

UNIFIED MODELING AND SIMULATION FOR SUSTAINABLE PRODUCT DEVELOPMENT

User Experiences



#MODSIM



WELCOME

SUSTAINABLE PRODUCT
DEVELOPMENT

MODSIM KEYNOTE

| UNILEVER

| RENAULT GROUP

MODSIM IN ACTION

| DESIGN CONCEPTS

| LIGHTWEIGHT
ENGINEERING

| MODSIM & SOLIDWORKS

| ADAS & MBSE

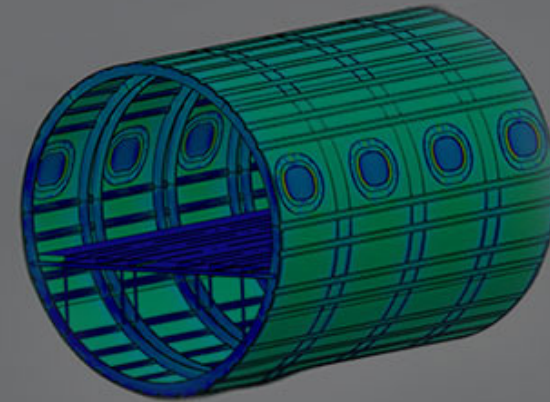
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At the **3DEXPERIENCE®** Modeling and Simulation (MODSIM) Conference 2022, simulation, modeling and design experts from different industries shared their experiences of **how MODSIM enables sustainable, efficient and connected product development**.

Explore this eBook to discover how a MODSIM approach creates the basis for organizations to reach sustainability goals and empowers the workforce of tomorrow.

Learn how [Unilever](#) and [Renault](#) are leveraging MODSIM for sustainable product development.



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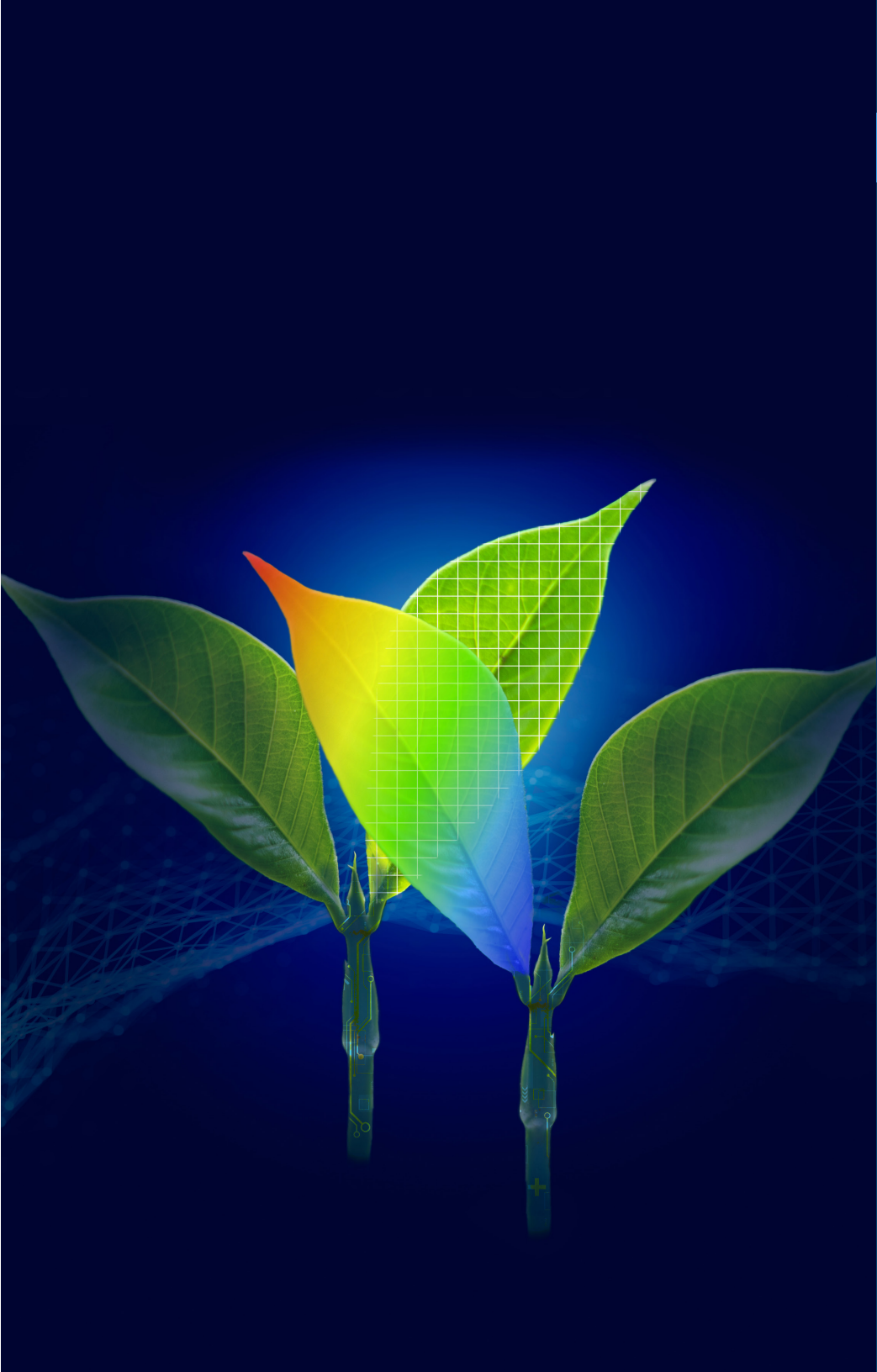
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SUSTAINABLE PRODUCT DEVELOPMENT

