Student Aircraft BUILDERS

University of Illinois

MISSION

Student Aircraft Builders is a team of students from the University of Illinois dedicated to constructing a Zenith CH-750 kit aircraft for completion in early 2014. Construction is under way at Willard Airport in Champaign, but the scope of the organization's efforts extends far beyond the hangar. Not only are some undergraduates modeling our plane in NX and ProEngineer, but others are reaching out to local schools to inspire the next great generation of innovators. Additionally, our members are given the opportunity to become familiar with both project and build management--a unique hands-on experience that will surely pave the way for future success.

As ambitious engineers, SAB set the bar high; we aim to take home the Oskosh AirVenture Homebuilt Lindy Award in summer 2014 and develop a viable research platform for students at Illinois and beyond. By the time SAB's project is finished, its members will have learned teamwork, organizational skills, administrative techniques, how to communicate and support ideas, and time management, all of which apply to solving real world problems. Most importantly, SAB hopes to fulfill the dreams that brought each of its students to Illinois in the first place.

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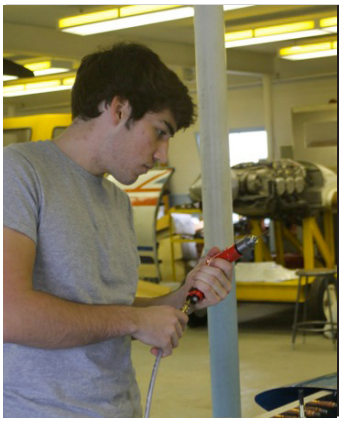
CAD CLASS

Experience in Computer Aided Design (CAD) is tremendously useful when looking to explore careers in design engineering, which is a very large element of modern day industry. Unfortunately, the instruction of CAD programs on campus are typically restricted by department. Mechanical engineering students are taught the ProE/ Creo suite, general engineering students are typically taught inventor, and only recently, the Aerospace Department has begun offering a class teaching NX (aka Unigraphics). Employers are typically much more diverse in their choice of CAD programs, and so a breadth of knowledge in CAD is highly valuable to students looking for internships.

Student Aircraft Builders have begun to bridge the gaps between departments, offering courses in both Creo/ProE and NX to students in *any* department. The classes are led by students with a history of previous internships and co-ops in design engineering as well as years of experience using CAD in student projects. Students are trained initially by modeling the same toolbox that is used in training sheet metal construction. This allows the members to become acquainted with the uncertainties of manufacturing while familiarizing themselves with sheet metal CAD modeling. The members then continue to model aircraft structures for visual aids and project planning. They also design and model the jigs that will be used to support the structures during manufacture.



SAB CLASS

SAB and the UIUC Department of Aerospace Engineering are offering participation in SAB as a one credit hour, open-seminar free-elective. As part of this course, the students will define their role in the project and establish a timeline for his/her contribution to the project for the semester. The course meets once per week in Talbot Laboratory where students will take rotate in updating the class on the recent accomplishments and near-term goals of the project.

