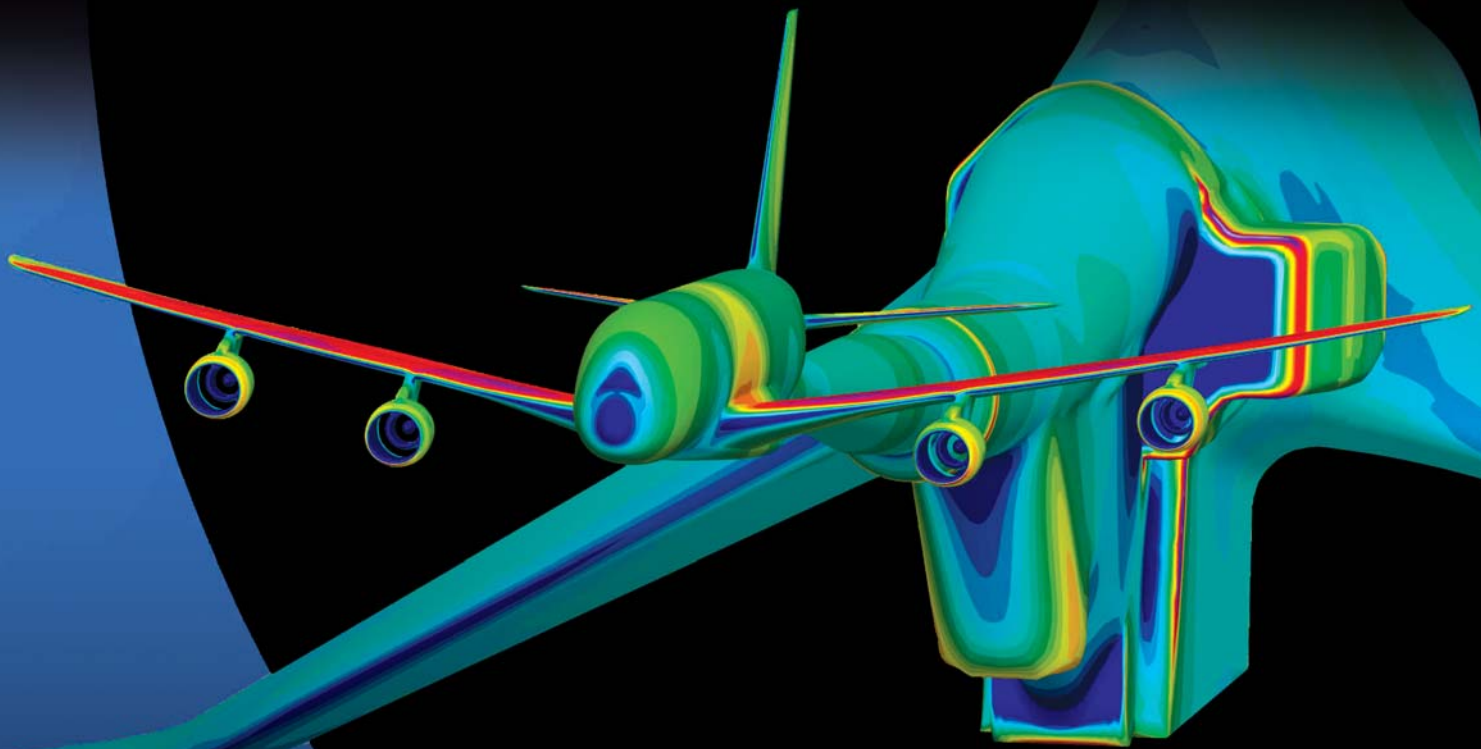


PROGRAMME



47th International Symposium of Applied Aerodynamics

Wind tunnel and computation:
a joint strategy for flow prediction
Paris, March 26-27-28, 2012

