

**LOW-FIDELITY AEROSTRUCTURAL OPTIMIZATION OF AIRCRAFT WINGS WITH A SIMPLIFIED  
WINGBOX MODEL USING OPENAEROSTRUCT**

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**Abstract:** It is common for aircraft design studies to begin with low-fidelity tools and move to higher-fidelity tools at later stages. After early conceptual design stages, designers can take advantage of developments in high-fidelity aerodynamic shape optimization, and more recently, coupled aerostructural optimization to improve their designs. Over the past few years, our research group has developed a framework that allows carrying out high-fidelity aerostructural optimization by coupling a RANS CFD solver to an FEM solver that uses shell elements. In addition, we have recently developed OpenAeroStruct, a light-weight and open-source tool for low-fidelity aerostructural optimization that couples a VLM code to an FEM code that uses spatial beam elements. Due to their low cost, such low-fidelity tools remain useful for design studies. In this paper, we present results from OpenAeroStruct for the optimization of a transport aircraft wing and compare them to results from our group's high-fidelity framework. Additionally, we describe the simplified wingbox model developed and implemented with OpenAeroStruct for this work.