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## Structural validation of a realistic wing structure: the RIBES test article

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### Abstract

Several experimental test cases are available in literature to study and validate fluid structure interaction methods. They, however, focus the attention mainly on replicating typical cruising aerodynamic conditions forcing the adoption of fully steel made models able to operate with the high loads generated in high speed facilities. This translates in a complete loss of similitude with typical realistic aeronautical wing structures configurations.

To reverse this trend, and to better study the aerolastic mechanism from a structural point of view, an aeroelastic measurement campaign was carried within the EU RIBES project. A half wing model for wind tunnel tests was designed and manufactured replicating a typical metallic wing box structure, producing a database of loads, pressure, stress and deformation measurements.

In this paper the design, manufacturing and validation activities performed within the RIBES project are described, with a focus on the structural behavior of the test article. All experimental data and numerical models are made freely available to the scientific community.

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### 1. Introduction

Verification and validation is an essential mean to evaluate performance and reliability of computational tools. By assessing how accurately computational results compare with experimental data it is possible to investigate not only the accuracy but also the limits of the models, making experimental campaigns fundamentals to attest the trustworthiness of the tools in a modeling-and-simulation-based design scenario. While engineers are nowadays confident on the

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