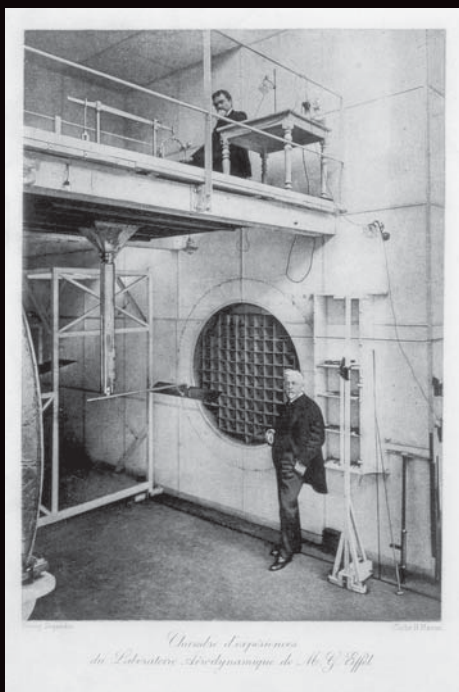


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1912-2012 Centenary of the Eiffel wind tunnel





Wind tunnel and computation: a joint strategy for flow prediction

In 1909, Gustave Eiffel built at the foot of his famous tower one of the first wind tunnels dedicated to a new science: Aerodynamics. In 1912, the wind tunnel was moved to Auteuil, in Paris, where it is still in operation.

In 2012, the French aerodynamics community celebrates the centenary of the Eiffel wind tunnel and its continued use for the study of a large number of aerodynamic problems concerning aircraft, automobiles, buildings, etc. The 47th International Symposium of Applied Aerodynamics, which is placed under the auspices of this celebration, will focus on today strategy used for performance predictions and detailed flow analysis. This includes intensive use of CFD in connection with wind-tunnel experiments aiming to assessing the accuracy of computations, investigating the physics of complex flows and improving theoretical models. The symposium will also consider the close connection between wind-tunnel operation and CFD within the context of a computer aided wind tunnel.

SITE OF THE CONFERENCE:

Arts et Métiers ParisTech
151, Boulevard de l'Hôpital
75013 Paris – France

ORGANIZATION:



Scientific Committee

Holger BABINSKY	University of Cambridge	Nicolas GÉTIN	MBDA
Abderrahmane BAÏRI	University Paris West	Patrick GILLIÉRON	Renault
Emmanuel BÉNARD	ISAE	Patrick GNEMMI	ISL
Jean-Paul BONNET	University of Poitiers	Vincent HERBERT	PSA – Peugeot Citroën
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Piotr DOERFFER	Polish Academy of Sciences	Jean TENSI	ENSMA
Michel DUMAS	SAFRAN-Snecma	Jean-Pierre VEUILLOT	Onera
Gérard FOURNIER	GFIC	Zoubir ZOUAOU	Glyndwr University
Anne GAZAIX	Airbus		

8h45 SYMPOSIUM WELCOME
Michel Scheller (President, French Aeronautics and Astronautics Society)
Alex Rémy (Director, Arts et Métiers ParisTech)

9h15 KEYNOTE CONFERENCE N°1:
Wind tunnels: key enablers for industrial innovation in aircraft design
Patrick Wagner (Onera)

Session n° 1a: Wind tunnel operation, improvement and development
Chairperson: Alain Merlen (Onera and University of Lille 1)

Session n° 1b: Computations and validation I: Wind turbines/propellers
Chairperson: Sandrine Aubrun-Sanches (PRISME Laboratory - Orléans)

10h00 **Development of a wind tunnel model passive vibration damping system**
Bergeron G., Dewar M., Fuchiron B., Mayaud U. and Weiss J. (Bombardier/Ecole de Technologie Supérieure, Montréal)

Wind tunnel experiments and numerical study of a wind turbine
Dobrev I. and Massouh F. (Arts et Métiers – ParisTech)

10h30 **Standard models in the experimental aerodynamics laboratory of VTI**
Damljanović D., Vuković D. and Oćokoljić G. (Military Technical Institute, Belgrade)

Wind turbine wake computations
Daaou Nedjaria H., Guerria O. and Saighib M. (Renewable energies Development Center/ Université des Sciences et de la Technologie Houari Boumédiène, Algiers)