Sustainability is one of the strongest business drivers facing every industry. In recent years organizations have had to adapt to electrification, circular economy and resource limitations. Products are getting more complex, requiring more testing and validation during development. At the same time, the need to eliminate waste, reduce emissions and innovate more efficiently is an urgent priority.

To support sustainability, product development must be transformed. That transformation covers three important categories where simulation and modeling play a key role: **alignment with regulations**, **faster time to market**, and the **workforce of the future**.

Across all industries, leading organizations are already demonstrating how the coupling between modeling and simulation (MODSIM) creates the basis to reach those goals. Their experiences illustrate how, by democratizing and automating simulation processes, **companies can empower designers and product developers to validate requirements in the early stages of concept design while putting sustainability at the center of what they do.**



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SUSTAINABLE PRODUCT DEVELOPMENT

“ 80% of a product’s impact on the planet is defined in the concept stage. We need to concentrate on the design, modeling and simulation stage to reduce that.

— Olivier Sappin, CEO CATIA, Dassault Systèmes

“ Historically, the main focus for simulation has been on improving accuracy – but we are now at a point where the accuracy of simulations should be a given. Their efficiency, robustness, and their integration within product design is becoming the key differentiator.

– Jean-Paul Roux, SIMULIA Sales & Marketing VP, Dassault Systèmes

“ To build next-generation product design systems, it is necessary to rethink the paradigm of how modeling and simulation is performed. The **3DEXPERIENCE** platform has been built with unified and integrated modeling and simulations at its core.

– Florian Jurecka , SIMULIA R&D Vice President, Dassault Systèmes

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“ At Dassault Systèmes sustainability is of strategic importance. That is why we created role-based applications to help designers assess the environmental impact of the product they are working on.

– Daniel Pyzak, CATIA Mechanical Industry Process Consult, Senior Director, SIMULIA Industry Consultant Director, Dassault Systèmes



By viewing the product and its systems as one, we can meet sustainability goals without compromising performance or user experience. MODSIM enables this, unifying modeling and simulation to quickly create and test thousands of design alternatives in an automated way.



By using a virtual twin to enable simulation early in the design cycle, organizations can left-shift the product development process. This generates cost savings, reduces concept development time and brings early insights into product performance to avoid late-stage failures.



MODSIM democratizes and automates simulation, making it accessible to non-experts and freeing experts to concentrate on high value tasks. It enables collaboration with a data science approach to create a more efficient, connected and coherent workforce for the future.

