## **EMBRACING TRANSFORMATION**

Lessons from the 2023 edition of the **3DEXPERIENCE**Modeling and Simulation Conference



**EXECUTIVE WELCOME** 

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DISCOVER MODSIM

# We live in an el

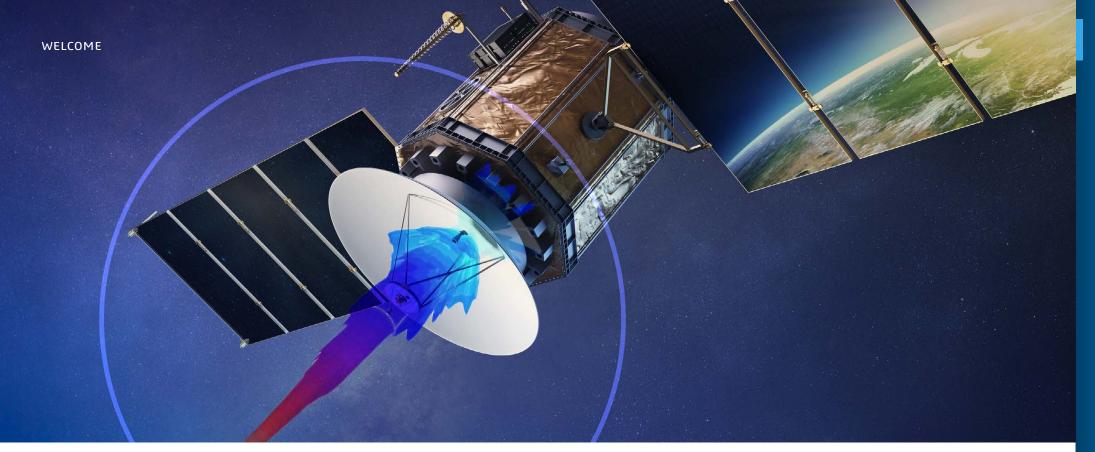
We live in an era defined by rapid technological evolution, turbulent markets, changing regulations and the need to deliver more sustainable and efficient products. Businesses that want to thrive must **embrace transformation**.

At the 2023 **3DEXPERIENCE®** Modeling and Simulation (MODSIM) Conference, designers, engineers and analysts from different industries exchanged ideas and discovered new technologies and processes to address their challenges.

**Explore this eBook** to learn how a fully integrated MODSIM approach can create a new paradigm in product development.

**Learn** how NIO and Resemin are using MODSIM to innovate with efficiency and flair.





We're looking at combining the modeling and simulation in the real-time process to check upfront if the system meets the requirements, rather than different engineering organizations working in silo and then find out the problems at a much later stage.

 Mark Zhou, Executive Vice President and Chairman of Product Committee, NIO We have an 'EcoDesign' feature built into **3D**EXPERIENCE, which will give a detailed breakdown of all the environmental impacts of your design from CO<sub>2</sub> emissions, land use, mineral and metal depletion to transportation impacts.

– Olivier Sappin, CATIA CEO, Dassault Systèmes MODSIM allows us to be much more reactive to changing regulation, market trends, evolving business models and so forth.

– Sebastien Gautier, SIMULIA Worldwide Sales & Marketing VP, Dassault Systèmes **EXECUTIVE WELCOME** 

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### NIO BREAKS THROUGH BARRIERS FOR COLLABORATIVE PRODUCT DEVELOPMENT

NIO's Nancy Tang discusses how MODSIM helps the electric vehicle manufacturer to **integrate CAD and CAE models** and seamlessly connect data-based design, simulation and results analysis in electric drive system development.



The **3D**EXPERIENCE platform provides many features out of the box that can meet our needs.

Through the use of the **3D**EXPERIENCE platform, we are able to realize digital continuity through design and simulation. We have also used the **3D**EXPERIENCE to build standardized,

streamlined, and automated simulation capabilities, which have greatly increased our efficiency.

The value of collaboration in modeling and simulation is higher efficiency and more accurate design.

- Nancy Tang, CAE Manager, EH Department, NIO

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#### RESEMIN DELIVERS CUSTOMIZED EXCELLENCE IN RECORD TIME

Resemin's Fernando Diaz and Manuel Morales explain how a MODSIM philosophy is **improving collaboration between design and structural analyst teams** and helping the company to produce **safe, optimized, durable and customized** mining equipment in shorter times.



If we need to make three or four physical tests it's about one month... with

3DEXPERIENCE simulation we can reduce all the time of the solver to about four or six hours.

