

Life sciences · Aerospace

icotec

Developing innovative parts using unique material

Products

NX, Teamcenter

Business challenges

Develop innovative products faster

Deliver products and tool systems simultaneously

Achieve highest quality and reliability per project requirements

Comply with comprehensive requirements pertaining to quality testing, documentation and traceability

Develop part tools quickly

Keys to success

Design products faster by using a high-performance 3D CAD system – NX with synchronous technology

Ensure an optimal PLM approach by managing data via single source of structured product and process information – Teamcenter with unified architecture

PLM system facilitates product and process definition, complying with strictest approval requirements

High-tech material – light and resilient

In 2000, icotec AG (icotec), located in Altstätten, St. Gallen, emerged as spin-off of the Eidgenössische Technische Hochschule (ETH) Zurich after conducting research projects on biocompatible materials and constructions.

The company's initial task involved developing industrial applications for an innovative composite flow molding (CFM) method using basis material, a fiber composite compiled from high-tech plastics

strengthened with more than 50 percent carbon- or glass-continuous fibers. The material weighs about a fifth of steel, a third of titanium and approximately half of aluminum. With it, highly resilient products can be made. They are corrosive-free, can be electrical and thermal isolating, and do not cause any signal errors. That is very important for medical implants, with the need for X-ray images to remain distortion-free and accurate. Biocompatibility, fatigue strength and long durability are also key elements of the new material. In aggregate, the material possessed a unique combination of strengths.

icotec now processes this distinctive material in a specially developed flowing-pressing method via simultaneous heat



Results

Highly efficient product development

Compliance with highest standards for quality and traceability

Better test results with accompanying finite element modeling calculations

Significantly improved use of existing product knowledge for new applications

Greater product innovation

application using a modified injection molding process.

Comprehensive CAD solution required

To improve its development process, the young company examined promising technology applications across numerous industries. "In doing so, we came into contact with all of the leading 3D systems," says Ramon Hüppi, project manager at icotec. "3D models had to be created for the company's first analyses. Sometimes complex free-form surfaces had to be developed, calculated and effectively communicated. Only a high-performance, top-notch 3D system could fulfill the varied requirements across the necessary fields that we required for success. In addition, for every safeguarded part, a manufacturing tool had to be developed using efficient inlay techniques."

All these tasks were initially addressed with Siemens PLM Software's I-deas™ software. I-deas was ultimately packaged with Unigraphics® software, also from Siemens PLM Software, to create NX™ software. Today, icotec not only uses NX, but also Siemens PLM Software's Teamcenter® software for product data management, which enables the company to focus on two particularly demanding domains. Roger Stadler, managing director of icotec, explains, "After having done experiments and prototypes across a num-

ber of prospective fields of opportunity, we now concentrate our efforts on life sciences and civil and military aviation."

More possibilities with NX and its synchronous technology

icotec is now optimizing existing parts, such as rotor fastening screws for helicopters and retaining brackets for airplane luggage racks, using the new, innovative composite material. The material will be used in parts for subsequent versions of the aircraft. Therefore, project engineers are working to meet strict guidelines regarding form, function, resilience and durability, including optimizing weight.

icotec also develops entirely unique products in cooperation with leading scientists. For example, the company is collaborating on the ETurn spine implant, a medical sciences breakthrough to replace damaged spinal discs.

After creating the first designs using NX and preparing static-mechanical calculations with the Ansys Workbench platform using STL file format data, icotec quickly delivered prototypes (using the laser sintering method) for an evaluation by the surgical team. Concurrently, surgical operating tools were designed. "Due to the synchronous technology of NX, we have more possibilities to move surfaces and to define manufacturing-ready roundings,"

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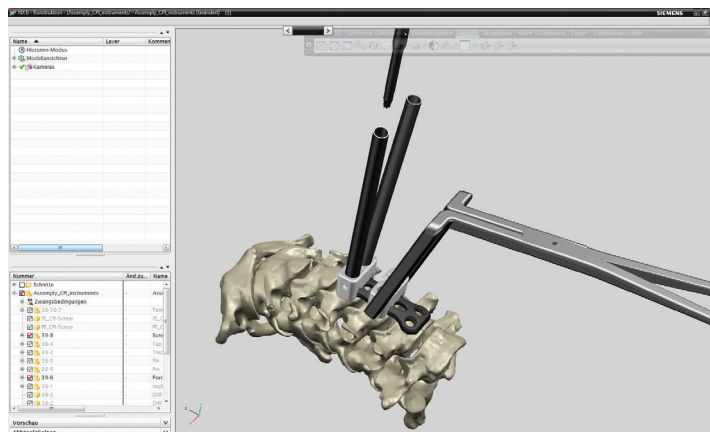
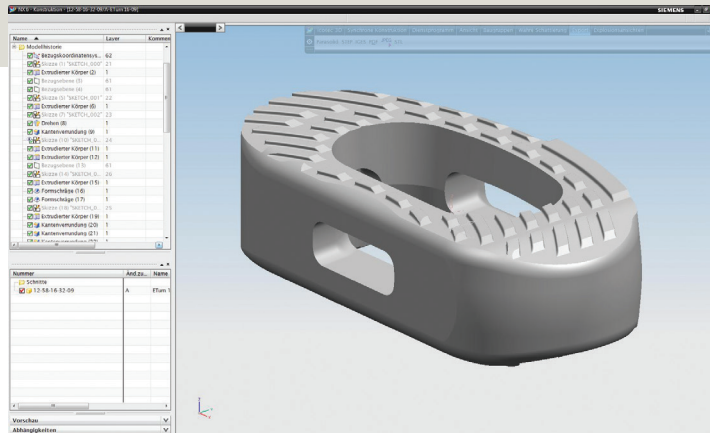
Ramon Hüppi
Project Manager
icotec

