Preface

Special Issue: Engineering Turbulence Modelling, Simulation and Measurements

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This Special Issue contains extended and revised versions of 14 papers selected from the presentations at the Symposium ‘Engineering Turbulence Modeling and Measurement-9 (ETMM-9)’, held in Thessaloniki, June 6–8, 2012, under the auspices of ERCOFTAC. The ETMM series of conferences is well established and continues to give prominence and focus to research on application-oriented aspects of turbulence and its computational and experimental characterization. This directly helps bridging the gap between fundamental approaches to turbulence and the exploitation of models, codes and knowledge in an industrial setting. In this respect, ETMM is thematically closely consonant with the aims of the FTaC journal, and is the main flagship for expressing ERCOFTAC’s ambitions.

The broad spectrum of topics featuring at ETMM meetings encompasses computational and experimental approaches to complex aero- and hydro-dynamic flows, heat transfer, multi-phase and reacting flows, flow control, flows in power generation and environmental fluid mechanics. The present Special Issue aspires to reflect this mix and to provide an archival record of some of the best papers presented at

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ETMM-9. To this end, selected papers were subjected to the same rigorous review process as that followed with any other contribution to FTaC, each manuscript being reviewed by three leading experts.

Of the 14 papers included in this Special Issue most are dedicated to simulation strategies for turbulent flow, while one study reports on novel high-speed experimental imaging techniques to investigate flow-spray interactions in internal combustion engines. The development and application of computational methods within the field of Large-Eddy Simulation (LES) is particularly relevant in this Special Issue, with seven studies directly dedicated to LES, one comparing recent subgrid-scale (SGS) models, and others dealing with applications ranging from energy to environmental issues and aeronautical flows. To facilitate zonal approaches featuring LES at critical regions in a flow domain, attention was also given in one paper to the construction of accurate boundary conditions for embedded LES. Further application-potential is developed and reported in two hybrid RANS/LES contributions and in more specialized (Z)DES (Detached Eddy Simulation) approaches. In two more fundamental studies, Direct Numerical Simulation (DNS) was employed in combination with theoretical developments to understand boundary layer transition and complex turbulent pipe flow.

The Editors hope that the readers of this Special Issue will judge it to be a valuable contribution to the literature, and to give credit to efforts by the scientific community to engage in turbulence modeling, simulation and measurements of immediate relevance to industry as a whole.