SATELLITE WAR

DESIGN • COMMUNICATE • SURVIVE

Official Competition Rule Book & Technical Specifications

01. THE MISSION TASK

Participants are required to build a fully autonomous satellite node. This system must utilize a designated microcontroller and sensor array to establish a reliable communication link with the organizer's **Ground Station**.

- **Phase I:** Build a functional satellite node with specified sensors.
- **Phase II:** Establish an autonomous handshake with the organizer's terminal.
- **Phase III:** Maintain a telemetry stream under simulated mission duress.

02. SYSTEM ARCHITECTURE

[SATELLITE NODE] ⟷ **[GROUND STATION]**

Team-Built Hardware — **LORA RF LINK** — Organizer Control

MANDATORY HARDWARE SPECIFICATIONS

3.1 FLIGHT CONTROLLER

Teams must select exactly ONE from the following:

- Arduino Uno / Nano
- ESP32 (Recommended)
- STM32 (Blue Pill or Equivalent)

Note: Raspberry Pi and OS-based SBCs are strictly forbidden.

3.2 RF MODULE

All communication must occur via:

- **LoRa (SX127x series only)**

Strict bi-directional capability is required for the handshake protocol.

3.3 MANDATORY SENSOR ARRAY

Every satellite node **must** include and transmit data from:

01. IMU	02. PRESSURE	03. ALTITUDE	04. CURRENT

SOFTWARE MISSION LOGIC

The satellite firmware must implement the following cycle autonomously:

A. **Handshake:** Locate and connect to the organizer's base station.

B. **Telemetry Stream:** Continuous transmission of all mandatory sensor data.

C. **Command & Recovery:** Respond to a **RESET** command sent from Ground Control. The system must reboot and re-establish the link without human intervention.

05. CREATIVITY HUB

Payload Design: Beyond the mandatory sensors, teams are encouraged to define a specific mission (Earth Observation, Disaster Monitoring, etc.) and add relevant sensors (Camera, Gas, Light).

Satellite Mimicry: Higher marks are awarded for mimicking real satellite behaviors such as power-saving safe modes, anti-jamming logic, or data encryption.

06. GROUND RULES

- **! NO LIVE CODING:** No reprogramming is permitted at the venue once testing starts.
- **! NO HARDWARE MODS:** Soldering or wiring changes are forbidden during the test window.
- **! NO LAPTOPS:** Testing is strictly autonomous. No serial monitor connection allowed.

LIVE EVALUATION & SCORING

CATEGORY	EVALUATION METRIC	MARKS
Purpose & Payload	Mission clarity, real-world relevance, payload justification.	**30**
Functionality	Working hardware, autonomous operation, zero manual reset.	**25**
Communication	100% command reception, telemetry accuracy, protocol compliance.	**25**
Inspection	Physical build: **Soldering quality, assembly**, design skills.	**10**
Presentation	Architecture explanation, decision defense, and Q&A.	**10**
	TOTAL POTENTIAL MARKS	**100**

08. TERMINATION (DISQUALIFICATION)

The following actions result in immediate mission failure:

- Live Code Editing or Hardware Rewiring during test.
- Manual Reset during the scoring window.
- Failure to comply with the fixed communication protocol.

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