

Student Unmanned Competition Sponsor Money Soars to New Levels

Utah State Awarded \$14,000 for Autonomous Craft Competition Win

By Danielle Lucey

AUVSI's Seventh Annual Student Unmanned Aircraft Systems Competition, held 17-20 June at Naval Air Station Patuxent River's Webster Field Annex in St. Inigoes, Md., saw a massive increase in prize money, nearly double last year's \$45,450.

Thanks to a grant from the Office of Naval Research, this year's money from sponsors mostly went toward prizes, allowing student teams to take home a total of \$78,600, according to competition director Joe Brannan.

Awarded the top prize was Utah State University, a 10-person team that had only participated once before. As last year's second place winner, team members decided the best way to up their chances of winning overall was to create a craft with a larger airframe and an improved camera system.

It worked, providing the school with first place scores in the journal and mission categories and third in their oral competition. Their total prize money, awarded from six "prize barrels"—separate categories where prize money was allocated—totaled \$14,000, \$6,000 more than they won last year.

The school is sponsored by the Utah Water Research Laboratory and the plane was primarily built for the lab's use. The unmanned aircraft built by the Utah State students are typically used for agricultural

applications like river tracking, monitoring habitats and overhead imaging the Logan River in Utah.

All those applications translated easily into the goals of the competition. In addition to submitting a paper and an oral competition, teams earned points by launching and landing their vehicles autonomously and identifying targets on the ground from the air. Each target is a certain shape, color and is labeled with a letter or number. The ultimate goal this year was to identify all the targets, which spelled out "PAX NO. 1."

This year, 25 teams turned in papers to be eligible for competition and 19 competed.

There was a two-way tie for second place between team Blackbird from Embry-Riddle Aeronautical University and the University of California, San Diego. One of two teams from the college to enter, Embry-Riddle Blackbird used a hand-launched vehicle, the LT-40, that flew autonomously upon takeoff and belly landed. The three-person undergrad team built the plane from a kit after previously trying to build their own frame, which resulted in too many balance issues, according to team members. They were awarded \$9,750.

The UC San Diego team was able to take off and land autonomously in windy conditions on 19 June after using their only time out to fix their speed controller, which burnt out, causing their engine to overheat. The team was able to fix the problem and identified the message spelled out by the targets. The students, who were awarded \$9,250, had numerous sponsors, including NASA, The MathWorks and General Atomics.

Two members of Utah State University's winning team.



Flying Solo

Of all the teams that participated in the contest, one stood out for its small size. Hillar Lago of Florida International University decided to forge ahead as a one-man team after his two other team members couldn't make it to the event.

"I worked already so hard on it, and this was probably going to be my last college event," says Lago, a spring semester graduate with a degree in mechanical engineering.

The original team worked together for six months putting together the system, but Lago was left to his own devices for the last month leading up to com-

petition. Brannan says other teams, like the University of West Florida and Embry-Riddle Aeronautical University, stepped up to help Lago, supplying necessities like tape and scissors and even helping him radio fly. Lago ended up taking home \$2,100 in prize money and placed 15th out of the 19 teams that flew.

Alternative Vehicle Designs

While most vehicles at the competition were fixed-wing airplanes, a few teams veered from that format.

Virginia Commonwealth University's team, which is comprised of members of the schools' senior design class and an extracurricular club, built an unmanned helicopter. Team member Skylar Roebuck says that working with a helicopter has its advantages in a competition like this one, where hovering to identify a target can be easier than flying over it. The team ended up placing seventh and winning \$4,000, which came out of four prize barrels, including one for completing the autonomous flight mission.

The most markedly alternative UAS design of the competition belonged to Oakland University, located in Rochester, Mich. Their quadrotor craft's body consisted of solid carbon fiber rods positioned

Second place Embry-Riddle team Blackbird.



in a cross shape. At the intersection of the rods, the team positioned all its electronics sandwiched between a Global Positioning System at the top and a camera at the bottom. The stationary rods each featured a propeller and foam balls at the tips to protect the propellers on landing.

Team Diversity

Of all the teams that participated in this year's competition, six came from outside of the United States to compete, including the sixth place team from the University of Alberta. The University of Alberta does not allow sponsorship of the team, whose 10 members this year were part of the school's Student Vehicle Project club. However, the team did receive support from Snell, MicroPilot, HiFlight Radio Control and the university.

A second Canadian team, the University of Manitoba, participated for the fifth time, placing 10th and collecting \$3,200 from four prize barrels. The *Université de Sherbrooke*, from Quebec, Canada, also submitted a paper but didn't participate in the competition.

The team with the most travel time to get to Webster Field was Delhi College of Engineering from New Delhi, India. The team was one of the few to have only undergraduate students—the rules allowed for one grad student per team. The 10-member team, which received the Director's award and \$1,500 at the competition, said that this was the first time they had gone to the competition or any competition outside of India.

"We wanted to take up something challenging," says team leader Rochak Chadha, an electronics and communications engineering



Hillar Lago, the one-man team from Florida International University, with his craft, the Telemaster.

Overall	School	Prize Money	Mission	Oral	Journal	# of Prize Barrels
1	Utah State University	\$14,000	1	3	1	6
2	Embry-Riddle Aeronautical University (Blackbird)	\$9,750	3	1		6
2	University of California, San Diego	\$9,250	Honorable Mention	Honorable Mention	2	5
4	University of West Florida	\$8,250	2	Honorable Mention		7

sophomore.

The University of Puerto Rico at Mayaguez also participated in the competition, and the American University of Sharjah, located in the United Arab Emirates, submitted a paper but did not compete.

In addition to international teams, this year's event also featured one high school. Six students, three faculty members and a remote control operator from Great Mills High School, located down the road from the competition in Great Mills, Md., participated, although their craft was not autonomous. The team placed 13th, ahead of six college teams, and was awarded \$1,700.

The first high school to enter the competition, Great Mills was sponsored by the Aviation Systems Engineering Co. The school had volunteered in unmanned competitions before, but this year the Engineering Club decided to participate, modifying an aircraft built with the help of their sponsor's volunteers. The students also presented to the judges.



The Oakland University team with its craft.

Major sponsors for this year's event included AUVSI, Naval Air Systems Command, the Office of Naval Research, Northrop Grumman, Lockheed Martin and The MathWorks.

Next year's competition will take place 16-20 June at Webster Field.

Danielle Lucey is associate editor of Unmanned Systems.

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