11h00 **Coffee break**

11h30 **Tandem nozzle supersonic wind tunnel design**
Wu J. and Radespiel R. (TU Braunschweig)

Evaluation of RANS modeling of wind turbine wake flow using wind tunnel measurements
Sumner J., Espana G., Aubrun S. and Masson C. (ETS Montréal / PRISME Laboratory - Orléans)

12h00 **Experiments and numerical investigations of pitch-plunging wing aerodynamics at low Reynolds numbers**
Wokoeck R. and Radespiel R. (TU Braunschweig)

Fluid-structure interaction and anisotropic mesh adaptation
Hachem E., Feghali S. and Coupez T. (CEMEF - MINES ParisTech)

12h30 **Interactive computation and visualization. Towards a virtual wind tunnel**
Labroquère J., Duvigneau R., Kloczko T. and Wintz J. (INRIA Sophia Antipolis Méditerranée)

Wake analysis of UAV propeller at incidence
Gomez Ariza D., Moretti S., Bénard E. and Moschetta J.-M. (BERTIN Technologies/ISAE)

13h00 **Lunch**

14h15 KEYNOTE CONFERENCE N°2:
Validation of the state of the art of computational aerodynamics through community workshops
Dimitri Mavriplis (University of Wyoming)

Session n° 2a: Computer aided wind tunnel
Chairperson: Holger Babinsky (University of Cambridge)

Session n° 2b: Computations and validation II: Data base/Propulsion
Chairperson: Michel Dumas (SAFRAN-Snecma)

15h00 **Using CFD to calculate support interference effect in wind tunnel tests.**
Cartieri A., Viscat P. and Mouton S. (Onera)

Creating a database for validation of predictive methods for rotorcraft
Pahov V., Valiev M., Jerehov V., Makarova L., Kusyymov A. and Barakos G. (Kazan National Technical University/University of Liverpool)

15h30 **Simulation and model support correction for slotted wall transonic wind tunnels**
Heidebrecht A. (DLR)

Garteur AG/AD-45 – Applications of CFD to predict high g loads
Hantrais-Gervois J.-L., Ceresola N., Heinrich R., van Muijden J., Sawyers D., Totland E. and Tysel L. (Onera/Alenia Aeronautica/ DLR/NLR /Airbus /SAAB/FOI)

16h00	<p>Prediction of the aerodynamic effect of model deformation during transonic wind tunnel tests <i>Mouton S., Lyonnet M. and Le Sant Y. (Onera)</i></p>	<p>Zonal Detached Eddy Simulation applied to the tip clearance flow in an axial compressor <i>Rièra W., Castillon L., Deck S., Riou J, Ottavy X. and Leboeuf F. (Onera/SAFRAN-Snecma/Ecole Centrale of Lyon)</i></p>
16h30	Coffee break	
17h00	<p>RANS simulations to compute wind tunnel wall corrections <i>Hantrais-Gervois J.-L., Mouton S. and Piat J.-F. (Onera)</i></p>	<p>Garteur AD/AG-48 – Computation validation on lateral jet interactions at supersonic speeds <i>Gnemmi P., Gruhn P., Leplat M., Nottin C. and Wallin S. (ISL/DLR/Onera/MBDA/FOI)</i></p>
17h30	<p>Modeling the S2A wind tunnel using Computational Fluid Dynamics <i>Vigneron R., Bourdassol C., Belanger A. and Kelley B. (GIE S2A)</i></p>	<p>Reverse thrust tests: An experimental approach based on numerics <i>Dejeu C., Vernet M. and Talbotec J. (SAFRAN-Snecma)</i></p>
18h00	<p>HPC capabilities of the elsA CFD software applied to a counter rotating open rotor test rig <i>Boisard R., Delattre G. and Falissard F. (Onera)</i></p>	<p>Modelling and numerical simulation of flow in ground run-up enclosures <i>Lazaro B. J., González E. and Liñan A. (Universidad Politécnica de Madrid)</i></p>
18h30	End of sessions	
19h30	Ceremony for the Centenary of the Eiffel wind tunnel at DGAC Organized by Aero Eiffel 100	

