

ECON Human Body Model OS topics

Background: our team provides the *Virtual Dummy Lab services* of a German automotive OEM partner (team responsible for ATD FE model validation and management for Occupant protection simulations) for 8+ years. Efforts extended with **Human Body Models** in past 3-4 years.

Most relevant activity: Introduction of HBMs into the Simulation workflow of this OEM as main Development Service Provider

- **Benchmarking** various Human Body Models
- Inclusion into **Simulation Workflow**
 - Pre- and Postprocessing of results
 - **Interaction** with other parts of the vehicle
 - **Injury** evaluation strategies and scripts, **comparisons with ATDs**
- Preparation for the upcoming **EuroNCAP protocols** related to **Virtual Testing** with HBMs (CP550, CP551, monitoring phase started on 1st January 2026)
 - Initial simulations
 - Feedback to the committee
- Participation of related **research activity**
 - E. g. joint publication for Ansys EMEA Transportation Summit and LS-DYNA User Conference 2025 on positioning related topics



Tools

- LS-DYNA solver
- Pre- and postprocessor BETA CAE Systems ANSA+META as main choice, but also experience with GNS Animator4 and Primer
- Set of custom Python-based scripts developed in-house

Initial ideas for cooperation

- Tech transfer from automotive OS field to **dynamic phases of flight** – comparison of applied protocols, modeling techniques, load levels, with focus on HBM, ATD and environment interaction (seating, restraint) modeling, uncovering improvement potentials
- Critical evaluation of **scenarios** currently modelled with **Hybrid III ATD** model
 - H3 ATD is outdated, originally intended for frontal loads in seated configuration, and **too stiff in general for biofidelic kinematic responses** (based on comparisons with THOR and HBMs)
 - Same scenarios could be **reimplemented in simulation with HBM models** (and maybe THOR ATD – possible validation of method)
 - **Comparison** of kinematics, uncovering **potential injury risks** NOT covered by H3 ATD

