

INNOVATEX 4.0 – Presidency University

MakerSpace Cluster | Standard Rule Book Format

Event Overview

Field	Details
Event Name	Cansat compitation
Cluster	Vikasana
Event Type	compitation
Mode	Offline
Team Size	Team of 4-5 Members
Duration	Multi-day

CANSAT COMPETITION RULE BOOK

Hosted by Presidency University, Bangalore

Academic Year 2024–25

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Note-All the rules are subjected to change at the discretion of the organizers and the judges if deemed necessary

1. Introduction

The CANSAT Competition hosted by Presidency University, Bangalore, is designed to expose university students to real-world aerospace engineering challenges. The event simulates an end-to-end space mission at a reduced scale, where each team designs, builds, tests, deploys, and analyzes a functional Can-sized satellite.

This rule book outlines the competition structure, technical requirements, scoring methodology, safety regulations, and submission standards that teams must follow throughout the event.

The objective is to foster innovation, practical engineering skills, and teamwork while maintaining strict safety and performance standards.

Participants will gain hands-on experience in telemetry, avionics, communication protocols, mission planning, and payload design.

All rules in this document are binding. Any unaddressed issues will be resolved by the organizing committee.

2. Mission Profile

Each CanSat will be deployed from an officially authorized drone at an altitude of **100 meters**.

Upon release:

- The system must **activate autonomously**.
- A **single(or custom) parachute deployment mechanism** must deploy immediately.
- No delayed deployment systems are permitted.
- Target descent rate: **3 m/s ± acceptable tolerance**.
- The CanSat must **collect and transmit telemetry at exactly 1 Hz** during descent.
- A **live camera feed (eg.ESP32-CAM)** must stream continuously until landing.
- Telemetry must be transmitted via **Zigbee protocol only**.
- LoRa modules are strictly prohibited.

The mission ends when:

- The CanSat has landed safely,
- The egg remains intact,
- The telemetry packet stream has ceased,
- Complete telemetry logs are stored on the onboard SD card in CSV format.

The SD card must be submitted to organizers immediately after recovery.

3. Technical Requirements

3.1 Physical Constraints

All CanSats must conform to:

- Shape: Cylindrical
- Diameter: **8 cm**
- Body height: **12 cm**
- Parachute housing height: **3 cm**
- Total height: **15 cm**
- Weight: **250–300 grams**

Measurements will be verified using:

- Weighing scale
- Measuring tape

Any deviation may result in disqualification.

3.2 Structural Integrity

- The internal structure must withstand 100 m deployment.
 - Egg must not break upon landing.
 - Electronics must be secured against vibration and shock.
 - No loose components permitted.
 - Battery must be insulated and firmly mounted.
-

4. Telemetry Requirements

Telemetry transmission must occur at **exactly 1 Hz**.

Required telemetry fields:

- CanSat ID
- Mission time
- Temperature
- Humidity
- Latitude
- Longitude

All telemetry must:

- Be transmitted live via Zigbee
- Be logged simultaneously to onboard SD card
- Be saved in strict CSV format
- Match Appendix A structure exactly

Corrupted or incomplete files will receive penalties.

5. Communication System

Permitted:

- Zigbee-compliant modules (2.4 GHz preferred)

Prohibited:

- LoRa
- Unauthorized transmitters

Requirements:

- Reliable communication throughout descent
- Antenna orientation must account for rotation
- Ground station must log RSSI
- Packet loss may reduce scoring

Full communication testing must be documented in CDR.

6. Ground Station Requirements

Allowed setup:

- Only 1 team at a time
- Maximum 2 team members

Ground station must:

- Decode all telemetry fields
- Display real-time numeric values
- Show live graphs for:
 - Altitude
 - Temperature
 - Humidity
 - Pressure
- Save received telemetry in CSV format
- Display live camera feed window
- Provide alerts for:
 - Low battery
 - Signal loss

Teams must ensure full compatibility between onboard Zigbee and ground receiver.

7. User Interface Requirements

The UI must:

- Be clearly readable outdoors
- Display critical values prominently
- Update graphs in real-time (1 Hz)
- Include live camera window
- Include signal quality indicators
- Include battery status at all times

UI screenshots must be submitted in post-flight review.

8. Deployment Rules

- Deployment conducted only by authorized drone operators.
 - Teams must not approach drone during operation.
 - CanSat must remain powered but inactive until deployment authorization.
 - Parachute must deploy instantly upon release.
 - Recovery allowed only after clearance.
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9. Safety Regulations

Strictly prohibited:

- Explosives
- Pyrotechnics
- Hazardous chemicals
- Biological materials
- Unauthorized RF transmitters

Additional requirements:

- Insulated wiring
- No sharp external edges
- Battery protection against short circuit
- Risk assessment submission required during CDR

Unsafe conduct results in immediate disqualification.

10. Team Structure

Team composition:

- Maximum **4-5 students**
- Faculty mentor permitted (advisory only)

Mentors may guide but must not physically build or program the CanSat.

Responsibilities must be clearly defined in documentation.

11. Design Reviews

CDR – Critical Design Review (March – Last Week)

- Final mechanical drawings
- Circuit schematics
- Wiring diagrams
- Software architecture
- Telemetry format compliance
- Testing images & videos(if there)

△ Final CanSat must match CDR exactly. Any deviation may result in disqualification.

FRR – Flight Readiness Review

- System validation
- Safety documentation
- Communication test results
- Telemetry verification

Late submissions incur penalties.

12. Scoring Criteria (Revised)

- Mission Performance (Safe descent + egg intact): 40%
 - Telemetry Reliability (1 Hz strict compliance): 20%
 - Communication Stability (RSSI + packet integrity): 10%
 - UI Quality & Real-Time Visualization: 10%
 - Structural Integrity & Engineering Design: 10%
 - Post-Flight Analysis & Data Quality: 10%
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13. Post-Flight Review

Teams must submit:

- PowerPoint presentation
- Telemetry graphs (from SD CSV)
- Camera snapshots
- UI screenshots
- Data analysis
- Anomaly explanation

Time limits must be respected.

14. Submission Formats

- Telemetry file: telemetry.csv
- Post-flight presentation: postflight.pptx
- Design document: design.pdf or design.docx

Incorrect formatting may result in penalties.

Appendix A – Mandatory Telemetry Format

CANSAT_ID, MISSION_TIME, PACKET_NO, TEMPERATURE, PRESSURE, HUMIDITY,
SAT_COUNT, TIMESTAMP, LATITUDE, LONGITUDE, ALTITUDE, BATTERY_PERCENT,
GYRO_X, GYRO_Y, GYRO_Z, ACCEL_X, ACCEL_Y, ACCEL_Z,
PITCH, ROLL, YAW, CAMERA_STATUS, STATUS_FLAG, RSSI

Appendix B – Example Telemetry Line

NCF-CANSAT-01, 13:00, 1, 28.50, 100325.12, 62.4, 7,
13:25:25.2, 17.385, 78.486, 98.2, 87,
0.12, -0.08, 0.95, -0.02, 0.01, 9.81,
3.4, -1.2, 45.6, ON, FLIGHT, -62

If you want, I can now:

- Build the full **CDR technical document**
- Design the **Zigbee communication architecture**
- Calculate exact **parachute diameter for 3 m/s**
- Create a **complete system block diagram**
- Draft the **power budget calculation**
- Design a professional **ground station UI architecture**

Tell me the next technical deliverable you want prepared.