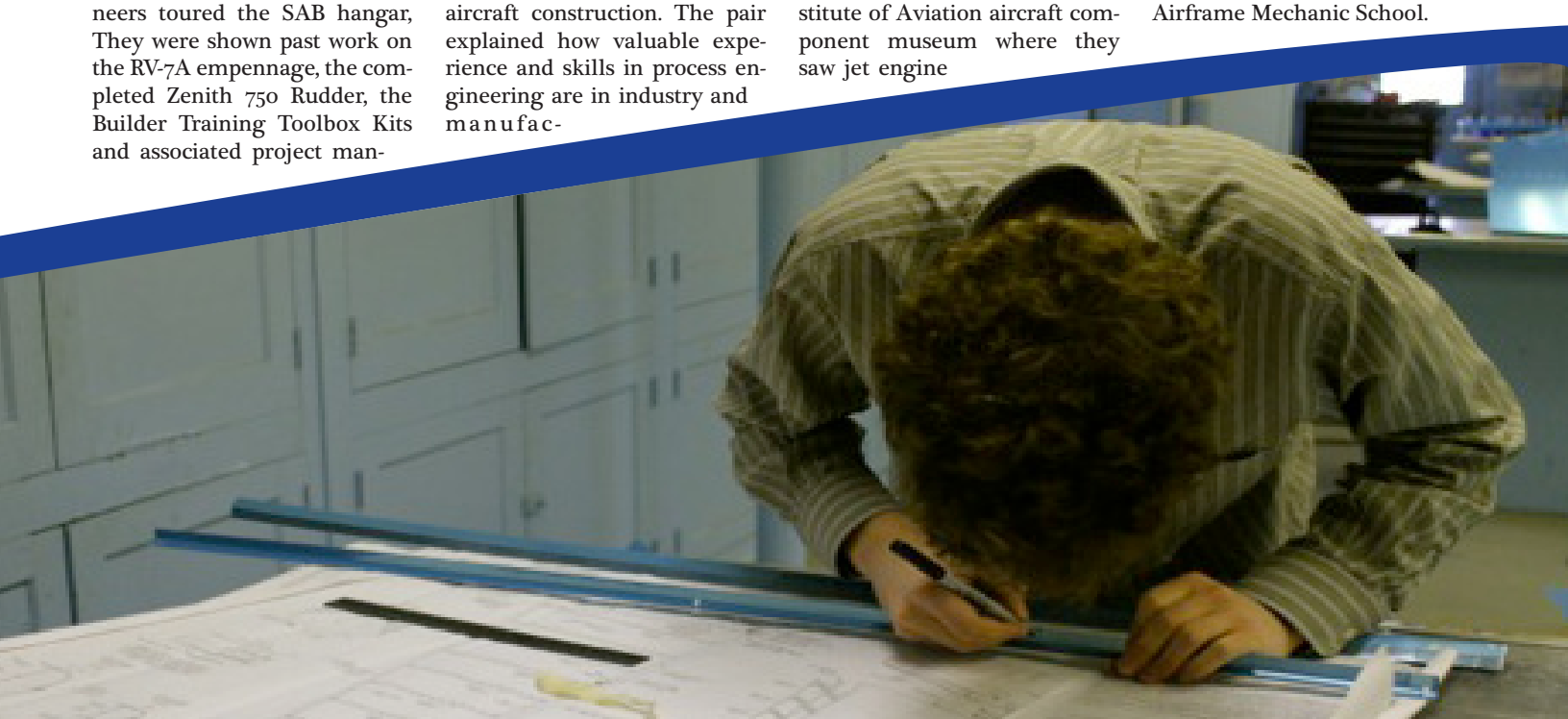
Each student is expected to make such a presentation at least once per semester. Students also give lectures on particular aspects of the project. Lectures so far include Build Process Overview, Builder Training Toolbox Kit Construction, Project Management, and Computer Vision Applications.

The class is led by Andrew Putch and facilitated by instructors Prof. Philippe H. Geubelle and Prof. Soon-Jo Chung. SAB is proud to say that students taking this class for three consecutive semesters, as well as taking on a leadership role, will be given three hours of technical elective credit. Currently, 30 students are enrolled.

SPACE X VISIT

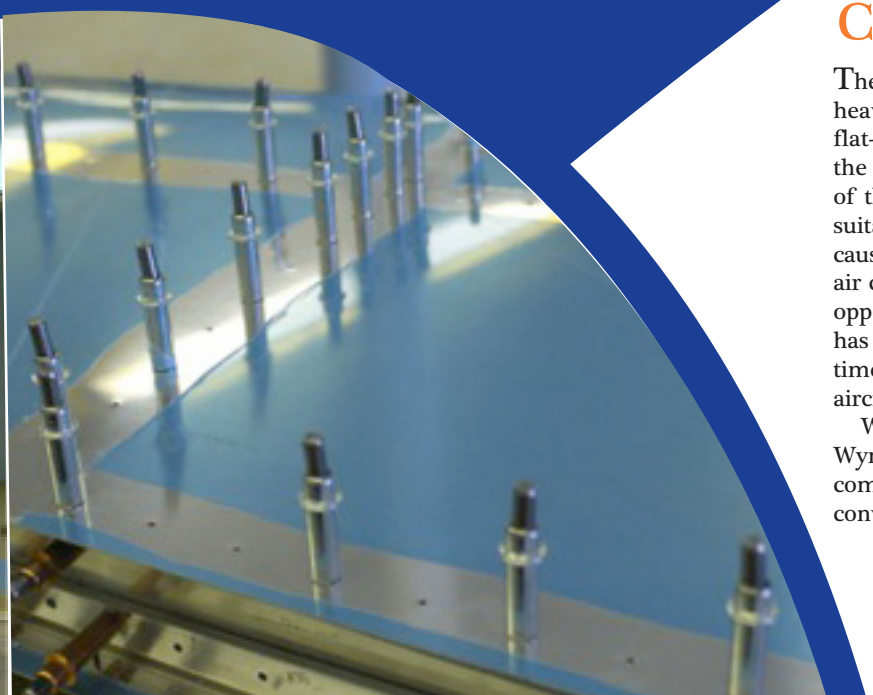
On September 24, SpaceX propulsion development engineer David West, mechanical design engineer Jack Sormaz, and several other SpaceX engineers toured the SAB hangar, They were shown past work on the RV-7A empennage, the completed Zenith 750 Rudder, the Builder Training Toolbox Kits and associated project management material.

