

Students Take on Aeronautical Design Challenge, Get Job Offers From Industry

By Nancy Pardo | Published: APRIL 25, 2012



Orville and Wilbur Wright first became interested in flight as boys when their father gave them a rubber-band-powered helicopter toy. And on a brisk winter's day in 1903 the brothers became the first to pilot a heavier-than-air machine for a prolonged length of time. The pair crashed most of the planes they built, but they never gave up.

Over a century later, a small group of high-schoolers stand on a stage at the [National 4-H Youth Conference Center](#) just outside Washington DC. The Aeronautical Dolphins hail from the Northern Mariana Islands, which lie between Hawaii and the Philippines. The team has traveled over 30 hours and 6,000 miles on myriad flights to get to their destination, but these kids show no signs of fatigue, only pride and sheer happiness.

The Mariana Islands team has just won the "Against All Odds" merit award at the national [Real World Design Challenge](#), where students compete to design the best fuel-efficient, light sport aircraft capable of flying from Kitty Hawk, North Carolina to Wright Patterson Air Force Base in Dayton, Ohio.

On the tiny island of Saipan, the team worked diligently through power outages and downed internet to make the final cut.

The Real World Design Challenge is a pioneering annual program which encourages high-school-age kids to design an aircraft to specific requirements. One-hundred percent of students who participate in the program go on to university and 90 percent of them go into engineering fields.

The program, which has grown exponentially over the past several years, has the backing of industry and government powerhouses—including [Lockheed Martin](#), [Northrop Grumman](#), [EADS](#), [FAA](#) and [DOD](#)—plus innovation leaders like [Space X](#).

Real World Design Challenge was founded after the FAA approved a new category of vehicle called [light sport aircraft](#) (LSA). There's growing interest in using this kind of aircraft for more efficient and convenient air travel.

And there's already some interesting designs out there. [NASA](#)'s researching multi-engine aircraft and developing smart materials, adaptive structures, and flight systems which mimic the natural flight of birds. Take the "morphing" aircraft for instance. Designed to alter its shape according to environmental conditions, it can sweep back its wings to minimize drag and sonic boom. And then there's the Civil Tiltrotor which flies like a plane but lands and takes off like a helicopter, reducing the amount of runway it requires.

The Real World Design competitors are not too far behind NASA. "These kids are doing post-graduate-level work. I'd be ecstatic if a first-year employee at [Boeing](#) gave these kind of presentations to a customer," said Scott Parks, director of navy and regional missile defense systems at Boeing.

Team Phoenix Blackout from the Arizona San Tan Foothills illustrated Parks' sentiments. Blackout showed real tenacity and commitment and overcame some huge obstacles. San Tan Foothills has one of the highest dropout rates in Arizona and 90 percent of its attendees are on free or reduced lunches. The kids struggled to put a team together and then begged their English teacher to lend them his home computer so that they could perform all the engineering calculations. Team members dropped out or got sick along the way and a week before coming to nationals a key member was involved in a car accident. Yet they made it regardless.

"In sixth grade I was interested in architecture," said Karla Elias, the outspoken team project manager and lead designer for team Blackout. "In high school they had an engineering program, I was the only girl and I had no clue what I was doing, but it became my favorite class. I desperately wanted to form a team and be part of this engineering challenge."

"Karla saw me toying around with an old robot one day and she asked if I wanted to be part of the team," said lead engineer Arron Gorney, whose grandfather helped design a NASA space shuttle. "I don't want a free ride to college with just a "C" average. I want to get there on merit and I couldn't say no to this project."

Team Blackout used the [Cessna Skycatcher](#) as inspiration for its design. "At first we came up with some pretty crazy designs—huge airplanes with eight wings—but we soon honed our ideas through research. We wanted our aircraft to be made of recyclable, durable material that provides an excellent overall customer experience," the team explained.

Blackout was one of only a few teams which chose to build a plane from aluminum rather than lighter and stronger carbon epoxy.

“Coming from Arizona, we learned that aluminum is much more durable on airplanes that are out in the hot sun all day. Over time aluminum would need less maintenance than carbon and therefore prove more cost efficient,” the team concluded.

Another team from Baldwin High School, Kansas used a [sail-plane](#) wing in their design. “This challenge has given us the opportunity to experience a real-world setting where there’s not always someone there to help, and we had to communicate with one another and experience working as a team,” the group explained to judges, who were bowled over by the presentations.

“Just in the groups I saw these kids could all get college scholarships,” said Michael Odell, a competition judge and associate vice president for sponsored research at the University of Texas. “Students need to understand that engineering is more than just academics – we need more programs like this that bring together schools, engineering colleges and industry.”

The top three teams (from Nevada, Pennsylvania and Kansas) were presented with awards at the [National Air and Space Museum](#) on Saturday evening.

Nevada, whose team members have already won places at MIT and the U.S. Naval Academy, attempted to design a battery and electric-powered aircraft using photovoltaic materials on the wings and tail, but at the last-minute the team decided diesel was the only viable option.

Pennsylvania designed their aircraft in an entirely virtual environment because the team of seven was widely dispersed throughout the U.S. The national competitions presented the first opportunity for them to meet in person.

Team Tornadoes from Kansas walked away with the top award for its safe and fuel-efficient aircraft which got 64 miles to the gallon. They also got a job offer from Zachary Lemnios, assistant secretary for research and engineering at the Department of Defense, and keynote speaker at the event.

“I’m looking for the future that you’re about to showcase,” Lemnios told the winning teams. “Hydrogen-powered unmanned systems, hybrid airships, advanced hypersonics – that’s what I’m talking about. Pursue your dream and push the limits. There’s a job waiting for all of you with us.”