

AAE 451 Request for Proposals (RFP): Fixed-Wing Aircraft Design, Build and Flight Test

Project objectives

We seek proposals from student teams to design, build, and flight test a remotely piloted, propeller-driven, fixed-winged aircraft. The primary objective is to create an aircraft that can be hand-launched, safely fly three laps at McAllister Park airfield in Lafayette, IN (as shown below), and belly land, while maximizing the ratio of the aircraft payload weight to the flight time for three laps.



Project requirements

The project requirements, other than those mentioned above, are the following:

- The aircraft must be stored within a 30 in width x 30 in height x 60 in length storage volume.
- The aircraft wingspan can be up to 5 ft.
- After takeoff, the aircraft will climb to a maximum altitude of 200 ft.
- The aircraft must demonstrate good flight test attributes:
 - Easy to assemble, deploy and fly onsite.
 - Does not require significant reconfiguration to fly a wide range of missions back-to-back, i.e., the payload and battery must be quickly swappable.
 - Stable under all flight conditions.
 - Easy to fly by a pilot external to the team, i.e., a pilot from outside the design team.
- The teams should use the standardized payload modules provided by the teaching team.

Materials and budget

Each team will have a six-channel transmitter and receiver provided to them AND a budget of \$400 to purchase materials and items specific to their aircraft. Materials and components sourced from the lab, such as hardware, 3D printed parts, motors, ESCs, propellers, control linkages, and servos, shall be included in the budget. Any deviations must be formally requested in writing to the customer (the teaching team) and justified using sound engineering and business logic.

Evaluation

The score for each team will be $(\text{payload weight}) / (\text{flight time for three laps})$. The higher the score, the better. Your grade will not be directly related to this score. The teams and their aircraft will be evaluated by the teaching team for grading purposes using a separate rubric.

Timeline and deliverables

Flight readiness reviews will be conducted in Week 12 of the semester. Flight tests will be held in Week 13, and additional flight tests, if needed, will be in Week 14. Final reports are due Tuesday 26 Nov at 11:59 pm. Poster presentations and award ceremony will be on Friday 06 Dec in the ARMS Atrium between 1:30 pm to 3:00 pm.