David and Jack were extremely impressed with SAB's process engineering and the pre-planning that was put into aircraft construction. The pair explained how valuable experience and skills in process engineering are in industry and manufacturing in particular. They also talked about similarities to the work and procedures SpaceX employs in their many projects. They then toured the SAB/Institute of Aviation aircraft component museum where they saw jet engine cuts-aways, rotary engines, propellers in several stages of manufacturing, an instrument flight simulator, and the remains of the Aircraft Power Plant and Airframe Mechanic School.



SITE VISIT TO MEXICO, MISSOURI

SAB members traveled to Mexico, Missouri to visit the Zenith factory. During the visit, members were able to gain valuable insight in avionics and engines from different aircraft enthusiasts for our zenith aircraft. They were also able to build a zenith supplied training kit which helped give a better understanding of basic building techniques. The trip was very informative and exciting as one member was even able to fly over Mexico in the Zenith 750 aircraft. The trip enabled members to build the rudder section of a plane and trained them in this area. We received half of our Zenith kit and are now much more knowledgeable in the design and build processes for our plane.



CORVAIR

The Corvair aircraft engine is a heavily modified version of the flat-six engine used to power the 1960 Chevy Corvair. It is one of the few automobile engines suitable for use in aircraft because it is naturally aspirated, air cooled, and has horizontally opposed cylinders. The Corvair has over 15,000 hours of flight time in general aviation, light aircraft.

We are working with William Wynne from www.FlyCorvair.com to perform the rebuild and conversion. Fly Corvair sells all of the custom parts and accessories we need. They have also offered us the opportunity to participate in the "Corvair College." This is a free workshop hosted by William Wynne where we can work on the conversion with expert guidance.

The Corvair gives us 100 horsepower for a fraction of the cost of any other aircraft engine. More importantly, the opportunity to build our own engine and attend the Corvair College is unique and suits the mission of SAB perfectly.

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SPONSORS

Northrop Grumman

On October 17th, James Mocarski, VP of Airborne Tactical Sensors, presented SAB with a check for $3,000 on behalf of Northrop Grumman. A few days later, SAB was lucky enough to host Mr. Mocarski at the hangar where construction is taking place. He gave feedback on processes and even got a little hands on experience of his own (see picture below). Conversation ranged from optical quality control to systems engineering to the history of Northrop Grumman. The industry insight gained from this visit will benefit SAB and its members immensely.

Zenith Aircraft Company

Zenith Aircraft Company has been an essential partner and has contributed more to SAB's success than any other organization. Even though the project is in its early stages, Zenith has done more for SAB than have been imagined. Not only did Zenith offer us the CH-750 at a heavily discounted price, but their mentorship and guidance in the early stages far exceeds any monetary value. Their willingness to work with a student group like SAB has been instrumental to the organization's early success. As the project progresses, their counsel and expertise will be relied on heavily.

Student Organization Resource Fee
SAB would like to thank the SORF board for its recent contribution of $6500.

Mechanical Science and Engineering Dept.
The Department, whose programs are well-represented in SAB, recently made a contribution of $1000 to SAB.

Electrical Science and Engineering Dept.
The Dept. recently made a $400 contribution to the SAB students.

This semester's sponsors:

Northrop Grumman UIUC Mechanical Science and Engineering UIUC Engineering Council SORF
UIUC Design Council UIUC Electrical and Computer Engineering Illinois Space Grant Consortium

For more information regarding sponsorship, please contact Ron Moravek (ronmoravek17@gmail.com)