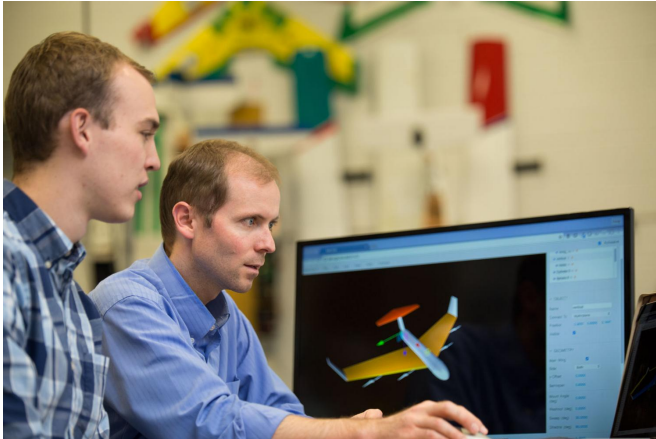


Aerospace engineer creates free 3-D aircraft design software

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USU aerospace engineering faculty Doug Hunsaker created a free aircraft design software. Credit: Utah State University

As interest in small autonomous aerial vehicles and their applications continues to expand, a Utah State University aerospace engineer is offering the public a free software tool that could revolutionize the drone industry.

Doug Hunsaker, an assistant professor of mechanical and [aerospace engineering](#) at USU, is offering a free, easy to use 3-D online software program that generates aerodynamic information about a user's [aircraft design](#). The program, called MachUp, is available at [aero.go.usu.edu](#). The web-based software operates on any browser and on any platform including smartphones and tablets. The site also features training tutorials and how-to videos.

"MachUp lets a user design an aircraft, and the software will calculate aerodynamic information about that design," said Hunsaker. "The program will generate lift, drag, stability and trim data for any design you put into it."

MachUp uses modern 3-D web graphics to render images in a browser, and does the heavy-duty aerodynamic computations on a dedicated server. The software could prove to be a valuable resource for companies developing small autonomous aircraft. Most software tools capable of calculating aerodynamic data are tied up in the major aerospace firms and are not commonly available without steep licensing fees.

"The average Joe does not have access to this kind of software," said Hunsaker. "And if they did, it would be prohibitively expensive for the average user or small startup company."

In the near future, small autonomous aircraft will play a big role in everyday life. Drones are already creating new opportunities in agriculture, research, cinematography and data delivery. Companies including Google and Facebook are exploring the use of drones to provide wireless internet coverage and, Amazon is developing drones to deliver packages. As applications expand, a variety of drones will be needed to perform a variety of tasks.

That's the heart of the problem for Hunsaker: There is no one-size-fits-all design for drones, meaning different drone models used in different applications will need to be designed from the ground up.

"For years, we've been imagining drones doing everything from delivering packages to monitoring freeway traffic and performing security functions," said Hunsaker. "But because each mission is different, each of those applications will require a unique drone that will have to be designed for safe and efficient operation. Designing any aircraft, including drones, requires sophisticated software tools and expert-level knowledge in aerodynamics and aerospace engineering."



The software is available to anyone including aerospace engineering students and drone start-up companies.
Credit: Utah State University

That's where MachUp comes in. Hunsaker said he developed MachUp with the goal of putting useful design tools into the hands of engineers at drone startup companies. Now, he wants anyone interested in fixed-wing drone design to try the software to see what it's capable of.

"It's a tool I would have used in my aircraft design courses if it had been around," he added. "This level of resource just hasn't previously been available to most designers."

Dozens of companies and aerospace engineering schools around the country have used MachUp including Embry Riddle, Virginia Tech and MIT. The software is also used by Utah State University's Aggie Air agriculture research program.

Hunsaker is a leading expert in aerodynamics and aircraft design. Before coming to USU, he worked for Scaled Composites, the California company behind the iconic SpaceShipTwo suborbital spaceplane.

Provided by Utah State University

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