Compositex Transforms its Composite Production With FDM Additive Manufacturing

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Gabriele Fanton, Business Unit Manager
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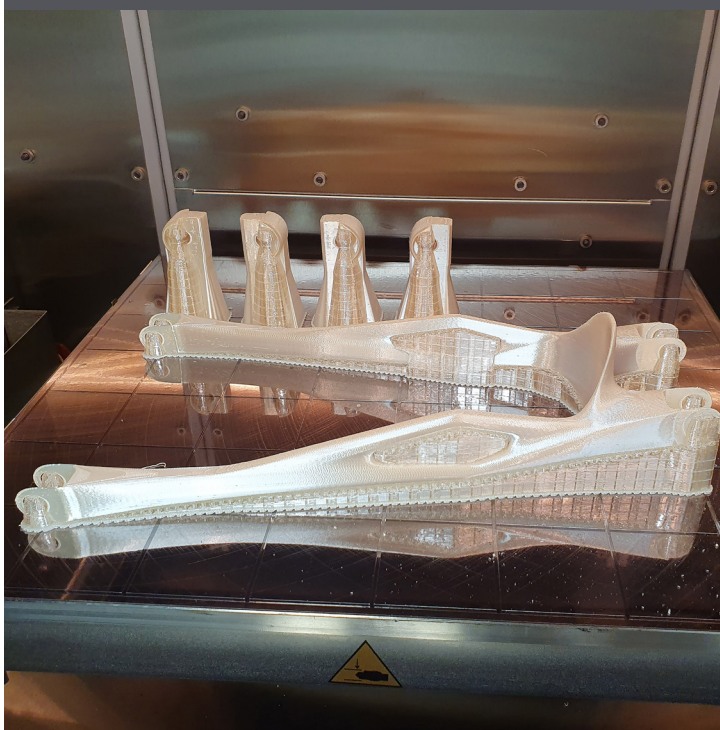

Case Study

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Continuous Innovation with a Customized Approach

Founded in 1986 in Vicenza, Italy, Compositex specializes in the development and manufacture of structural composite components. An established supplier to the aerospace and motorsport industries, the company has built a strong reputation for its ability to design, develop and deliver tailored solutions. Leveraging its 30-year expertise and in-house cutting-edge technologies, Compositex provides its clients with full-service design and manufacturing capabilities ranging from project design to the manufacture of models and molds.

"Continuous innovation and a customized approach to our service offering have always been central to our company's vision and strategy," said Gabriele Fanton, business unit manager at Compositex. "Each of our clients comes to us with different yet demanding manufacturing requirements, so it's vital we deploy the most advanced technologies available to ensure we effectively fulfill their needs."

To address ever-changing industry demands and maintain its competitive edge, Compositex invests significant resources to enhance its production equipment and support R&D. This has established the company as an international leader in prepreg technology for composite production. However, to meet high customer expectations in a more cost- and time-effective way, Compositex turned to additive manufacturing to strengthen its production capability.

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Gabriele Fanton, Business Unit Manager
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The Fortus 450mc 3D printer at Compositex's production facility.

Reinventing Traditional Composite Production With Additive Manufacturing

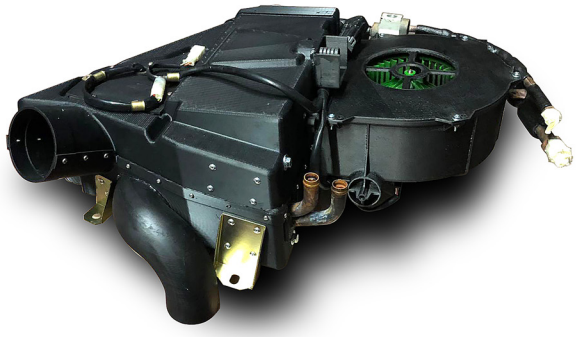
Having explored a number of 3D printing technologies, Compositex approached Stratasys local partner, Technimold, to purchase a Fortus 450mc™, an industrial-grade FDM® 3D printer designed to produce complex parts using high-performance materials. The printer's capabilities made an immediate impression, particularly in the area of composite tooling. The company now 3D prints a range of composite tools, such as lay-ups, inserts and mandrels, all key components of traditional prepreg production. Manufacturing these tools in-house lets Compositex eliminate costly outsourcing, while significantly reducing production lead times. More importantly, since using FDM technology for composite tool production, Compositex has achieved higher-quality results.

"We are currently producing water-soluble mandrels 3D printed in ST-130™ material and the results are outstanding," explained Fanton. "For example, in order to manufacture a drone duct for one of our established customers, we were able to use just one 3D printed water-soluble mandrel to complete production. To put this into context, with conventional composite tooling the creation of four female molds would have been required, as well as additional milling and finishing operations. Not only did we halve the production time and save around 20% in costs, but we were also able to fully satisfy the customer's expectations in terms of the finishing of the internal side of the duct."