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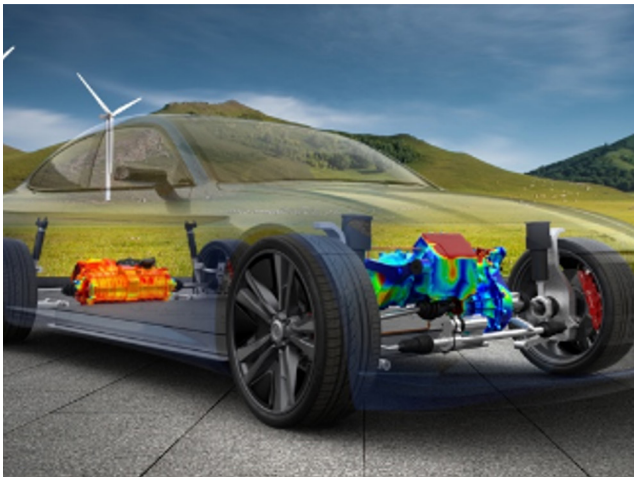
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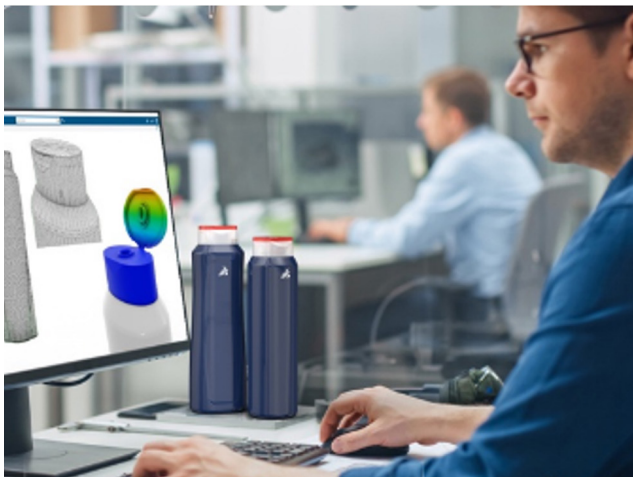
“ MODSIM can help the wind energy sector to save the planet and reduce costs. Customers using CATIA to design rotor blades have cut design time by 90% and one company reduced capex costs by 8% for a single wind turbine.

– Steve Mulski, Strategic Business Development Executive, Wind Energy, Dassault Systèmes



“ In a study of scenarios for optimizing a vehicle’s electric drivetrain, one 3DEXPERIENCE customer found that optimizing each system individually enabled efficiency savings of 15-25%. Viewing and optimizing the system as an integrated unit brought savings of 40%.

– Joe Amodeo, Technical Director, SIMULIA, Dassault Systèmes



“ When more users can participate in product development, companies can reach their sustainability targets faster. A MODSIM approach helped one customer in the packaging industry to reduce the weight of a plastic bottle by 20% and cut development time from 10 months to three weeks.

– Dhiraj Nahar, Industry Process Success Director, Technical Sales, Dassault Systèmes

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HOW UNILEVER ACHIEVES A 12% WEIGHT SAVING

Unilever’s Mel Creasey discusses how a MODSIM approach enables R&D teams to quickly design robust, reliable products while optimizing materials and managing multiple stakeholder requirements in his conference keynote presentation.



“MODSIM is helping our engineers to explore the full design space efficiently, and this rich data is really helping to identify performance risks early and understand the robustness and reliability of our designs for scale-up.

We’ve been able to use the same material optimization workflow again and again and it’s really starting to unlock savings that were technically unachievable with traditional

methods. We’ve run over 50 projects now using this approach, averaging around 12% weight savings, so this is really starting to benefit the business. It’s contributing to the sustainability challenge and in terms of democratization this is the type of automated workflow that can be used beyond the expert community.

