

Drone Racing Category

Rules for the category

In this category during the competition the main challenges for the participants are to design and to pilot drones. There are two stages in this category.

The drone racing contest is organized on the basis of 3 stages:

- Free Practice Stage
- Future Postman Stage
- Drone Racing Stage

General rules and regulations

The start of the races is done by the circle marshal. For the rounds which need a timekeeping, the time is triggered when the circle marshal or timing system announce the start of the race.

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Reflights are systematically flown at the end of the considered round.

i. Judging and marshaling:

- All races will be managed by an appointed team of judges
- Each race will be monitored by judges, timing/lap systems and marshals to maintain fair and accurate competition
- In the event of a mid-air collision, pilots can resume the race if they are able to take off again without intervention, otherwise their heat is considered as did not finish.

ii. Pilot Responsibilities:

- Pilots are responsible for operating and maintaining their own equipment.
- Pilots are responsible for ensuring proper flight operations through timing gates and recording all official times. If timing is not recorded in the official timing system, or inaccurately recorded, it is the pilot's responsibility to prove the accurate time or other method.

iii. Race Commencement:

At the case of premature start a re-flight is announced and 3 points are deducted.

iv. Disqualifications:

- Any pilot not physically present on the flight line fully prepared to race at the time of their scheduled heat will receive a disqualification and will not receive a rerun.
- Un-sportsman like conduct will not be tolerated

All decisions made by the Race Director or Judge are final

1. Free Practice (Stage-I):

- Practice flights on the racing circuit, other than those authorized by the organizer, are strictly forbidden under threat of being disqualified from the contest.
- A practice session will be organized at the beginning of the event. Each competitor will only enter this practice session when he has finished his models registration, processing and scrutineering and the model is deemed safe for flight in the contest.
- It can be a free practice session organized by groups with an allocated time identical for each group. The allocated time and the number of competitors per group are defined by the organizer.
- Each competitor can do as many circuit laps as he wants during the practice time allowed to his group. Once the practice time is over.
- In case of a crash, where the model cannot resume flight, the model must stay on the ground with motors off until the end of the practice session, the competitor cannot then request another practice time except if the crash reason cannot be attributed to the competitor.

2. Future postman (Stage-II)

2.1 Scenario:

A newly founded logistics company "INFOMATRIX2018" employs a drone to deliver small packages to the customers. Participant was assigned as a pilot of the drone and as day 1 task 5 boxes should be delivered to their owners precisely as fast as possible. Within a town that company operates government provides strict air traffic regulations and the special services penalizes those who break them. Moreover company itself cares about a service they provide and also is very strict with conditions of packages they deliver. The pilot of a drone might receive a deduction for dropped boxes.



Figure 1: Drone picking up the object (UCAR Project)

2.2 Requirements:

- Team must deliver 5 boxes to their respective destinations, and precisely place them
- Team must deliver each box one by one.
- Drone must follow track and cannot shortcut the path to gain advantage.
- Teams are not allowed to assist to a personal drone physically besides by manipulating with remote control.
- Dropped box is remained on the ground until teams session ends.
- Teams that delivered and placed precisely every box are awarded with following points:
 - The fastest team – 25 points
 - 2nd fastest team – 18 points
 - 3rd fastest team – 15 points
 - 4th fastest team – 12 points
 - 5th fastest team – 10 points
 - 6th fastest team – 8 points
 - 7th fastest team – 6 points
 - 8th fastest team – 4 points
 - 9th fastest team – 2 points
 - 10th fastest team – 1 points
 - Others – 0 point

2.3 Deductions:

- Team that get off the track and gains advantage is deducted with +10 seconds.
- Team that ignores track to gain advantage is deducted with 24 points.
- Team that drops a box is deducted with 5 points per drop.
- Team that has purchased a drone \$100 more expensive drone than was proposed is deducted with 10 points.

3. Drone racing (Stage-III)

3.1 Scenario:

The drone racing stage consists of free flight through predefined obstacles and paths. The race is performed in 5 laps and the winner is awarded the one who has biggest number of points. Pilots must stay within all prescribed flight paths. Pilots must adhere to the prescribed launch sequence. No movement before the starting signal. False starts will incur a penalty. Pilots must maintain control of their aircraft at all times and only fly within their skill level. Any pilot who exhibits unsafe flying procedures may be disqualified at any time from the event. Pilots must successfully fly through all gates, flags, and other obstacles on the course. If a pilot misses an obstacle, they must safely turn around and attempt the obstacle again. They will have up to two further attempts before being disqualified from the heat. The Flight Line Director, Race Director or Race Commissioner has the right to disqualify any pilot for any reason if the pilot or piloting behavior is deemed unsafe or if the pilot has breached any rule or regulation within this document.

3.2 Requirements:

- Team must successfully finish the 5 laps of predefined path through obstacles.
- Team must race individually one by one.
- Drone must follow track and cannot shortcut the path to gain advantage.
- Teams are not allowed to assist to a personal drone physically besides by manipulating with remote control.
- Teams that successfully finished the race are awarded with following points:
 - The fastest team – 25 points
 - 2nd fastest team – 18 points
 - 3rd fastest team – 15 points
 - 4th fastest team – 12 points
 - 5th fastest team – 10 points
 - 6th fastest team – 8 points
 - 7th fastest team – 6 points
 - 8th fastest team – 4 points
 - 9th fastest team – 2 points
 - 10th fastest team – 1 points
 - Others – 0 point

3.3 Deductions:

- Team that get off the track and gains advantage is deducted with +10 seconds.
- Team that ignores track to gain advantage is deducted with 24 points.
- Team that performed a false start is awarded a reflight and deducted with 3 points
- Team that has purchased a drone \$100 more expensive drone than was proposed is deducted with 10 points.



Figure 2: Racing a drone over a particular area (FPV Racing Project)

4. Reflight:

- A reflight can be granted when a model cannot be prepared or when the flight cannot be started in the allotted time limit for safety reasons, or is disrupted by external interference.
- If for a reason that is not a competitor's fault, a competitor has been forced to land on request of an official.

- A failure of the model, video system or radio control cannot be considered as reasons for a reflight unless it can be proven that these were caused by external factors beyond the competitors control.
- Incidents during races such as collisions between models or with obstacles cannot justify a reflight.
- Granting of a reflight is the responsibility of the contest director. A reflight leads automatically to a cancellation of the current flight for which he has been granted a reflight.

Report:

1. The cover page of the written report must include project title and full name of participant. The written report must be submitted in MS Word format, (as .doc/.docx file), using "Times New Roman" font size 12 in A4 format. Sample of the project report is provided in the system.
2. The written report must be written in English explaining their drone, its characteristics and providing pictures of it. Based on your report juries are going to decide whether to select or not your project.

Drone specifications:

Due to the reason that current drones are very expensive the juries decided to set some limits and advice participants to get similar model (Syma X8W cost around 120\$) of the drone. The weight must be between 550 gr and 650 gr. Details can be seen from this link <https://goo.gl/XYyajD>



Evaluation of projects and determination of degrees:

In the first phase all projects will be presented. On the second day of the competition participants will have an exam. Participants will be given their points according to these two phases.

Grading Policy:

Based on both stages average points are going to be calculated, and medals will be awarded according to total points grade.

IMPORTANT NOTES:

- 1. In this category there must be only one team member.**
2. Participants must bring their own drones