

Go4Hybrid

Grey Area Mitigation for Hybrid RANS-LES Methods



FINAL OPEN WORKSHOP

The Go4Hybrid Project Objectives

Despite excellent results by hybrid RANS-LES methods, a fundamental issue remains to be addressed. Known as the “grey area problem”, this concerns the transition region between the RANS and LES modes of such hybrid methods. The grey area problem has a particularly detrimental impact on flows featuring shallow regions of boundary layer separation and reattachment. In such cases, the accuracy of hybrid RANS-LES predictions can be inferior to lower order RANS methods. Unfortunately, applications that tend to suffer from grey area issues include some of the most important aerodynamic and aero-acoustic flows, such as wings near the borders of the flight envelope and jet noise.

This is the main motivation for the Go4Hybrid project, which has pursued the development and demonstration of improvements to hybrid RANS-LES methods to reduce the severity of the grey area issue (or eliminate it entirely).

A range of approaches to reducing the grey area severity have been developed and evaluated. The evaluation took into account not only the predictive accuracy of the improved methods but also practical issues, such as computational expense and user-friendliness. A balance was struck between simple academic test cases (for reduced computational expense and isolated flow mechanisms) and complex application test cases (for demonstrating practicability). Details will be presented in this Final Open Workshop.

Location

Premises of CFD Software GmbH, CHIC, Bismarckstr. 10-12, 10625 Berlin, Germany

Nearest public transport: Ernst-Reuter-Platz

Date

28th – 29th September 2015

Workshop Fees

The **workshop fees will be 400€** - and will contain coffee breaks, lunches, dinner, and most of all, a **free copy of the final report of the Go4Hybrid project** to be published by Springer in the NNFM (Notes on Numerical Fluid Mechanics and Multidisciplinary Design) book series. This book will contain all results and experience gained from the Go4Hybrid project.

Registration

The deadline for registration to the workshop is **31 August 2015**.

Please visit:

Go4hybrid-final-workshop.eventbrite.de

or use the QR-Code directly →



We thank our sponsors:



CFD Software GmbH



CFD Software Entwicklungs-
und Forschungsgesellschaft mbH



The University of Manchester



Rolls-Royce

Programme 28 September 2015

12:00 Light lunch

13:00 C. Mockett The Go4Hybrid Project in brief
CFD Software GmbH

Invited Lectures

13:20 F. Menter Stress-Blended Eddy Simulation (SBES) - A New Paradigm for hybrid
ANSYS RANS-LES Modelling

13:50 S. Jakirlic Residual turbulence modelling in Hybrid RANS/LES simulation methods
TU Darmstadt

14:20 Coffee

14:35 L. Davidson Inlet boundary conditions for two-equation hybrid LES-RANS models
Chalmers University

15:05 D. Laurence Design of Near-wall RANS models for heat transfer at all Re numbers
EDF

15:35 D. Knoerzer Research and Innovation in Horizon 2020 – Aeronautics research on
European Commission European level

Industrial views

16:05 B. Duda Investigations of the grey area behavior of the hybrid LBM-VLES approach
EXA

16:30 Coffee

16:45 G. Servera Well-capturing the unsteady flow and pressure forces on an Ahmed body
PSA Peugeot-Citroen by numerical computations

17:10 S. Arvidson From steady to unsteady flow simulations in the aircraft industry –
P. Weinerfelt Saab's view on CFD
SAAB

17:35 C. Hirsch Industrial and Turbomachinery applications and requirements for Hybrid
NUMECA methods

20:00 Workshop Dinner

Programme 29 September 2015

The Go4Hybrid Methods

- 09:00 C. Mockett Non-zonal methods for grey-area mitigation
CFD Software GmbH
- 09:20 M. Strelets Improved embedded approaches for grey-area mitigation
NTS

Go4Hybrid Results (Test Cases)

- 09:40 S. Deck Flat Plate Turbulent Boundary Layer - a fundamental test case
ONERA
- 10:00 S.-H. Peng Spatial Shear Layer - a fundamental test case
FOI
- 10:20 A. Revell Helicopter fuselage flow
The University of Manchester
- 10:40 J. Kok Delta wing with vortex breakdown
NLR
- 11:00 Coffee
- 11:20 A. Probst Three-element airfoil – DLR F15
DLR
- 11:40 M. Strelets 2D Wall-mounted Hump
NTS
- 12:00 C. Mockett Round Jet flow and noise
CFD Software GmbH
- 12:20 M. Fuchs Assessment of methods on a common CFD platform
A. Revell
CFD Software GmbH/The Univ. of Manchester
- 12:40 Conclusion of the Workshop - Lunch