



SAFETY ANALYSIS FOR AUTOMOTIVE

KEY BENEFITS

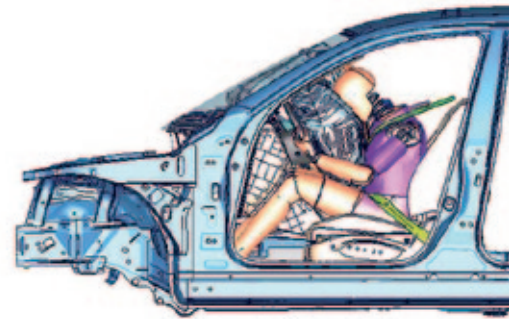
- Complete safety solution
- Improve occupant restraint systems
- Reduce design cycle
- Save costs and time
- Bring deeper insight into kinematics and injury criteria

*“ESI provides the market with the long-expected tool that is able to efficiently generate FE models for any folded airbags. SIM-FOLDER will help in making a commodity the use of accurately folded airbag, hence allowing **very realistic deployment behavior for all the airbag simulations.**”*

Gerd Scholpp,
Director Systems Engineering,
Key Safety Systems Deutschland

The enforcement of safety specifications has a strong impact on the automotive industry. With each new development of safety systems, an increasing number of tests needs to be performed.

In response to these requirements, ESI delivers Virtual Performance Solution. This highly versatile software package addresses market needs for scalable simulation solutions. It enables collaborative engineering by integrating safety restraint systems designed by the suppliers, for instance seatbelt, airbag and seat.



Frontal Impact with one dummy model.
Courtesy of NISSAN MOTOR CO. LTD

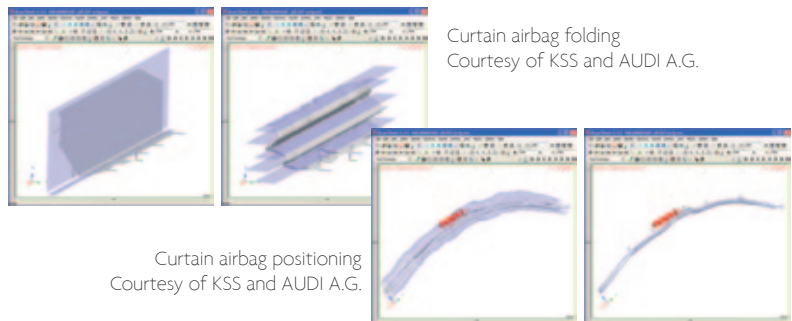
A REALISTIC SAFETY MODEL

The safety application within Virtual Performance Solution, PAM-SAFE, optimizes your safety simulation from the set-up (airbag folding, dummy positioning, belt fitting), to the simulation results (airbag deployment, criteria analysis).

PAM-SAFE helps you predict how car interior components, such as dashboard and trim, will behave under occupant impact. It provides you as well with realistic prediction of occupant behavior in vehicle crashes, taking into account restraint systems, such as airbags and seat belts. Large models can be calculated in DMP (Distributed Memory Parallel) mode enabling outstanding performances.

AIRBAG FOLDING

Virtual Performance Solution features SIM-FOLDER, a simulation-based airbag folder. It enables accurate folding sequences avoiding perforations of the airbag during the process. Additionally, SIM-FOLDER offers a large folding tools library enabling the assessment of all fold pattern types.



Curtain airbag folding
Courtesy of KSS and AUDI A.G.

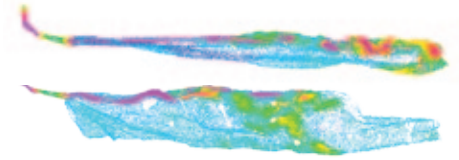
Curtain airbag positioning
Courtesy of KSS and AUDI A.G.

AIRBAG INFLATION

Finite Point Method (FPM) is widely accepted as an advanced industrial tool for modeling gas dynamics effects during airbag inflation.

Included in Virtual Performance Solution, FPM allows you to make realistic airbag deployment simulations in Out of Position (OOP) situations or for side airbags within the car environment (e.g. trims). It provides a very accurate virtual design of the airbag system.

FPM is fully embedded within Virtual Performance Solution, which avoids extensive parametric tests, saves cost and turnaround time.



Curtain airbag deployment with FPM
Courtesy of Key Safety Systems Deutschland.

SEATBELTS

Seatbelts are the first line of defense in automobile safety. Easily and precisely model all aspects of a complete seatbelt mechanism, including slippers, retractors, pretensioners, and their interaction with the occupant.



Seatbelt positioning under Visual-Safe

A DEDICATED ENVIRONMENT FOR SAFETY

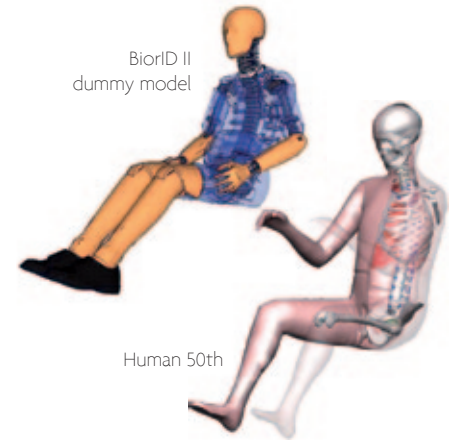
Virtual Performance Solution operates within a seamless and dedicated user environment. Visual-Environment allows you to rely on high quality digital models for your simulation and automated tasks report generation. It enables parallel and iterative engineering work in the development tasks.

COMPUTE MODEL LIBRARY

ESI offers a vast library of compute models including a variety of frontal and side-impact dummies as well as barriers.

- Dummy models can be simple and CPU-efficient for parametric studies, using Multi-Body Systems or more complex for design verification, using Finite Elements.
- A large set of static and moving barriers is available for all crash conditions in order to gain realistic input conditions for safety analysis.

Human models are available for research projects with ESI. They provide bio-fidelic kinematics and injury mechanisms (fracture, ligament strains, internal pressures and stresses), in addition to traditional injury criteria.



BiorID II
dummy model

Human 50th

For more information, visit: www.esi-group.com/virtual-performance-solution/occupant-safety

ABOUT ESI GROUP

ESI is a world-leading supplier and pioneer of digital simulation software for prototyping and manufacturing processes that take into account the physics of materials. ESI has developed an extensive suite of coherent, industry-oriented applications to realistically simulate a product's behavior during testing, to fine-tune manufacturing processes in accordance with desired product performance, and to evaluate the environment's impact on product performance. ESI's products represent a unique collaborative and open environment for Simulation-Based Design, enabling virtual prototypes to be improved in a continuous and collaborative manner while eliminating the need for physical prototypes during product development. The company employs over 750 high-level specialists worldwide covering more than 30 countries. ESI Group is listed in compartment C of NYSE Euronext Paris. For further information, visit www.esi-group.com.



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