9h00 KEYNOTE CONFERENCE N°3:
Applications of data assimilation in aerodynamics
Richard Dwight (Delft University of Technology)

Session n° 3a: Advanced measurement techniques, processing and calibration methods
Chairperson: Markus Raffel (DLR)

Session n° 3b: Computation and validation III: Transition and instabilities
Chairperson: Daniel Arnal (Onera)

- 9h45 **4D-variational data assimilation using POD reduced-order model**
Tissot G., Cordier L. and Noack B. R. (PPRIME Institute - Poitiers)
- 10h15 **Pressure-sensitive paint techniques in hypersonic flows**
Yang L., Quinn M., Zare-Behtash H. and Kontis K. (University of Manchester)

- Transition control by micron-sized roughness elements: Non-linear stability analyses and wind tunnel experiments**
Vermeersch O. and Arnal D. (Onera)
- Investigation of the laminar separation-induced transition with the γ - Re_{θ} transition model on High-Lift Low-Pressure Turbine (HLLPT) rotor blades at steady conditions**
Babajee J. and Arts T. (VKI)

10h45 Coffee break

- 11h15 **Dynamic mode decomposition of PIV measurements for the cylinder wake flow in turbulent regime**
Tissot G., Cordier L. and Noack B.R. (PPRIME Institute - Poitiers)
- 11h45 **Experimental investigation of the behaviour of incompressible turbulent attachment lines and in its proximity**
Gowree E.R. and Atkin C.J. (City University London)
- 12h15 **Interference of the flapped wings in low-speed open circuit wind-tunnels**
Zherekhov V.V., Ledyankina O.A. and Sungatullin A.R (Tupolev's Kazan National Technical Research University)

- Comparison of experimental and computational boundary-layer profiles and instability growth on a flared cone in a Mach 6 quiet flow**
Hofferth J.W., Reed H.L. and Saric W.S. (Texas A&M University)
- Computational and experimental results in the open test section of the aeroacoustic wind tunnel Braunschweig**
Ciobaca V., Pott-Pollenske M., Melber-Wilkending S. and Wichmann G. (DLR)
- Joint wind tunnel and CFD examination of flow over shock control bumps**
Nübler K., Colliss S., Lutz T., Krämer E. and Babinsky H. (University of Stuttgart/ University of Cambridge)

12h45 Lunch

14h15 KEYNOTE CONFERENCE N°4:
CFD and wind tunnel testing 'hand in hand' at Dassault Aviation
Zdenek Johan (Dassault Aviation)

Session n° 4a: Cooperative CFD and wind tunnel for aerodynamics design
Chairperson: Nicolas Daniel (Airbus Germany)

Session n° 4b: Experiment and validation for miscellaneous applications I
Chairperson: Vincent Herbert (PSA Peugeot Citroën)

15h00 **Transition prediction on a supersonic natural laminar flow wing: Experiments and computations**
Vermeersch O., Yoshida K., Ueda Y. and Arnal D. (Onera/JAXA)

Hot wire and pressure-velocity analysis of a model A-pillar vortex with and without upstream turbulence. Comparison with DES computation
Affejee F., Sicot C., Perrin R. and Borée J. (PPRIME Institute/ENSMA)

15h30 **Combined wind tunnel tests and flow simulations for light aircrafts performance prediction**
Mouton S., Rantet E. and Gouverneur G. (Onera/Aviation Design/ESTACA)

Three-dimensional organisation in an incompressible cavity flow
Pastur L. R., Faigneau Y., Lusseyran F., Faure T.M., Basley J. and Douay C. (University Paris-South/LIMSI-CNRS/University Pierre et Marie Curie/Ecole de l'Air)

16h00 **Development status of a prototype system for EFD/CFD integration**
Watanabe S., Kuchi-ishi S., Murakami K., Hashimoto A., Kato H., Yamashita T., Yasue K., Imagawa K. and Nakakita K. (Japan Aerospace Exploration Agency – JAXA)

