

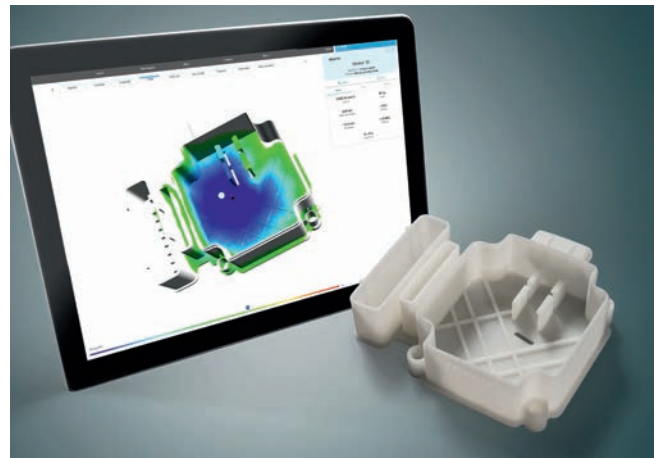
25 Years of Ultrasim: CAE Pioneer for Engineering Plastics and Foams since 1999

“The Integrative Aspect Is Our Great Advantage”

The CAE simulation service Ultrasim celebrates 25 years of pioneering work in virtual engineering. BASF customers from various industries use the tool, whose services have recently become available as web apps, for their development and innovation processes. We took stock in an interview with Dr. Stefan Glaser, Vice President Simulation Engineering & Ultrasim.

Powered by unique and ultra-accurate simulation methods, extensive material data, and easy-to-access web services, the computer-aided engineering (CAE) competence Ultrasim creates an unparalleled offering for BASF customers. “This is how Ultrasim is described in the chemical company’s self-presentation. As a pioneer in the field, BASF introduced the first integrative simulation capability for plastics in 1999, laying the foundation for what is today a strong global network of CAE simulation services.

“The late 1990s were an exciting time”, Dr. Stefan Glaser, today Vice President Simulation Engineering & Ultrasim, recalls. He joined BASF in 1996 to develop BASF’s integrative simulation capability and prepare its launch. “It was a completely new way of thinking. The internet opened up new possibilities, Google went live in 1998, and we at BASF already thought about connecting the data of our plastic materials and using them to optimize our customers’ products. This was truly pioneering work.” Since the launch in 1999, the Ultrasim competen-



The app “molded”, which is part of the Ultrasim Web Services, provides insights into the filling behavior of molds and an understanding of the interplay between design, material selection, and manufacturability. © BASF

History Continues to Be Written

Ultrasim helps customers use BASF plastics and foams to develop sustainable innovations – with simulation services for process design (filling and foaming simulations) and mechanical design (static and crash analysis). The plastics are described with accurate material models that cover a wide range of phenomena like the dependence of the material response on strain rate, temperature, moisture content and, in particular, its processing.

“The track record of Ultrasim is impressive”, acknowledges Josef R. Wünsch, Senior Vice President Research & Development Performance Materials, “Regardless of the target application, all customers enjoy valuable benefits from using BASF’s simulation services: Ultrasim helps them achieve a more sustainable part development with less waste, time, and energy. This results in lower costs and higher performance of their products.” The global network of Ultrasim simulation experts works hand-in-hand with colleagues in technical development at BASF to incorporate specific customer needs.

“Ultrasim has been a true success story – and it doesn’t stop now”, adds Wünsch, “We continue to develop our offering and have recently revolutionized the field of CAE material simulation again to seamlessly integrate BASF’s material and part design knowledge with customers’ in-house development processes: The Ultrasim Web Services offer simulation services as easy-to-access and 24/7 available web apps.”

www.ultrasim.basf.com

cies have expanded continuously: “In the last 15 years, we added at least one new simulation capability to our Ultrasim portfolio per year to address new applications of our plastic materials”, Glaser shares. And is ready to answer our questions.