 Manuel Morales, Mechanical Design and Structural Analyst, Resemin All the designs, simulations of the Raptor 7 was performance in the platform. Because of that collaboration, we have achieved shorter time to market...In that design we reduced the mass by about 300 kilos.

– Fernando Diaz, Engineering Manager, Resemin With this solution in the cloud enabling the MODSIM process with our platform philosophy, we get several benefits. We get shortened design cycles because we have four engineers collaborating in the simulations and the modifications of geometries. We have integrated, multidisciplinary simulation. We have enhanced collaboration, and we get accuracy in our results for very large simulation cases like the arm of the lift cage and the roof of the cabin.

 Manuel Morales, Mechanical Design and Structural Analyst, Resemin

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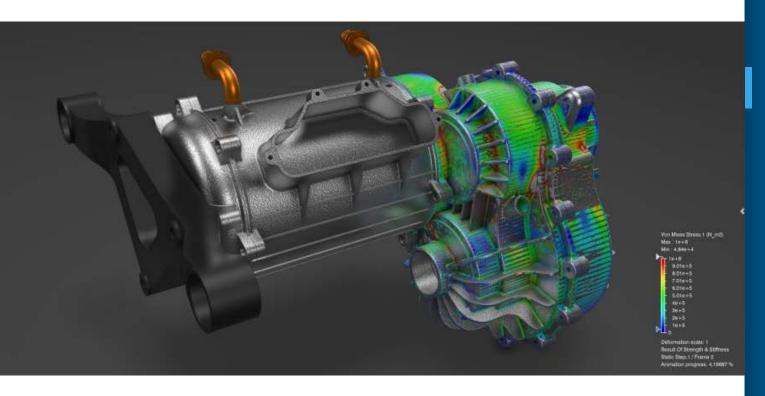
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#### TRANSFORMATION THROUGH MODSIM

MODSIM is the mechanism by which we implement all of our simulation technology on the **3D**EXPERIENCE platform.

– Joe Amodeo, SIMULIA Industry Process Director, Dassault Systèmes





MODSIM on the **3DEXPERIENCE** platform provides a **single source of truth** to transform and integrate processes so teams have all of the information they need in the right context. **Automated** modeling and advanced tools accelerate processes and allow engineers to focus on what they do best.



Connected processes can transform engineering. A MODSIM approach uses virtual twins to democratize simulation so different ideas can be tried and tested earlier in the design cycle. The result is faster product engineering, more power to innovate and greater efficiency.



Engineering transformation impacts the business. By democratizing simulation and left-shifting the design cycle, a MODSIM approach delivers shorter development cycles, more desirable products and costefficient design processes that transform the business.

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### **BUSINESS TRANSFORMATION**

For businesses to thrive, they need to embrace transformation. Our MODSIM goal for business transformation is through shorter development cycles, more cost-efficient design processes, and a more desirable product. There are extraordinary examples of how MODSIM can make a real difference to the development cycle of electric vehicles, industrial mining equipment, boats, or plastic bottles.

Thanks to the MODSIM approach, we are about to develop a clipping device [to treat mitral valve regurgitation] faster – from years to weeks. And we are able to halve our reliance on animal and human testing.

Patricia Millot, SIMULIA Industry Process Consultant,
 Dassault Systèmes

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### PROCESS TRANSFORMATION

Process transformation relies on some of the unique characteristics of MODSIM on the **3DEXPERIENCE** platform. The core MODSIM technology provides some unique opportunities for automation, creates new advanced technologies and integrates the wealth of technologies and features available on the **3DEXPERIENCE** platform.

In contrast to the traditional CAE process, the MODSIM process is a loop instead of a straight line. This enables our customers to do more, and do it faster and more efficiently. Instead of exporting data every time for geometry cleanup, meshing, connections, results and post processing, all of the data in a MODSIM approach resides on the platform. So the data is enriched for each process, and when there is a design iteration, it will all update automatically.

MODSIM allows you to design complex shapes in a matter of seconds. Not only design them, not only automate the design if you need to generate a family of products, but also create advanced simulation on them and make these non-added-value tasks of creating the mesh, preparing the data, designing the connections, in seconds.

