Guest editorial: Aerodynamics for lower environmental impact

This special issue is dedicated to

Jean Delery

President of the Aerodynamics Technical Committee of the French Aeronautics and Aerospace Society (3AF) for 20 years, member of the 3AF High Scientific Council

passed away on 6 December 2022.

The Aeronautics and Space community to which he contributed and devoted himself, his family and friends are very grateful.

This special issue of the *International Journal of Numerical Methods for Heat & Fluid Flow* (*IJNMHFF*) focuses on aerodynamics for lower environmental impact.

Scientific evidence of the impact of noxious gases on the environment has been present for almost five decades. However, measures for reduction are being enforced only recently following the declaration of a climate emergency. Consequently, serious questions are being asked about the contribution from aviation and land transportation. Regardless of the sharp drop in flights due to the recent pandemic, a growth in aviation industry is still forecasted and thus raising back concerns of its impact on our climate. The increased number of flights taking off and approaching urban areas has also raised questions of noise levels. This aeronautical activity also has a significant impact on the temperature of the environment, which requires the control and optimization of heat and mass transfer phenomena and associated new techniques.

Noteworthy progress has been made through improvements of traditional configurations and emergence of a variety of novel architectures. Hydrogen and electric propulsion are slowly paving their way in transport applications, but improvement in aerodynamic efficiency through better design can accelerate the implementation of these technologies at larger scale.

Assessment of the environmental impact is also a major concern for terrestrial vehicles (noise emission, trailers instabilities, high-speed train performance and nuisance), in particular through the reduction of aerodynamic drag. Buildings are also concerned through ventilation and heating systems. Wind turbines' design is also a major concern to reduce induced perturbations (noise, wake and vibrations). The design and optimization of novel concepts are enabled through more accurate representation of the physics from experiments and our ability to simulate complex systems for larger parameter spaces using more advanced algorithms. Novel mobility systems are attempting to redefine intra- and interurban transportation using in particular unmanned aerial systems.

All the numerical and/or experimental articles of the present special issue have been reviewed by at least two independent international experts with the rigorous expertise process of the *IJNMHFF* journal. Some works are the completed versions of the most instructive contributions to the 56th 3AF International Conference on Applied Aerodynamics AERO2022, organized in Toulouse (France) by the Aerodynamics Technical Committee of the French Aeronautics and Aerospace Society (3AF).

La Société Savante de l'Aéronautique et de l'Espace

Ce numéro spécial est dédié à Jean Delery, pour son immense contribution à l'avancement des sciences aéronautiques et spatiales. La 3AF, ses amis, ses pairs reconnaissants.

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The 3AF International Conference on Applied Aerodynamics is an annual event organized by the 3AF Aerodynamics Commission at places known for their activity in the field of aeronautics and/or aerospace science and technology. This event is an excellent opportunity for scientific exchange between scientists from industry, research institutions and academia.

The future 57th 3AF International Conference on Applied Aerodynamics AERO2023 (March 29–31, 2023), **dedicated to Jean Delery**, is organized in Bordeaux (France) under the theme "High speed aerodynamics, from transonic to hypersonic."

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