

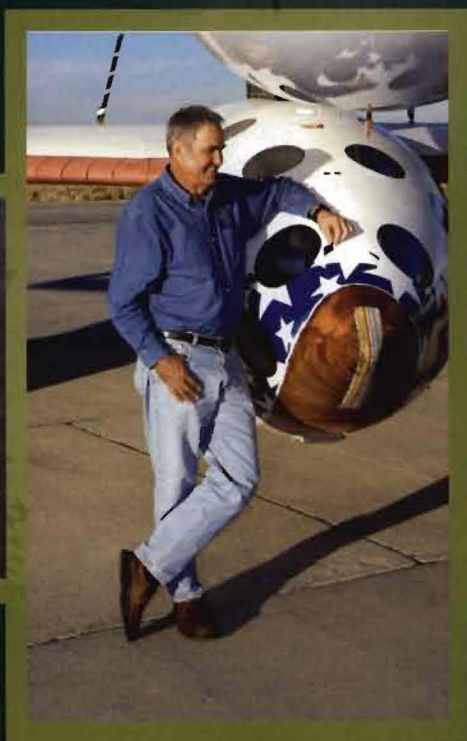
STUDENTS SOAR

THE FUTURE OF THE AEROSPACE INDUSTRY IS A HALF-BUILT ALUMINUM PLANE, SITTING IN PIECES IN A SMALL-TOWN HANGAR A FEW MILES SOUTHWEST OF SAN LUIS OBISPO. IT'S ALSO A RIP-THE-ENVELOPE, MULTI-MILLION-DOLLAR PRIZE-WINNING SPACECRAFT BASED HUNDREDS OF MILES AWAY IN THE MOJAVE DESERT. **THE CONNECTION: CAL POLY.**

By Susan McDonald



(Photo courtesy of Scaled Composites LLC)



Burt Rutan (Photo by Mike Mills)



(Photo by Mike Massee)

BURT RUTANS DON'T COME ALONG EVERYDAY. BURT IS A BONA FIDE GENIUS.

P R O F E S S O R D A N B I E Z A D



Aerospace engineering students build a single-engine plane at Oceano airport. (Photos by Tony Hertz)

Students in Professor Dan Biezad's aero classes are learning firsthand how an airplane flies – not just by reading about it – but by actually building one. It's the first plane Cal Poly students have actually built in more than 50 years, Biezad said.

The plane project also demonstrates the strong influence Cal Poly alum **Burt Rutan (AERO '65)** has on the university's aerospace engineering education.

Rutan, renowned for his lightweight composite aircraft, designed SpaceShipOne, the plane that won the \$10-million Ansari X prize last October when it became the first manned, private aircraft to travel into space.

Inc. Magazine named Rutan its top entrepreneur of 2004, not only for SpaceShipOne, but for Rutan's methods of building aircraft "without an army of engineers and billions of dollars in government money. He did it the same way a fast-growing software or biotech company develops a product."

Rutan became a U.S. Air Force test pilot after graduating from Cal Poly. In 1974 he started his own company to develop light, home-built aircraft. In 1982, he founded Scaled Composites Inc. in Mojave.

It's a dream come true that many of Professor Biezad's students hope to imitate one day.

Biezad is quick to point out, though, that while most of his students are outstanding, Burt Rutans don't come along every day. "Burt is a bona fide genius. You don't find many people with his innate talent. We use him as an ideal. We give our students his vision and let them go out to reach their own potential."

Such inspiration may lead to building their own planes or starting their own companies. "I've heard many times that Cal Poly students are 'fearless.' What we really try to give them is the full experience – the theoretical and the practical."

Grad student Joon Kim, who follows Rutan's adventures on the Internet, is impressed by his accomplishments. He has also met Rutan. "Our class had a field trip to his facilities, where we saw SpaceShipOne," Kim said. "He gave us a real motivational talk. 'Don't give up on your dreams,' he advised us. 'Follow your passion.'"

Kim, who was born in South Korea and grew up in Bakersfield, dreams of becoming a flight test engineer at Edwards Air Force Base. His decision was influenced by Rutan and by Biezad, who also was a test pilot there until he retired in 1990. "Edwards – that's the place to be," Kim said.

Biezad knew Rutan at Edwards. His favorite Rutan quote: "Don't design anything you can't build."

The students will test out someone else's design as they build a single-engine plane – an RV7A – which came in a kit. The total cost to build it will be nearly \$50,000, about half the price of buying a similar factory-built plane. A student-fee initiative paid for the plane kit, a fact that impresses Biezad.

"Students told me they wanted to build an airplane," he said. "I could see they had the drive and creativity it takes. Then they voted for a fee increase themselves. I'm humbled and impressed by them."

Students have been putting parts of the plane together in a tiny hangar at the Oceano Airport for the past year. They first had to

demonstrate their skills at reading plans, riveting and using a lathe, drill press and other tools at a lab on campus before they could go out to the hangar.

So far they have completed the fuselage, empennage and parts of the wings. It will take approximately 3,000 hours to complete the plane. That's if things go according to plan.

But the students keep coming up with modifications. One has built a cover for the instrument panel out of composite materials. Joon Kim is working on gauges to measure strain on the plane. "We're taking advantage of this opportunity to experiment," he said. "We won't have another chance to do this unless we have millions of dollars."

Taylor McClurg, a third-year aerospace major who wants to work for NASA someday, continues to work on the plane, though she's already completed Biezad's lab class. "I worked last spring riveting for endless hours," she said. "I'm doing this now just for fun. It's good to know how to use the tools and read the plans. Someday, I would really like to fly."

Sky Sartorius is one of the few first-year students allowed to work on the plane. The project was designed for third-year students and higher, but Sartorius convinced Biezad he had the motivation and skills needed to join the team. Maybe it's because he still builds model airplanes as a hobby, including his own designs. "I always knew I wanted to be an engineer," he said.

So, what happens when the plane is finished?

"I'll fly it," answered Biezad. "I'll have to actually sign off on what these guys are doing." ■