

NATURAL LAMINAR FLOW HIGH ASPECT RATIO WING SHAPE OPTIMIZATION USING A DISCRETE ADJOINT APPROACH

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Natural Laminar Flow (NLF) High Aspect Ratio Wing (HARW) is one of the most promising ways to dramatically reduce the carbon footprint of Business Jets aircrafts.

The aim of our work is to propose an efficient extension to flow transition of our in-house RANS gradient-based shape optimization framework [6, 1, 2].

Two bottlenecks will be addressed. The first deals with managing transition extension [5, 3] in the framework of gradient-based optimizer & discrete adjoint. The second one deals with CAD (NURBS-based) high-order regularity [4].

Application to a 3D wing body configuration will highlight the gain in terms of Drag count savings.



Figure 1: NLF HARW Business Jet

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