UNECE GRSP IWG Equitable Occupant Protection (EqOP)
Task Force – Virtual Crash Testing

Minutes of the 10th meeting.
On-line meeting on the 16th of October 2025 with 30 participants.

Adoption of the agenda
Agenda was approved by the participants.

Adoption of the minutes of last meeting
Minutes of the 9th meeting were approved after revising wording that indicated that we aim to write a regulation, which is not quite correct. The intention of the proof of concept in this respect is to formulate a comprehensive description of the virtual testing procedure and its essential components, which helps us to identify potential challenges and define a clear roadmap with milestones and by when they can be achieved. We decided to come back to the definition of the proof of concept later in the meeting to ensure that we all have the same understanding of the PoC workplan.

Human Body Model Qualification
Presentation by Felix Ressi (TUG)
The development of a robust HBM qualification methodology aims to ensure the biofidelity and comparability of HBMs used in virtual testing, addressing the current lack of standardized qualification. The aim is to include HBM-neutral validation setups and assessment notebooks to enable harmonized post-processing and biofidelity scoring. The presentation concludes by noting the public availability of the setups and assessment scripts and outlining the outlook for the 2029 Euro NCAP protocol update, which plans to increase biofidelity requirements and update anthropometry definitions. The proposed HBM qualification methodology is designed to create a robust and standardized approach for ensuring biofidelity during occupant protection assessments in virtual testing within Euro NCAP. The discussion following the presentation was about how to adequately represent other anthropometries in the future (i.e. the 5th and 50th percentile female occupants) in qualifications as there is fewer data available. TUG replied that there are already several load cases included in the current catalogue where tests with female PMHS are included. Thus, the situation is better than expected. Also, when it comes to the 50th percentile female, although not originally targeted, a lot of appropriate data is included in the original unscaled data sets where the data was originally either downscaled to 5th percentile females or upscaled to 50th percentile males.

Traceability
Presentation by Marcy Edwards (IIHS)
The presentation describes a model traceability procedure for an automotive virtual testing framework, which is essential for building confidence in simulations, especially if no physical testing is possible. The research involved a multi-task approach, including surveying vehicle manufacturers and developing guidelines and rules for model traceability, ultimately aiming to create a surveillance process for virtual testing. This procedure addresses critical issues such as protecting intellectual property while ensuring simulation integrity and confirming that outputs are derived from trusted models without inappropriate changes between validation

and assessment. A prototype LS-DYNA implementation was evaluated using hashing and encryption to automatically track and secure model changes, a process that establishes a secure digital link between model components and simulation results for assessment agencies to verify. The long-term objective is to increase trust in simulation outcomes for assessment purposes and to accommodate necessary model adjustments while preventing misconduct. The discussion following the presentation focused on the move toward integrated model traceability mechanisms to enhance trust and security in virtual testing outcomes, contrasting the newly developed LS-DYNA prototype with older external concepts, i.e., separate tools that track model changes outside the simulation software itself. Furthermore, the necessity of compatibility with other simulation tools like VPS (Virtual Performance Solution) was discussed and it was confirmed that discussions with other code houses are ongoing. The chair highlights that traceability was identified also by the TF as an essential building block and that based on the presentation and discussion it seems feasible to have widely implemented solutions available within the next 3 years.

The presentations of this meeting are posted on the UN Wiki:
10th meeting/workshop TF3 - Transport - Vehicle Regulations - UNECE Wiki

Discussion on the Proof of Concept and its elements – Workplan
The chair opened the Master Document with the purpose to guide the discussion (and the PoC progress). Note that the Master Document has been created by the TF VCT of the IWG EqOP to outline the plan to integrate virtual crash testing, using HBMs, into the development of UN R137 with the goal to enhance restraint system robustness – for the sake of equitable occupant protection. The primary goal is to assess injury risk for various occupant types, including different body shapes and anatomies, addressing equity concerns. The workplan defines steps for developing a trusted VCT procedure, including defining requirements for reproducibility and traceability, while also addressing the feasibility and potential cost-benefit analysis of its introduction over a ten-year horizon. We continued to discuss around virtual component models. OICA mentioned that as airbags and seatbelts work in concert there might be a need for different levels of component models. We continued discussions specifically on the validation of seat simulation models, which are subject to work within the IMPROVA project. We discussed also whether it is appropriate to speak about international standards but concluded it will be better to call any model standards for harmonized standards as we do not now consider a specific need for ISO standards. The Master Document was updated in the meeting. It is posted on the following page of the UN Wiki:
VCT Master Document - Transport - Vehicle Regulations - UNECE Wiki

Next steps
Determine value (benefit) of HBM to close equity issues.
Determine if it possible to use HBMs in regulations within the next 10 years.
Continue to look at the readiness of respective component models and consolidate statuses.
Keep the PoC work plan as is and keep it in a ppt format until further notice.
Seek feedback from GRSP during 2026 on the needed level of details regarding the basis upon which GRSP shall decide about how to proceed with VCT using HBM.

Next meeting
There will be two discussion topics in the next meeting:

1. Determine value of HBM to close equity issues.
2. Determine if it possible to use HBMs in regulations within the next 10 years.

Next meeting will be an online meeting on the 17th of November 2025, 12:00 – 13:30 CET.