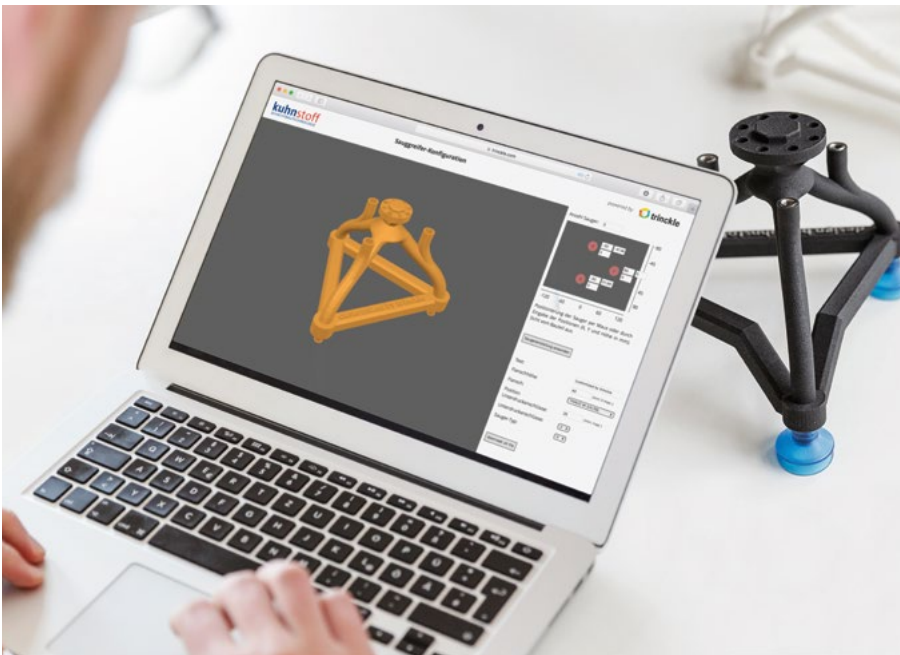


Industrial 3D Printing Enables New Business Potentials with Individualized and Automated Processes

Source: trinckle



trinckle's configurator with a
customized gripping system

Challenge

Automate the complex task of product design for additively manufactured parts.

Solution

A web-based software configurator enables individualized product models to be automatically generated.

Results

Design time reduced from over 8 hours to just 10 minutes

Perfect, application-specific mechanical fit

Eliminate the need for CAD expertise

Gaining a Competitive Advantage by Solving the Challenges of Custom Design

Additive manufacturing (AM) has now graduated to the stage of industrial production, offering a spectrum of exciting new opportunities to both enterprises and end-users. Kuhn-Stoff has impressively highlighted this potential by creating a specialized gripper. Constructed with EOS technology, this gripper has immense advantages over conventional grippers: an 86 % weight reduction achieved by eliminating 19 of 21 parts, reducing the production time from 21 days down to just 4, as well as cost savings of 50 %. These figures illustrate the successful combination of AM and customization that is acting as a beacon to other industries. Now trinckle and Kuhn-Stoff have partnered together to create a software-based configurator that automates the complex task of product design for additively manufactured parts, reducing design time and costs and lowering the entrance barrier of AM for businesses.

Challenge

Today, customization has become essential for companies to stay competitive, and industrial 3D printing offers a manufacturing technology that is perfectly suited to such individualized products. Ultimately, this creates new business potentials and competitive advantages for companies, elevating their position on the value chain. However, the major challenge for companies lies in integrating AM into their business. Once a company recognizes the need for individualization, it needs to acquire the right technology to assure serial production of high-quality AM parts - no matter the size or geometry of these parts, or any number of other variations - which is where EOS comes into play. But, long before the production of customer-specific components can actually take place,

an intelligent design that leverages all the advantages of additive manufacturing is necessary. This is often a complex process and represents a common obstacle that many businesses struggle to overcome. The design process requires many hours of engineering work in several iterations. No matter who performs this specific task - the vendor or the customer - it is tremendously time and cost-intensive. Plus, the necessary design and CAD know-how is often simply not available. trinckle and Kuhn-Stoff took the example of gripper systems and partnered together to solve the problem of automating efficient development and design processes while also eliminating the need for specific 3D design or CAD knowledge.



