UNIVERSITY SOLVES DESIGN DEMAND WITH FORTUS

FORTUS
3D PRODUCTION SYSTEMS

A 500% Enrollment Increase in Aerospace & Engineering Program Required Advanced 3D Production Technology

"The Fortus system offered the right balance of part functionality, material choices, and operating cost that met our needs best. We couldn't be happier with our decision."

— Stephen Collins, Prototype Development Specialist, UAH

Stephen Collins, prototype development specialist at the University of Alabama in Huntsville (UAH), had an enviable problem. Demand for his services became white hot as the number of students in the university's prestigious Department of Aerospace and Engineering skyrocketed from 200 to 1,000 over a ten-year period.

Collins oversees the university's 12,000 square foot student fabrication shop, which houses a variety of computer and manually driven equipment the students use to produce various prototypes for their own projects and those sponsored by public and private sector and partners such as NASA, the U.S. Army and BAE Systems.

Not only was the number of prototypes on the rise due to enrollment, demand for geometrically complex models – difficult and time-consuming to produce with conventional fabrication methods – was becoming increasingly common.

Collins had been familiar with 3D printing and Fused Deposition Modeling (FDM) technology since its inception and finally turned to Fortus 3D Production Systems for a solution to his output issues. "We looked at every other manufacturer and system out there. In the end, it was a no-brainer," said Collins. "We understood that this was a one-time funding opportunity and we had to get it right."

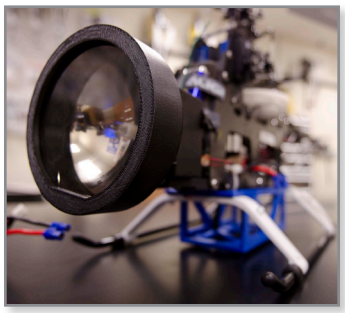
Since purchasing the Fortus 3D Production System, Collins has been thrilled with the results. "It's easy for the students to learn to use and it produces more precise, functional models at all hours of the day and night. It's the equivalent of having a second and third unmanned shift in our fabrication facility."

Student Design Flourishes with Fortus

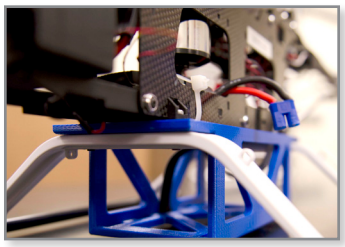
Recent student design projects have benefited greatly from the use of the Fortus 3D Production System. One such example is the University Student Launch Initiative (USLI). This NASA-sponsored international competition challenges student teams to design, build, and launch a scientific payload to a prescribed altitude. The university's team, Charger Rocket Works, is using the Fortus 3D Production System extensively in the development of the project for a few key reasons:

- **Time.** The schedule for completion is tight and the ability to quickly produce the various models at different scales with the Fortus 3D Production System has freed the team to focus on the engineering, design and scientific aspects of the process.
- **Design complexity.** The design of this year's payload is a contemporary update of the Gemini space capsule being developed to serve as a possible private crew vehicle. The team is doing basic aerodynamic testing of flight

Nosecone prototype for a rocket



Fire sensor cap for unmanned helicopter

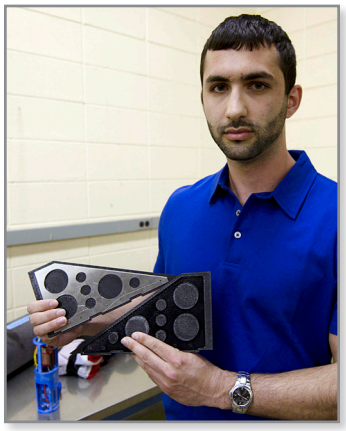


Battery undercarriage for unmanned helicopter

Various components for NASA-sponsored University Student Launch Initiative (USLI) competition

characteristics of some of the changes and additions to the original design. The model needs to be accurate to a degree not possible with traditional model rocketry fabrication methods such as injection molding. Additionally, the team is developing Fortus-built ABS fins outfitted with metal inserts to bear a much higher load than most rockets can experience.

- **Wow factor.** At a recent sub-scale launch, several participants and spectators were impressed with the students' models, calling their work "revolutionary to the way these things are done."



Reinforced rocket fins for NASA-sponsored University Student Launch Initiative (USLI) competition

Building a Bridge to Future Employers

One unintended benefit of acquiring the Fortus 3D Production System was that outside private and public sector organizations have approached the university about helping them produce prototypes. "Apparently word spread quickly when we got the machine, and people came knocking on our door long before we where prepared to do business with them," said Stephens. "We've now worked with NASA, the U.S. Army, BAE Systems and other similar organizations that prefer to remain nameless."

Huntsville students are using Fortus 3D Production Systems to help a private inventor design a fire sensor that mounts to unmanned helicopters designed to detect forest fires - and even gunshots - in remote forest regions. Another prototype built with the Fortus 3D Production System for a private party is a complex automotive mechanism with an estimated market value over $280 billion dollars.

Stephens notes that the financial benefits of these partnerships are valuable, but in terms of the student impact, he points out that not only is it a great opportunity for students to work with engineers from outside the university, it's also a valuable foot in the door for what could be a future employer.

"As word of our capabilities has traveled through the business community, the Fortus system has afforded us the opportunity to forge partnerships that would not have occurred otherwise. It allows us to support, improve and enhance the relationships we have with our students, our research and teaching faculty, and our R&D community partners." And on the performance front, Stephens concludes: "The Fortus system offers the right balance of part functionality, material choices, and operating cost that met our needs best. We couldn't be happier with our decision."

For more information about Fortus systems, materials and applications, call **888.480.3548** or visit **www.fortus.com**

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