Virtual Seat Solution

Design a safe, lightweight and comfortable seat at first try-out using virtual prototypes
Certify the physical seat prototype at first try-out with accurate virtual tests

The aeronautics seat safety process automatically sets up and chains the three steps of a real sled test: positioning and belting, pitch & roll and sled test. Positioning is crucial to simulate in realistic conditions. Pitch and roll is required by aircraft safety regulations and represents the deformation of the floor during crash.

Simulate the Head Injury Criterion (HIC)

The seat and restraint system in the airplane must be designed to protect each occupant during emergency landing conditions. With ESI’s Virtual Seat Solution, you can predict the Head Injury Criterion (HIC) and check very early in the seat design process that the seat complies with crash safety regulations such as FAR 25.562.

Develop lighter seats with composites

Seat manufacturers are coming up with innovative seat designs in order to address two major challenges: reduce the seat weight while at the same time increase living space and comfort. Using composite materials for the seat frame is one of the answers. With ESI’s Virtual Seat Solution, perform virtual tests that take into account manufacturing processes, and certify your physical seat prototype at first try-out.
Optimize the Cabin Interior by predicting the passengers’ living space

Virtual Seat Solution predicts the exact posture of the passenger in the seat by taking into account the deformation of the seat, the interaction between the seat and the passenger, as well as the passenger’s physical reaction. This complete and accurate simulation of the passenger posture is used to calculate the living space.

Iterate virtually on your seat design using ESI’s Virtual Seat Solution based on a single core model

**KEY BENEFITS**

- Reduced cost and time-to-market by limiting the number of physical prototypes through an integrated End-to-End solution,
- Improved product quality and occupant safety, while innovating by anticipating potential manufacturing and performance issues,
- Improved synergies within teams and early management of conflicting seat design requirements.

**THE CHALLENGE**

Global Seating Systems designed a new, lighter and thinner military seat, minimizing the weight and the overall structure while still maximizing the seat comfort. With ESI’s Virtual Seat Solution, they achieved the optimum seat static Pressure Map and determined precisely the amount of foam needed, in order to reduce the overall seat weight.

**THE RESULTS**

- A seat entirely designed with simulation, thus cutting tooling costs for physical prototypes,
- Comfort precisely measured and quantified through virtual prototyping,
- Seat design optimized to reduce weight while keeping the same level of comfort,
- Physical prototypes matched the simulation predictions.

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Predict the comfort of your innovative seat

Assess climate seat and thermal comfort
Test virtually the passenger comfort in the cabin environment with regard to temperature, humidity, ventilation and well-being. Virtual Seat Solution analyzes the seating of the passenger and the heat exchanges between the passenger, seat and cabin environment.

Consider several anthropometries
5th, 50th and 95th percentile human models developed in partnership with Hyundai Motor Company.
Assess the comfort & ergonomics of the pilot seat

The seating of the pilot in Virtual Seat Solution takes into account the deformable seat reaction, provides an accurate position of the pilot, and enables an evaluation of both the pilot's comfort and his accessibility to the different control commands.

“The end result we achieved thanks to ESI’s Virtual Seat Solution is what we believe to be the best-in-class comfort, which is one of the most important elements for the occupant,”

Jeff Krueger, Director of Product Development, Global Seating Systems, USSC Group

Virtual Seat Solution’s graphical interface is dedicated to the seat

Thanks to a dedicated seat graphical interface, Virtual Seat Solution simplifies design iterations.
ESI is a pioneer and world-leading provider in Virtual Prototyping that takes into account the physics of materials. ESI boasts a unique know-how in Virtual Product Engineering, based on an integrated suite of coherent, industry-oriented applications. Addressing manufacturing industries, Virtual Product Engineering aims to replace physical prototypes by realistically simulating a product’s behavior during testing, to fine-tune fabrication and assembly processes in accordance with desired product performance, and to evaluate the impact of product use under normal or accidental conditions. ESI’s solutions fit into a single collaborative and open environment for End-to-End Virtual Prototyping. These solutions are delivered using the latest technologies, including immersive Virtual Reality, to bring products to life in 3D; helping customers make the right decisions throughout product development. The company employs about 950 high-level specialists worldwide covering more than 30 countries. ESI Group is listed in compartment C of NYSE Euronext Paris.