– Mel Creasey, Packaging Excellence Leader, Unilever

[View](#) the recording of the Unilever keynote

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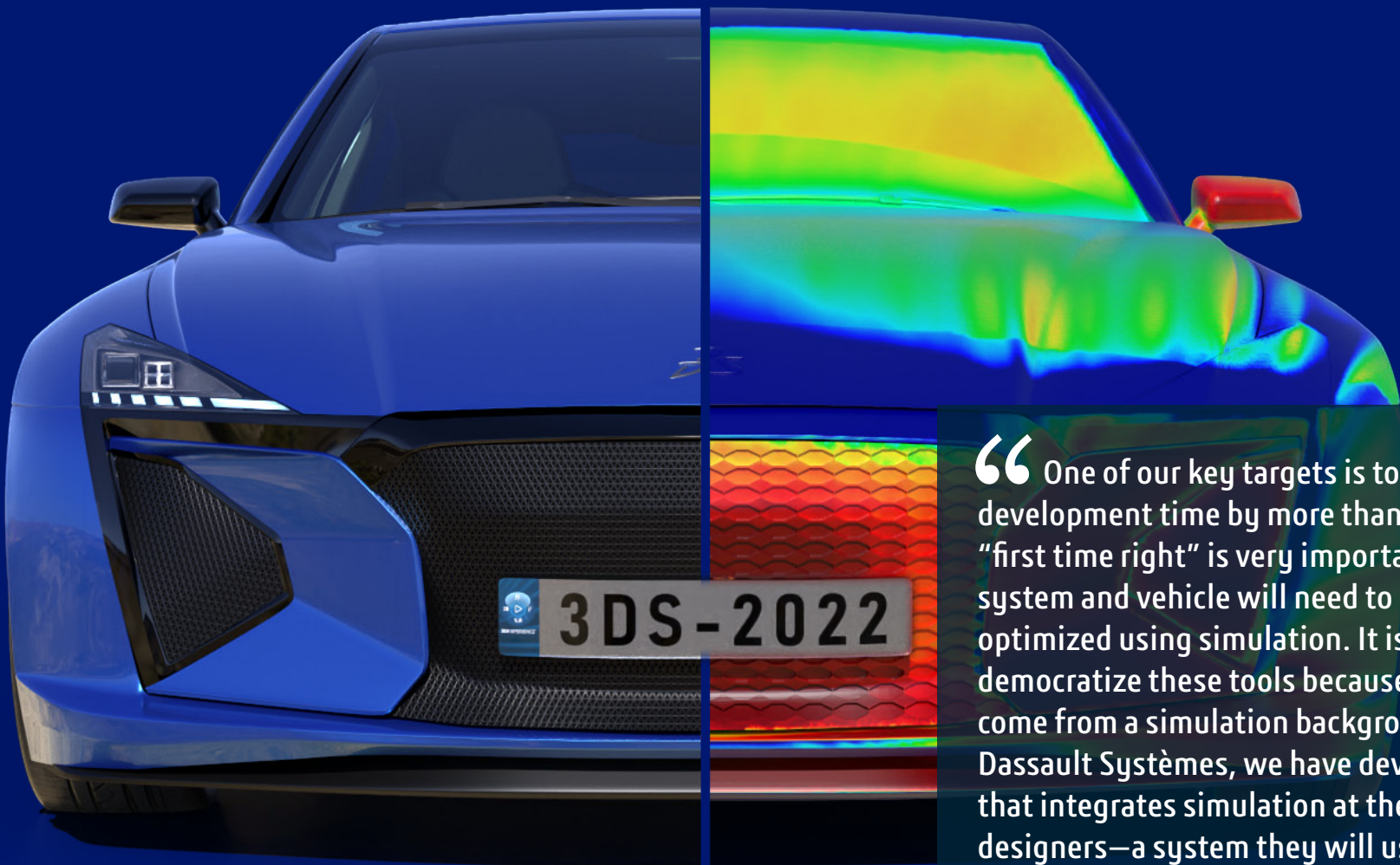
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RENAULT GETS IT RIGHT THE FIRST TIME WITH MODSIM

Pascal Remusan of Renault Group explains how the company’s Renaulution Virtual Twin strategy is empowering designers with simulation tools to boost sustainability, optimize vehicle performance and shorten design loops.



“ One of our key targets is to reduce car development time by more than a year (25%), so “first time right” is very important and every part, system and vehicle will need to be sized and optimized using simulation. It is mandatory to democratize these tools because designers do not come from a simulation background. With Dassault Systèmes, we have developed a system that integrates simulation at the service of designers—a system they will use and that will benefit us in terms of quality and time.

– Pascal Remusan, General Manager of Methods and Tools for Numerical Simulation, Renault Group



UNIFYING MODELING AND SIMULATION TO DRIVE EFFICIENT CONCEPT DESIGN DEVELOPMENT

MODSIM in Action panel: Ford and Renault discuss trends for left-shifting simulation into concept design.

Rapid and robust innovation is needed to create successful new vehicle concepts and bring them to market quickly. In highly dynamic fields like **electromobility**, developing and integrating new technologies requires **effective collaboration** between multiple stakeholders, teams and disciplines.