Short Profile

The Berlin-based company trinckle develops software for the age of additive manufacturing. trinckle's core offering, paramate, automates design processes and provides a platform for advanced product configuration. Paramate enables customer-specific adaptations of any product - whether it be prostheses tailored to the patient, mechanically optimized industrial components like end-of-arm grippers, low-volume jigs and fixtures or personalized lifestyle products.

Further information
www.trinckle.com

Founded in 2005, Kuhn-Stoff quickly established itself as a leading fulfillment provider for custom laser-sintered products. Kuhn-Stoff supports its clients throughout the entire additive production process: from development and construction optimization, to fast and precise production, and even in-house finishing. Kuhn-Stoff is a member of the exclusive EOS Partner Network.

Further information
www.kuhn-stoff.de

Customer-specific gripping system
manufactured with an EOS P 396.
(Source: trinckle)

Solution

The solution is a web-based application that enables individualized product models to be automatically generated. The automation and robotics industry is just one of many possible applications. Other examples include patient-specific prosthetics and personalized jewelry. In automation and robotics, standardized components such as robotic arms meet tools such as gripping systems, which are tailored to each workpiece that has to be moved. "Custom robotic grippers pose a considerable design challenge, and our software platform, paramate, is the perfect tool for solving this challenge. With it, we were able to develop a configurator to automate complex design tasks with relative ease," says Dr. Bröker. The software on which the configurator is based uses parametric design methods. First, a 3D model is mathematically described with rules and limitations that guarantee the functionality of the model and ensure manufacturability. The integral basic structure of the model remains the same. Finally, the product is adapted to each specific application simply by changing individual parameters. These changes might involve relatively simple parameters such as the wall thickness or the scale. However, more complex manipulations are also possible, such as changes to the surface structure or the number of cogs on a gear wheel. To automatically generate the Kuhn gripper, the algorithm has to perform various complex tasks: automatically position the gripping points, find the ideal balance between rigidity and lightweight design, and, most importantly, automatically generate integrated air channels within the structure of the pneumatically powered gripping systems. This interplay of complex factors is precisely what makes traditional, manual design so time-consuming and hence cost-intensive. trinckle's gripper configurator is based on an optimized and tested standard gripper design provided by Kuhn-Stoff, which is manufactured in series using EOS additive manufacturing technology. "Without

a reliable high-quality 3D printing system for serial production, the full potential of customized AM parts cannot be utilized," explains Hannes Kuhn, CEO of Kuhn-Stoff.

Results

With trinckle's software platform, paramate, users can now quickly develop configurators for specific applications without needing CAD expertise themselves. They simply enter a series of parameters into an intuitive user interface to modify the product model to their requirements. In the case of gripper systems, this includes the number and positioning of the gripping points on the component, or the intended load capacity. "We expect the gripper configurator to provide customers without any profound CAD knowledge with access to additively manufactured tools. This is for example relevant in the field of plant engineering when products need to be converted promptly," says the managing director of Kuhn-Stoff. He further expects that "the average design time for a custom gripper will be reduced from around eight hours to a few minutes." This significantly reduces the overall production time. These time savings naturally translate to savings in design costs. But beyond just savings, automating the design process removes barriers from the production process entirely. Christian Waizenegger, Business Development Manager at EOS empha-

sizes the positive impact on the AM ecosystem. "We at EOS see customers producing, for example, robotic grippers that are lightweight, durable, but which nonetheless outperform grippers made by conventional means. However, many customers struggle with the manual design workload of such customer-specific components. The gripper configurator is the missing link that brings everything together, and can serve as inspiration for countless other industrial applications." Eliminating the need for specific 3D design or CAD knowledge marks important progress in product design and represents a way to improve the accessibility of industrial 3D printing for businesses. Existing internal processes can thus be radically streamlined and made more efficient. Valuable differentiation options will become available for products that until now have only been offered in standardized form. Such products are increasingly being perceived as interchangeable in the context of global competition. Dr. Bröker, Head of Business Development at trinckle, explains the impact of solution chains with customer-oriented software and additive manufacturing: "For many companies, this creates new, scalable business potentials and markets. Suppliers of grippers for example are now able to offer custom-made gripping systems paired with cost efficiency with an extremely short time-to-market solution. This adds a decisive competitive advantage."

"In industrial contexts we see an enormous potential for individualized solutions to create perfectly customized products, to develop the ability to integrate clients more deeply into the development and design process, and to design cost-efficient automated processes. Additive manufacturing offers all of these possibilities - at trinckle, we want to make them usable for businesses."

Dr. Ole Bröker,
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