

WORLD SPACE WEEK 2026

PARACHUTE WATER ROCKET CHALLENGE

SCHOOL-LEVEL COMPETITION

ORGANISED BY



COLLABORATION & AFFILIATIONS



OFFICIAL COMPETITION GUIDELINES

Technical Specifications, Rules & Regulations, and Judging Criteria

Document Type	Competition Guideline — Official Release
Category	School Level (Classes as notified by the Organizing Committee)
Event Window	4th October 2026
Venue	Haldwani, Uttarakhand
Organised By	Astroverse Experience Pvt Ltd

1. Preamble

Astroverse Experience Pvt. Ltd., in association with Astropathshala, is pleased to host the Parachute Rocketry Challenge as part of World Space Week 2026. The challenge combines water-rocket engineering with controlled parachute recovery, electronics, sensing and data collection. Participants shall design a rocket capable of stable flight and successful deployment of one or more parachute recovery systems while demonstrating engineering, electronics and data-collection skills. This document constitutes the official guideline for the competition.

2. Objective

To engineer a water-propelled rocket featuring an integrated autonomous guidance and recovery payload, designed to achieve higher altitude and execute a controlled parachute deployment for a stable landing.

3. Eligibility & Team Composition

- Teams must register within the official registration period (15 August – 15 September 2026)
- Eligible classes: VI to XII.
- Team size: 1–3 students .
- All participants shall comply with technical, safety and launch instructions.

4. Technical Specifications

4.1 Pressure Vessel & Bottle

Participants may use suitable 2 L PET beverage bottles. The supplied specification explicitly lists Fanta, Coca-Cola and Sprite as examples. Every bottle remains subject to technical inspection.

Parameter	Specification
Capacity	2.0 L
Examples	Coca-Cola, Sprite, thumbs up
Condition	No cracks, cuts, deep scratches, deformation, heat damage or chemical damage
Approval	Organizer/Technical Team approval required
Prohibited	Glass or otherwise unsuitable/damaged pressure vessels

4.2 Launcher Interface

Parameter	Specification
PVC Pipe Diameter (Launcher)	22.5 mm
Recommended launch interface	Approximately 23 mm, compatible with official launcher
Launch control	Official Technical Team

Participants shall not independently modify, pressurize or operate the launcher.

4.3 Rocket System & Customisation

Participants may customize the following, subject to inspection:

- Nose cone
- Fins and fin geometry
- Body configuration
- Payload/satellite module
- Recovery mechanism
- Electronic payload
- Sensors
- Data-logging system
- Parachute design

4.4 Recovery System

Parameter	Specification
Main Rocket Parachute	Slows the descent of the primary rocket body and enables safe recovery.
Payload/Satellite Parachute	Separate recovery system for the payload/module, demonstrating a multi-stage recovery concept.

Parachute lines shall be securely attached and the deployment path shall remain clear of tangles and obstructions.

4.5 Electronic Payload

Students may optionally incorporate an electronic payload for approved sensing, logging and/or telemetry. Sensors such as temperature, pressure or IMU sensors are optional and are not mandatory for participation.

- Altitude measurement (optional)
- Flight-time measurement (optional)
- Temperature sensing (optional)
- Pressure sensing (optional)
- Data logging (optional)
- Telemetry/transmission (optional)

The exact electronics and deployment architecture shall be student-designed but technically approved before launch. Any electronic or mechanical parachute-deployment system must undergo a ground test and technical inspection before flight. Successful payload integration and data collection will be considered as a bonus for Judging criteria.

4.6 Electronics Implementation & Deployment Architecture

For a clear, repeatable mechanism, teams may use a non-pyrotechnic electrically actuated recovery system. An equivalent architecture may be proposed subject to Technical Team approval. You may use the necessary controller, altitude sensor, data logger, actuator, telemetry etc.

4.7 Deployment Mechanism Requirements

- Use a controlled mechanical release such as a servo-operated latch/hatch.
- No pyrotechnic, explosive, incendiary or chemical deployment mechanism is permitted.
- The release must remain positively retained during launch acceleration.
- The parachute compartment must provide a clear deployment path.
- The mechanism must be repeatedly ground-testable.
- Any alternative or backup mechanism requires Technical Team approval.

