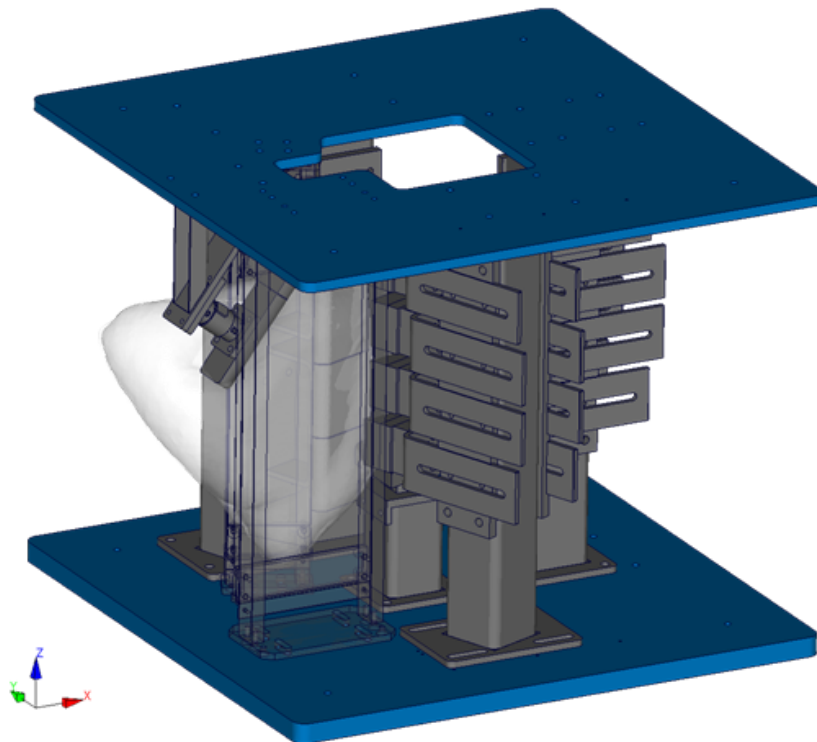


ARVIN - SIDE AIRBAG

Airbag Research & Validation Infrastructure

- Integrated Hardware and Simulation Testing: Enables validation through synchronized physical and virtual airbag tests.
- Accurate Force Measurement: Captures environmental forces around the airbag for precise system evaluation.
- Simulation-Validation Loop: Direct comparison of test and CAE data forms the basis for airbag model validation.
- System-Level Integration: Supports seamless incorporation of validated models into full occupant safety systems.



ARVIN - SIDE AIRBAG

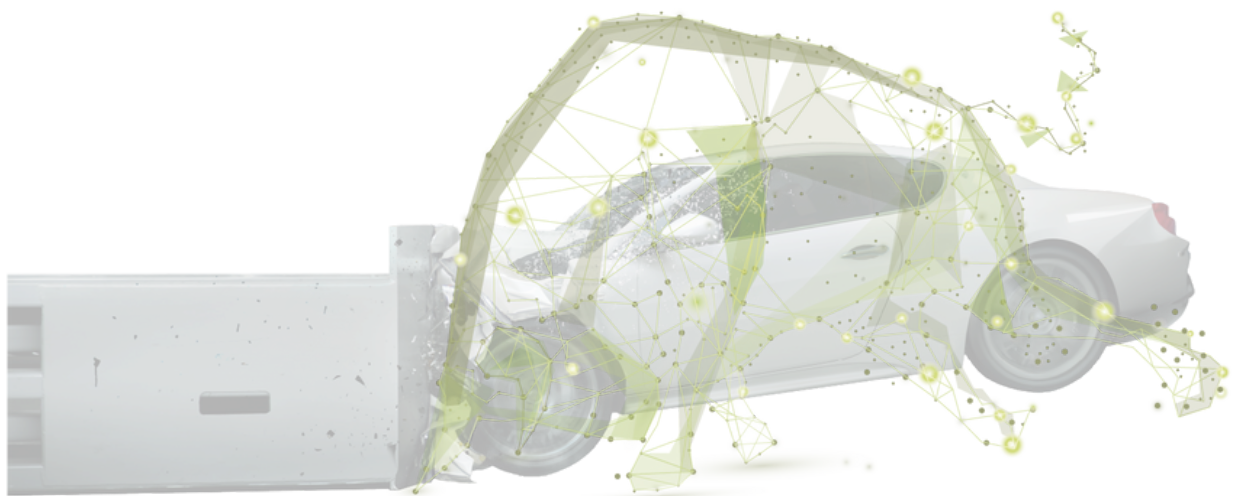
Airbag Research & Validation Infrastructure

Application Areas

- Verification of airbag components and systems
- Validation of airbag behavior under various conditions
- Development of countermeasures, e.g., Out-of-Position (OoP) protection
- Measurement of airbag environment forces
- Resolution of system validation issues, e.g., seat-integrated side airbags
- Reduction of influencing factors in test and simulation environments

Validation Stages

- 1. Availability of airbag hardware and CAE models:**
 - Physical airbag components and simulation models are prepared.
- 2. Airbag testing in ARVIN hardware and CAE environment**
 - Controlled physical and virtual tests using ARVIN infrastructure.
- 3. Curve comparison between physical tests and simulations**
 - Results used as the foundation for airbag model validation.
- 4. Integration of the validated airbag model into the overall system**
 - Seamless integration into occupant protection systems for further development and assessment.



