ASRW 2026

Guidelines for Design Review

sloshing@euroavia.eu

EUROAVIA

EXECUTIVE SUMMARY

Guidelines for Design Review in the final stage of the Airbus Sloshing Rocket Workshop 2026

Table of Contents

1 Scoring

The scoring of the Final Event will be decided based on the following:

- 70% Flight Performance
- 20% Design Review
- 10% FDR marking from Ansys and MathWorks (names sorted in alphabetical order).

The On-site Design Review will take place within the first three days of the event, specifically prior to any assembly activities. Teams must defend their design's safety and regulatory compliance to receive judge approval for assembly.

2 Flight Performance

Flight performance shall be awarded based on the following scoring formula:

$$\text{Flight Score} = \left(\sqrt{\text{Horizontal Distance (m)}^2 + \text{Altitude (m)}^2} + \text{Time (s)}\right) \times \frac{\text{Payload (kg)}}{\text{Takeoff Weight (kg)}}$$

The metrics are measured with the means below:

- Horizontal Distance: roll tape/roller wheel as primary measurement, backup tape measure.
- Altitude: Altimeter as the primary measurement, with “observer approach” as the backup (used in previous years).
- Time: stopwatch.
- Payload: Weighting scale.
- Take-off Weight: Weighting scale.

The following metrics are measured to confirm compliance with technical regulations

- Vector Dimensions: Tape measure.
- Launch Angle: Large ruler and protractor as the primary measurement, photometric evidence (or phone) as a backup measure.
- Liquid mass for propulsion tank: Weighting scale.
- Propulsion tank pressure: pressure gauge.

3 Demonstration of Compliance

Prior to the flight of the rockets, teams **must** be able to demonstrate the following, as per the Technical Regulations. Suggestions for how to show compliance with the requirements are also listed:

- The weight of the vector shall not exceed 5kg.
- The propellant (water) mass must be less than or equal to the mass of the sloshing liquid.
- Unpressurised sloshing tanks must contain a minimum of 500ml of water. The tank must contain 50% water and 50% air to generate sloshing loads.
    - **Suggestion**: If using a non-transparent sloshing tank, to show compliance, teams can fill the sloshing tank entirely and record the mass of water before pouring out half the mass. A similar process can be used to ensure the propellant mass is not greater than the sloshing liquid mass.
- The minimum cross sectional area should not be less than 50% of the maximum cross sectional area. The maximum cross sectional area is determined by the maximum area enclosed by the outer perimeter (i.e. a “normal” cylindrical tank with a diameter of d will have the same cross sectional area as a hollow cylindrical tank with an outer diameter of d). (This rule applies individually to each XYZ axis. You must satisfy this requirement in all axes (i.e. min(Ax) > 0.5 max(Ax) AND min(Ay) > 0.5 max(Ay) AND min(Az) > 0.5 max(Az)).
    - Teams shall present a CAD model and calculations of the cross sectional area in the Final Design Report and Design Review presentation to demonstrate compliance with this requirement.
- Teams must present sloshing and propulsion tanks to judges for volume verification before they are integrated into the fuselage. Judges may mark or seal verified tanks to prevent alteration.
- No pressurised container shall exceed a pressure of 10 bar (145 psi).
- Verify that the rocket utilizes the mandatory Rectus Type 26 Quick Coupler male fitting.
    - **Suggestion**: If pressurising a container using a bike pump for instance, compliance with this requirement can be demonstrated by showing the pressure dial on the pump to the judges
- Any singular baffle inside the tank cannot cover more than 50% of the cross-sectional area of the tank.
    - Teams shall present in the Design Review presentation a CAD model of their design showing the cross sectional area calculation of the largest baffle to demonstrate compliance with this requirement.

