

InnovAero Competition 2026

Task Description

The InnovAero Competition 2026 is about:

Design the VIP Cabin of the Future and contribute to exclusive acoustic flight comfort.

You need to solve challenges in the areas:

- Aircraft Cabins
- Materials
- Acoustics
- Project management
- Program management
- And other challenges

Are you interested? Then please contact us with your university team.

Your Chance:

Invitation of teams with the most promising solution to the award ceremony with prize money at Lufthansa Technik in Hamburg.

Events:

31 May 2026:

Team registration closes at 23:59 UTC via email to too.haminnovaero.competition@lht.dlh.de

Please include the following information in your registration email:

- Team name
- Full names of all team members (up to five)
- University affiliation of each participant

31 August 2026:

Submit your technical report (maximum 15 pages) via email by 23:59 UTC

2–4 December 2026:

Final three-day event at Lufthansa Technik in Hamburg, including the announcement of the winning team. Further details will follow

Introduction

This competition has a clear goal: to improve acoustic comfort in VIP cabins on long-haul aircraft. These cabins already offer passengers first-class service. They are equipped with lockable sliding doors that ensure privacy, and the comfortable seats can be easily converted into reclining seats. The exclusive furnishings of the compartments are particularly important, as they are designed to allow passengers to relax as much as possible during the flight. This creates an atmosphere in which everyone can feel comfortable and recharge their batteries.

The compartments are furnished with high-quality materials and feature sound-absorbing panelling, which ensures an exceptionally quiet atmosphere. Your task is to play an active role in shaping the acoustic comfort in VIP cabins – today and in the future.

Description of the Task

As part of this task, you will develop concepts for noise reduction and noise protection, specifically in the area of sound insulation. You will begin by conducting a comprehensive analysis of the noise situation in the cabin environment. You will then create acoustic models and perform analytical evaluations of the noise phenomena. Based on this, you will develop and evaluate targeted measures that can effectively reduce noise.

The investigation is not limited exclusively to sound-absorbing and sound-insulating materials, but also includes the identification of dominant sound transmission paths. Based on this, suitable materials are to be identified, with the optimal selection being made taking into account the relevant boundary conditions. The acoustic noise protection measure is then recalculated.

The aim is to minimise the noise pollution experienced by passengers, both in a seated and reclined position, caused by disturbing noises. During processing, the typical constraints of aircraft design must be observed.



The task is divided into two focal points

A: Acoustic Analysis, Modelling and Calculation within the cabin environment:

- 1) *What methods are available for measuring loudness and sound pressure?*
- 2) *Describe the acoustic situation using physical principles and formulate the relevant equations for sound propagation and transmission with reference to the figure shown, disregarding all absorbent or insulating materials in this step. Make reasonable assumptions.*
- 3) *Using your model, calculate the volume or sound pressure perceived by the seated person and assess whether this would be reasonable.*
- 4) *Now apply sound-absorbing and insulating materials and evaluate them in terms of weight, integrability and potential certifiability.*
- 5) *Perform updated calculations using the sound-absorbing and insulating materials you have selected. Adjust the model accordingly and display the resulting volume perceived by the passenger. Compare this with task 3 and evaluate. Now assume that the person is lying down and recline. How would you assess the atmosphere for sleeping?*

B: Development of possible solutions:

- 6) *What equipment can be used to measure sound pressure during a potential test flight? What conditions or influencing factors do you think need to be taken into account?*
- 7) *How can the sound-absorbing and insulating materials you selected in your calculation be integrated or installed in the cabin, and what conditions or restrictions need to be taken into account?*
- 8) *What additional measures can be taken to improve passenger comfort with regard to acoustic conditions during the flight?*

A conceptual sketch is shown below. It depicts a person seated inside an cabin compartment, illustrated from a top-down perspective.