Automotive manufacturers face the challenge of empowering their designers to **put complex engineering knowledge into practice** during early-stage development.

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

- Maximizing the value of simulation-derived insights in early-stage product design
- Breaking down organizational and technological barriers to effective collaboration across the design cycle
- Identifying and applying the tools and processes for an efficient MODSIM working environment.

[View](#) the recording of this panel discussion

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“ With robust CAE processes at the concept design phase, designers are realizing that what we are doing through optimization is lowering their costs, lowering their weight and improving their performance, and it’s not a trade-off. Now there is a good relationship between DRE (Design Release Engineer) and CAE Engineer. Together, we are looking at products that are much more efficient. Value is going to go up because you spend less money on testing, and time to market has been shrunk because of this collaboration. This relationship is being naturally created because of the performance of simulation.



Behrooz Shahidi, Manager, Vehicle Simulation Integration, Ford Motor Company



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THINK LIGHT? DO LIGHT AT THE SPEED OF LIGHT WITH 3DEXPERIENCE GENERATIVE DESIGN

MODSIM in Action panel: [ACED](#), [HYVIATE](#), [NIAR](#), [Scania](#) and [Zenith](#) discuss the impact of generative design in their organizations.

Lightweight engineering has become a must in all industries, enabling manufacturers in industries like [aerospace](#) to [transport and mobility](#) to design for [better performance](#), [lower emissions](#) and [reduced costs](#).

But many organizations are also under pressure to combine lightweight performance with [eye-catching design](#). **3DEXPERIENCE** provides tools that empower designers and engineers to quickly address these challenges through techniques including [topology optimization](#) and [lattice simulation](#).

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

- Why lightweighting is so important
- Experiences and value of topology optimization tools and how they should evolve
- Methods and tools for achieving lightweighting with “cool” design.

[View](#) the recording of this panel discussion

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“ We design, build and operate aircraft. Aircraft size affects the cost of operations, and the size of the aircraft is affected by the weight of every component and subcomponent, so lightweighting is something that we’re focusing on every day.

To give you an idea, I have a part that we’ve been working on. This part used to weigh roughly 55lbs, and now we are around **5lbs**, and that’s basically thanks to the generative optimization in **3DEXPERIENCE**.



Raphael Nardari, Co-founder and CEO,
Zenith Aerospace

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VALUE UP JOURNEY – MODELING ON SOLIDWORKS AND SIMULATING ON 3DEXPERIENCE

MODSIM in Action panel: MLC CAD, Practical Engineering Solutions (PES) and RESEMIN lead the way in developing MODSIM approaches to solve complex and resource-intensive analyses.

Enabling engineers and designers to run simulations in a fully integrated, collaborative environment is a powerful way to **accelerate product innovation**. Today, a combination of tools and technologies, powered by the **cloud**, are not only **democratizing simulation** but also enabling more **complex analyses** to be run much **faster**.

Across multiple industries, **design engineers, structural analysts** and **process consultants** are creating value using a MODSIM approach that leverages the synergy of SOLIDWORKS and the **3DEXPERIENCE** platform.

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

- Real-world business and technical benefits of a MODSIM approach using SOLIDWORKS
- Using MODSIM to build bridges between designers, engineers, analysts and other stakeholders
- Accelerating innovation with MODSIM and cloud-enabled engineering.

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“Being fast and cost-effective, those things separate us from our competition. We really need a group of connected tools to cut out some of those inefficiencies. SOLIDWORKS tools and the 3DEXPERIENCE platform ensure that we operate as efficiently as possible.

The 3DEXPERIENCE platform has opened some doors for us and we enjoy using it.

It’s an abbreviated learning curve because the platform is so similar to what you’re already accustomed to using in the SOLIDWORKS simulation platform.



Tyler Cook, Operations Manager of the Mechanical and Civil Structural groups, Practical Engineering Solutions, LLC (PES)



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ADVANCED DRIVER-ASSISTANCE SYSTEM (ADAS): INCREASE ACTIVE SAFETY AND DRIVER ASSISTANCE WITH MBSE

MODSIM in Action panel: Continental, Renault and UTAC address ADAS challenges and solutions.

