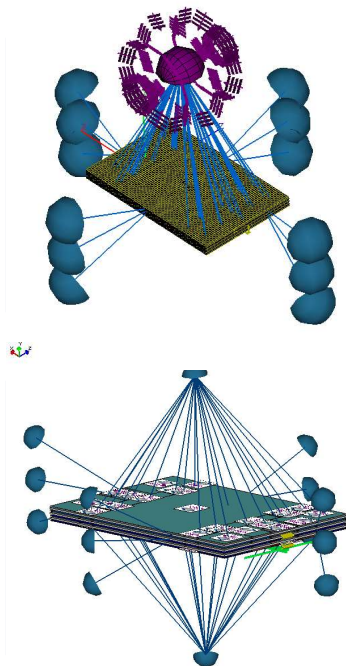


Aerospace Engineering Research Group

The group is focused on Aerospace Engineering with its main research lines focused on structural dynamics, fluid-structure interaction and acoustics. The group is a joint collaboration between the School of Aeronautical and Space Engineering (ETSIAE) of the Universidad Politécnica de Madrid and the Institute for Physical and Information Technologies (ITEFI) within the Spanish National Research Council (CSIC). The members of the group collaborate to develop research programs at both national and international level.

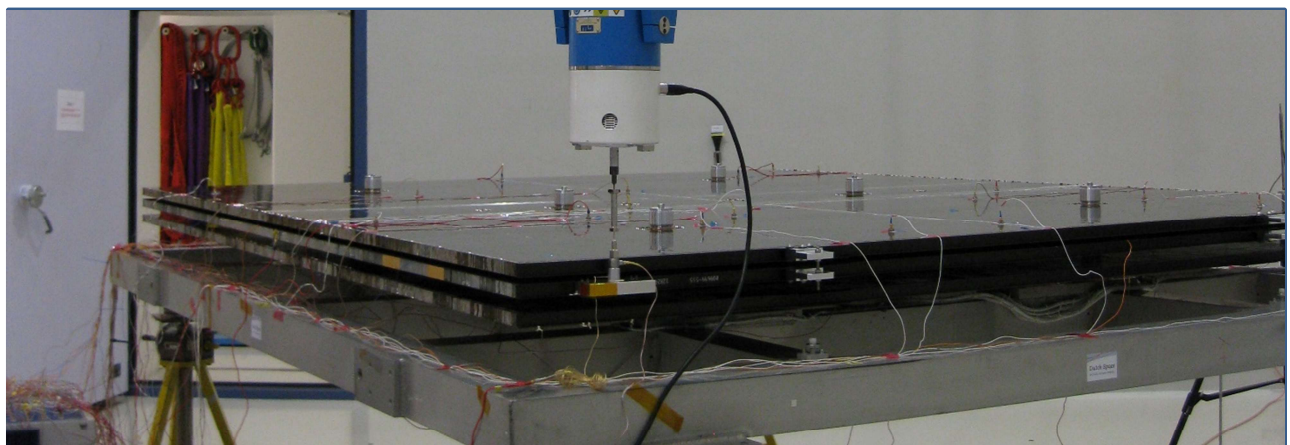
Facilities and infrastructures



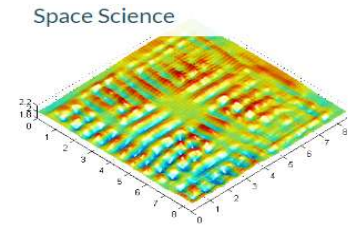
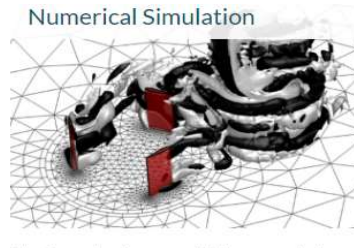
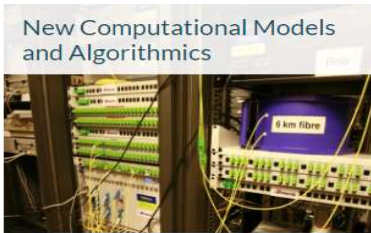
The research carried out by the group relies mainly on numerical simulation, powered by several workstations and commercial and own-developed codes.

The validation of the numerical models is performed by experimental testing on benchmark cases that are performed either at the ETSIAE/UPM facilities more oriented to the structural dynamics or the ITEFI/CSIC facilities that has several acoustic test rooms (reverberant, anechoic).

The testing activities related to larger test items is performed on occasions on other facilities, including the UPM facilities at Montegancedo Campus.



Research areas associated with Big Science



Main projects in Big Science

- 2007-2008, ESA, **Random vibration environment derivation by vibro-acoustic simulation:** development of guidelines for the numerical simulation of the vibro-acoustic response of spacecraft structures.
- 2008-2009, ESA, **Vibro-acoustic Analysis and Test Methods for Large Deployable Structures:** research on deployable structures and the fluid-structure interaction on solar arrays during launch due to the stacked configuration.
- 2012-2014, ESA, **Dynamic Analysis of Payloads And Structures with Intermediate Modal Density:** development of a hybrid formulation to address the medium frequency range of large structures.
- 2019-2020, ESA, **Launch Sound Level Reduction:** research on the improvement of the acoustic load on spacecrafts during launch by means of sound reduction solutions on the launch pad and the launch vehicle fairing.

Collaboration with Large European Scientific Facilities

- Several joint collaborations with national and international agents (EADS Astrium, Dutch Space, O1dB, FFT, Universitat Politècnica de València, Le Mans Université) on several research projects for ESA.

Software, tools or licenses to be applied to Big Science

- Own-developed code for structural dynamics.
- **MSC Nastran/Patran.**
- ESI Group **VAOne.**



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