



Global Seating Systems uses PAM-COMFORT to achieve best-in-class seat comfort

THE CHALLENGE

Global Seating Systems designs a new lighter and thinner military seat, minimizing the weight and the overall structure while still maximizing the seat comfort. With ESI's PAM-COMFORT simulation software, they are able to achieve the optimum seat static pressure map and determine precisely the amount of foam needed, in order to reduce the seat overall weight.

THE BENEFITS

- Design the seat entirely with simulation, thus avoiding the costs of the tooling for physical prototypes,
- Measure and quantify comfort precisely through virtual prototyping,
- Optimize the seat design to reduce weight while keeping the same level of comfort,
- Obtain physical prototypes with performances matching the simulation predictions.

*"The end result we achieved thanks to PAM-COMFORT is what we believe to be **best-in-class comfort**, which is one of the most important elements for the occupant."*

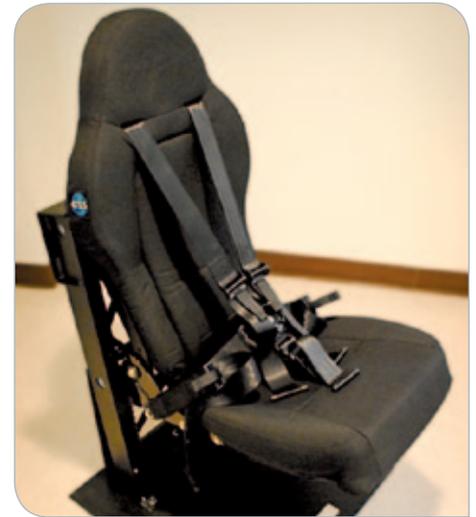
Jeff Krueger,
Director of Product Development,
Global Seating Systems, USSC Group

Global Seating Systems (GSS), a member of USSC Group, is a North-American based company which designs and engineers world-class seating for several types of vehicles. Their goal is to develop the most durable and ergonomically designed seats to reduce day-to-day driver fatigue and stress. Safety oriented, GSS is well known for premium seats they develop according to their customers' requirements. Their in-house certified test laboratory supports the efforts to produce seats in scientifically proven seating performance.

GSS used ESI's seat comfort simulation software PAM-COMFORT to develop a new seat for a military vehicle. Soldiers and military vehicle occupants in general can stay seated for unspecified times, missions lasting easily eight hours or more, with no defined limit, which makes comfort one of the most important criteria for a military seat.

To develop this new seat design, the GSS engineers involved in the project set the requirements based on customer feedback which led them to define three main objectives:

- Design a seat with an overall comfort to not only meet but exceed the previous best-in-class seat in the industry,
- Take into account a very tight package space for the foam cushion,
- Reduce the seat overall weight: make it lighter and thinner than any other seat designed before.



GSS's new military seat with foam & comfort development executed in ESI's PAM-COMFORT

Designing the most comfortable military vehicle seat with simulation

GSS engineers worked with ESI to leverage its simulation software PAM-COMFORT, accounting for all criteria they set up to design a new military seat.

First of all, they measured the static pressure map of an existing seat and then entered it in a PAM-COMFORT model. This model became their benchmark and target. Then, they designed a new seat, with the objective of meeting the pressure map of the actual production seat. They developed both the new design and the pressure mapping with PAM-COMFORT. Jeff Krueger, Director of Product Development at Global Seating Systems, highlights it: *"We executed the new design and the pressure mapping using PAM-COMFORT to prove that the pressure map would meet or exceed the best-in-class seats on the market"*.

Besides, still with the help of PAM-COMFORT, GSS engineers reached their comfort quality target while preserving the overall unique style and design of their seat.

Thanks to simulation, GSS engineers were able to understand their comfort problematics better than ever without finalizing any tooling, as they used virtual data to prove they met their comfort target before developing any physical tools. Thus, this new military seat design was made 100% with simulation without relying on any physical prototype parts to

back up the results. In the end, the physical seat prototype was right the first time and results matched perfectly those of the virtual seat prototype.

