AUTONOMOUS DRONE MISSION

INTRODUCTION

The Autonomous Drone Mission is designed to test the ability of UAV systems to operate independently in structured environments. This competition focuses on developing drones that can perceive surroundings, process data, and execute precise movements without manual control. It reflects real-world applications such as surveillance, inspection, and smart navigation, where reliability, accuracy, and autonomy are essential.

PROBLEM STATEMENT

Design and develop an autonomous drone system capable of performing end-to-end navigation within a structured arena without human intervention.

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The drone must be able to take off, detect and interpret environmental cues, and follow a predefined or dynamically assigned path using onboard sensors, vision systems, or programmed algorithms. It should demonstrate stable flight, precise control, and reliable decision-making throughout the mission.

The system must also be capable of avoiding obstacles, reaching designated waypoints with high accuracy, and executing controlled hovering at specific checkpoints.

DRONE SPECIFICATIONS

- Recommended flight time: 20 minutes (not a strict condition; no marks deduction)
- Frame size: 300-550 frame, max 10 inch propeller
- It should have a strong receiver and transmitter to operate in small spaces with walls and other structures that can potentially block signals.
- Battery Voltage <= 24 V

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ABSTRACT SUBMISSION

The participating teams must submit an abstract of their drone's concept, in online mode. This should include its configuration, design, features, estimated cost, and an approach to tackle the problem statement. The teams must compile all this information in a PDF file. If any extra files are to be included, the submission must be in the form of a ZIP file. Please note that the files submitted should NOT be password-protected or corrupted. In either of the cases, the submissions would be straightly rejected.

GUIDELINES FOR ABSTRACT SUBMISSION

Rough sketches of your idea including the Design Report of your model. The abstract must specify the use of software and the mechanism used in the design analysis of the drone.

- USPs (Unique Selling Propositions) of your design and innovations made by you should be mentioned in the report and mention how they are going to tackle the specific challenges.
- An abstract of the idea needs to be uploaded on the Dronotics website before the deadline.
- The abstract should not exceed 500 words and should include the following details of all team members along with the Team.

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Cover Page Details:

The cover page of the submission must include the following details:

Team Leader Details

Team Name.	**Team Leader Name**
College / Institute Name	**Year of Study**
Email ID	**Phone Number**

Other Team Members

- Name(s) of all team members

File Naming Convention:

The file must be submitted in the following format:
<TeamName>-<LeaderName>-<CompetitionName>.pdf
Example:
CCU-YashAggarwal-AutonomousDroneMission.pdf

Submission Email

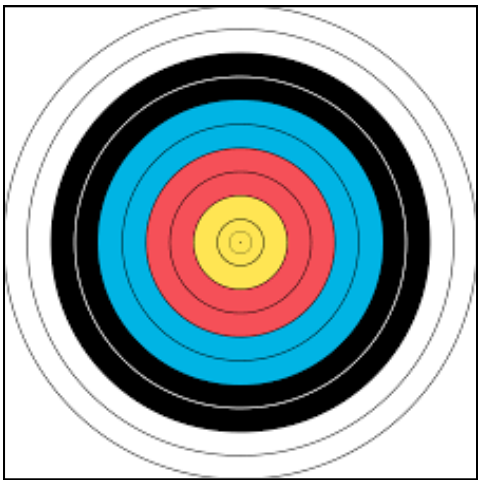
The abstract/design report must be mailed to:
dronoticsjiit128@gmail.com

Important Note

- Only PDF format submissions will be accepted.
- Files must not be corrupted or password-protected.
- Any submission not following the naming convention may be rejected.

ROUND 1

In this round, participants will need to completely map an arena of size 15mX10m using a camera by manually flying their drone within an altitude of 6 meters.
Teams need to detect targets (each of them will be identical) and generate target locations using their mapping logic. The no. of targets will be revealed on the day of the round.
The target will be an image of 2m in diameter.
You will have 5 minutes to finish round 1.



GUIDELINES FOR ROUND 1

Just before the start of Round 1, there will be an inspection round for each team to ensure whether your drone design falls within the constraints or not. In case it's not, some penalty will be imposed on the overall marks (Round 1 + Round 2).
Any increment in frame size will directly impose a 10% penalty.
For every 2-minute increment in the mapping task, there will be a 5% penalty in Round 1 marks.

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ROUND 2

The round will consist of teams covering the waypoints within the mapped region in the fastest way possible autonomously. Utilization of a mission planner is strictly prohibited and teams are required to develop a control system to reach the waypoints and hold the position for 5 sec before going towards the next waypoint.
Teams will be marked based on the time taken to complete the task, the number of waypoints reached, and how accurately the drone reaches the position.
The GPS coordinates of drones will be cross-verified with the actual waypoint provided by a referee at the site and marking will be done accordingly.

SCORING CRITERIA

Round 1 will be of 100 Marks.
Successful mapping will be 20 marks.
Detection of waypoints will be of 80 marks.
Round 2 will also be of 100 marks.
(100 marks for round 2 will be distributed equally for reaching each waypoint)
In case teams reach equal waypoints then ranking will be done based on the overall time taken to cover the waypoints.

Note: The organizers reserve all rights to change any or all of the above rules.

All metrics have not been disclosed and will be specified on day of event.

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