4.8 Electronics Wiring & Mounting

- Securely mount all boards, batteries, sensors and wires.
- Use strain relief on wiring.
- Protect battery terminals against accidental short circuits.
- Protect electronics from direct water exposure unless specifically designed and approved for it.
- Secure the actuator against vibration-induced release.
- Do not allow electronics or wiring to obstruct parachute deployment.

4.9 Mandatory Ground Test

Before launch, the complete electronics/recovery system shall demonstrate:

1. Power-up/self-test.
2. Sensor response.
3. Data logging.
4. Simulated launch input or launch-detection check.
5. Simulated deployment condition.
6. Actual actuator and release operation.
7. Parachute extraction/opening test where practicable.
8. No unintended deployment during handling.

A repeat test may be required after any modification to the mechanism, wiring, electronics or parachute packing.

5. Mandatory Pre-Launch Preparation Protocol

5.1 Install the Recovery System

1. Install the main parachute and, where applicable, payload/satellite parachute.
2. Verify secure attachment and untangled lines.
3. Verify free operation of the recovery compartment.

5.2 Electronic System Check

1. Power supply
2. Sensors
3. Data logging (optional)
4. Deployment mechanism
5. Connections
6. Controller/arming state

5.3 Approved Atomizer/Launch System

Where applicable, install the organizer-approved atomizer/system under instructor supervision.

5.4 Seal & Reinforce

1. Inspect joints, attachments and seams.
2. Confirm the recovery compartment stays closed until intended release.
3. Confirm no component can detach unintentionally.

5.5 Balance Test

1. Check that the Centre of Gravity (CG) lies ahead of the Centre of Pressure (CP).
2. Confirm fin alignment and secure attachment.
3. Confirm payload/electronics do not create unsafe imbalance.

5.6 Label Rocket

- Team name/code
- School name/code
- Bottle size
- Payload/module identification

5.7 Fill Water & Final Launch Control

1. Use organizer-prescribed water quantity.
2. The rocket remains sealed and under Technical Team control until launch.
3. Launch pressure is standardized at 110 PSI and controlled by the official Technical Team.
4. The electronics and recovery system must be in approved launch-ready state before pressurization.

6. Safety Regulations & General Rules of Conduct

- Follow all Organizing Committee and Technical Team instructions.
- Only authorized personnel control filling, pressurization and launch.
- 110 PSI is the standardized launch pressure and is controlled exclusively by the Technical Team.
- Do not approach or adjust a pressurized rocket.
- No launch without approved recovery/electronics inspection and ground test.
- Pyrotechnic, explosive, incendiary and chemical deployment systems are prohibited.
- Glass, damaged or unsuitable pressure vessels are prohibited.
- Secure and protect batteries/electronics from short circuits.
- Keep the launch/recovery zone clear of unauthorized personnel.
- Unsafe rockets or systems shall be withheld from launch.
- Technical and safety decisions of the Technical Team/Range Safety authority are final.

7. Judging Criteria & Evaluation

Judging focuses on the recovery objective of this category.

7.1 Main Body Parachute Deployment

- The parachute deployed successfully.
- The parachute opened correctly.
- Descent was controlled.

- The rocket body was safely recovered.

7.2 Payload/Satellite Parachute Deployment

- Payload separated successfully.
- Payload parachute deployed.
- The payload was safely recovered.

7.3 Flight Stability & Flight Time

- Stability during ascent
- Controlled trajectory
- Recovery performance
- Duration of flight

7.4 Engineering & Innovation

- Recovery-system design
- Electronics integration
- Payload design
- Innovation
- Quality of engineering
- Reliability

8. Project Report Submission

Project Report Submission is mandatory for every participating team. The report shall document design approach, construction, electronics architecture, recovery mechanism, testing, modifications and final performance.

8.1 Electronics Documentation

- Electronics block diagram
- Controller/sensor list (where electronics are used)
- Power arrangement
- Deployment mechanism
- Deployment logic/flowchart
- Ground-test results for the recovery/deployment system
- Flight data, where available and where an electronic data-logging system is used.

8.2 Submission Requirements

- Online Submission: Submit before the competition on the organizer-specified date.
- Competition-Day Submission: Bring one printed copy.
- Final Details & Specifications: Verify required height, mass, dimensions and final results after inspection.
- Physical Submission: Submit the verified final copy to organizers.
- Online and physical copies must correspond to the final competition entry.