STS 240

Advanced CFD Applications for Complex Aircraft Configurations

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Session Abstract

Key Words: *Applied aerodynamics, computational fluid dynamics (CFD), high-lift aerodynamics, flow control, load alleviation, propulsion*

The applied aerodynamics analysis of transport aircraft still poses high challenges on the capabilities of numerical simulations. In past years, this series of STS focused specifically on the high-lift regime, where the demand on accurately predicting stall onset achieved to a sophisticating level. Nowadays, new challenges arise with the progress on active flow control technologies and load control as well as new types of propulsion. This issue of the STS is intended to provide insight into such activities tackling the improvement of simulation capabilities for complex aircraft configurations, as there are:

- low-speed assessment of different propulsion concepts;
- unsteady active flow control for load alleviation;
- simulation of strut-braced wing aircraft.

Contributions are coming from running international research projects governed by EU funded Research and Innovation Actions, contributions to Clean Sky 2 and Clean Aviation Joint Undertakings, as well as other national and international cooperation activities. The following contributions are foreseen:

1. "Unsteady simulations of an aircraft in take-off conditions with installed engine and rotating fan" by F. Sartor, F. Moens & O. Atinault (ONERA)
2. "About the Ability of Anisotropic Mesh Adaptation to Capture Complex Physics on a Transonic Tandem Compressor" by E. Guilbert*, A. Remigi, M. Philit & F. Alauzet (Equipe Inria-ONERA & Safran Tech)
3. "Numerical Analysis of a Large Scale Distributed Propulsion Experiment at High Lift" by J. Oldeweme, T. Lindner, C. Bode, P. Scholz & J. Friedrichs (TU Braunschweig)
4. Aerodynamic Investigation of a Propeller-Driven Transport Aircraft with Distributed Propulsion within the IMOTHEP Project" by D. Keller, A. Visingardi, L. Wiart, Y. Maldonado, F. Morlando & G. Andreutti (DLR, CIRA & Safran Tech)
5. "Increasing Take-Off Performance of a Distributed Propulsion Wing Section using Segmented Flaps" by T. Lindner, J. Oldeweme, J. Friedrichs & P. Scholz (TU Braunschweig)
6. "Investigating Truss-Braced Wing Configuration through CFD Based Analysis" by M. Hothazie, D. Crunteanu, I. Bunescu & M. Pricop (INCAS)
7. "Fluidic Actuation for Gust Load Reduction on an Aircraft Wing" by A. Bauknecht, F. Siebert& K. Khalil (TU Braunschweig)
8. "Assessment of engine/airframe aerodynamic performance: comparison between ONERA, DLR, NLR and Airbus" by F. Sartor, A. Stürmer, M. Laban, S.R. Janssen & B. Caruelle (ONERA)