

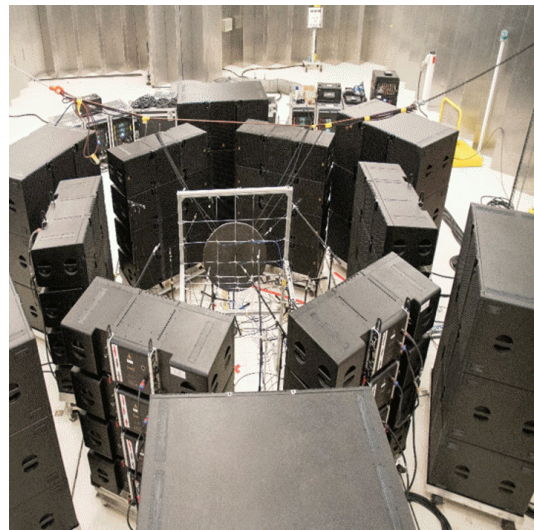
Internship / Master thesis proposal

Study of vibro-acoustic responses in Direct Field Acoustic Noise tests

Start: March 2024
Duration: 6 months
Location: Leuven, Belgium

Topic

Satellites are exposed to extremely violent noise and vibration excitations when they are launched into space. Consequently, spacecraft manufacturers need to ensure that all the structural and electronic components will survive these dangerous environments as part of the qualification test campaign. In this context, Direct Field Acoustic Noise testing, or DFAN, is a method recently introduced to acoustically test the spacecraft using a large set of high-powered loudspeakers, which is being increasingly adopted by the space industry as a reliable and efficient approach to reproduce the launch acoustic environments in the laboratory. In these tests, understanding the vibro-acoustic interaction between the direct acoustic fields generated by the electro-acoustic plant and the structure is of paramount importance to ensure the test is carried out safely.



Research Activity

The aim of this research project is to study in detail the relation between the structural response of the item under test and the acoustic fields generated by the multiple-input multiple-output (MIMO) controller that is driving the loudspeaker set. To this end, the following activities are planned:

- Setup and instrument a small-scale DFAN setup including a structural specimen. Perform acoustic tests based on MIMO control using the software Simcenter Testlab
- Characterize experimentally the structural responses using a Digital Image Correlation (DIC) approach. The goal is to study the feasibility of this method to measure the full-field deformation of the specimen under different acoustic loads.
- Generate vibro-acoustic model of the DFAN test setup using the CAE software Simcenter 3D. Correlate the simulation with the acoustic and structural responses obtained from the test campaign.
- Investigate the vibro-acoustic interactions and the effects of the MIMO control parameters

Profile

We are searching for a motivated student in the last year of the MSc in Engineering (Aerospace, Mechanical, or similar). The following requirements will be considered:

- Strong interest in space applications
- Good knowledge of structural mechanics and vibrations. Knowledge in acoustic engineering and control systems.
- Experience with structural analysis tools (e.g. Nastran) and/or test methods.
- Fluent communication skills in English.
- Combine analytical thinking with a result-oriented approach, strong team spirit and eager to contribute to common objectives.

Additional information

- Siemens Industry Software offers: accommodation for the agreed period, company desktop/laptop, required software.

If you think you are a good candidate for this position and would like to apply, please send your CV, cover letter and current certificate of enrolment to Alberto Garcia de Miguel (alberto.garcia_de_miguel@siemens.com) and Davide Mastrodicasa (davide.mastrodicasa@siemens.com).

<https://plm.sw.siemens.com/en-US/simcenter/>