Press Information

Blueprint for automated product development

EDAG Group and Elise GmbH start "generative engineering" cooperation

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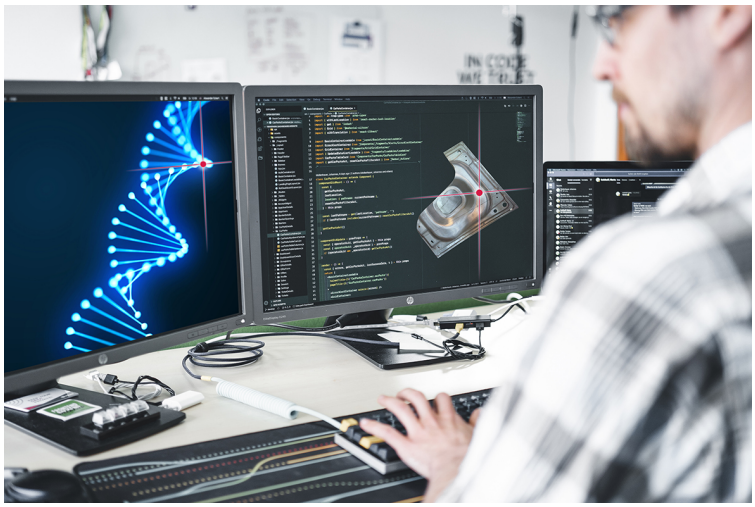
New materials, manufacturing methods, and trendsetting vehicle concepts are some of the innovations in the mobility industry that are generally in the spotlight. But the engineering process itself also offers enormous potential for innovation, to enable products to be developed with greater efficiency and speed in the future, and previously unthought-of solutions to be found.

Motivated by these considerations, EDAG, the world's largest independent development service provider for the automotive industry, has entered into a „generative engineering" cooperation with ELISE GmbH. ELISE, a startup company founded in 2018, has developed a software platform that automates the entire development process, from styling and design to simulation.

Thanks to the profound engineering expertise of the EDAG Group, this new dimension of product development is to be taken to a practice-oriented level.



The basic, revolutionary thinking behind the software is the definition of a technical DNA. As in nature, this DNA contains the blueprint for the ensuing development process. This calls for a rethink: instead of concentrating on the component itself, as was previously the case, engineers define a set of rules for the product, along with basic conditions. This concept features a completely new development process for components and the software tools used. All previously necessary process steps, such as simulations and CAD design and the associated software, must be integrated into the technical DNA and run through automatically (see Fig. 1).

EDAG uses the ELISE software to set up the entire development process in a continuous and automated workflow. It is therefore no longer the component itself, but the path to the component that is created in the software.

Once the construction principle, also called the DNA, has been defined, the workflow can be run through as often as required, while the basic conditions can be adjusted again and again. In this way, for instance, the developer can specify different loads, manufacturing processes or materials, and will automatically obtain a component that adjusts precisely to these conditions. This means that, instead of having to individually design each part, the engineer will in the future design only the DNA. This blueprint can be implanted into various vehicles, and a component adapted to its environment developed.

This method is revolutionising today's sequential development process. To date, designers, CAD engineers, simulation engineers and production planners have had to manually import changes to basic conditions into their particular tools: a process that involves a great deal of time and effort.
Using generative engineering, these iteration loops can be automated, making them significantly more efficient. This innovative technology can be used not only for additive production methods, but also for traditional processes such as die-casting.

In the "VariKa" research project, for example, generative engineering enabled up to 50 % of the development time for additively manufactured battery nodes to be saved. The result was also 40 % lighter than it would have been using the conventional development process. In a different project, furthermore, the concept design with an optimised ribbed structure for a die-cast strut brace was automatically generated (see Fig. 2). Due to the fact that the development steps are continuously mapped in ELISE, the process can be run through automatically whenever basic conditions are changed. An important element here was the automatic transfer of the topology optimisation results to a parametric CAD model using the skeleton algorithm.

To enable the field of application to be expanded and the method to be established with EDAG customers in the future, FEYNSINN, an EDAG Group brand, is working with connected engineering to interconnect ELISE and third party applications, for instance existing CAD systems.

