11th Annual 3D Printed Aircraft Competition, July 17, 2027

The University of Texas at Arlington will host the 11th Annual 3D Printed Aircraft Competition July 17, 2027 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, 2027
Design report submission deadline: May 15, 2027

Aircraft check-in date: July 16, 2027 1:00-4:00 p.m.
Aircraft check-in location: UTA Woolf Hall 214B
Fly-off date: July 17, 2027, 8:00 a.m.
Fly-off location: UTA Football Stadium

Fixed Wing Category

All lifting surfaces must remain fixed

- Siemens 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

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

Energy Absorption Category

Impact deceleration is measured after flight vehicle ascends and then drops from specified height

- Siemens 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

1. 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.
2. 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.
3. Aircraft may be unpowered, or they may be powered using a safe propulsion method (e.g. no rocket motors, external flames, or CO_2 canisters) for a maximum continuous duration of 8 seconds (i.e. no pulsing or intermittent operation).
4. 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.
5. 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 60 feet (i.e. twice football goalpost height). A flight attempt in which an aircraft violates these boundaries for a duration longer than 3 seconds (per event, not cumulative) will be disallowed.

6. 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.
7. 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.
8. Students may participate on more than one team only if the submitted designs are significantly different.
9. Teams may have up to 6 members.
10. 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 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.
11. Each team must register at http://uta.engineering/3DPAC by the registration deadline above
12. 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.
13. Aircraft must be presented for eligibility evaluation between 1:00 and 4:00 p.m. on the check-in date before the competition.
14. 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.
15. Aircraft must be launched by hand or takeoff under their own power. Catapults or other launching devices may not be used.
16. 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.
17. 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.
18. 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.
19. 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.
20. 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.
21. 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.

Energy Absorption Category Supplemental Rules (22-33)

These rules are in addition to the standard 3DPAC rules for the Impact Resistant Aircraft competition

22. The impact resistant rules shall apply in addition to all standard 3DPAC rules. In the event of overlap, the 3DPAC base rules shall serve as the baseline requirements, and the impact resistant rules function as supplemental constraints specific to the new category
23. A standardized payload package design and bill of materials is available at http://uta.engineering/3DPAC. All teams shall use this official bill of materials and integrate the official standardized payload package into their flight vehicle designs. No modifications to the payload hardware are permitted. Each team shall verify that the standardized payload package operates within safe electrical and mechanical specifications prior to competing. Verification shall include functional testing of all integrated sensors.
24. All participating aircraft shall be designed to accommodate the standardized payload module, which shall not exceed 10 cm × 10 cm × 5 cm in external dimensions.
25. The payload module shall remain fully operational and intact following the unpowered impact drop. The drop shall be conducted from a minimum altitude of 30 ft over a Polytan-USA track surface, which is a hard rubberized surface that registers a measurable deceleration signature on impact. Failure of the payload to operate after impact will invalidate the scoring attempt.

26. The payload data acquisition shall record time, altitude, peak g-force, and impact data for scoring.
27. All competing aircraft shall demonstrate the ability to reach a minimum altitude of 30 feet prior to the unpowered drop. Altitude will be verified by the standardized payload altimeter or an approved external measurement method. In addition, a qualified competition official or designated witness will be present to verify that the aircraft reached the minimum height before the nonpowered drop. Attempts lacking verified altitude confirmation will be disallowed.
28. All Teams shall submit a electrical packaging schematic incorporating PCB layout, MOSFET placement, thermal considerations, power routing, and connector locations.
29. Each aircraft must incorporate one or more Energy-Absorbing Structures (EAS) of their own choosing. No prescribed EAS concepts will be provided by the competition. The EAS can be integrated or detachable; however, it needs to be structurally attached to the aircraft airframe at the time of impact with the ground. No specific location, configuration, orientation is mandated, nor is a linear or vertical descent required.
30. The use of drag-enhancing devices, including but not limited to parachutes, streamers, or any mechanism intended to slow descent, is strictly prohibited. External padding or cushioning materials are prohibited. Designs shall rely solely on structural energy absorption.
31. Each team's payload module will be flashed and replaced with standardized code to ensure fair competition.
32. A standardized scale will be used to measure the mass of each aircraft before flight and drop testing
33. The winning team will have the highest Performance Index (PI), which is defined as PI = potential energy/impact acceleration = (measured mass * altimeter measured height * gravity) / accelerometer impact acceleration

For Questions and Sponsorship Inquiries

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