says Hüppi. For example, different sizes and modifications for the cervical spine quickly resulted in a large product family. The tool design team compensates for this variety using an efficient inlay technique. Hüppi explains, "For tool manufacturing, we send a Parasolid file to our service provider, who uses it as starting point for the programming." (Note: Siemens PLM Software's Parasolid® software is the world's leading production-proven 3D geometric modeling component software, providing core functionality that enables users of products based on Parasolid to rapidly and robustly model the industry's most complex products.)

Once the first genuine samples are made using one of icotec's two CFM machines, the approval tests can be conducted. Static and dynamic tests as well as studies under compression, torsion or shear are performed by external test laboratories in up to five million cycles. Changes are done very quickly using synchronous technology, even for the migrated I-deas data that lacks history information. "With the upgrade of our CAD system, we significantly increased efficiency in addressing each new product development challenge," says Stadler. Hüppi is especially happy about the new capabilities of NX that guide the user and its full screen mode: "Now, some tasks can be finished within two seconds. The more you work with it, the faster you find a solution."

Easing compliance across products and processes with Teamcenter

New products for aviation and life sciences must comply with the strictest development and approval standards, sometimes involving processes that can take years. For series production, comprehensive requirements pertaining to quality testing, documentation and traceability for every single part must be fulfilled. To address the highly specific tasks of compliance, icotec often uses Teamcenter. With its unified architecture, Teamcenter is considered by icotec representatives to be the most



powerful product data management (PDM) system available.

At icotec, Teamcenter handles all aspects of part management. This includes controlled check-in and check-out directly in the CAD system and searching for precursors, revision status and similar projects, as well as handling a comprehensive and daily drawing management process for the development team. "With Teamcenter, we prepared ourselves for the growth of our company," says Stadler. "And yet, we have not exploited all possibilities of the system." In the future, the company plans to use special Teamcenter capabilities to support the approval processes for the American Food and Drug Administration (FDA). In addition, the company plans to start leveraging the powerful data organization functionality of Teamcenter to streamline the management of more than 30 years of aircraft spare part inventories and warranty obligations.

Solutions/Services

NX

www.siemens.com/nx

Teamcenter

www.siemens.com/teamcenter

Parasolid

www.siemens.com/plmcomponents

Customer's primary business

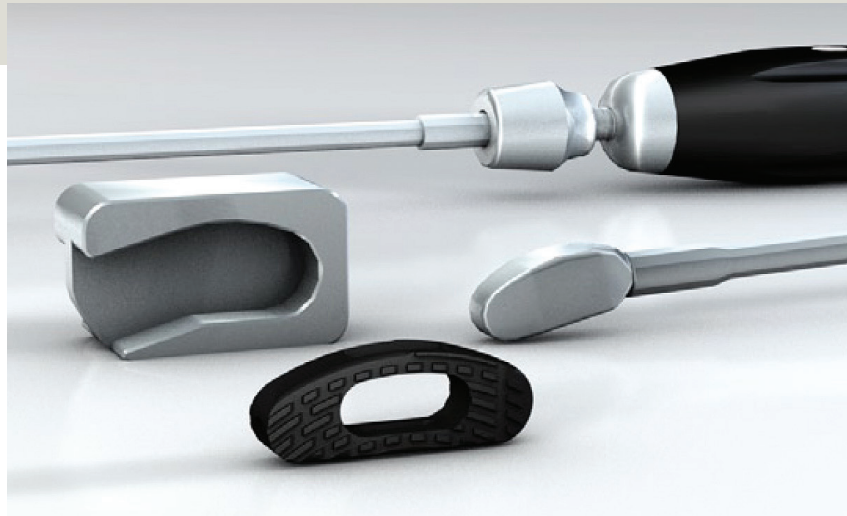
icotec AG develops and produces innovative products for aviation and life sciences using a new composite flow molding technique.
www.icotec.ch

Customer location

Altstätten
Switzerland

Partner

avasis AG



The high value of consulting

Markus Frei, managing director of avasis AG, an authorized partner of Siemens PLM Software, notes that his company is committed to the highest quality service. According to Stadler, avasis is meeting or exceeding requirements: "We rely on professional consulting along all developing processes of our product range. After all, we want to get better every day. So far, not only all pending questions have been answered and with great clarity, but avasis has helped us to prepare for the future."

The power of Siemens PLM Software's technology combined with the exceptional service of avasis is making a difference at icotec. Hüppi notes, "We are proud to deliver state-of-the-art innovations in our products and services. Due to NX and Teamcenter, icotec's developers have more time for creativity. When we have specific questions to our applications, the cooperation with avasis is excellent."

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Ramon Hüppi
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