Boeing & IITs present

National Aeromodelling Competition 2018-19

Final Round Problem Statement

Problem Statement:

A team must design, fabricate and demonstrate a fixed wing aircraft system that can perform tasks mentioned in following rounds with given constraints.

Design Constraints:

1. T/W <=0.75 without payload (If excess thrust is measured, it will be neutralized by adding weight below the aircraft at center of gravity)
2. Propeller diameter should not be greater than 13 inches
3. Total wingspan should be a maximum of 1.2 m
4. Only electrical motors are allowed. The use of IC engines or any other means of providing thrust is prohibited.
5. Use of gyroscopes (gyros) and programming assistance in receivers is prohibited

Abstract Submission:

1. All the participants need to submit an abstract on their aircraft, which should be no longer than 15 pages (A4 size 1.5 line spacing) with standard formatting. The Abstract must document the basic design of the aircraft (dimensions, wing areas, speed, etc.) and should also explain how their design is suitable for given problem.
2. Along with the abstract, participants also must send a zip file containing at-least 5 and no more than 10 photographs of the aircraft while it is being built.
3. The Abstract has to be submitted as per the format mentioned. Click here for abstract format
4. The Abstract must be submitted 20 days in advance of the Final competition date

Format of the Competition

The competition requires participants to design and fabricate an RC Aircraft (no readymade aircraft like RTF, ARF, BNF etc. are permitted) and perform a set of tasks. Propellers, Motors, ESC, Servos, Receiver and Transmitter are allowed as off-the-shelf items.

The event will be conducted at the ground of IIT Delhi and participants will need to bring their aircrafts and all necessary equipment to this venue. The arena will be placed in an open ground.

Maneuver Round

In this round, the design w.r.t. to the payload handling capability of the aircraft is put to test.

The aircraft should carry two or more than two payloads *(golf balls of weight - 45g, diameter - 43mm-* will be supplied by the organizers during the competition) and drop them in a circular drop zone of 20m diameter. The payloads should fall as independent objects and not as one object. i.e no arrangements should be done to make multiple balls fall together as one object (ex: sticking the balls together, enclosing the balls in a bag and dropping the bag are not allowed).The drop zone is at a distance of 40m from the take-off and landing zone. (For a better understanding of the arena, refer to the illustrations).

The aircraft should drop the payloads in the drop zone twice without landing in between. There should be a minimum flight time of 30 seconds between both the drops. The aircraft should land after the second drop.

The aircraft can then reload and take-off again to perform the same maneuver multiple times to score more points. A maximum time of 5 minutes will be given between the first take off and the final landing.The scoring for this round will be carried out based on the following formula.

Scoring Details

N1 = Number of payloads landed in the drop zone during first drop

N2 = Number of payloads landed in the drop zone during Second drop

$$\textbf{Score} = \sum[\,(N1)^2 + (N2)^2 \times 2]$$

Maximum of 2 channels in the transmitter should be used for dropping.

So, it is important to design the aircraft for quick loading (for multiple attempts) and quick releasing of payloads (to ensure they drop within the zone when released) in addition to the payload carrying capacity.

If there is a tie, winner will be decided by a separate round framed by the Judges on the spot. Judges' decisions would be considered final in all cases.

