

# Experimental Testing for Aerospace Structures

Laboratory Activity n° 4 — December 05<sup>th</sup> – 06<sup>th</sup>, 2022

Name

Surname

The modal characteristics of an aircraft fuselage component are needed for its dynamic assessment. To estimate the modal parameters, the fuselage component is hung from a supporting structure with elastic rubbers, Fig. 1, and excited with a modal hammer. By using the *SDOF* approach known as “Half-Power Bandwidth Method,” (a.k.a. “*Peak-Picking*”) estimate the modal parameters of such a structure, assuming the following acquisition parameters:

- 5 measurement points (evenly distributed over the blade);
- Frequency range 0 – 1024 (*Hz*);
- 2048 Sampling points;
- 10 averages.

The main tools and transducers, whose technical specs are given by the manufactures in the provided data sheets, are:

- 1 modal hammer with different hammer tips
- 5 accelerometers (to be evenly placed at test article selected locations)
- 1 signal analyzer with the proper number of active measurement channels

In addition to the overall discussion about the laboratory experience, the report should also include comments on:

- the effects of the stiffness of the hammer tip on the estimate of the FRFs
- the effects of the chosen type of the FRF representation (real/imaginary or amplitude/phase) for the estimate of the modal parameters
- the effects of the boundary conditions on the overall dynamic behavior of the structure
- validity of the “*SDOF*” assumption on the dynamic behavior of the test article

Save the report in pdf format and named it as “*L4\_GX\_FAMILYNAME.pdf*” (being *X* the laboratory group number).

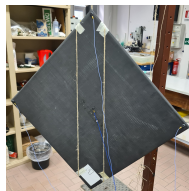


Figure 1: Experimental layout.