Virtually assessing different materials

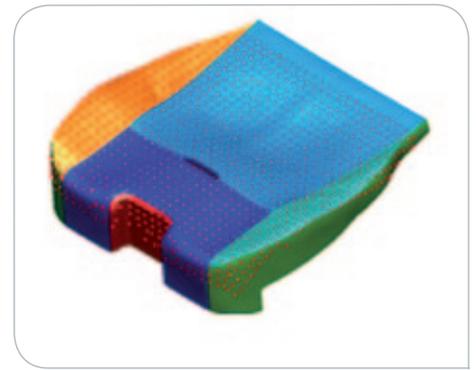
GSS engineers also evaluated multiple materials in simulation before making the physical extra part samples. For instance, they tested three different key variables:

- Foam type including different foam suppliers,
- Polyurethane (PU) foam: as PU can be molded with varying firmness, they needed to evaluate the different PU foam firmnesses,
- Shape of foam.

Testing different materials with virtual data allowed GSS to avoid material waste and save cost by only manufacturing the part sample they had selected thanks to the simulation tests.

Bringing competitive advantages to seat design

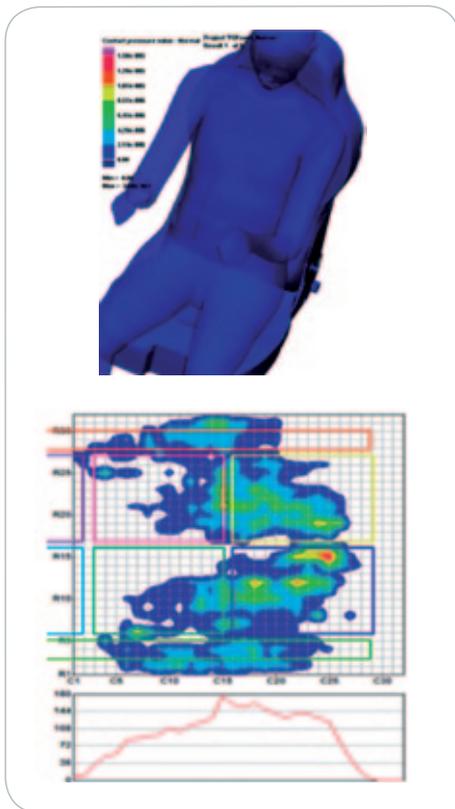
According to Jeff Krueger, using PAM-COMFORT contributes to making their brand stand out: Global Seating Systems engineers were able to use the software to keep the seat's unique appearance while offering best-in-class comfort. Without PAM-COMFORT, they may have deviated



New seat cushion made from simulation

from their original conception style which could have proven to be more costly and ill-received by the customer. While achieving their comfort target, GSS kept their brand equity.

In the future, USSC Group will likely continue using simulation with PAM-COMFORT to design best-in-class seat models, not only for military vehicles, but also for heavy duty transit buses along with small and medium size buses and other extreme duty markets.



Virtual analysis and pressure mapping of the new seat cushion



Initial CAD model of GSS's new military seat

To find out more about ESI's PAM-COMFORT, please visit: www.esi-group.com/comfort

ABOUT GLOBAL SEATING SYSTEMS

Global Seating Systems (GSS) is dedicated to protecting our troops through the development and manufacture of high technology, high strength military seating and restraint systems. Our commercial arm, USSC Seating LLC, has been developing and manufacturing seating systems for extreme duty markets since 1987. Building upon and enhancing the proven, robust ergonomic designs from the commercial market, GSS developed seating systems specifically for the threat environment experienced in military ground vehicles. For more information, visit www.globalseating.com

ABOUT ESI GROUP

ESI is a pioneer and world-leading provider in virtual prototyping for manufacturing industries that takes 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 performance. ESI's solutions fit into a single collaborative and open environment for End-to-End Virtual Prototyping, thus eliminating the need for physical prototypes during product development. The company employs about 850 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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