



3D printed internal door handle for a helicopter, produced in ULTEM™ 9085 resin on the Stratasys F900™ Production 3D printer.

Game-Changing Capability

Plyform Composites s.r.l Uses 3D Printing to Raise the Bar for Aerospace Production

The Need for Both Speed and Quality

Based in Varallo Pombia, Italy, Plyform s.r.l is an expert when it comes to utilizing advanced composite materials to manufacture parts for industrial applications. The company operates across a range of industrial sectors, with a particular expertise in aerospace. In fact, Plyform is one of the main suppliers of aerostructures in Italy with a reputation for high-quality manufacture of complex composite structures.

As part of its continual drive to increase customer responsiveness, Plyform needed a production solution that would reduce time and costs while allowing Plyform to maintain its spirit of innovation. “With traditional composite production, the challenge is always lead times, cost-effectiveness, and in many cases, the quality of the final composite part,” explained Luca Ceriani, Plyform Head of Manufacturing Engineering.

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Luca Ceriani

Head of Manufacturing Engineering, Plyform



3D Printing Makes a Positive Impact

After exploring a number of industrial-grade additive manufacturing solutions to meet its goals, Plyform saw the benefits of using 3D printing with industrial-grade additives. The company selected Stratasys' FDM®-based F900™ 3D printer. Using the F900, Plyform is using 3D printed composite tools to produce a wide range of high-quality carbon-fiber parts for helicopters, significantly faster than using aluminum tools and at a fraction of the cost. This is exemplified when producing the pilot's cyclic stick. The company 3D prints a mold tool in a high-performance soluble material, ST-130. The carbon fiber composite material is then wrapped around the mold, and once cured, the internal sacrificial core is washed away leaving the final composite part.

"To produce the composite tool for a helicopter's pilot stick, traditionally we would need four hours to mill the tool and another four hours to give it an external treatment to avoid resin contamination," noted Ceriani. With Stratasys FDM Technology™, we can 3D print a tool in just two-and-a-half hours and at 80% reduced cost. In addition, I estimate that, using this technique, the quality of the part has improved by 30%. This is a game-changer for our business."



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Luca Ceriani

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Pilot's cyclic stick final composite part produced in half the time and with a reduced cost of 80% compared to traditional manufacturing.



Carbon fiber mandrel for a helicopter cyclic stick produced using a 3D printed composite tool. Plyform reports 30% increase in part quality versus traditional composite production.

Expanded Capabilities and Services

The results were so positive that Plyform now uses the F900 across its entire production process, from composite tooling to final part production. With more customers seeking low volumes of final aircraft parts in short lead times, Plyform is also utilizing the F900 to extend its service offering to customers.

Due to stringent certification required in the aerospace industry, the company leverages Stratasys' aerospace-grade ULTEM™ 9085 resin to 3D print flight-ready parts with the desired flame, smoke and toxicity requirements for use on aircraft. "Additive manufacturing enables us to overcome the time and cost limitations of traditional low-volume production for aerospace, but there are strict rules and regulations around certification that require the highest level of repeatability and traceability with every part manufactured," said Ceriani. "The F900 offers the

best precision and repeatability of all additive manufacturing technologies we've tried, while the ULTEM™ 9085 resin is ideal for the aerospace industry as it's FST compliant and offers high chemical and thermal resistance. Having access to this technology enables us to bypass the traditional tooling process and 3D print lightweight parts for our customers on demand at a much lower cost."

The future looks bright. Leveraging the F900's large build plate, Plyform is able to produce complex geometries, down to the smallest millimeter or large-scale parts, that might not be possible using subtractive production processes. Through the 3D printer's capabilities and additive manufacturing, Plyform is well positioned to meet its need and the needs of its customers for a long time.



Stratasys Headquarters

7665 Commerce Way,
Eden Prairie, MN 55344 USA
+1 952 937 3000 (international)
+1 952 937 0070 (Fax)

1 Holtzman St., Science Park, PO Box 2496
Rehovot 76124, Israel
+972 74 745 4000
+972 74 745 5000 (Fax)

stratasys.com
ISO 9001:2008 Certified

Stratasys GmbH
Airport Boulevard B120
77836 Rheinmünster, Germany
+49 7229 7772-0
+49 7229 7772-990 (Fax)

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