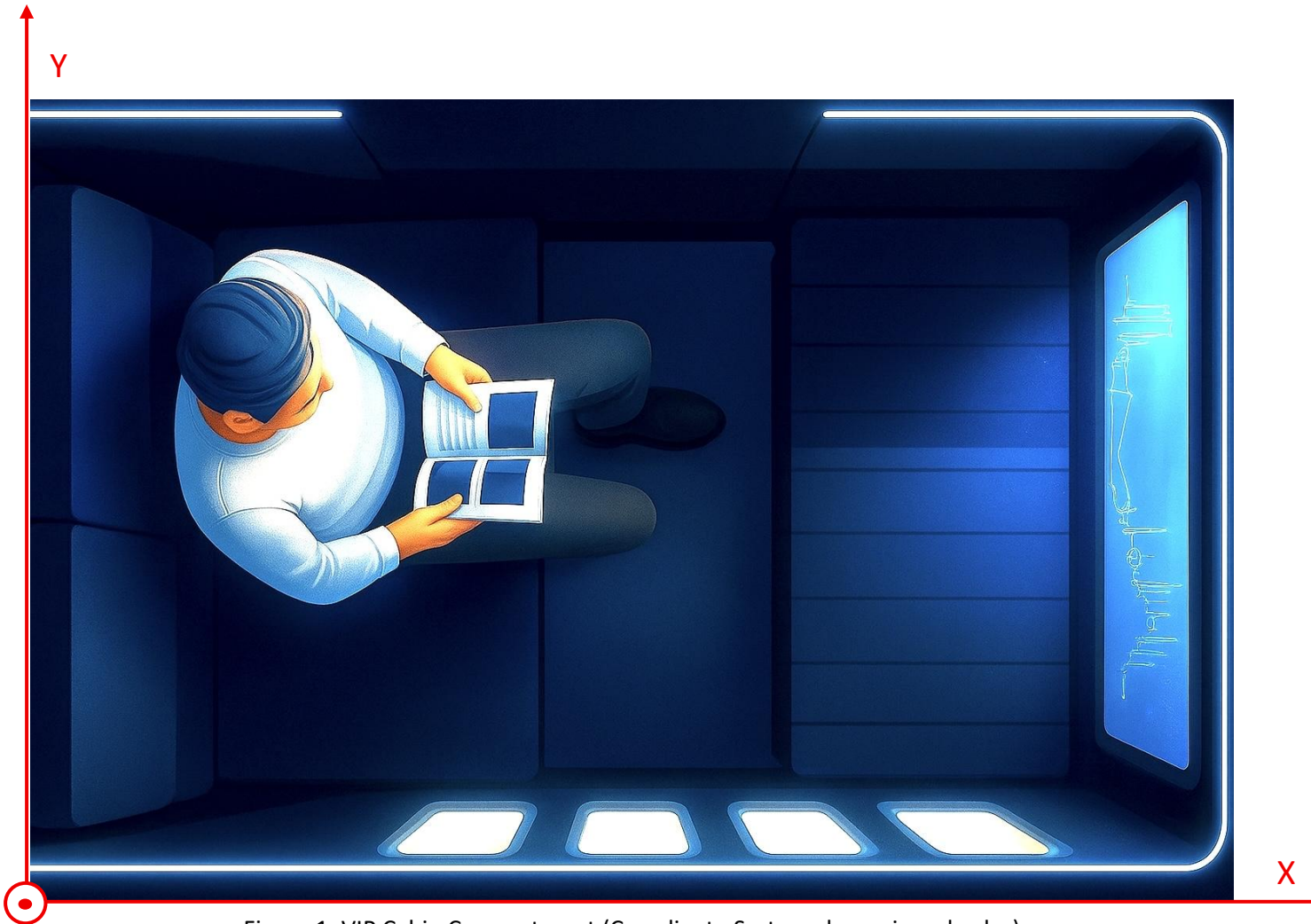


Figure 1: VIP Cabin Compartment (Coordinate System shown in red color)

Coordinates sound source from Origin: [-10,0m; -8,5m; -3,5m], VIP Cabin Compartment Size: [3,0m; 2,0m; 2,3m]

This is a view of the VIP cabin area from above. The area is rectangular in shape. The outer shell construction is located in the window area. This applies to the first part of the task for the entire cabin area. Then use your sound-absorbing and insulating material, also for the entire cabin area. The sound source is an engine.

Notes:

- The aircraft is a twin-jet, long-haul wide-body airliner with a capacity of up to 300 passengers and equipped with state-of-the-art high-performance turbofan engines
- The primary fuselage structure of the aircraft under consideration is entirely constructed from carbon laminate composite
- The aircraft is cruising at an altitude of 36,000 feet
- There is no moisture condensation present
- Possible reflections are not present
- Only the dominant sound path needs to be considered for the calculation
- Formulate assumptions concerning the sound sources and the sound absorption and insulation materials
- Sound absorbing and insulating materials enclose the entire compartment
- Explain everything in detail so that your steps and conclusions can be understood
- Explain the calculation methods and sources used
- How could the components be designed and integrated into the aircraft? Use sketches to clarify



Required Documents

Technical report:

Page 5

- Introductory material, this is required but does not fall within the 15 pages limit:
 - Title page: Team name, name of the supporting organization or institution, name of the academic supervisor, head of the student team, date of submission
 - List of members of the student team and number of semesters (Bachelor's or Master's degree program)
 - Abstract (1 page)
- Everything essential must be presented in the 15 pages:
 - Introduction and brief overview of the used literature
 - Representation of acoustic analysis, modelling and calculation within the cabin environment
 - Make your assumptions comprehensible
 - Listing and representation of sound absorption and insulation materials
 - Description and illustration of how the materials can be installed in the aircraft
 - Required diagrams, tables and figures should be included
 - Conclusion and recommendations for further investigations
- Other required material (does not fall within the 15 page limit):
 - Bibliography

Presentation at the final meeting on site:

The results must be presented at the final event of the challenge. Each team's presentation should not be longer than 10 minutes. It is important to mention that you may receive new sound absorption and insulation material data on site for updated calculations. This serves to validate your approach and opens the possibility of exchange. Self-created animations or videos are allowed.

The submitted reports will be evaluated by an independent jury based on the following criteria and their weighting are as follows:

- Feasibility (40%)
- Creativity and form (20%)
- Comparison of the submitted solutions (40%)

The report and the presentation are included in the evaluation as follows with appropriate weighting:

- Report 40%
- Presentation 60%

Conditions of participation:

- All participants must be enrolled at a university
- The teams can have a maximum number of five members to show up at the event in Hamburg
- The presentation and the report must be prepared in English
- The communication for the event will be in English
- If you have any questions about the task, you can contact the organizer
- The following costs will be covered by Lufthansa Technik for all participants:
 - Flights and associated costs (will be booked by Lufthansa Technik in consultation with you)
 - Accommodation for the evening before and on the evening of the event

Submission guidelines for the technical report:

- The technical report file size should be under 10MB and as .pdf
- Email address to which the technical report must be sent:
too.haminnovaero.competition@lht.dlh.de
- Subject: LHT_InnovAero2026_teamname



Formal regulations and further information:

- No formulations or ideas from other authors may be adopted without citing the source. If you use the statements or ideas, they must be clearly marked as quotations and given as a footnote. Submitted work containing plagiarism will be disqualified. The paper and presentation must be created independently and exclusively by team members
- The report should adhere to scientific and engineering standards, particularly regarding citations and the quality of reasoning
- The jury consists of aviation experts, and the presentation is made to the higher management board

Good luck