

STS05

Shock Wave Boundary Layer Interaction in Aeronautical Applications

Pawel Flaszynski*, Piotr Doerffer*

* Institute of Fluid Flow Machinery, Polish Academy of Science (IMP PAN), Gdansk, Poland
pflaszyn@imp.gda.pl

Keywords: *Shock Wave, Boundary Layer, High-Fidelity CFD, Wing, Transonic Compressor*

Knowledge of the shock wave boundary layer interaction (SBLI) is essential for the development of more efficient aircraft and propulsion. This session aims at presenting selected results from the H2020-MSCA-ITN TEAMAero (Towards Effective Flow Control and Mitigation of Shock Effects in Aeronautical Applications) project [1].

The main objective of TEAMAero is: (1) to improve fundamental understanding of the physics of SBLI, including three-dimensionality and unsteadiness (2) to develop flow control for mitigation of SBLI effects, and (3) to develop numerical methods for improvement of SBLI effects prediction. This session brings together researchers focused on developing algorithms for high-speed flows and application of numerical methods in solving fundamental and industrial problems. Contributing presentation will focus on algorithms development for techniques in Direct Numerical Simulations (DNS) of turbulent high-speed boundary layers, RANS and LES for transitional SBLI in basic flow configuration (flat plate) and application cases. Results from numerical simulations for supercritical wing and highly loaded transonic compressor cascade will be presented. The session will include papers in the following topics:

Three Decades of SBLI in European Research

Piotr Doerffer, Pawel Flaszynski, *IMP PAN, Gdansk, Poland*

Numerical Tripping of Supersonic/Hypersonic Boundary Layers

Alessandro Ceci, Andrea Palumbo, *Sapienza University of Rome, Italy*, Johan Larsson, *Univ. of Maryland, USA* and Sergio Pirozzoli, *Sapienza University of Rome, Italy*

Length and Time Scale Comparison in Different Transitional SBLIs

Mariadebora Mauriello, Lionel Larcheveque, *Aix-Marseille Univ., CNRS, IUSTI, France*

Numerical Simulation and Turbulence Modelling of a 3D Transonic Regime around a Supercritical Wing Involving Strong Separation

César Jimenez-Navarro, Abderahmane Marouf, Clément Rouaix, *Institut de Mécanique des Fluides de Toulouse, France*, Nikolaos Simiriotis *Imperial College of Science and Technology, London, UK*, Yannick Hoarau, *Universite de Strasbourg, France*, Marianna Braza, *Institut de Mécanique des Fluides de Toulouse, France*

Transonic Buffet Simulation using a Partially-Averaged Navier-Stokes Approach

Andrea Petrocchi, Rene Steijl and George N. Barakos, *Univ. of Glasgow, UK*

Numerical Investigations of Transitional SBLI on a Highly Loaded Transonic Compressor Passage in Industrial Applications

Selin Kahraman, Paolo Adami, Marius Swoboda, *Rolls-Royce Deutschland, , Germany*

Test Section Design for Investigations of SBLIs in Highly Loaded Compressor Stator

Arun Joseph, Pawel Flaszynski, Michal Piotrowicz, Piotr Doerffer, *IMP PAN, Gdansk, Poland*

LES of Compressor Cascade Shock-Boundary Layer Interaction at Engine-Representative Conditions

Philipp Nel, Paolo Adami, *Rolls-Royce Deutschland, Germany*

[1] The TEAMAero Project, <https://h2020-teamaero.eu>