



JSF F35A FULL-SCALE MOCK-UP BUILT BY DCU, INC.

CHALLENGE:

Complex and highly precise parts require too many man hours & cost too much money using traditional approaches.

SOLUTION:

Stratasys FDM 3D printing solutions from GoEngineer.

RESULTS:

Complex parts that formerly required several days to create are now 3D printed overnight while maintaining the highest levels of detail & accuracy.

DCU FLIES HIGHER WITH STRATASYS 3D PRINTING SOLUTIONS FROM GOENGINEER

Diving, Models and the Movies

Mark Hambelton, owner of DCU in Wylie, Texas, started out making radio-controlled airplane models as a hobby to fill large gaps of time while employed as an underwater inspection diver. "We were offshore thirty days and onshore thirty days," Hambelton recalls. "I started designing, flying, and selling model airplanes in my spare time." Eventually the model airplane business got so big that he quit diving.

As DCU became better known for creating amazingly accurate, true-to-life models, it landed contracts creating aircraft models for Paramount Pictures, including the films *Flight of the Intruder* and *Die Hard*. "We built A-6 Intruders, and did all the composite work and all the tooling. We built two MiG-17s for *Flight of the Intruder*. We built molds, helicopter bodies, and helicopters for *Die Hard*."

Hambelton says that some of the models took 200 man hours to create (before 3D printing), only to be blown to bits on the set. "The first one hurt," Hambelton says with a laugh. "But it got easier, and that's what we were getting paid for!"

Opportunity Knocks

Hambelton was introduced to a few guys from the Lockheed Martin model shop by a friend and fellow model airplane hobbyist. That casual meeting led to a couple of small jobs from the giant aerospace manufacturer. DCU created 1:20 scale models of

F-22s and other ordnance-related models. These were not models you find at a typical hobby shop; they were excruciatingly accurate—down to the finest details.

Those first projects with Lockheed Martin turned into more work and, eventually, a growing expertise in aerospace and ordnance models. Today DCU serves many of the largest aerospace companies in the world. Many of its models are used as training aides for the military. Others are used for proof of concept, as-built, or engineering studies.

3D Printing Changes the Game

A mechanical engineer and pattern-maker by trade, Hambelton prides himself on craftsmanship, but as a savvy business owner, he also does whatever it takes to save his customers time and money. At DCU's first opportunity, the company invested in CNC machines to improve accuracy and decrease turnaround times. When 3D printing became a viable technology for manufacturing, Hambelton was quickly doing his homework on what kinds of benefits 3D printing might bring to his company.

"I'm a huge research buff," says Hambelton. So I thoroughly researched 3D printers and materials." Fused deposition modeling (FDM), selective laser sintering (SLS), and stereolithography were among the technologies considered.

“3D printing has truly changed the way we do business.”

– MARK HAMBELTON, President, DCU, Inc

Hambelton decided on Stratasys' Fused Deposition Modeling (FDM) technology. “The ABSplus is absolutely perfect for what we do,” says Hambelton. “It doesn't shrink. It takes primer. You can glue to it. And, I love that the ABSplus material is packaged in a sealed container. When it runs out, you simply insert a new cassette and continue growing the part.”

DCU purchased the printers and maintenance contract from GoEngineer, a local reseller of Stratasys 3D printers. “The maintenance is a good deal,” reports Hambelton. “The technicians from GoEngineer come out annually to perform maintenance on all my printers. For most 3D printing issues, I simply make a phone call and GoEngineer solves the problem right there on the telephone.”

Hambelton believes that 3D printing is a game-changer for DCU. “We recently completed a highly detailed cutaway model of an explosive device. It had 52 internal parts,” says Hambelton. “Every part was painted a different color. I am not even sure I could do some of these jobs without a 3D printer.” The 3D printers often enable DCU to do more complex jobs faster and cheaper while maintaining or even exceeding quality expectations.

Tough Projects Made Easier

Depending on the size of the original, DCU clients typically start with full-scale models: “We'll do the main body, the large parts, out of fiberglass—but everything else is made of the ABS-plus material.” DCU customers often return within a couple months for 1:3 or 1:4 scale sizes that serve as show pieces on office desks or for tradeshow. The smaller-scale versions are mostly comprised of 3D-printed parts from FDM machines.

Right now DCU is making two 1:10 scale tilt rotors for a new Bell helicopter. Hambelton continues: “I bet there are 20 parts on the wings that are comprised of FDM parts that would have been a nightmare to make by hand; they would have taken countless hours. With FDM, I produce the parts overnight. I don't have to mess with molds or tooling or putting blocks together.”

“Before 3D printers we had to build every little bump, or fitting, or whatever—completely by hand, which was very time consuming and costly,” says Hambelton. “Today there isn't a product we make that doesn't have an FDM part in it somewhere. And, jobs go through a lot smoother and faster than with traditional methods—3D printing has truly changed the way we do business.”



Pratt Whitney F135 full-scale engine mock-up used to validate fit and clearance. Majority parts produced on Stratasys FDM machines.



Model of Lockheed Martin C-130. The scoops on its wings and details on fuselage comprised of 3D printed parts.



Model of Bell AV280. All fairings, weapons, and blisters on the fuselage were created with Stratasys 3D printers.



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GoEngineer is a provider of powerful product design and engineering tools including support and training for SOLIDWORKS, Stratasys, CAMWorks, Altium, and PLM with over 30 years of customer experience in high tech, medical, machine design, energy, and other industries.

DCU Inc.

DCU has been serving the aerospace, military, hobby and film industries as custom modeler and manufacturer since 1985.
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