

## “Furthering of High-Fidelity CFD Prediction”

Driven by the tremendous improvements of the last decades, quantitatively smaller and smaller enhancements are sought in aircraft design. We address this demand by developing flow simulation techniques beyond the current state. Limited by computational power resources, key challenges are e.g. the required accuracy of the simulations, the increasing number of parameters, interaction between groups of components and robust design for different flow conditions.

Regarding the increasing requirements on flow simulation accuracy closer to the design optimum, recent work carried out within the EU Go4Hybrid project will be presented. In this project, significant improvements to hybrid RANS-LES approaches such as Detached-Eddy Simulation (DES) have been formulated. These have been successful in mitigating the “grey area” problem, which is particularly influential e.g. in weakly separated flows typical of maximum lift conditions.

Turning then to the optimization problem, examples from current studies such as practical high-lift configurations and jet noise will be given. The significant challenge of lift and noise optimization based on hybrid turbulence-resolving simulations in the presence of a huge amount of parameters is addressed. Furthermore, a strategy to optimize the noise attenuation characteristics of liners will be presented.