Putting more **connected and autonomous vehicles** on the streets brings tremendous challenges for the automotive ecosystem across the entire vehicle development phase. **Safety, market approval, costs, time to market** and **over-the-air software updates** are some of the challenges engineers must overcome.

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

- Using systems engineering methodology, virtual testing and simulation to enforce end-to-end traceability
- The importance of virtual testing in consumer ratings and certification
- Ensuring a reusable, digital thread from operational design domain definition to final certification.

[View](#) the recording of this panel discussion

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“Once we establish trust, or confidence, that the simulation can match sufficiently accurately with the measurements, then we would try to rely more on simulation and expand it through a wide range of scenarios which would involve a lot of cost with physical testing. This would also save a lot of time, because now OEMs are more focused on decreasing their time to market and they want to do the simulations very early in the product cycle.



Yadhu Krishnan M K, Technical Lead: RF simulation, Continental AG



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ACHIEVING SUSTAINABILITY TARGETS

Sustainable product development is vital for competitive business and the future of the planet. But when designers, engineers and analysts all work separately with their own agenda, it adds extra time, cost and effort to the process – slowing time to market and undermining sustainability efforts. Leading organizations are using a MODSIM approach to support sustainable business, enabling them to:



Unify modeling and simulation

MODSIM unifies the data model behind modeling (CAD) and simulation (CAE) so that there is no longer a distinction. This immediately removes barriers and friction, since there is no need to export or convert models to create simulations.



Automate modeling and simulation

Maximizing automation in the design process is critical to 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 can speed up the design process and free simulation experts to focus on higher value work.



Left-shift design processes

MODSIM empowers 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

Creating a virtual twin early in the design process empowers engineers to test their ideas and accurately predict product behavior. Automated exploration of multiple iterations also reduces uncertainty.



Connect a future-ready workforce

MODSIM connects teams across disciplines to enable real-time collaboration and ideas-sharing at every stage, enabling fast, efficient innovation.

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BE PART OF THE COMMUNITY

The MODSIM community brings together simulation, modeling and design experts to break down the silos for a fully integrated product development experience.

Connect with members of the MODSIM community, 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!

To view all of the content from 2022 MODSIM in addition to 2021 conference featuring **Airbus**, **Novo Nordisk**, and **JLR**, among others visit go.3ds.com/modsim

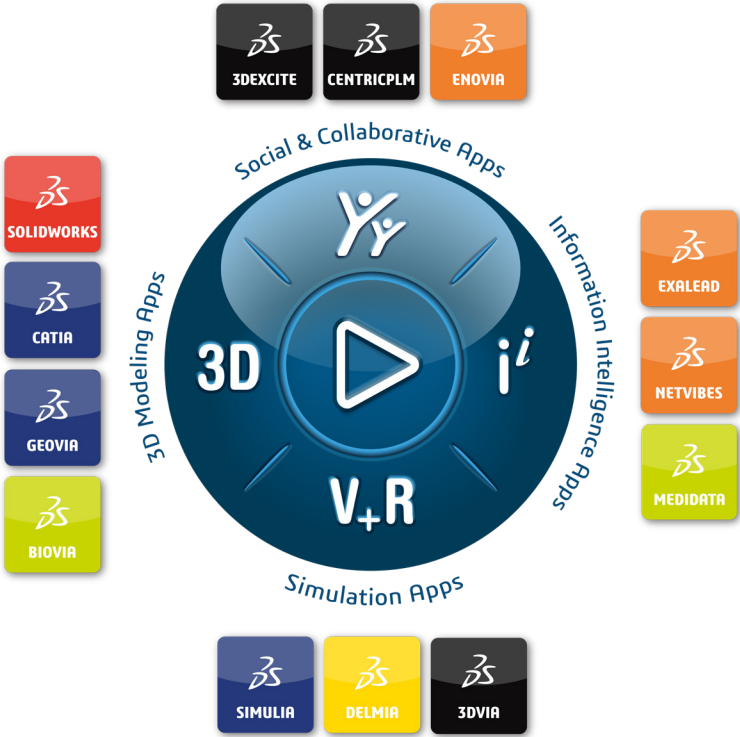


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Our **3DEXPERIENCE®** platform powers our brand applications, serving 11 industries, and provides a rich portfolio of industry solution experiences.

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 www.3ds.com.



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