Drona Aviation Pvt. Ltd.
Contact: +91-7208255431 | **Email**: info@dronaaviation.com

RULE BOOK

INTER IIT TECH MEET 14.0

Address: Unit 111 Second floor, Punjani Industrial Estate Khopat Thane - 400601 | CIN: U29219MH2014PTC259689

Drona Aviation Pvt. Ltd.
Contact: +91-7208255431 | **Email**: info@dronaaviation.com

RULE-BOOK

PS: Control System for Drone Stabilization and Precision Motion

1. Overview

This challenge requires teams to build a complete **stabilization and precision motion control system** for the Pluto drone. The system must achieve stable hover, altitude consistency, and precise 10–20 cm micro-movements using on-board computation only.

The drone must rely solely on the following onboard sensors:

- Optical Flow
- Time-of-Flight (ToF)
- IMU
- Barometer

All computation must run within **MagisV2 firmware**.

2. General Rules

1. Teams must use only the official drone, MagisV2 firmware, and provided sensors.
2. No external computation (laptop, cloud, phone), motion tracking, or external sensors are allowed.
3. Stick inputs must map to **discrete displacement commands**, not continuous velocity control.
4. Code must be written for real-time microcontroller constraints.
5. Unsafe flight or uncontrolled behavior leads to immediate disqualification.

3. Allowed & Not Allowed

3.1 Allowed

- Custom MagisV2 firmware modifications
- Custom filtering & control designs
- PID tuning
- Debug overlays / dashboards
- Well-structured modular code

3.2 Not Allowed

- Offboard computing
- External sensors (lidar, cameras, motion capture)
- Physical modification of drone hardware
- Adding markers, weights, reflectors
- Continuous RC-like movement mapping

4. Task Requirements

4.1 Hover Stability

The drone must:

- Take off via a single trigger
- Enter stable hover mode
- Hold X-Y-Z position

- Maintain altitude up to **2 meters**
- Resist disturbances and recover quickly

4.2 Precision Micro-Movement

Each stick input must trigger a **10–20 cm** movement:

- Pitch → forward/back
- Roll → left/right
- Throttle → up/down

The system must ensure:

- Smooth acceleration & deceleration
- No overshoot (±2 cm tolerance)
- Clean stop and instant hover at new point
- Ignoring accidental micro-stick noise

5. Sensor Fusion Requirements

A robust fusion of the following is required:

- Optical Flow
- ToF
- IMU
- Barometer

Fusion must remain stable across:

- Low-texture floors
- Lighting variations
- Optical flow dropouts
- ToF noise at height
- Micro-vibrations
- Slow yaw rotation

Graceful degradation is mandatory.

6. Failure Conditions (Resulting in Disqualification)

- Continuous drifting with no correction
- Oscillatory or unsafe flight
- Overshoot during micro-movements
- Dependence on external devices
- Movement directly proportional to stick input
- Sensor spoofing or hardware changes

7. Judging & Evaluation

Teams will be evaluated based on:

- Stability and Precision
- Control system Design
- Sensor fusion Quality
- Engineering Innovation
- Documentation and presentation

.