– Daniel Pyzak, CATIA Senior Director, Dassault Systèmes **EXECUTIVE WELCOME** 

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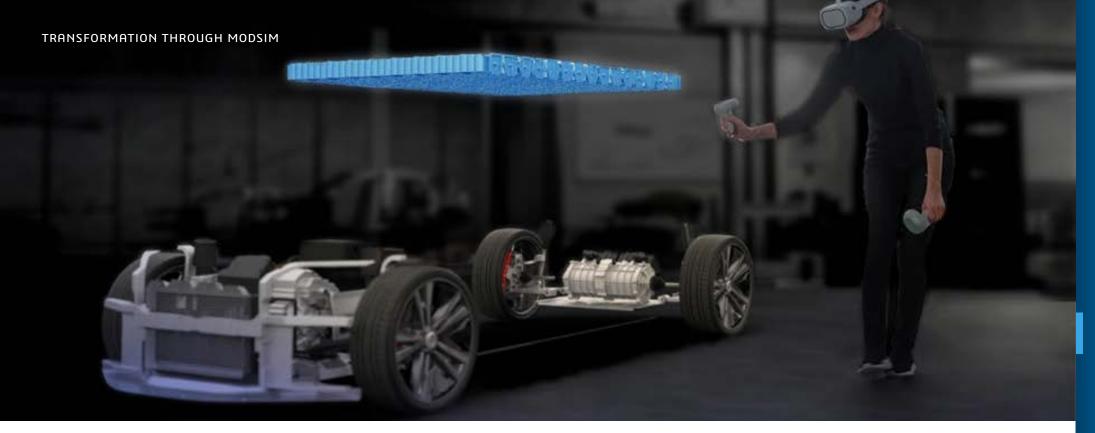
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### **ENGINEERING TRANSFORMATION**

MODSIM will accelerate the engineering process of modeling, simulating, and optimizing a design – with time savings often being an order of magnitude improvement. MODSIM allows designers to explore areas of design space that were not possible before, innovate using virtual twin experiences that are not possible in real work and access and manage data of the whole lifecycle from the **3DEXPERIENCE** platform that guarantees a single-source of truth.

In CATIA SCANER, you can do a driving simulation considering the dynamics, the ADAS and the control system of the vehicle, but also energy management ... all simulated virtually by combining all the different models together.

Frédéric Merceron, Transportation & Mobility Industry
 Solution Experience Director, Dassault Systèmes

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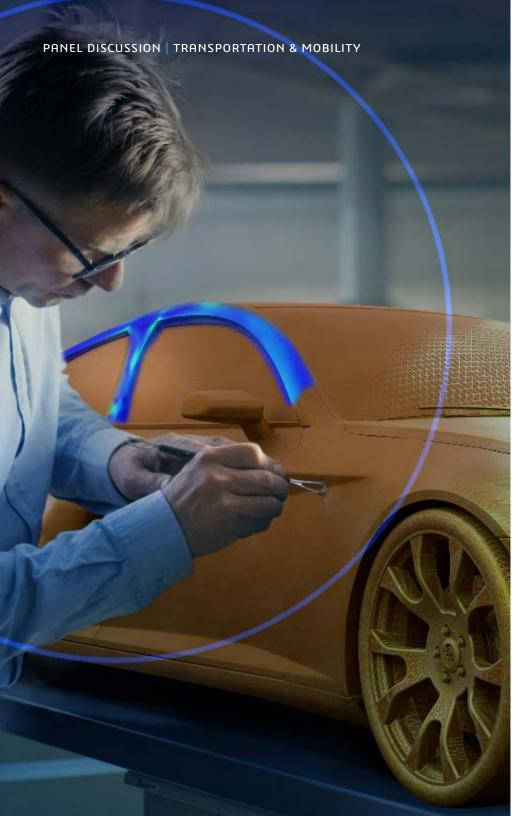
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## ACCELERATE ADVANCED DESIGN CONCEPTS FOR PRODUCT DESIGN

MODSIM in Action panel: Ford Motor Company, BOBST, Stellantis, H2 Clipper and Air Liquide consider how MODSIM affects their concept design and validation processes.

The **concept phase** has become critical to the product development cycle. For automakers, electrification means that **vehicle structures are being redefined** to accommodate battery packs and address **new challenges**. Equipment of all kinds must **meet all performance requirements** while being **lightweight** and **scalable**. And as organizations create new variants, they must deliver the same level of performance across different configurations with **minimum design changes**.

**3DEXPERIENCE** provides tools to democratize simulation and left-shift the design process so these complex challenges can be resolved in the concept phase.

Learn what domain experts and industry thought leaders think about:

- Emerging trends and challenges in mobility and product design
- Using MODSIM to design advanced structural concepts
- MODSIM's importance for future innovation
- Achieving lightweighting through topology optimization
- The ideal MODSIM user profile

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We're developing very large structures.
They're acted on by forces, gravity loads, G-forces and aerodynamics. Being able to close that loop in a simulation driven design rapidly between designer and simulator is where the MODSIM type approach comes in for us.

