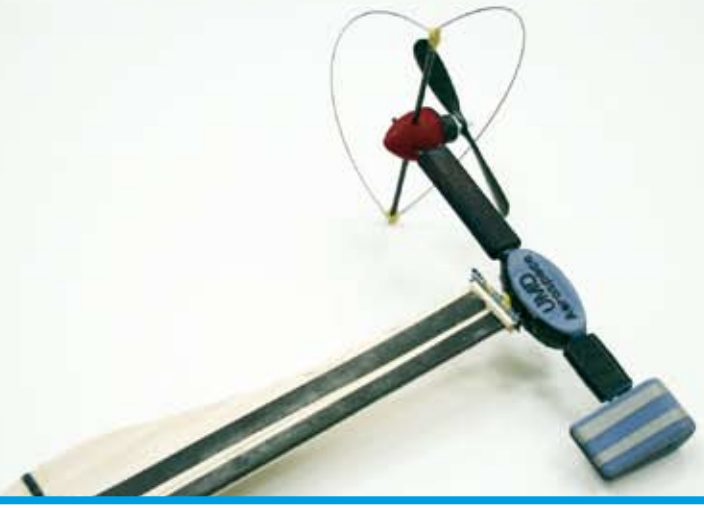
"Objet technology has substantially expanded and improved our research and testing capabilities, enabling us to achieve new discoveries and recruit the best and brightest emerging engineers"

Prof. Darryll Pines,
University of Maryland



Case Study

Using Objet 3D printing technology, University of Maryland aerospace engineers significantly enhanced the validity and productivity of research studies

At a Glance

Organization: University of Maryland A. James Clark School of Engineering, Department of Aerospace Engineering
URL: www.idgroup-inc.com
Location: College Park, Maryland, USA
Industry: Higher education

Challenges

A University of Maryland research team sought to reduce errors and costs for government-funded studies, as well as boost productivity and validity of research findings

Solution

The Eden350V™ 3D Printing System from Objet

Results

- Significantly reduced errors and costs
- Increased validity of the study's results
- Sped up the testing process by one whole year

For over 50 years, the Department of Aerospace Engineering at the University of Maryland A. James Clark School of Engineering has pioneered breakthroughs in understanding flight, exploring space and designing aerospace components, vehicles and systems. This program has earned a reputation for excellence in engineering, education and research. The school's research laboratories – focused on areas such as advanced propulsion, composites and hypersonics – are world-renowned, and among its distinguished alumni are aviation pioneer Glenn L. Martin and former U.S. National Aeronautics and Space Administration (NASA) head Michael D. Griffin.

The department has received funding from the U.S. Army for a wide range of projects including the analysis of alternate modes of flight for potential military applications. As part of their research in this area, faculty and Ph.D students frequently subject numerous identical prototypes to the same experiment over and over to increase testing validity. This requires engineers to create multiple, and often tiny, test objects with 100 percent identical characteristics.

Objet's Eden 350V™ selected as the best solution due to high resolution, accuracy and durability of models

For years the department sought the best way to produce large volumes of highly accurate testing prototypes. Recently, under the direction of Professor Darryll Pines, former department chair and now dean of the Clark School, several 3D printing technologies were explored to improve the testing process. "Objet was selected based on its exceptional resolution, accuracy and detail and durability," said Pines, who oversaw the department's acquisition of the market-leading Eden 350V™ system.

The Eden printer had an immediate, substantial impact on productivity, speeding up research and testing processes by enabling engineers to develop specimens faster and to recover more quickly from design process errors. "The Objet technology reduced the prototype development cycle by a full year and yielded a cost savings of approximately $80,000 per year. It eliminated the need to pay for homemade prototype material such as aluminum and plastics that outside vendors marked up by nearly 1,000 percent," said Evan R. Ulrich, a graduate research assistant candidate in the department. Most importantly, Objet enhanced the validity of the department's research findings by ensuring that test objects are always 100 percent identical.

OBJET

According to Ulrich, all aspects of the testing apparatus are now constructed with Objet. "There's no waiting on other people, as we can produce our models in-house at a much faster speed than ever before," he said. "This machine has fundamentally improved our overall process, completely revolutionizing our ability to do research on this scale."

Pioneering the next generation of aerospace breakthroughs

One of the university's many applications of Objet technology was in the examination and relation of how insects avoid obstacles during flight. The department employed the Eden system in the design and manufacture of the first structure used aboard small helicopters that allowed sensors to test for close obstacle avoidance. "The Objet system reduced, by months, the time it would have taken to complete this research using our prior methods," said Ulrich.

Ulrich has also seen the benefits of Objet technology in his own research activities, using Eden-generated models to study how the distinct flight patterns of winged plant seeds falling from trees might have application in unmanned vehicles. "The capabilities of such vehicles are often limited by the power required to simultaneously maintain flight and operate onboard electronics," said Ulrich, "but the flight mode exhibited by winged seeds requires little to no power. Using the Objet system he was able to quickly and cost effectively test numerous design iterations leading to the invention of the smallest controllable robotic samara to date.

In addition, Ulrich – with a team of fellow students – used the Eden to create a model for the annual Cessna/Raytheon Missile Systems Student "Design/Build/Fly" competition. Organized through the AmericanInstitute for Aeronautics and Astronautics (AIAA), the contest challenges students to design, fabricate and demonstrate the flight capabilities of an unmanned, electric powered, radio controlled aircraft. The model had a four-foot wingspan and detailed specifications for wind tunnel conditions. The Maryland team finished very high in the competition and companies that supplied the wind tunnels were so impressed that they researched the potential of Objet technologies in their own testing processes, according to Ulrich.

"Objet technology has proved itself as an asset that can help engineers and those who train them to better execute some of the most sophisticated and technical research studies in the world," said Pines. "It represents the future of aerospace studies and will surely help our best minds achieve the next generation of scientific breakthroughs."

About Objet Geometries

Objet Geometries Ltd., the innovation leader in 3D printing, develops, manufactures and globally markets ultra-thin-layer, high-resolution 3-dimensional printing systems and materials that utilize PolyJet™ polymer jetting technology, to print ultra-thin 16-micron layers.

The market-proven Eden™ line of 3D Printing Systems and the Alaris™30 3D desktop printer are based on Objet's patented office-friendly PolyJet™ Technology. The Connex™ family is based on Objet's PolyJet Matrix™ Technology, which jets multiple model materials simultaneously and creates composite Digital Materials™ on the fly. All Objet systems use Objet's FullCure® materials to create accurate, clean, smooth, and highly detailed 3D parts.

Objet's solutions enable manufacturers and industrial designers to reduce cost of product development and dramatically shorten time-to-market of new products. Objet systems are in use by world leaders in many industries, such as Education, Medical / Medical Devices & Dental, Consumer Electronics, Automotive, Toys, Consumer Goods, and Footwear industries in North America, Europe, Asia, Australia, and Japan.

Founded in 1998, Objet serves its growing worldwide customer base through offices in USA, Mexico, Europe, Japan, China and Hong Kong, and a global network of distribution partners. Objet owns more than 50 patents and patent pending inventions. Visit www.objet.com.

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