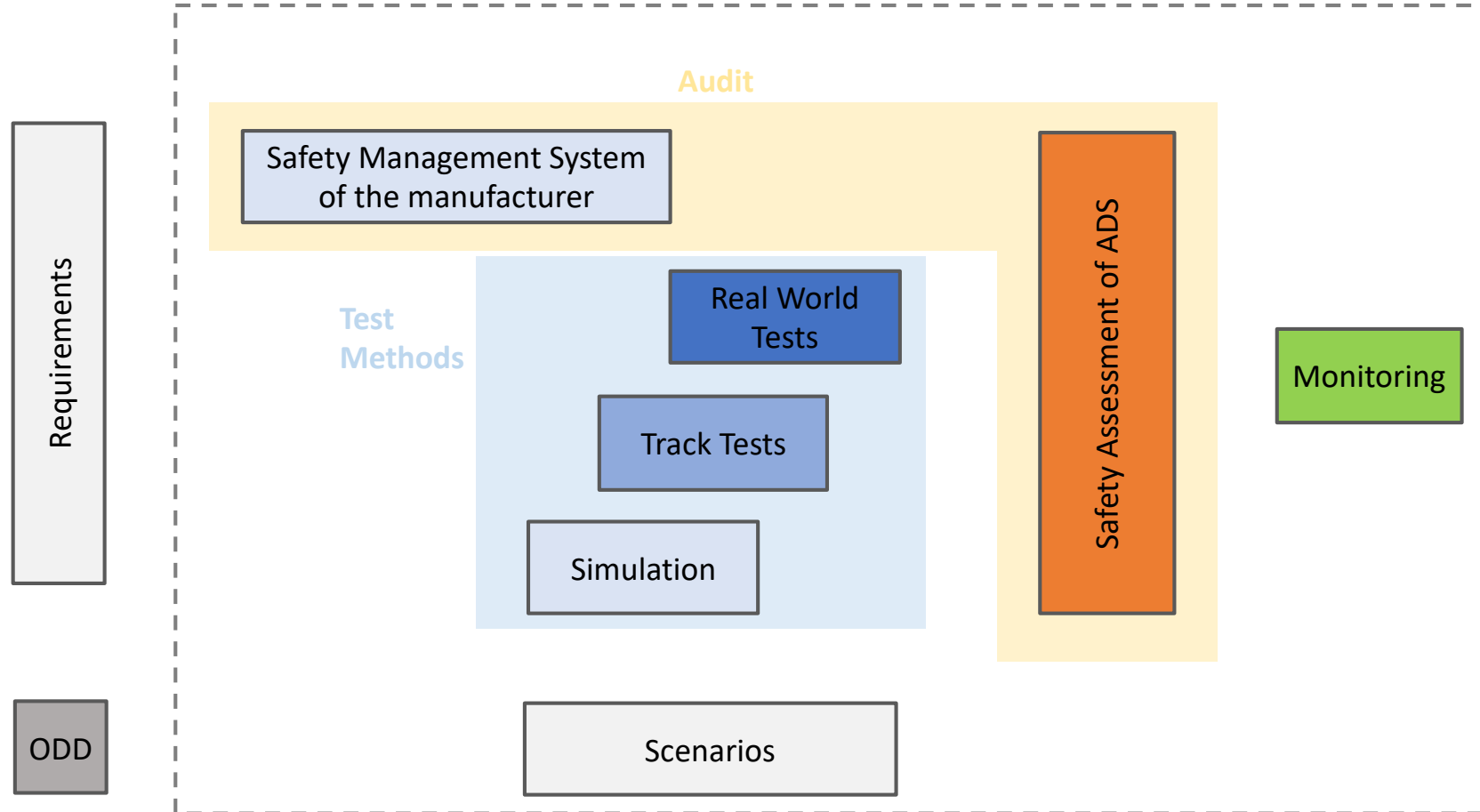
Inputs received from SG2 members

- RDW (10/02).
- AVL (17/02)
- WMG and PEARS (24/02)
- CITA and JRC (03/03)
- SAFE and general discussion (10-17/03)
- UTAC and JRC (31/03)
- All presentations on UNECE-VMAD wiki page:

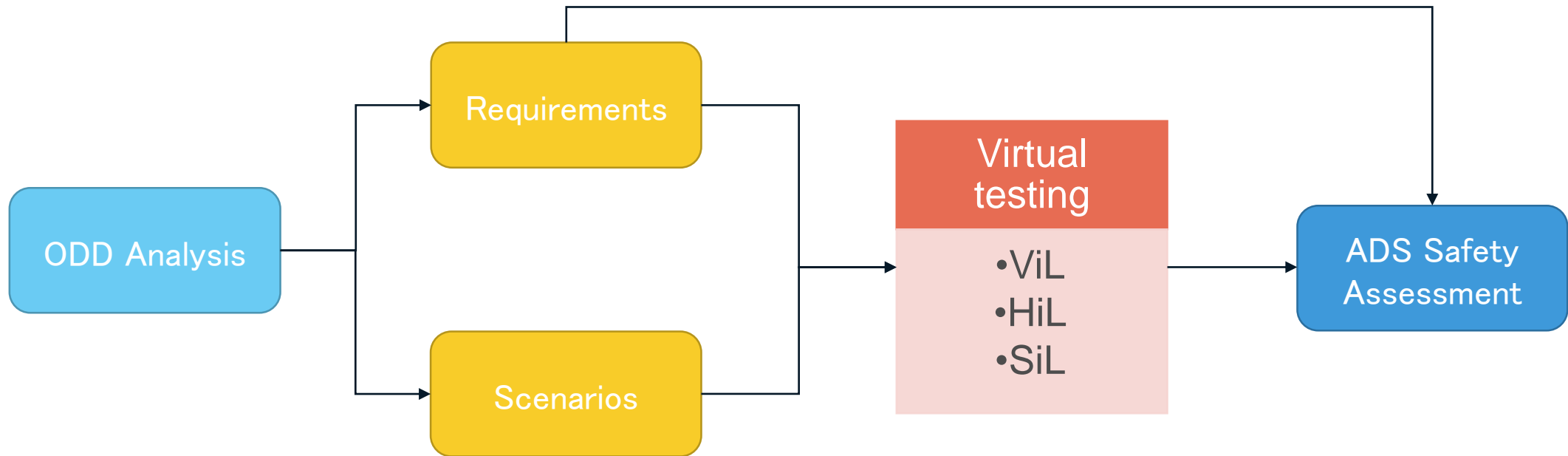
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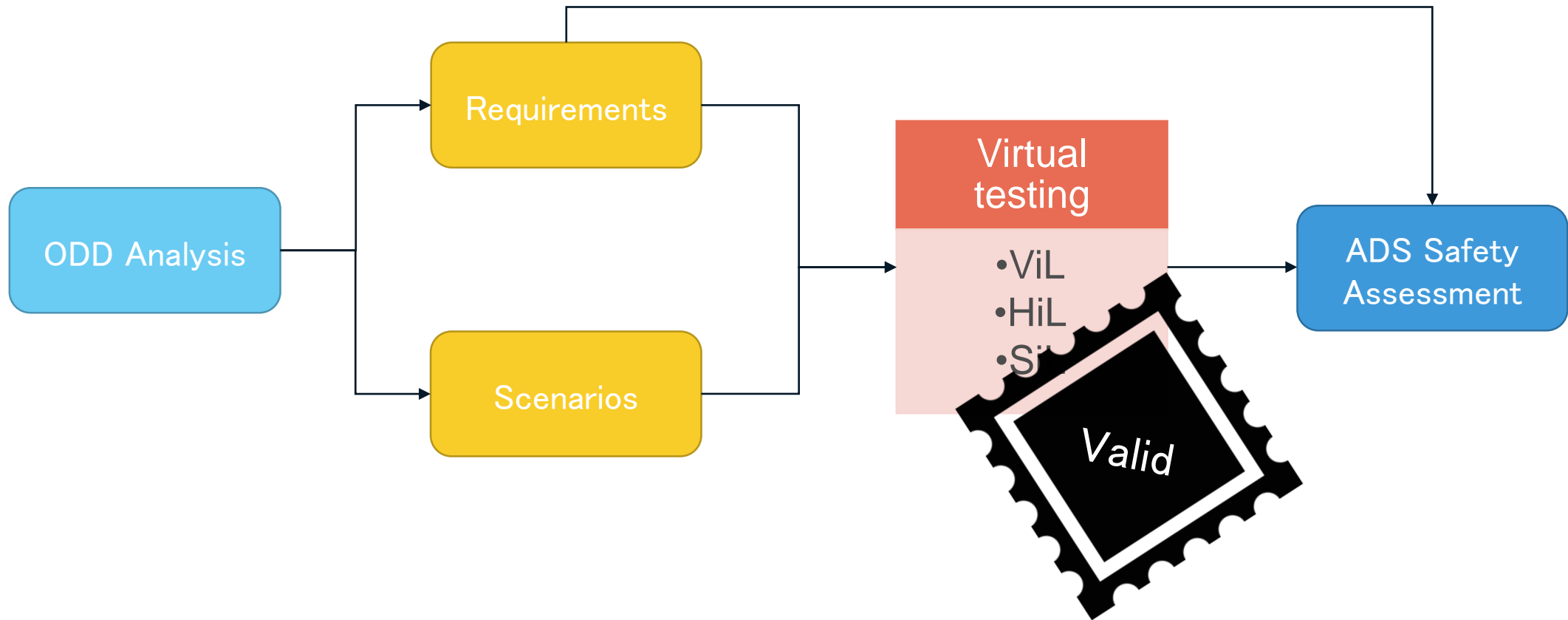
Assessment of ADS safety in GRVA/VMAD*



