2026 GAME MANUAL - COMPETITION RULES SUMMARY

LIGNUM NATIONAL ROCKETRY COMPETITION | Caribbean Apex Challenge | Morant Point, Jamaica | August 16, 2026

WHAT IS THIS COMPETITION?

The LNRC Caribbean Apex Challenge is a student rocketry competition. Teams design, build, and fly a precision rocket to reach exactly 300 metres altitude, deploy a miniature satellite payload (PicoSat), and safely recover all flight hardware including an intact raw egg.

This is a precision engineering challenge. The winner is determined by combined performance across altitude accuracy, landing prediction, and payload data quality. Lower score = higher ranking.

KEY DATES

Milestone	Date
Q&A System Opens	May 30, 2026
Team Registration Opens	May 16th 2026
Kit Distribution	July 2026
Competition Day	Aug 16, 2026

TEAM & ELIGIBILITY

- Minimum 2 members per team. No maximum team size.
- Members do not have to be students. No faculty advisor required.
- Registration is free. No registration fee.
- Register at www.lignumpropulsion.com
- No registration fee - participation is free

ROCKET REQUIREMENTS - CHOOSE YOUR AIRFRAME CLASS BEFORE REGISTRATION

Parameter	2-Inch Class	3-Inch Class
Body Tube Inner Diameter	2.0 in (50.8 mm)	3.0 in (76.2 mm)
Height Range	90 cm to 168 cm	90 cm to 168 cm
Motor Mount Inner Diameter	34 mm	34 mm
Recovery System	Dual (required)	Dual (required)
Trade-off Note	Less drag, tighter internal volume	More internal space, more drag to manage

- Fins: symmetrically spaced and securely bonded with epoxy fillets; static stability margin min 1.0 calibre. No fin shape or count requirement.
- Permitted airframe materials: cardboard tube, fibreglass, PVC, plywood, balsa, corrugated plastic
- Avionics bay: minimum 2 pressure equalisation holes (min 1/8 inch diameter)
- Recovery harness: Kevlar or nylon, minimum breaking strength 300 N

WARNING: All rockets must pass full technical inspection by the Lead Rocket Inspector (LRI) before launch. Failure to pass forfeits the assigned launch window.

STANDARDISED MOTOR - LP-KNSB-34-165 (3 MOTORS ISSUED PER TEAM (for test flights + competition day))

Propellant	Casing OD / Length	Avg Thrust / Burn	Total Impulse / Class
KNSB composite propellant	34 mm OD / 165 mm	~79 N / ~0.84 seconds	~69 Ns / F-class

WARNING: Never modify, disassemble, or substitute the issued motor. Report any dropped or damaged motor to officials immediately. Improper motor handling = immediate disqualification.

PICOSAT PAYLOAD

Every team must design and fly a PicoSat. It is ejected from the rocket at apogee by the onboard avionics flight computer, then descends independently and logs atmospheric data throughout.

Physical & Electronics

- Shell built from competition kit materials
- Arduino Nano (provided in kit) as primary flight computer
- Calibrated barometric pressure sensor
- Temperature sensor for ambient air
- Humidity sensor for relative humidity
- Independent recovery device (parachute or streamer)
- All electronics secured for minimum 15G axial acceleration
- Independent battery power from the moment of arming

Data Logging (all mandatory)

- Altitude from barometric pressure - min 1 Hz throughout descent
- Ambient air temperature
- Relative humidity
- Timestamp for every data point (referenced to ejection)
- All data stored on SD card

Post-Flight Submission

- Raw dataset must be submitted to judges
- Clearly labelled graphs of all three sensor streams required
- Submit at the post-flight data submission window on competition day

EGG PAYLOAD - STRUCTURAL INTEGRITY CHALLENGE

- Carry one Grade A large chicken egg, inspected and marked by a Technical Advisor before loading
- Egg must remain raw and untreated - no hard-boiling, chemical treatment, or coating of any kind
- Design a dedicated, easily accessible compartment within the airframe to house the egg
- Success: egg is recovered with no cracks or leaks visible to the naked eye

> **WARNING:** A cracked egg with no leakage is assessed at the Lead Rocket Inspector's sole discretion. The LRI's decision is final.

SCORING SYSTEM - LOWER FINAL SCORE = HIGHER RANKING

Final Score = (Altitude Penalty + Accuracy Penalty) minus Bonuses Earned

Altitude Tiers - Apogee Target: 300 m

Tier	Altitude Range	Score Effect
PERFECT	290 m to 310 m	minus 1,000 pts (maximum bonus)
HIGH	250-289 m or 311-350 m	minus 500 pts
MID	200-249 m or 351-400 m	minus 300 pts
BASELINE	100-199 m or 401+ m	minus 100 pts
DISQUALIFIED	Below 100 m or total vehicle loss	0 pts (no bonus)

Landing Accuracy Penalty

Before launch, each team submits a Predicted Landing Coordinate (PLC) - the exact location where they expect the PicoSat to land. This cannot be revised after submission.

Accuracy Penalty = D x 10 (D = metres between PLC and actual PicoSat landing location)

Example: 10 m off target = 100 penalty points | 25 m off = 250 penalty points | 50 m off = 500 penalty points

Payload Bonuses (subtracted from score)

Bonus	Condition to Earn It	Points Subtracted
Structural Integrity Bonus	Egg recovered with no cracks or leaks	minus 500

Bonus	Condition to Earn It	Points Subtracted
PicoSat Data Excellence Bonus	Complete, clean dataset covering full descent	minus 500
PicoSat Graph Quality Bonus	Well-labelled, clearly presented graphs submitted	Up to minus 200

SAFETY & CONDUCT

- Dual recovery is mandatory: rocket body and PicoSat each need independent recovery systems
- All electronics must be disarmed before transporting rocket to the launch rail
- Only the Launch Director may authorise arming on the launch rail
- All personnel must clear the Hot Zone before countdown begins
- Any component striking the ground without a deployed parachute = disqualification
- No pyrotechnic material other than the issued motor is permitted
- Repeated or serious violations = disqualification from launches and awards
- Attendance at opening briefing AND awards ceremony is mandatory for all teams

WARNING: The Event Director has final authority on all safety matters. The Range Safety Officer's determination of flight safety is final and cannot be appealed.

POST-INSPECTION MODIFICATIONS

Any change made after passing inspection requires a new inspection - EXCEPT these permitted changes:

- Addition, relocation, or removal of fasteners (cable ties, tape)
- Addition, relocation, or removal of labelling or markings
- Revision of flight software or data logging code
- Replacement of an identical component of the same size, weight, and material
- Any change that does not alter the rocket's size, structural integrity, or safety profile

Questions? lignumpropulsion@gmail.com | www.lignumpropulsion.com | Q&A System opens May 30, 2026. Moderators answer questions each Monday and close the weekly cycle on Thursday at 12:00 p.m. Jamaica Time.

Non-Kit Components: Teams may use items not in the kit. Any component not addressed in the full manual must be approved via the Q&A system. Teams may also request 3D-printed parts from Lignum Propulsion through the Q&A system. This document is a summary only. The 2026 LNRC Game Manual is the authoritative document for all rules and requirements. All teams must read the full manual.