WORLD SPACE WEEK 2026

Reusable Solid-Propellant Rocket Challenge (Autonomous Landing)

COLLEGE-LEVEL COMPETITION

ORGANISED BY

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OFFICIAL COMPETITION GUIDELINES

Technical Specifications, Rules & Regulations, and Judging Criteria

Document Type	Competition Guideline — Official Release
Category	College Level
Event Window	5th October 2026
Venue	Haldwani, Uttarakhand
Organized By	Astroverse Experience Pvt Ltd

1. Preamble & Purpose

This document defines the technical, safety and operational requirements for the Reusable Rocket Competition 2026. It is intended to provide teams, mentors, technical officials and safety personnel with a common set of requirements for the design, inspection, launch, recovery and reuse of reusable rockets.

The competition emphasizes aerospace-system engineering, structural integrity, aerodynamic stability, propulsion safety, avionics, Autonomous recovery, landing performance, engineering design and post-flight reusability. Safety takes priority over competition performance at all times.

The competition is mission-based: the rocket must demonstrate ascent, verified apogee, Autonomous recovery, controlled descent, landing and a condition suitable for safe reuse.

2. Competition Objective

The objective of the competition is to design, build, launch, recover, and safely reuse a rocket demonstrating an operational Thrust Vector Control (TVC) system.

The rocket must:

- Demonstrate active thrust-direction control during flight.
- Reach a minimum verified altitude of 15 metres.
- Recover safely.
- Land within the designated landing/recovery zone.
- Be substantially intact and capable of subsequent flight after inspection and replacement of permitted consumable components.

3. Rocket Requirements

- The rocket must be reusable and designed for controlled recovery.
- A functional TVC system is mandatory.
- The TVC system must actively control the rocket's thrust direction during flight.
- The rocket must achieve a minimum verified altitude of 15 m.
- The rocket must land within the designated recovery/landing zone.
- No remotely guided flight or external physical assistance after launch is permitted unless specifically authorised by the organiser.

4. Mandatory TVC Information

Each team must clearly provide the following information regarding its TVC system:

- Number of control axes

- Maximum commanded deflection
- Control-system architecture
- Flight computer
- Sensors
- Actuators
- Power system
- Fail-safe behaviour
- Emergency/abort behaviour

5. Reusable Motor & Airframe Requirement

The airframe/vehicle must be reusable; the motor itself is not necessarily required to be reusable.

The recovered rocket should be substantially intact and capable of a subsequent flight following inspection and replacement of permitted consumable components.

Competition officials may inspect:

- Motor casing
- Closures
- Nozzle
- Mounting system
- TVC interface
- Thermal/structural damage
- Fasteners and seals

A motor must be re-qualified after significant damage, modification, or abnormal firing.

6. Motor Categories

Category A — Certified Commercial Motor

- Factory-manufactured and commercially available.
- Must have documented thrust and total-impulse characteristics.
- Motor selection may be based on rocket mass, dimensions, aerodynamic characteristics and mission requirements.
- The motor must not be physically modified except where permitted by the manufacturer and competition rules.

Category B — Competitor-Developed Motor

- Designed and manufactured by the competing team.
- The team must provide the proposed propellant composition for safety review.
- The motor must be designed according to the rocket's weight and required thrust/impulse.
- The motor must pass independent inspection and static-test qualification before flight.

Motor Weight Limit

The complete motor assembly, including casing and propellant, must weigh less than 500 g (0.5 kg).

7. Motor Datasheet

Each team must submit a Motor Data Sheet containing:

- Motor manufacturer/designator
- Motor category
- Total impulse
- Average thrust
- Peak thrust
- Burn duration
- Motor mass
- Propellant mass
- Motor dimensions
- Expected thrust-time curve
- Static-test report for competitor-developed motors
- Motor serial number

8. Rocket Technical Details

Teams must provide the following technical parameters:

- Liftoff mass
- Rocket length and maximum diameter
- Centre of Gravity (CG)
- Centre of Pressure (CP)
- Predicted stability margin
- Predicted maximum velocity
- Predicted maximum altitude
- Predicted maximum acceleration
- Predicted landing velocity
- Motor thrust curve
- TVC authority
- Recovery configuration
- Propellant/motor mass before and after test

Submitted calculations, simulations and test data should support the stated values.

Measured motor results will become the official motor data used for flight approval.

9. Launchpad & Ground Equipment

- Each team must design and construct its own launchpad/launch-support system.
- The launchpad must provide stable rocket support, safe ignition and adequate clearance.
- The organiser must inspect and approve the launchpad before launch.
- Remote ignition must be used.
- A clearly defined safety perimeter must be maintained.
- No person may remain inside the designated launch exclusion zone during ignition or launch.

10. Mandatory DPR Submission

Before flight, every team must submit a Detailed Project Report (DPR) containing:

1. Rocket objectives and design overview
2. System architecture and major specifications
3. CAD drawings/files of the rocket and launchpad
4. TVC design, control concept and electronics overview
5. Recovery-system description
6. Propulsion-system information, including proposed propellant composition
7. Structural/material information
8. Mass and dimensional data
9. Testing and verification records
10. Flight plan and expected performance
11. Team members and individual responsibilities

The organiser may request additional drawings, calculations, test evidence or safety documentation before granting launch approval.

11. Judging Criteria & Scoring

The rocket will be evaluated on the following criteria:

Judging Criteria	Evaluation Focus
TVC Control Performance	35
Successful Flight	20
Guidance/Trajectory Accuracy	15
Recovery	10
Reusability	10

Engineering/Design Documentation	10

12. Disqualification Criteria

A team may be disqualified for:

- Failure to meet mandatory flight requirements
- Unsafe operation or violation of the safety perimeter
- Unauthorised propulsion materials or configuration
- Misrepresentation or concealment of design information
- Deliberate interference with another team's equipment
- Launching without official approval
- Failure to submit required documentation

13. Final Flight Approval

A rocket will be permitted to fly only after completion of the required technical inspection, documentation review, launchpad approval, motor qualification requirements, and safety checks specified in these guidelines.

The organiser reserves the right to withhold launch approval where the submitted system does not satisfy the stated competition requirements.

IMPORTANT NOTE	Teams that submit a **CAD (Computer-Aided Design) model/drawing of their rocket** along with the project documentation may be awarded **additional bonus points** under the judging criteria. The CAD model should clearly represent the final rocket design and major components. Bonus of 10 score will be credited for successful design of CAD file.