Plastics Insights: Mr. Glaser, what are the possible applications in the Ultrasim portfolio?

Dr. Stefan Glaser: Ultrasim can simulate almost all of our plastics, i.e. engineering plastics, polyurethanes, thermoplastic polyurethanes and foams made from these polymers. For these materials, we offer services in process design with filling and foaming simulations as well as in mechanical design with static and crash analysis. Since the introduction of Ultrasim 25 years ago, we have taken an integrative approach.

Plastics Insights: What distinguishes the integrative simulation approach?

Glaser: In integrative simulation, we take into account the influence of the processing on the material properties in the component. We are constantly developing these skills. For example, in the past, the focus was mainly on fiber orientation, but now we also consider the density from the foaming process. Depending on the application, our material models can take into account various phenomena, such as anisotropy, strain rate and temperature dependence, failure, creep, fatigue, and cyclic loads.

Plastics Insights: Why does BASF allow itself the luxury of its own simulation landscape?

Glaser: Because we offer our customers convincing added value with the digital twin of our materials and with our simulation capabilities. With Ultrasim, the customer can reliably develop new component designs while saving costs and time. Ultrasim also supports the market launch of new materials: Of course, customers want to know if our new products add value to their applications. With Ultrasim, they can virtually test these materials and see for themselves how they perform.

“We have customers where the development department no longer builds prototypes without getting the blessing of Ultrasim first.”

Dr. Stefan Glaser

Plastics Insights: Can Ultrasim do more than commercially available simulation software?

Glaser: Yes, definitely! With our applications, we have been pioneers in virtual engineering for 25 years. Our field of expertise is material modeling. But we not only know our materials very well, but also our customers. With some customers, we have been working closely for decades and therefore learn directly from them what it is they need. The integrative aspect of Ultrasim is our great advantage: If, for example, we investigate the filling behavior of a new polyamide, we can also use these results for more in-depth structural mechanical simulations. Overall, we offer our customers the best possible service, whether they need an ultra-accurate analysis or the quick 80/20 recommendation.

Plastics Insights: Does BASF also provide other tools with comprehensive material data?

Glaser: The big advantage of Ultrasim is the combination of material data with our industry-leading simulation expertise, which is precisely tailored to our materials and customers. Therefore, providing our material data with our simulation tools is the most profitable combination for the customer.

Plastics Insights: How accurate are the results today and where do you still have limits in your simulations?

Glaser: Nowadays, the results are very, very precise. We have customers where the development department no longer builds prototypes without getting the blessing of Ultrasim first. Over the past 25 years, our capabilities and the accuracy of our simulations have really grown tremendously. This is also due to the ever-improving computing performance: In the IT industry, it is assumed that computing power doubles every two years – this has been the case since the mid-1960s and seems to be continuing. For us, this means that in the future we will be able to calculate even extremely complex models very quickly.



About the Interviewee

Dr. Stefan Glaser studied aerospace engineering at the University of Stuttgart, Germany, and received his doctorate and habilitation in the field of structural mechanics. After joining BASF, he was leading the unit for the development of CAE methods and their application to engineering plastics at BASF SE and is now Vice President Simulation Engineering & Ultrasim.

Plastics Insights: Which addition to the Ultrasim portfolio are you currently working on – what's next?

Glaser: Two years ago, we launched “molded”, our first web-based simulation app for injection-molded parts. “molded” is part of the Ultrasim Web Services, which make our comprehensive simulation know-how easily accessible. We are currently working on further apps to offer our customers an uncomplicated entry into the Ultrasim world for other applications as well.

Plastics Insights: And topic-wise?

Glaser: Thematically, our focus is currently on the development of simulation tools for electromobility. Our materials can be found almost everywhere in electric cars, for example as a support structure in batteries – where we simulate which foam is best suited where and how. Electromobility is a strong growth market for our customers with new applications that require a lot of development work. With Ultrasim we are at their side. ■

Interview: Dr. Clemens Doriát, editor