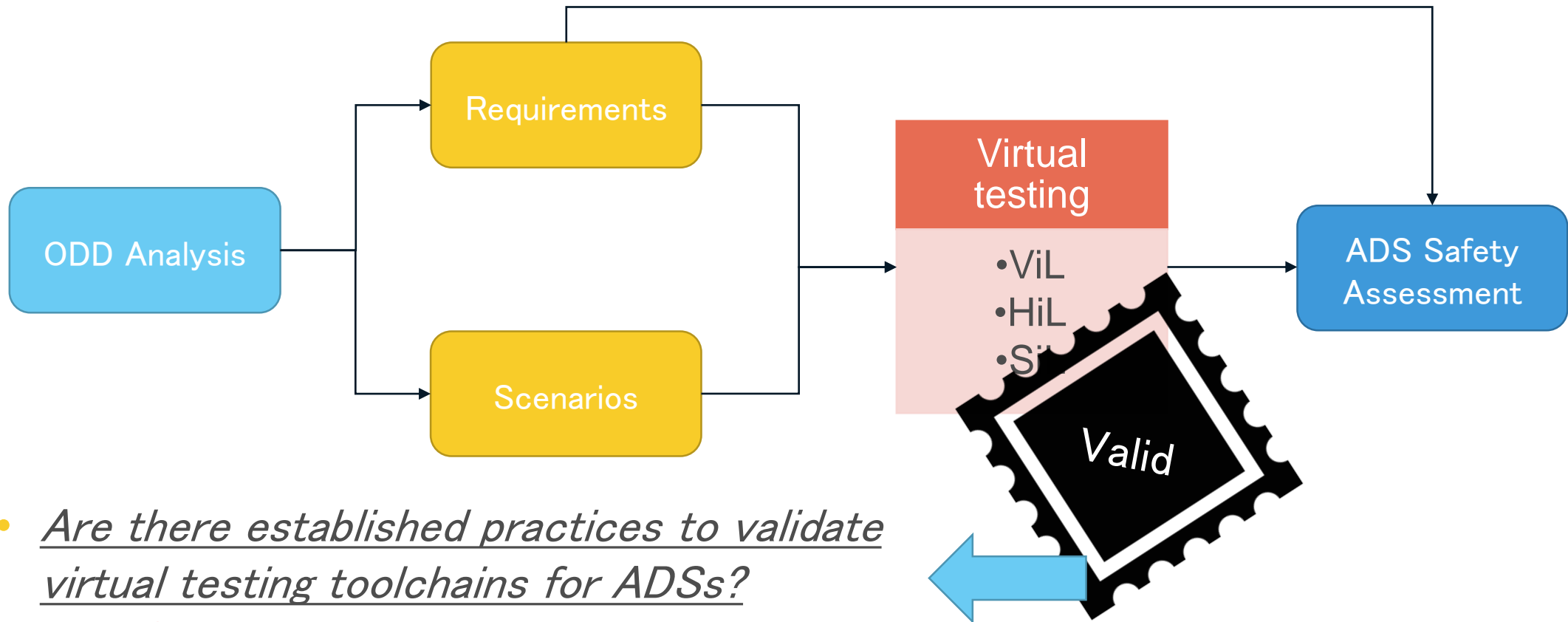
Focus on Virtual Testing



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Focus on Virtual Testing



- Are there established practices to validate virtual testing toolchains for ADSs?

- **NO!**

Credibility rather than validation



KEY QUESTION

What Makes A Simulation “Credible”?

- Most people think “**validation**” is the hallmark of simulation credibility. But is it?
- **Validation has well-known limitations:**
 - Limited scope of validation tests
 - You **cannot validate** over the whole domain of the M&S
 - Validation data are **difficult and costly** to obtain
 - Moreover “Real World” **always contains factors** not accounted for in the simulation.
 - Obtaining **sufficient validation test data** can be costly
 - Some simulations simply **cannot be validated** in the conventional sense of the word.
 - Wars are not experiments designed for data collection
 - e.g., how can we validate mission and campaign level warfare M&S?

Fortunately, there are other measures of simulation credibility

IBST - INTEGRATED BATTLESPACE SIMULATION AND TEST DEPARTMENT

US Naval Air System Command,
2014



NASA Standard and Handbook on
Simulation

VMAD-SG2

Credibility assessment

- The framework identified goes beyond the toolchain validation and is based on the concept of “Models and Simulations Credibility”
 - ***“Credibility. The quality to elicit belief or trust in Models and Simulations results.” (NASA-STD-7009A.)***





Structure of the new NATM Chapter (VMAD-SG2-18-02_Credibility_Assessment.docx)

1. Introduction, motivation and scope (why is the credibility assessment needed to use virtual testing in ADS validation)
2. Components of the Credibility Assessment Frameworks
 1. M&S Management
 2. Teams experience
 3. ...
3. Documentation structure
4. Interdependices with SG1 and SG3

Next steps

- 19/05
 - Meeting cancelled as overlapping with VMAD
 - Deadline for submitting additional comments to the new version or additional contributions (pending inputs from UK and AVL) -> **extended to 21/05**
- 26/05
 - Meeting overlapping with GRVA -> Meeting cancelled
 - Distribution of new version of the document
- 02/06
 - Final round of comments on the overall framework and first final draft

Thank you

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