

CALL FOR PAPERS



Association Aéronautique
et Astronautique de France

56th 3AF International Conference
on Applied Aerodynamics
Aerodynamics for Lower
Environmental Impact
Toulouse, France – March 28-29-30, 2022

www.3af-aerodynamics.com



Project AMPERE of regional electric plane. © ONERA-CEA



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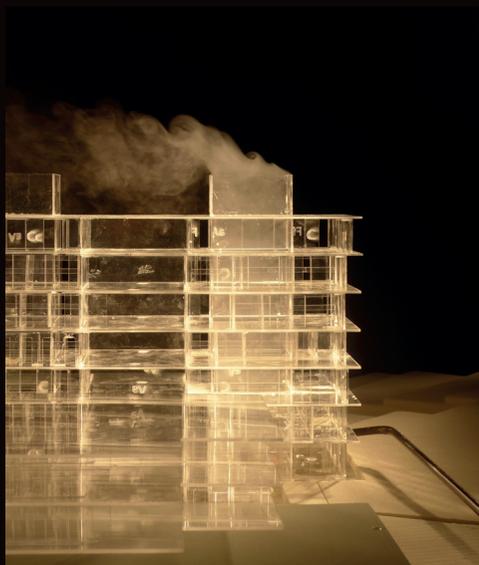
Communication abstracts (300 to 500 words, preferably with figures) have to be mailed to the 3AF Executive Secretariat before **November 15, 2021**.

The Scientific Committee will inform the authors of acceptance by **December 13, 2021** at the latest.

OFFICIAL LANGUAGE & PUBLICATIONS

Papers must be submitted and presented in English. The written version of the communications will be in English and must be sent to the 3AF Executive Secretary (aero.conf@3af.fr) before **February 21, 2022** to allow their insertion in the conference proceedings. A 3AF template file will be provided for the preparation of the manuscript.

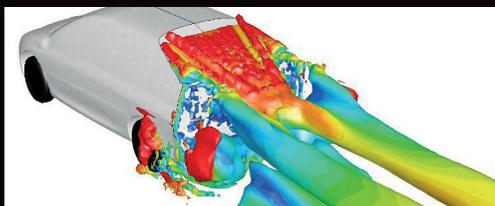
Authors will be invited to propose an extension of their works for publication in a special issue of the *International Journal of Numerical Methods for Heat & Fluid Flow* dedicated to the conference. Each paper is reviewed by the guest-editor and, if it is judged suitable for publication, it will be sent to at least two independent referees for peer review. It is also possible to submit papers for publication in the *CEAS Aeronautical Journal*. Authors are however free to publish their paper in any other journal, a reference to the conference being then appreciated.



Administrative building ventilation © Aérodynamique Eiffel- CSTB

CONFERENCE DEADLINES

Abstract submission: **November 15, 2021**
Paper acceptance: **December 13, 2021**
Full length paper: **February 21, 2022**
Conference in Toulouse: **March 28-29-30, 2022**



Near wake of a land vehicle. © CNRT R2A

CONFERENCE SECRETARIAT COORDINATES

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AERODYNAMICS FOR LOWER ENVIRONMENTAL IMPACT

The 3AF International Conference on Applied Aerodynamics is an annual event organised by the French Aeronautics and Aerospace Society (3AF) at French venues between researchers of all nations leading an activity in aeronautics or aerospace. It is an excellent opportunity for scientific exchanges between researchers from industry, research institutions and academia. Researchers from other fields are also welcome as **the current theme englobes the whole transport and energy sector.**

Each year the conference addresses a particular topic in aerodynamics. It is organised on the basis of five half-days of technical presentations, each introduced by a keynote conference from a recognised expert and is concluded by a technical tour in connection with the conference theme.

This 56th edition hosted by the “Département d’Aérodynamique, Énergétique et Propulsion” (DAEP) at ISAE-SUPAERO intends to gather experts in diverse fields to share their perspectives 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, which accounts for less than 5% of the overall emission. 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.** 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 small-scale applications, but improvement in aerodynamic efficiency through better design can accelerate the implementation of these technologies at larger scale.

The design and optimisation of these 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 inter urban transportation using unmanned aerial systems.

Coupled with the emergence of micro-air systems we are being encouraged to revisit low Reynolds number flows while seeking inspiration from nature. The real impact of emission can be assessed with further understanding of contrails and dispersion of emissions through atmospheric and geophysical fluid dynamics studies.

The aviation industry has seen tremendous growth, but we are currently transiting into a new era in which its **future needs to be redefined.**

Assessment of the environmental impact is also a major concern for terrestrial vehicles, in particular through the reduction of aerodynamic drag. Buildings are also concerned through ventilation and heating systems, which can impact on covid-19 transmission.



Configuration with boundary layer ingestion. © ONERA

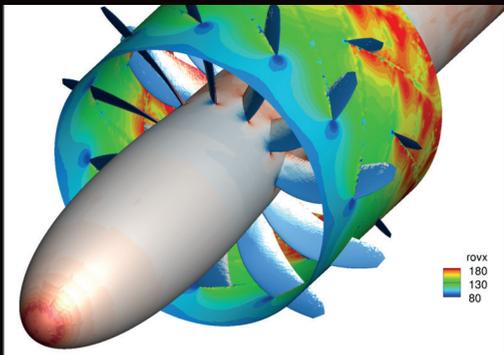
MAIN TOPICS

The following items will be considered to address the above challenges (the list not being exhaustive):

- **Aerodynamic design and optimisation of novel configurations and propulsion systems for a very large range of Reynolds number**
- **Geophysical fluid dynamics – radiative forcing and dispersion of emission**
- **Emerging concepts – Urban Mobility Systems, Unmanned and Micro-Aerial Systems**
- **Flow control techniques for drag and load – transition delay and separation control**
- **Advances in measurement techniques, data processing, wind tunnel or flight test**
- **Recent development in modelling and prediction, from low order models to high fidelity simulations, data driven analysis**
- **Emerging fields such as nature-inspired solutions and deep learning**
- **Heat transfer phenomena**
- **Condensation trails. Effects of biofuels/hydrogen, altitude, and other factors**
- **Noise prediction and reduction techniques**

KEYNOTE CONFERENCES

Bert BLOCKEN	Eindhoven University of Technology
Jeffrey CROUCH	Boeing Commercial Airplanes
Denis DARRACQ	Airbus Commercial Aircraft
Volker GREWE	DLR-Institut für Physik der Atmosphäre
Pierre MOSCHETTI	Direction Générale de l’Aviation Civile



Large-Eddy simulation of a counter rotating open rotor. © ISAE-SUPAERO

SCIENTIFIC COMMITTEE

Members of the 3AF Aerodynamics Technical Committee

EXECUTIVE SCIENTIFIC COMMITTEE

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Characterization of low Reynolds number rotors in an anechoic room. © ISAE-SUPAERO



CONFERENCE LOCATION

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