"For the EDAG Group, I see enormous potential for further accelerating the efficiency of the product development process by means of this new engineering concept," explains Sebastian Flügel, EDAG project leader at the department for Innovation.

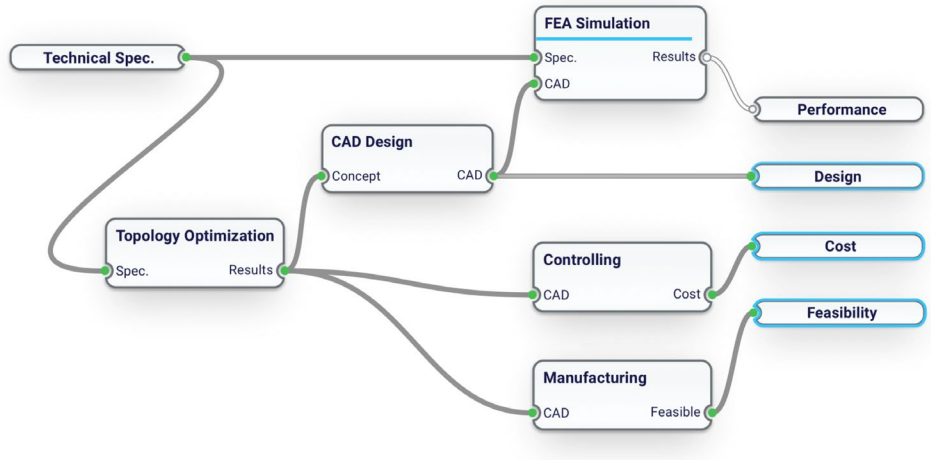


Fig. 1: The principle of technical DNA in ELISE

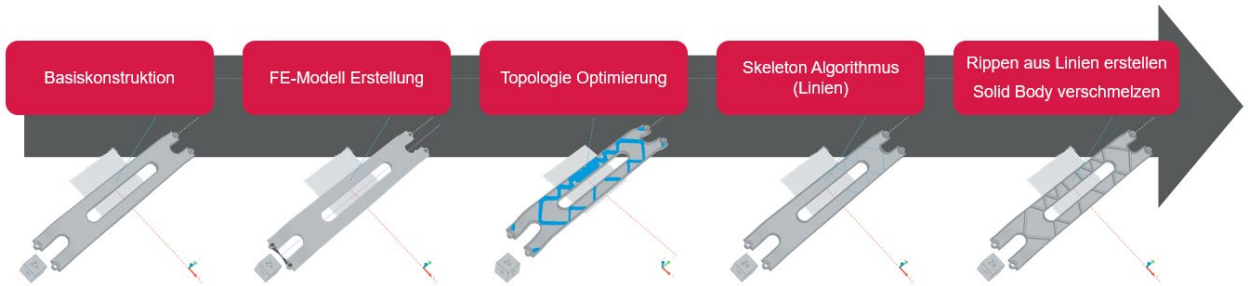


Fig. 2: Automated generation of an optimised ribbed structure for a strut brace

ABOUT EDAG
EDAG is an independent engineering service provider working for the global automotive industry. The company has a global network of some 60 branches at the world's major automobile centres to serve leading national and international vehicle manufacturers and technologically discerning automotive suppliers.
In addition, EDAG also offers engineering services in the Vehicle Engineering, Electrics/Electronics and Production Solutions segments. FEYNSINN, an EDAG Group brand, optimises IT-assisted processes.

This extensive competence enables EDAG to provide its customers with all-round support, from the original idea to design, through to product development, prototype construction and even turn-key production systems. As an innovative technological leader, the company also has competence centres for ground-breaking future technologies for the automotive industry: lightweight design, eMobility, digitalisation, integral safety, cyber security and new production technologies.

About ELISE
ELISE, a spin-off of the Alfred-Wegener Institute (AWI), was founded in Bremerhaven in 2018. Its investors include BMW i Ventures. ELISE today has its head office in Bremen. The company's more than 25 employees have developed an open software platform for technical product development, which has demonstrated their superiority in numerous practical tests with companies like BMW, the Ariane Group, Volkswagen and EDAG.

Do you have any questions, or need further information?
I look forward to hearing from you:

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