ARVIN - SIDE AIRBAG

Airbag Research & Validation Infrastructure

Key Features

- Combined physical and digital validation environment
- Repeatable and scalable testing for a wide range of configurations
- Supports system-level integration and simulation correlation
- Enhances robustness and predictability of airbag deployment

How is the test rig structured?

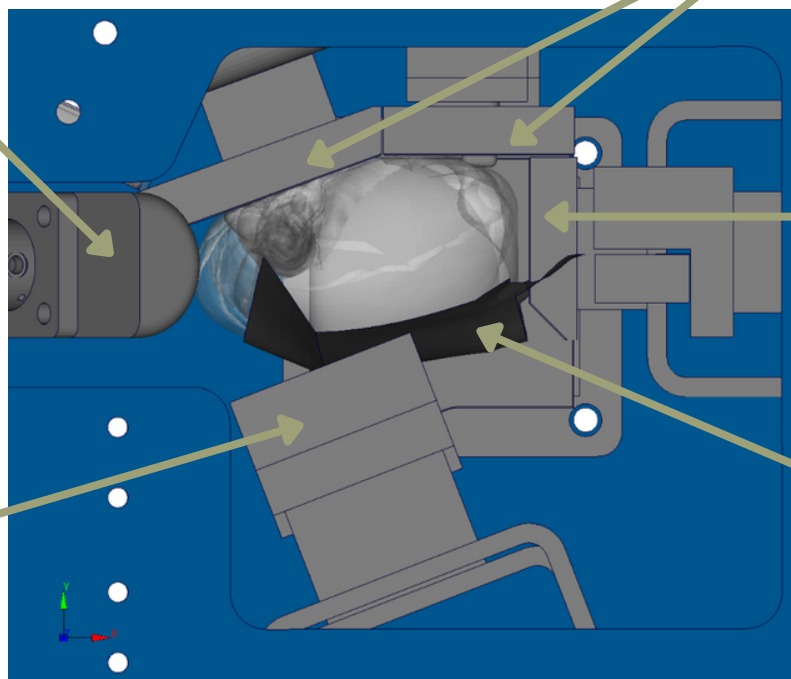
Arm Segment: This segment captures the forces that the airbag would exert on a dummy arm.

Seat Structure Segments: These segments of the test rig replicate the installation space of a seat. The forces generated by the airbag deployment are measured.

Airbag Inflator Segment: The airbag inflator is mounted to this segment.

Flap: Provides the side airbag with a seat-like deployment space at the beginning. It deforms due to the airbag's deployment force and is stopped by so-called brake segments, which record the acting forces.

Brake Segments

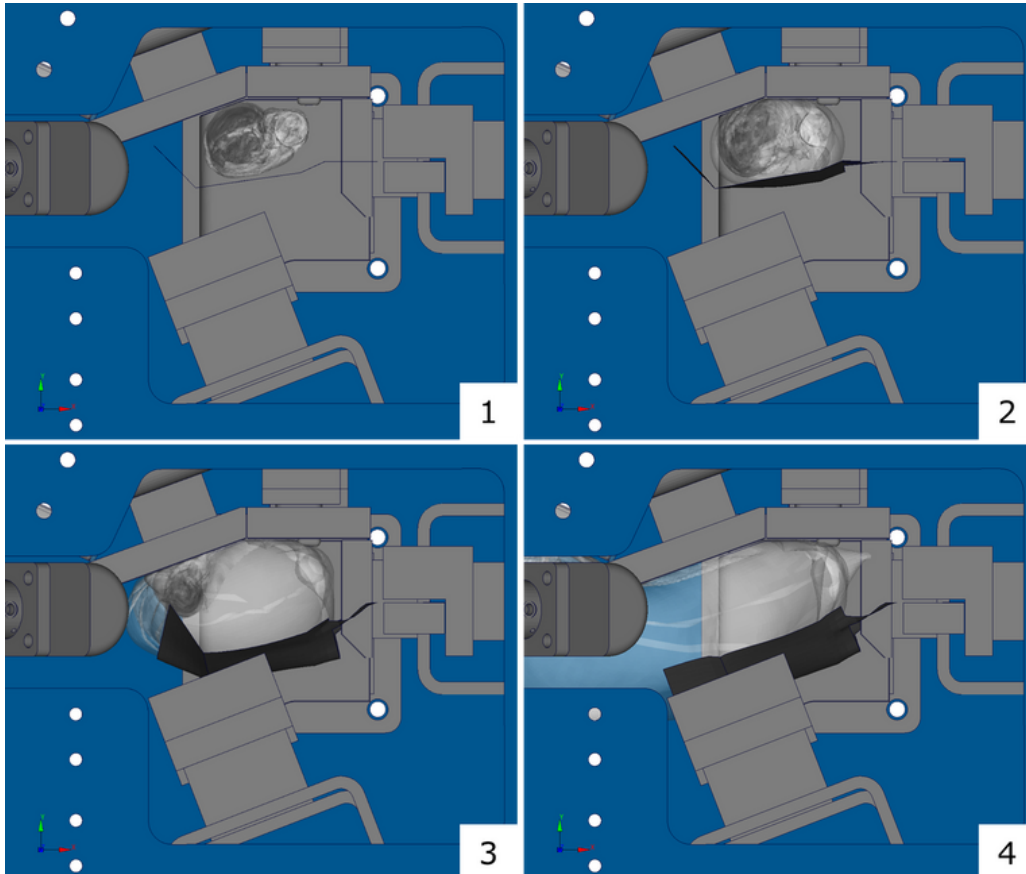


Top view

ARVIN - SIDE AIRBAG

Airbag Research & Validation Infrastructure

Airbag Deployment Process in the Test Rig



Top view