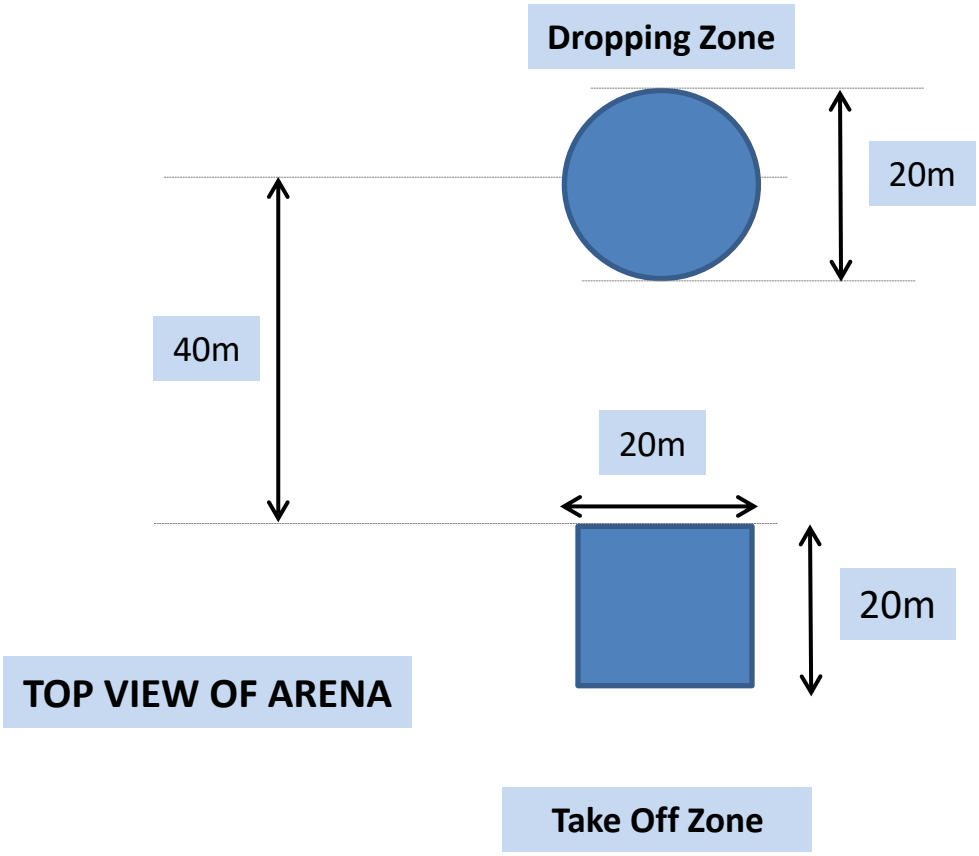
Rules

1. Each team would be given two attempts in Maneuver Round and the best score is considered as per the scoring procedure mentioned above for each round.
2. The timer will start the moment the participating team enters the take-off zone with the aircraft or within 60 seconds of previous team completing their attempt, whichever is earlier. The participants need to be prepared in time and launch without delay after entering the take-off zone.

Revisions

Any revisions to the Scope of the Competition would be intimated to all the participants via registered email.

General Guidelines

1. The use of 2.4 GHz radio is required for all aircraft competing in the competition. If the participants want to use any other frequency, they will have to inform the organizers in advance.
2. A limited number of 2.4 GHz radios will be available with the organizers for use by the teams. Teams who do not have access to radios can inform the organizers in advance to request use of these radios.
3. Receivers installed in the aircraft must be in 'receiver mode only'.
4. All the systems (Servos, motor, etc.) will be checked by organizers for functionality before the competition. If found not working, teams will be dismissed from the competition.
5. Pilot can position himself at any point in the arena to fly the aircraft during the rounds.
6. In view of stringent safety requirements, if a pilot flies out of the designated flying zone which includes overhead of the event organizing and control section, as mentioned at the venue, he/ she is disqualified and has to immediately turn back and land at any cost.
7. Teams are suggested to carry additional components (motors, batteries, propellers etc.) as needed to avoid last minute surprises at the venue. You will lose time/ attempt if you are not ready at the time of your turn.
8. Metal propellers are not allowed.
9. Pilot should fly only using transmitter and receiver. FPV or any other devices that assist in flying are not allowed.
10. The models can have powered take-off with a landing gear or can be launched manually by a person standing at ground level.
11. Aircraft should be built from scratch by the participants of the team and should not be a purchased model.
12. A team member can’t be a part of more than one team.
13. Teams can participate in more than one zonal event if they are not qualified for the finals already.
14. Teams that claimed reimbursement in one zonal event cannot claim in any other zonal event in case they are participating in more than one zonal event.
15. New members cannot be added to the teams who have been selected at Zonals to reach the Final Round.
16. Bring your college/student I-Card at the time of competition.
17. Any of the above-mentioned rules, if found violated, teams would not be allowed to participate in the competition.
18. Each team is advised to bring all components for their aircraft although they are coming from same college. Any delay due to sharing of components might result in your team losing the time available for your attempt or lose the entire attempt itself.

Arena Information