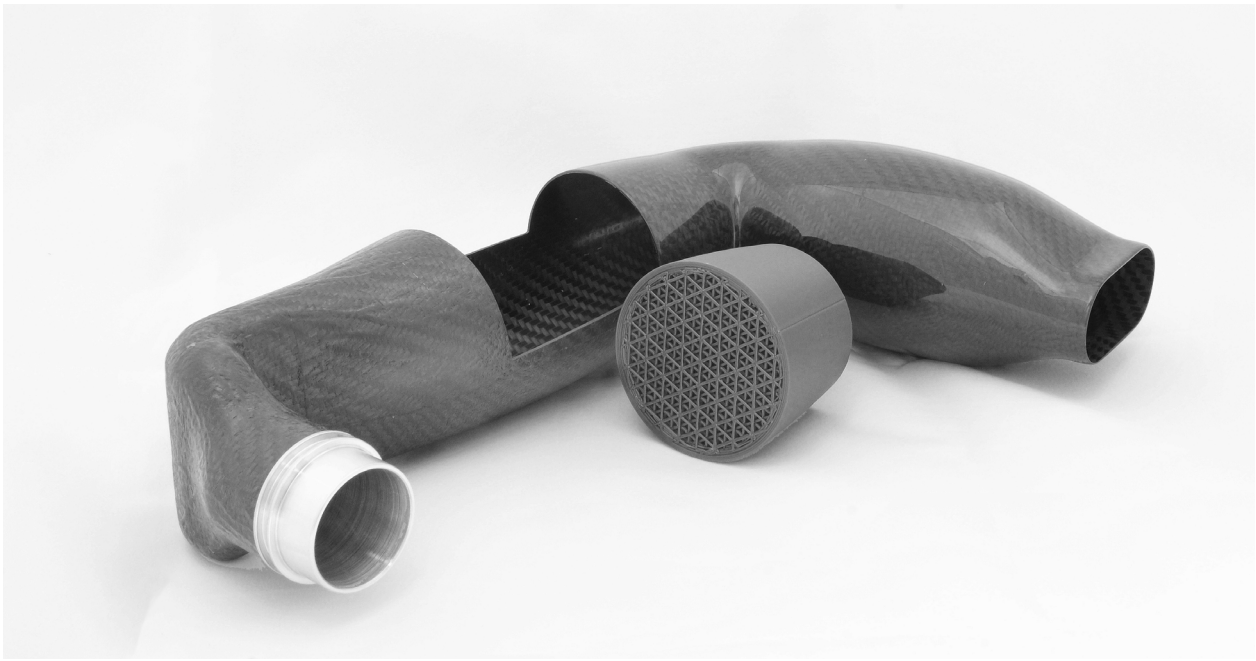
Compositex is also using the Fortus 450mc to 3D print customized parts. These include aesthetic components and structural parts that would simply be too complex or cost-prohibitive to produce using conventional methods, such as the exterior body of remote-controlled aircraft and drones, automotive air ducts, and motorcycle handgrips. Use of the Fortus 450mc and its high-performance materials, such as ULTEM™ 9085 resin and FDM Nylon 12CF™, has been crucial for the company in expanding its services to meet the needs of a more diversified customer base.

"Stratasys FDM additive manufacturing ensures we can quickly and cost-effectively produce certain final parts, which means we can now respond to customer requests that we could not fulfill before," said Fanton. "We were asked to produce an air conditioning duct for a historic supercar which is no longer in production. We reverse-engineered the original duct and then 3D printed the part using carbon fiber-reinforced FDM Nylon 12CF for the structural components and ASA material for non-structural elements. The result was exceptional, far beyond our — and our customer's — initial expectations. In fact, producing this obsolete part with traditional manufacturing would have been impossible."

Obsolete air conditioning duct for historic supercar that needed replacing.



Final air conditioning unit for the historic supercar, featuring the 3D printed air duct produced in Nylon 12CF and ASA materials.



This complex hollow composite part was made using an ST-130 3D printed mandrel (part of which is shown in the foreground) which halved production time and saved 20% in cost.

Building Upon Success, Layer-by-Layer

Compositex's Fortus 450mc runs 24/7 and those in charge of the 3D printing department are keen on testing new production applications. The team is also exploiting the features of GrabCAD Print™ software to further streamline workflow during design and development.

"The Fortus 450mc has changed our approach to business and we fully intend on continuing to push the boundaries of composite production with this technology," explained Fanton. "In fact, when it comes to finding manufacturing solutions for our customers, we feel the only limit is our imagination. Unlike other 3D printers we've tried, the Fortus 450mc is suitable for the most-demanding production applications, while the level of reliability and repeatability it provides is essential for occasions where we try and test unexplored solutions."

Fanton concluded: "There is no going back. Working closely together with Technimold, we have been able to learn how to fully streamline and optimize use of the technology. Gaining this knowledge and having the local support has been essential in identifying new applications that can be enhanced with additive manufacturing. We very much see this technology as an important part of future production and a key driver for us in attracting new business opportunities."

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