

# 7<sup>th</sup> Annual 3D Printed Aircraft Competition, July 8, 2023

The University of Texas at Arlington will host the 7<sup>th</sup> Annual 3D Printed Aircraft Competition July 8, 2023 at UTA Maverick Stadium in Arlington, Texas. As 3D printing technologies have expanded the design space for many applications, the challenge of leveraging this design freedom for improved performance while satisfying fabrication process constraints has likewise increased. This competition challenges students to

- Develop lightweight, 3D printable airframe configurations
- Integrate design and advanced manufacturing to maximize mission performance
- Design within 3D printing process and material constraints
- Leverage direct digital manufacturing technologies
- Develop team and hands-on design experience

## **Registration and event details:**

<http://uta.engineering/3DPAC>

**Registration deadline:** January 31, 2023

**Submission deadline:** May 31, 2023

**Aircraft check-in date:** July 7, 2023 1:00-4:00 p.m.

**Aircraft check-in location:** UTA Woolf Hall 214B

**Fly-off date:** July 8, 2023, 8:00 a.m.

**Fly-off location:** UTA Football Stadium

## **Fixed Wing Category**

All lifting surfaces must remain fixed

- Altair Most Innovative Design, \$1000 (design report received by submission deadline)
- Longest duration flight, first prize, \$1000
- Longest duration flight, second prize, \$500

## **Rotary Wing Category**

A significant proportion of lift is generated by rotation of components or of the entire body

- Altair Most Innovative Design, \$1000 (design report received by submission deadline)
- Longest duration flight, first prize, \$1000
- Longest duration flight, second prize, \$500

## **Rules and Details**

- All airframe components, including all aerodynamic surfaces and control surfaces, must be printed using a purely (not hybrid) 3D printing technology. For safety reasons, propellers and rotors should be commercial off-the-shelf hardware. If propellers or rotors are 3D printed, a validation report must be submitted that demonstrates through analysis and test a high safety factor for the number of cycles required during the life of the aircraft. Any assembly hardware, hinges, actuators, systems components, etc. that might be used do not need to be 3D printed. Tape may be used as a mechanical device (e.g. living hinge) but not as structural attachment at a joint.
- There are no size, configuration, weight, or material restrictions except that no lighter-than-air methods may be used (e.g. no helium) and no fundamentally unsafe or hazardous configurations or materials may be used.
- Aircraft may be unpowered or they may be powered using a safe propulsion method (e.g. no rocket motors, external flames, or CO<sub>2</sub> canisters) for a maximum continuous duration of 8 seconds (i.e. no pulsing or intermittent operation).
- Rotary wing category aircraft may use configurations that rotate the entire vehicle but may not incorporate propulsion configurations that include a horizontal component of thrust.
- Aircraft may be controlled or uncontrolled and follow any course but flights must operate safely within a 300 x 160 foot area (i.e. football field) and remain under 30 feet (i.e. football goalpost). A flight attempt in which an aircraft violates these boundaries for a duration longer than 3 seconds (per event, not cumulative) will be disallowed.
- All design, analysis, and fabrication of the competition entry is the sole responsibility of the student team members. Student teams are responsible for all costs incurred.
- All design work must be performed by undergraduate or graduate students enrolled full time during at least one of the preceding Fall, Spring or Summer terms at an accredited university. 3D printing may be performed by non-team members or non-student personnel.
- Students may participate on more than one team only if the submitted designs are significantly different.
- Teams may have up to 6 members.
- Award funds are distributed among winning team members. Winning team members must complete required paperwork within 2 weeks of the event date in order to receive award funds. Team leads are responsible for

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ensuring all team members receive required paperwork. Award funds will only be disbursed if there are at least 3 valid entries in a competition category.

- Each team must register at <http://uta.engineering/3DPAC> by the registration deadline above
- Each team must complete the submission details at <http://uta.engineering/3DPAC> by the submission deadline above to receive a competition t-shirt and be eligible for the Altair Most Innovative Design Prize.
- Aircraft must be presented for eligibility evaluation between 1:00 and 4:00 p.m. on the check-in date before the competition.
- Aircraft pilots must be undergraduate or graduate students enrolled full time during at least one of the preceding Fall, Spring or Summer terms at an accredited university.
- Aircraft must be launched by hand or takeoff under their own power. Catapults or other launching devices may not be used.
- Timing starts when the aircraft is no longer in contact with the ground or the hand that launches it and stops when any part of the aircraft touches the ground.
- Teams are allowed 3 flight attempts with the best flight time recorded as the official time. Aircraft that are not ready to fly at the appointed time will forfeit that flight attempt.
- Aircraft repair is allowed between flights using adhesive and 3D printed components but not tape or other non-3D printed repair methods. Teams may use multiple aircraft of identical design and fabrication across flight attempts. Aircraft must be flown in the same configuration for each flight.
- Timing and judging will be performed by a panel of faculty and industry professionals that will have sole and final authority and discretion for verifying eligibility, measuring performance, evaluating safety, and resolving disputes.
- Any protests regarding aircraft or flight validity must be made in a timely manner prior to the subsequent flight round or before 10 minutes following the final flight round.
- Altair Design Innovation Awards are based on submitted design reports received before the published submission deadline following the template provided at the competition website. Bonus points are awarded for designs that meaningfully use Altair HyperWorks or Inspire engineering software tools to influence design.

## For Questions and Sponsorship Inquiries

Robert Taylor ([taylorrm@uta.edu](mailto:taylorrm@uta.edu))

Mechanical and Aerospace Engineering, University of Texas at Arlington

Rules date: 8/3/2022

See [www.uta.edu/mae/events.php](http://www.uta.edu/mae/events.php) for the latest version of these rules