Two teams of Aerospace Engineering students from the University of Cincinnati each won in their respective divisions at the 2011 National SAE Aero Design East competition in Marietta, Georgia, this weekend.

Over 70 teams were present from across the globe including Canada, Poland, Venezuela, India, Mexico, Egypt, and Brazil (the previous year's competition champions).

The competition requires teams to design, build, and fly a radio-controlled aircraft over a closed course from takeoff to landing to gain points. They earn points based on satisfying specified design requirements, presenting the design in both a written report and an oral presentation, and carrying the most payload for a complete circuit of the course.

A team of three Aerospace Engineering graduate students won the Micro class competition. The team included Marshall Galbraith, Philip Italiano, and Cody Lafountain.

One key criterion of the Micro class competition was the ratio of the fully loaded aircraft weight to its empty weight. Their aircraft weighed a mere 0.7 pounds when empty, so they had the highest score for this critical ratio, as well as the highest score for their presentation.

"Due to the poor flying conditions, we continuously experienced 'hard' landings after every round that damaged our nose gear. As such, we spent every minute between flight rounds repairing the damage,” explained Galbraith.

The second team was a team of Aerospace Engineering Seniors who won the Regular class division. Team members included Timothy Britt, Daniel Brunck, Nicholas Ernest, Robert Fellows, Lisa Kain, Christopher Lightfield, Dustin Muller, Dominic Pompeo, Christopher Porter, Tyler Relf, Nathan Rooy and Michael Whitsel.

The Regular class team set a record for the most payload ever carried around the closed course in all 25 years of the competition. The story of this victory can be classified as a true tale of "Triumph from Disaster.”
The undergraduate team completed all flights the first day of the competition landing them in first place with a 14 point lead. The following day, the team would attempt a 37 pound payload flight to assure victory. Although conditions were perfect, the aircraft lost control for unknown reasons and crashed into the ground.

This crash set the team back to second place trailing the leader by 10.65 points. After the crash the plane was in pieces and looked to be beyond repair. During the competition, the team has the opportunity to rebuild their aircraft and carry on in the competition; the requirement being that the aircraft must be 50% original to be considered the same and they had only 45 minutes to complete it. If the rebuild was over 50%, the scores would be wiped from the day before.

“Those 45 minutes were very intense. I personally thought that we had worked on it for at least 1 ½ hours for the amount of work that we had done. There was a lot of teamwork as we only had a few blades and only one bottle of glue. Everybody was being productive and helping out,” said Fellows.

The team had built a prototype earlier in the design process and had enough spare parts to rebuild, and the team went to work fixing the competition aircraft. After an adrenaline pumped 45 minutes, the team had reconstructed the plane to flyable condition. The condition of the aircraft would be considered less than ideal to say the least but it was determined fit enough to fly. With the plane fixed it was time to decide what payload should be carried for the maiden and last flight. The team agreed that “We did not come here to lose” and it was decided that 35 pounds of payload would yield enough points to move into first place and win the competition.

With slight winds and unfavorable density altitude, the plane began its last flight of the competition; it rolled down the runway and lifted off within the required 200 feet ground roll. While in the air the tail started to shift because of the quick repair but held firm and the aircraft made it to a successful landing because of the skill and control of Santiago Panzardi, the team’s pilot.

“The competition requires the pilot of teams to be an AMA (Academy of Model Aeronautics) licensed pilot. These planes are highly loaded which makes them extremely hard to fly no matter how good the design is. Gravity is always a formidable opponent,” said Galbraith.

“We told him [Panzardi] that we really had nothing to lose on this flight. We were going for it all and if we didn’t get it, we knew we put it all out there. So I think that might have taken some pressure off of him and loosened him up to fly with no reservations,” Fellow explained.

“All the thinking occurs before the airplane is flown,” said Panzardi. “Wind assessment, flight path, and planned energy management to keep the airplane in the air. The pilot must always be ahead of the airplane's action and ready to react in the event of momentary stalls which do occur.
due to the extreme tasks being demanded of the aircraft. When the plane stalls in flight, you must remain calm, not fight the aircraft, and then convert any altitude into speed to regain control.”

After landing the payload weight was determined to be 35.27 pounds - a new record for regular class aircraft. The Brazilian teams in first and third place also completed flights in the final round making it unsure if the 35 pound payload would yield enough points.

Once the scores were tabulated, teams were notified and the University of Cincinnati Team had won the regular class competition with an 11.82 lead over both Brazilian teams.

Although it was a competition, the teams were friendly and supportive of each other. “I went to the competition expecting the other teams to be hostile and uncooperative but in fact it was the exact opposite. If someone needed tools or just wanted to talk, the surrounding teams were glad to help,” said Italiano.

Teams from universities in Brazil have dominated this competition in recent years, finishing first in each class for the last two years. UC teams finished 2nd and 3rd in the Regular class the past two years – the highest of any North American team, and 6th in the Micro class two years ago.

“The biggest competitors, as always, are the teams from SAE Brazil. They always show up with excellent aircraft, so it was very satisfying to finally beat them. We had issues this year with the nose gear on our aircraft, as it broke after every round of flight and we had to do rapid repairs,” said Lafountain.