Numerical simulations and wind tunnel measurements on a tricycle wheel sub-system
Driant T., Remaki L., Moreau S., Fellouah H. and Desrochers A. (University of Sherbrooke)

16h30 **Coffee break**

17h00 **A combined numerical and experimental approach for the prediction of control surface efficiency**
Girodroux-Lavigne P., Lepage A. and David J.-M. (Onera)

Experimental and numerical simulation of an Iranian wind mill
Hocine A., Chanetz B., Guenoun S., Baïri A., Tomassetti A., Brocato M. and Gohari K. (LTIE - University Paris West/ENSAPM)

17h30 **CFD / WTT synergy towards an enhanced A/C performance prediction at Airbus**
Estève N. and Estève M.-J. (Airbus Operations SAS)

Modeling and simulation of air flow around solid structures using COMSOL multiphysics. Model verification in case of buildings.
Eissa S. H. and Eissa A. S. (National Research Center/Cairo University, Cairo)

18h00 **Development of new heat exchanger design. Part I: Experimental and numerical investigations of heat transfer from smooth and grooved cylinder**
Couzinet A., Pierrat D., Gros L., Moctar A. and Foata A. (CETIM/University of Nantes/DGA)

Experimental and numerical analysis of apex vortex location on delta wing-fuselage combinations
Boumrar I. and Ouibrahim A. (University Mouloud Mammeri, Tizi-Ouzou)

18h30 **Awards and banquet**



9h00 KEYNOTE CONFERENCE N°5:

Cathedrals for the wind, a movie from *Jean Tensi (ENSMA)*, followed by:
Gustave Eiffel and the wind: A pioneer in experimental aerodynamics
Martin Peter (Eiffel Wind Tunnel)

Session n° 5a: Fundamental experiments and CFD for flow control

Chairperson: Azeddine Kourta (PRISME Laboratory – Orléans)

Session n° 5b: Experiment and validation for miscellaneous applications II

Chairperson: Eric Ribadeau-Dumas (MBDA)

9h45 **Mach 2 supersonic rarefied airflow around a cylinder and its interaction with a DC discharge.**
Parisse J.-D., Pons J. and Lago V. (JUSTI - University of Provence/Institute ICARE – Orléans)

LES of shock induced nozzle flow separation
Chaudhuri A., Hadjadj A. and Palerm S. (CORIA - Rouen/CNES)

10h15 **On experimental sensitivity analysis of an axisymmetric turbulent wake**
Grandemange M., Gohlke M. and Cadot O. (ENSTA – ParisTech/PSA Peugeot Citroën)

Experimental and numerical analysis of the dual bell nozzle concept for nano-launcher applications
Palerm S., Robinet J.-C., Bar V., Reijasse P. and Bermond Y. (CNES/Arts et Métiers ParisTech/Onera)

10h45 **Coffee break**

11h15 **Self-adaptive control of a bluff body wake by means of porous flaps**
Feuvrier A., Mazellier N. and Kourta A. (PRISME Laboratory – Orléans)

Subsonic roll-damping data obtained in the T-38 wind tunnel for two missile models
Samardžić M., Anastasijević Z., Marinkovski D. and Isaković J. (Military Technical Institute, Belgrade)

11h45 **Experimental validation of vortex generators modeled by source terms for drag reduction of ground vehicles**
Rouillon T., Harambat F., Mathelin L. and Tenaud C. (PSA Peugeot Citroën/LIMSI)

Testing of antitank missile with lateral jets
Ocokoljić G., Samardžić M. and Vitić A. (Military Technical Institute, Belgrade)

12h15 **Drag reduction on the 25° slant angle Ahmed reference body using pulsed jets**
Joseph P., Amandolese X. and Aider J.-L. (IAT/CNAM/ESPCI)

On the aerodynamics of battle damaged wings
Djellal S. and Azzam T. (Laboratoire de Mécanique des Fluides, Algiers)

12h45 **Lunch**

14h45 **TECHNICAL VISIT**
 17h00 **The Eiffel Wind Tunnel at Auteuil (Paris)**