    - The judges reserve the right to request destructive inspections after the launches to ensure compliance (e.g. cutting open the tank). Should there be any non-compliance with Technical Regulations observed, a severe penalty might be imposed including disqualification.
- There will be a mandatory inspection of the water-resistant housing for altimeter protection. The mounting must measure static pressure and protect the device from impact without using tape or adhesives directly on the altimeter.
- The launch angle will be 85 degrees, an offset of 5 degrees from vertical, with a tolerance of +/- 3 degrees.
    - **Suggestion:** A photo of the setup prior to launch will be checked by the judges and the angle measured.
- The following additional points will be checked to show compliance with the rules outlined during the Q&A sessions held during the CDR and FDR phase:
- The liquid in the sloshing & propulsion tanks shall be inspected to ensure it is only water.
- The sloshing tank shall be inspected to ensure no sponge lining or any other water absorbing lining is present. The tank will also be inspected for loose objects as these are prohibited.
- The rocket shall be checked to ensure parachutes are not deployed while attached to the rocket during flight.

4 Suggested Design Review Structure

The **45-minute** design review presentations should largely summarise the content covered within the technical report, describing the process of arriving at your chosen solution and defending the design in terms of proving why it is effective at meeting the requirements and maximising score.

The presentations are 30 minutes long with the remaining 15 minutes for Q&A from the panel. The presentation should strictly take no longer than 30 minutes. There will be a warning at the 30-minute mark and teams are expected to close the presentation shortly. Presentations that extend significantly beyond this point will be cut short by the panel.

The review sections will be assessed and marked against the criteria below.

4.1 Introduction [10%]

Should include the following content based on the technical report Introduction section (excluding literature review):

- Scope and objectives of the project.
- Team organisation & cost breakdown

- Present the considerations for managing the project (including a timeline of events), project costs and justification of any significant cost items.

4.2 Overall Rocket Design [30%]

Should include the following content based on aspects of the technical report **Concept Design, Detailed Design and V&V** sections:

- Rationale for design decisions made
  - Process for arriving at chosen solution
- Defending the design
  - Proving why it is effective at meeting the requirements and maximising score (analysis which may include analytical or numerical analysis, design trade studies, optimizations, etc.)
- Show means by which compliance with each requirement has been demonstrated by simulation and/or prototype testing

4.3 Sloshing Management [20%]

Should include the following content based on aspects of the **FDR** sections: **Detailed Design and V&V.**

- Explanation of how the sloshing behaviour has been predicted and how the control mechanism has been designed.
- Validation of techniques used for predicting sloshing.

4.4 Manufacturing, Safety & Launch Mechanism Considerations [20%]

Should include the following content based on aspects of the FDR sections: Detailed Design and V&V:

- Description of manufacture including material selection, component manufacture, assembly sequence, and manufacturing challenges.
- Discussion of how safety was considered in the design, manufacturing, and operations of the aircraft.
- Considerations for the design of the launch mechanism.

4.5 Lessons Learnt [5%]

Should include the following content based on the FDR sections: Conclusion

- Identify key lessons learnt throughout the project

- Future recommendations for further development.

4.6 General Quality [5%]

- Overall quality of the presentation including structure, visual clarity, use of illustrations, and referencing.

4.7 Q&A Quality [10%]

- Answer any general and technical questions from the panel to a high standard.

5 Launch Window Structure

Teams will be given the opportunity to launch their rockets up to three (3) times during the finals. Teams will be allocated strict 30-minute Launch Windows on a first-come first-serve basis. This window includes setup, pressurization, and launch time. If the rocket is not airborne by the end of this window, the attempt is forfeited. Judges will strictly monitor time.

- Teams must declare their attempt as a Test Launch or Scoring Launch prior to pressurization.
- A launch attempt is officially counted the moment the team begins pressurising the rocket. If the team aborts the launch after this point, it still counts as one of the three (3) allowed launches.
- Teams must be airborne within their 30-minute window. Failure to launch within this time results in a forfeited attempt (0 points for that flight), though the team may still use their remaining attempts in a later slot.