10. CFDB; CFD Software GmbH

CFD Software GmbH

CFD Software Entwicklungs- und Forschungsgesellschaft mbH

GRAIN2

Contributions to GRAIN2

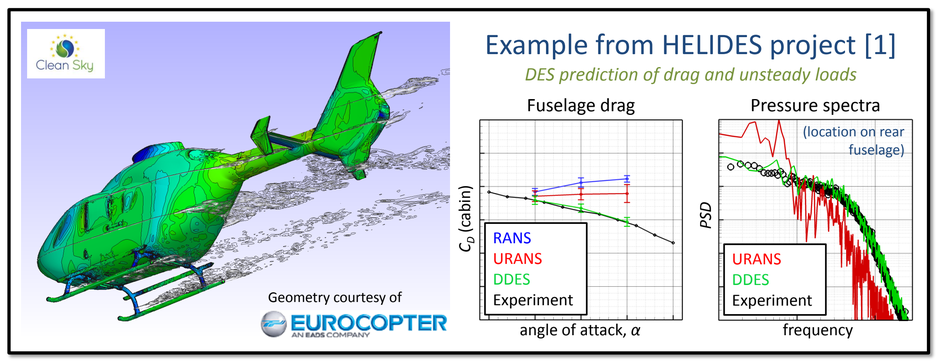
Role of the institution in GRAIN2

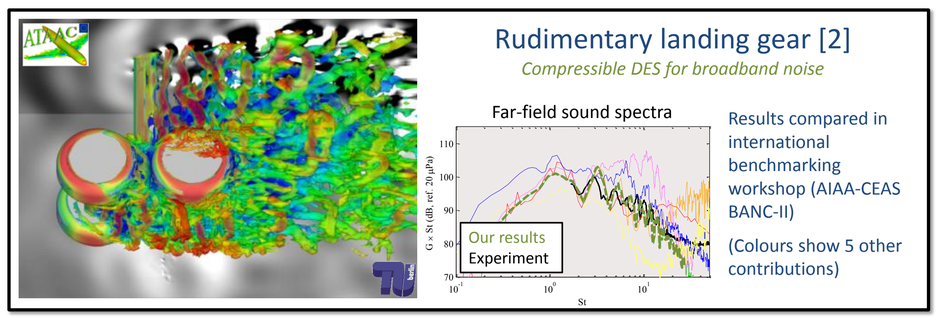
CFDB – CFD Software GmbH:

- SME based in Berlin, Germany
- Technology provider for high-fidelity CFD and CAA using state-of-the art methods

Technical contribution:

- **KGT2; Advanced simulations for drag & noise reduction**
- Robust hybrid RANS-LES for turbulent flow prediction
  - Drag prediction for challenging, separated flows
  - Airframe noise source prediction
- Efficient solvers for low-Mach number flows
- Methods and best-practice for low spurious noise
- Simulation of flow control devices (passive and active)
- Industrialised methods for complex configurations





Projects:

- **Go4Hybrid** (coord)
  - EU FP7, L1, 2013-2015
  - Further improvement of hybrid RANS-LES models
- **JERONIMO**
  - EU FP7, L1, 2013 – 2018
  - Study of jet / wing interaction noise
- **HELIDES** (coord)
  - EU CleanSky, 2011 – 2013
  - DES for drag prediction of highly-complex helicopter geometry

Previous experience of CFDB personnel:

- **ATAAC**
  - EU FP7, L1, 2009 – 2012
  - Improvement of hybrid RANS-LES
- **VALIANT**
  - EU FP7, L1, 2009 – 2013
  - Validation of tools for numerical prediction of broadband noise

Future activities:

- Development of modelling and numerics strategies for aeroacoustic prediction with low spurious noise on unstructured grids
- Development of improved hybrid RANS-LES methods to reduce Grey Area problem
- Simulation & analysis of jet / wing interaction noise using unstructured meshing strategy
- Development of discrete adjoint optimisation methods (collaboration with RWTH-Aachen)
  - Optimisation of AFC parameters for high-lift configurations with DES
  - Shape optimisation
  - Acoustic liner design optimisation
  - Optimisation of vortex generator configuration
- Hybrid parellelisation strategies
- Industrialisation of CAA solver on GPU hardware (factor 250 speed-up relative to CPU achieved for 2D solver)

Selected Publications:

1. Mockett, C., Le Chuiton, F., Fuchs, M. & Thiele, F. Helicopter fuselage wake prediction using Detached-Eddy Simulation. Prog. in Hyb. RANS-LES Modelling, NNFM, Vol. 117, p. 413-425, 2012.
2. Wang, L., Mockett, C., Knacke, T. & Thiele, F. Detached-Eddy Simulation of landing gear noise. Proc. 19th AIAA-CEAS Aeroacoustics Conference, 2013.

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