

Drone Racing Challenge

Fifth International Robo Tech Olympiad 2025

Organized by Robo Tech Valley & Uttara University

About

Drone racing is an electrifying competition where pilots control **high-speed, camera-equipped quadcopters** using **first-person view (FPV) headsets**, allowing them to experience the thrill of flight in real-time. Similar to full-scale air racing, the challenge is to navigate a **predetermined circuit** as quickly as possible, testing both speed and precision.

As part of the **Fifth International Robo Tech Olympiad 2025**, organized by **Robo Tech Valley and Uttara University**, this event will push the boundaries of **aerial maneuvering and real-time decision-making**. Competitors must navigate through a **complex indoor course**, relying solely on **onboard processing and sensing**, as external sensors are not permitted.

Despite the challenges, past teams have successfully utilized **waypoint tracking strategies and precise visual identification of multi-colored gates** to optimize their flight paths. With the **entire race environment pre-mapped**, competitors will have the opportunity to **showcase their expertise in high-speed drone navigation and advanced control systems**.

Eligibility

1. Participants must be undergraduate or polytechnic students, or currently enrolled in a college or school.
2. Teams can consist of **1 to 3 members**.
3. Students from different institutions can form a team together.

Arena Specifications

- Several **400mm x 400mm** boxes will be marked on the ground.
- Participants must take off from a designated box, navigate obstacles, and land in another box through a series of loops, bends, and underpasses.
- The course includes **pillars, loops, bends, and** requiring high levels of control and maneuverability.

Drone Specifications

- The drone must fit within **350mm diagonally** Dimension.



- **Autopilot, sonar, GPS, or obstacle avoidance systems** are strictly prohibited. If detected, the team will be disqualified.
- The drone must be **fully manually controlled**.

- **Pre-built commercial drones** are not allowed; all teams must use custom-built quadcopters.

Spare Parts:

- Participants should bring **extra propellers and chargers** for their drones.

General Rules

- Each team has a maximum of **10 minutes** to complete the track.
- The timer starts once the countdown finishes and stops when the drone lands in the final landing zone.
- **Trial runs are not allowed** before the race.
- Misconduct or violation of rules may result in **Disqualification**.
- The **judges' decision is final** in case of disputes.
- The organizing team reserves the right to **modify any rules** as necessary, with updates being communicated on the official event website.

□ Obstacle Passing: For passing a rectangular obstacle 25 points will be given (K) For passing a triangular obstacle 40 points will be given (L) • For passing a ring-shaped obstacle 35 points will be given (M) For passing a U-shaped obstacle 25 points will be given (N) □ Bonus Point: For successful completion of each lap will be awarded with 50 points. (Q) For successful landing after the crossing of the finishing line will be awarded with 75 points. (R)
Total obstacle passing and bonus point:

$$P_b = 25*K + 40*L + 35*M + 25*N + 100*Q + R$$

Time Count: For a given time T second if the drone takes t second to finish the track, It will have points of :

$$P_t = 5 \cdot (T - t)$$

K, L, N, M, R, Q, are the number of successful attempts. □ Penalties:
Colliding with any obstacle will result in a penalty of 20 points (m).
Skipping any obstacle will result in a penalty of 20 points (n).
Every restart will result in 20 point deduction (l).

Total Penalty :

$$P_p = 20 \cdot n + 20 \cdot m + 20 \cdot l$$

n, m are counts of failure.

Total Point Calculation

$$P_{total} = P_b + P_t - P_p$$

Awards & Prizes

- **Champion: 20000 BDT**
- **Runner-Up: 10000 BDT**
- **2nd Runner-Up: 5000 BDT**