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## **Preface**

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**Biographical notes:** Bruno Chanetz received his PhD in 1986 and HDR in 1997 from the University Lyon I. He has been the Deputy Director of the Fundamental and Experimental Aerodynamics Department since 2003. He was an Associate Professor at the University of Versailles from 2003 to 2009 and he is currently an Associate Professor at the University Paris-Ouest. He has published 40 papers in archival journals and 100 articles in international or national conferences, mainly dealing with experimental hypersonic studies. He is currently involved in activities using plasmas for supersonic aerodynamics with presence of shock waves. He is a member of the Aerodynamics Commission of 3AF (French Aeronautics and Astronautics Society) and a member of the National Centre for Technological Research in the field of land vehicle aerodynamics and aeroacoustics.

Jean Délerly has been the Director of the Fundamental and Experimental Aerodynamics Department of ONERA since 2003. He is currently an Emeritus Advisor for this department, the Chairman of the Aerodynamics Commission of 3AF (French Aeronautics and Astronautics Society) and the Chairman of the

Scientific Committee of the National Centre for Technological Research in the field of land vehicle aerodynamics and aeroacoustics. He was an Associate Professor at the University of Versailles from 1994 to 2003. He gives lectures at the University of Paris and the University of Roma 'La Sapienza'.

Abderrahmane Baïri is a Professor at the University Paris Ouest (UPO). His main teaching activity is related to heat transfer and engineering numerical methods. His areas of research are numerical and experimental natural convection in closed cavities, thermal characterisation of materials, heat transfer at solid-solid interfaces and renewable energy. He is a member of the Aerodynamics Commission of 3AF (French Aeronautics and Astronautics Society) and a member of the National Centre for Technological Research in the field of land vehicle aerodynamics and aeroacoustics.

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The Centre National de Recherche Technologique on 'Aerodynamics and aeroacoustics of land vehicles' (CNRT R2A) federates the main actors of the French automobile and railway industry and prominent research laboratories active in the domain of fluid mechanics and acoustics. The research actions undertaken under the auspices of the CNRT R2A and with its financial support are organised in different scientific topics aiming at:

- improvement of the physical understanding of phenomena
- exploitation of advanced experimental facilities and evaluation of accompanying measurement techniques including processing methods
- contribution to the development of predictive methods and establishment of data banks for code validation
- setting of methodologies for the analysis of vehicle aerodynamic and acoustic properties.

Each year, the CNRT R2A organises a workshop to present the main results obtained in the course of the past year activities as also original and new developments in the field of land vehicle aerodynamics and aeroacoustics.

The present special issue of IJAD publishes eight articles representative of recent research actions executed within the framework of the CNRT 2A or connected to its domain. The articles are organised according to the following themes:

- Concerning train aerodynamics in crosswind, a first article presents a theoretical study dealing with a rotational flows perturbed by a circle and Joukowski profiles. A second article presents the global status of aerodynamic studies for railways crosswind which is a key issue for high speed trains. European regulations and aerodynamic process are presented as well as some current issues with a focus on the ground configuration choice.
- The next two articles deal with the aerodynamics of the flow past bluff bodies for which the base region is the main source of drag. The first article presents a characterisation of the flow around a square back Ahmed body. In the second article the flow past two different road vehicles with blunt afterbodies (Renault Traffic and Peugeot 3008) has been studied in the full scale aeroacoustic wind-tunnel of GIE S2A. The wake was investigated through static pressure and velocity measurements.

- Flow control is today a major issue with a view of reducing drag and noise generated by flow separation. In the first article, an analytical model is proposed to represent the evolution of the time-dependent flow rate in the exit plane of a two-dimensional pulsed jet. In the second article, the control of two-dimensional flows around bluff-bodies is achieved by using porous devices added on some parts of the body, the modelling of the flow in different media being performed by means of the penalisation method.
- Two articles deal with aeroacoustics which is an important concern both for cars and high-speed trains since at high speed the flow around the vehicle becomes the dominant noise source. One article presents an investigation of the effects of vortex dynamics and unsteady flow separation downstream of a forward facing step on the inside noise radiation through a window. The second article is about a POD application for separating acoustic and turbulent fluctuations from wall pressure synthesised field.