Unsteady separation in fluid–structure interaction—I

This Special Issue represents papers selected by the Scientific Committee of the Smartwing Morphing Center, www.smartwing.org, after the oral presentations made at a series of meetings from June 2011 to June 2013, focusing on the investigation of the unsteady separation arising in fluid–structure interaction, particularly regarding the new designs of lifting structures. Among these meetings supported by the French research platform SMARTWING under the auspices of the Foundation STAE-RTRA (Sciences et Technologies pour l’Aéronautique et l’Espace–Réseau Thématique de Recherche Avancée), the last one was the international symposium “Unsteady Separation in Fluid–Structure Interaction”, held in Mykonos, Greece, 17–21 June 2013, under the aegis of ERCOFTAC (European Research Community on Flow, Turbulence and Combustion). The present special issue is the first part of two volumes. The selected articles were extended contributions, a decade from the SMARTWING platform meetings, and also include two contributions from the last ERCOFTAC symposium. All papers have been reviewed in the same way as the articles submitted in this Journal. The SMARTWING platform is coordinated by the Institut de Mécanique des Fluides de Toulouse (IMFT), under the label of UMR, "Unité Mixte de Recherche" CNRS-INPT-UPS No:5502.

In this context, IMFT organised the ERCOFTAC symposium, www.smartwing.org/ercoftac, with 75 participants was co-chaired by Dr. Marianna Braza, Prof. Alessandro Bottaro and Prof. Mark Thompson. The topical sessions of the SMARTWING workshops and of this symposium associated with the present selection of articles were as follows:

- Theoretical aspects of fluid–structure interaction (FSI) involving separation.
- Instability and transition studies related to the onset of separation.
- Intelligent materials and electroactive morphing.
- Biomimetics for smart-wing design.
- Experimental techniques for the dynamics of separation.
- Turbulence modeling approaches involving FSI: URANS, LES and hybrid (RANS-LES).
- Theoretical/coupling strategies CFD-SM.
- Control of unsteady separation in FSI.

These meetings brought together renown scientists in the above fields and contributed to advancing the physical comprehension, simulation and modeling methods in fluid–structure interaction involving unsteady separation. A general outcome from these meetings was that the scientific communities working on experimental, theoretical and numerical approaches, related to the unsteady separation and its control in fluid–structure interaction, have learned a lot from one another and these meetings have brought new research ideas to everyone and new concepts for smart designs.

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