Matt Knapp, Chief Engineer, H2 Clipper



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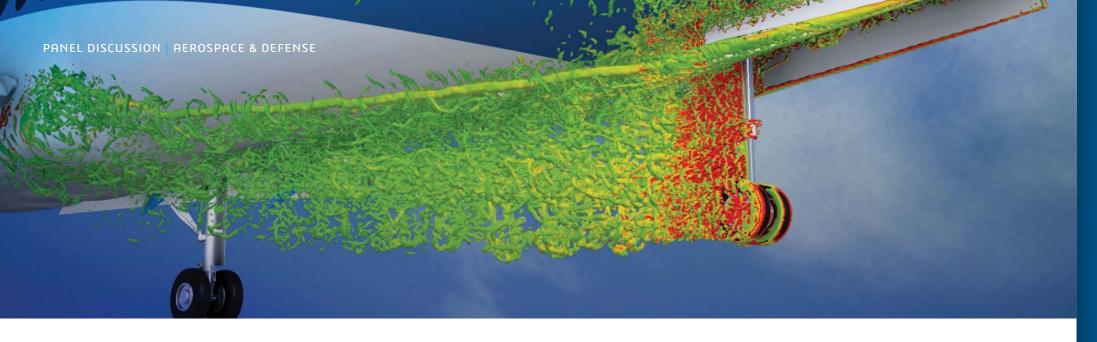
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## MODELING & SIMULATION FLYING TOWARDS NEW HORIZONS: FROM CONCEPT TO CERTIFICATION

MODSIM in Action panel: Textron Aviation, Airbus and Lifecycle Insights explore the potential of modeling and simulation in the aerospace industry, from conceptual design to certification.

Aerospace organizations must innovate to safely enhance the sustainability of air travel. This brings unique challenges, especially in the crucial domains of conceptual studies and certification. **Mastering simulation-based processes is critical** for businesses in this industry to ensure efficient workflows, particularly in the conceptual phase. **Accelerating the transition from CAD** to simulation is the key.

Find out the views of domain experts and industry thought leaders on:

- Challenges and business pressures facing aerospace organizations
- Areas where companies are using simulation to drive progress
- Leveraging simulation and automation to support a changing workforce

- Using a MODSIM approach for aerodynamics, structural analysis and systems integration
- The importance of simulation in certification, safety and compliance

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Simulation... allows us to look a multiple designs and investigate different avenues to produce aircraft, maybe with less labor than what we've relied on in the past.

We are dancing a lot closer to the edge of the optimal structure now than we ever have. It ties back to emissions. The more optimal the airframe is, that's going to help with the economy and the efficiency of the product.



Gene Paulsen, Senior Manager – UM, Structures Engineering, Textron Aviation/Cessna Aircraft



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## **ACCELERATE INNOVATION OF HIGH-TECH & MEDICAL DEVICES WITH MODSIM**

MODSIM in Action panel: Inovonics and GE HealthCare discuss how they are applying a MODSIM approach to transform their businesses.

Developing successful new high-tech and medical devices takes **rapid innovation and pinpoint accuracy.** Organizations in this industry are under huge pressure to beat the competition with **faster product cycles** while **staying on top of industry trends**.

Leading organizations are using a MODSIM approach on the **3DEXPERIENCE** platform to ensure quality and compliance in new designs while reducing costs and turnaround times.

Discover the experiences and insights of domain experts and industry thought leaders on:

- The importance of transformation in the MODSIM journey
- Leveraging a MODSIM approach to achieve design KPIs and regulatory compliance while reducing costs and turnaround times
- Moving from siloed product development to an integrated, collaborative approach
- Breaking barriers with cloud-enabled engineering

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browser, so the entire software where I can do my designing, my parameterization, my simulation, it's all online. ... It's so quick and easy to bring up all this data, all this representation, everything you want to do, and there's such a benefit to it – not just in my workflow but in showing people outside of what you do, what's happening in your company. And this leads into the collaboration process. SOLIDWORKS is integrated with all this as well, and the next step within our company is to streamline this all with MODSIM online.

Just CST integration alone has caused us to go from 7-8 revisions on our antennas to 1-2 revisions only. It's incredibly great to have these simulation tools and these modeling tools to streamline this process. As we get into transformation, this process will get even more streamlined with MODSIM and having everything all together on one platform.



Mark Zakhem, Staff Hardware Design & Regulatory Engineer, Inovonics

66 MODSIM from SIMULIA connects various teams within our division.



Dhanachezhian DURAIKANNU, Lead Mechanical Engineer, GE HealthCare

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## HOW MODSIM BENEFITS THE DEVELOPMENT OF PACKAGING

MODSIM in Action panel: Packaging experts Mel Creasey, Matthius Friedrich and Raman Singh explore how MODSIM can help to address the industry's biggest challenges.

