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Progress in Hybrid RANS-LES Modelling

Papers Contributed to the 4th Symposium
on Hybrid RANS-LES Methods, Beijing,
China, September 2011

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and Dieter Schwamborn (Eds.)

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Preface

The book contains the contributions presented at the 4th Symposium on Hybrid RANS-LES Methods, held in Beijing, China, 28–30 September 2011. The Symposium was a continuation of previous symposia, taking place subsequently in Stockholm (Sweden, 2005), Corfu (Greece, 2007) and Gdansk (Poland, 2009).

The symposium is dedicated in general to hybrid RANS-LES methods and similar modelling approaches that enable turbulence-resolving simulations as a compromise between (unsteady) RANS and LES computations. The aim of the symposium has not changed since it was first initiated in Stockholm, which is to bring together researchers from universities and research institutes, engineers, R&D managers and consultants from industries, with the goal of experiencing and communicating the latest development and applications of turbulence modelling methods in focus.

As is reflected in the Symposium by the broad spectrum of fundamental and applied topics, the development of hybrid RANS-LES methods have been greatly stimulated over the past decade by industrial needs to fill the gap between (U)RANS and LES computations at industrially relevant Reynolds numbers. At the Symposium, along with five invited keynotes addressed, respectively, by A. Abbas (Airbus), K. Fujii (JAXA), S. Girimaji (Texas A&M University), F. Menter (ANSYS), D. Schwamborn (DLR), and H. L. Zhang (COMAC). An honorary talk was given by D. Knoerzer from the European Commission presenting an overview about the aeronautic research activities in the EU Framework Programme. 53 papers were accepted and presented addressing the following main topics: *Novel turbulence-resolving simulation and modelling, Improved hybrid RANS-LES methods, Comparative studies of difference modelling methods, Modelling-related numerical issues and Industrial applications*. After further review and revision, 39 papers have been included in the present book.

The present book communicates recent activities and progress on hybrid RANS-LES methods. It is hoped that the volume will serve as a useful source of reference and inspiration for new advancement of engineering turbulence modelling.

As is always, the publication of the book relies essentially on the contributions of the Symposium participants, primarily of the authors. The Scientific Committee members and a number of external experts have served to review the full papers

included in the book, which has greatly supported to improve further the quality of the book. The Symposium was co-organized by Tsinghua University, the Chinese Society of Theoretical and Applied Mechanics (CSTAM), the German Aerospace Centre (DLR) and the EU ATAAC Project Consortium.

The editors are grateful for the excellent organisation of the Symposium for the tremendous effort in making this 4th Symposium a success, dedicated by the team of Tsinghua University and the Symposium Secretary, Mr. Jie Chen from CSTAM.

Last but not least, we wish to express our sincere gratefulness for the valuable sponsorship to the 4th Hybrid RANS-LES symposium, provided kindly by AIRBUS, ANSYS, COMAC, ERCOFTAC, EDF, LNM, LTCS, NUMECA, WHAC as well as by the European Union project ATAAC.

May 2012

Song Fu (Local Chair)
Werner Haase (Co-Chair)
Shia-Hui Peng (Chair)
Dieter Schwamborn (Co-Chair)

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