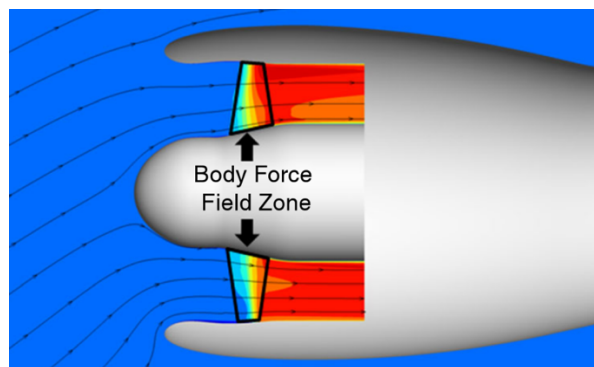


IMPROVING THE LOSS MODELLING IN THE BODY FORCE APPROACH

DESCRIPTION:

Low-fidelity methods such as Body Force Modelling (BFM) are well suited to tackle innovative propulsive architectures and particularly Boundary Layer Ingestion (BLI) configurations where the engine fan constantly operates under aerodynamic distortion.



However, the main weakness of the BFM approach lies in the loss modelling inside bladed areas, especially in the stator row. This limitation can be observed when carrying out off-design studies, at low (stability limit) or high (windmill regime) mass flow rates. A more refined loss modelling could significantly improve both the physics and the accuracy of the performance prediction.

Therefore, the current loss modelling must be completed, in order to fit higher fidelity results (typically coming from full-annulus URANS simulations) while keeping a physics-based formulation as much as possible.

EXPECTED OUTPUT:

- New / additional terms in the volumetric force accounting for the loss inside blade rows
- Possible calibration based on numerical (URANS) or experimental (in house measurements) results

REQUIRED SKILLS:

Useful theoretical knowledge: fluid mechanics, advanced turbomachinery

Useful technical skills: Linux environment, Python programming, previous CFD experience

CONTACT:

Emmanuel Benichou, post-doctoral researcher at DAEP: emmanuel.benichou@isae-supero.fr

Xavier Carbonneau, professor at DAEP:

xavier.carbonneau@isae-supero.fr