Simulation has become essential for packaging development and validation, and it's a key tool in accelerating innovation as consumer packaged goods firms look for innovative sustainability solutions. In this industry, simulation has typically been handled by specialists. Now, organizations face the challenge of **democratizing** and automating repetitive simulation tasks to enhance agility and enable a more proactive approach to product design.

Understand what domain experts and thought leaders think about:

- When and how MODSIM can benefit packaging development and create business value
- Applying automation to bridge the gap between CAD and simulation models
- Moving from reactive troubleshooting to proactive evaluation and testing of concepts, designs and materials
- Using simulation to drive the entire product development process
- MODSIM's significance in the packaging industry's future

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We've seen examples where automated optimization processes have been able to unlock 10-20% material efficiency and savings compared to more traditional lightweighting approaches. This material efficiency is a key enabler in helping to achieve some of the sustainability targets that companies face.

It also helps companies to save money in the process. For example, saving just 1 gram of plastic in a bottle – if you're producing 100 or 200 million bottles per annum, that can quickly add up to US\$200,000 to US\$400,000 per year. Those savings rack up quickly.



Mel Creasey, SIMULIA Business Development Consultant, Dassault Systèmes



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### **POWERING BUSINESS TRANSFORMATION**

Businesses of all kinds share a critical need: **to stay competitive, they must transform**. Achieving that goal demands a multi-layered approach. When processes are integrated and automated, engineering can be more innovative and efficient – and brings greater agility for the whole business. Leading organizations are using a MODSIM approach to achieve these goals. It gives them the power to:







### Unify modeling and simulation

MODSIM unifies the data model behind modeling (CAD) and simulation (CAE) so there is no longer a distinction. This smooths the path of product development because there is no need to export or convert models to create simulations.



## Automate modeling and simulation

By maximizing automation in the design process, organizations can achieve incremental gains in efficiency and performance. **3DEXPERIENCE** enables automated simulation that can be used at an industrial scale with little expertise and maintenance required.



## Democratize modeling and simulation

Leveraging the latest integrated and automated solutions can make even complex simulation workflows available to designers and non-experts. This speeds up the design process and frees simulation experts to focus on higher value work.



### Left-shift design processes

MODSIM puts automated modeling and simulation tools in the hands of non-experts, empowering designers to test against specifications early on instead of relying on analysts to do it later. This also lowers overall cost by avoiding late-stage failure.



### Minimize physical prototypes

With a virtual twin created early in the development process, engineers can test multiple ideas and accurately predict product behavior. Automated exploration of multiple iterations also reduces uncertainty and risk.



## Empower a future-ready workforce

MODSIM connects teams across disciplines so they can collaborate and share ideas in real time and at every stage of the cycle. The result: fast, efficient innovation.

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## **DISCOVER MODSIM**

- Learn how MODSIM benefits engineers, teams and leaders
- Discover customer success stories
- Watch webinar replays and learn to accelerate product development with a MODSIM approach
- Get answers to frequently asked questions
- Download e-books and explore the benefits of a MODSIM approach regardless of your industry

go.3ds.com/MODSIM

## **JOIN THE CONVERSATION**

In the MODSIM community, you can connect with simulation, modeling and design professionals, including Dassault Systèmes R&D experts and customers benefiting from a MODSIM approach.

Discover replays from MODSIM **3DEXPERIENCE** conferences, as well as presentations, demos and tutorials.

Ask a question. Start a discussion. Become an author. Establish yourself as a thought leader!

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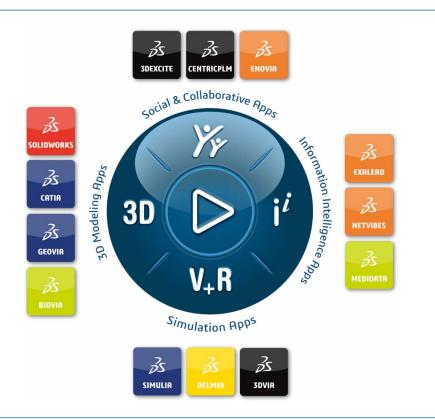
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#### Our **3D**EXPERIENCE® platform powers our brand applications, serving 11 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3DEXPERIENCE** Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating 'virtual experience twins' of the real world with our **3DEXPERIENCE** platform and applications, our customers push the boundaries of innovation, learning and production.

Dassault Systèmes' 20,000 employees are bringing value to more than 270,000 customers of all sizes, in all industries, in more than 140 countries. For more information, visit **3ds.com** 



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