

# 4<sup>th</sup> SYMPOSIUM ON INTEGRATING CFD AND EXPERIMENTS IN AERODYNAMICS

September 14-16, 2009  
von Karman Institute, Rhode-Saint-Genèse/Sint-Genesius-Rode, Belgium

## SYMPOSIUM PROGRAM

### MONDAY - SEPTEMBER 14, 2009

**8.30**            **Opening of Registration**

**9.30**            **Welcome address and Introduction to VKI**

*J. Muylaert, VKI Director*

**10.00**          **Welcome address and Introduction to Symposium**

*P. Rambaud, Chairman*

**10.30**          **Coffee Break**

**11.00 KEY NOTE LECTURE:**

**Integrating CFD and Experiments on Hypersonic Vehicle Design - a  
DLR Perspective**

*José Longo, DLR Braunschweig, GERMANY*

### LUNCH (from 12.00 to 13.00)

#### SESSION 1

**13.30**            **Integrated Computational/Experimental Approach to UCAV and Delta-  
Canard configurations regarding Stability&Control**

*Andreas Schütte<sup>1</sup>, Russ Cummings<sup>2</sup>, Thomas Loeser<sup>3</sup>, Dan Vicroy<sup>4</sup>*

*(German Aerospace Center-GERMANY, Air Force Academy Colorado-USA,  
German-Dutch Wind Tunnels-GERMANY, NASA Langley Research Center-  
USA)*

**14.00**            **Digital/Analog Hybrid Wind tunnel: A Prototype System towards  
EFD/CFD Integration**

*Shigeya Watanabe, Shigeru Kuchi-ishi, Takashi Aoyama, Naoyuki Fujita,  
Hiroyuki Kato, Yuichi Matsuo*

*(Japan Aerospace Exploration Agency-JAXA – Japan)*

**14.30 Integration of CFD and Experiments in the CUBRC LENS Shock Tunnel Facilities to Understand the Physics of Hypersonic and Hypervelocity Flows.**

*Matthew MacLean<sup>1</sup>, Michael Holden<sup>1</sup>, Timothy Wadhams<sup>1</sup>, Graham Candler<sup>2</sup>, Ioannis Nompelis<sup>2</sup>.*  
(CUBRC-USA, University of Minnesota-USA)

**15.00 Coffee Break**

**SESSION 2**

**15.30 Study of Cavity unsteady flowfield**

*Bidur Khanal, K. Knowles, A.J. Saddington*  
(Aeromechanical Systems Group, Cranfield University-UK)

**16.00 Experimental and Numerical Investigation of the Near-Field Wake behind a Transport Aircraft with an Open Ramp**

*Eric W.M. Roosenboom, Niko Schade, Ismail Acisu, Andreas Schröder*  
(DLR - German Aerospace Center-GERMANY)

**16.30 Transonic Wind Tunnel Simulation with Porous Wall Model**

*Atsushi Hashimoto<sup>1</sup>, Taisuke Nanbu<sup>2</sup>, Takashi Aoyama<sup>1</sup>, Tetsuya Sato<sup>2</sup>*  
(Japan Aerospace Exploration Agency-JAXA - JAPAN, Waseda University – JAPAN)

**17.00 ICE BREAKING RECEPTION @ VKI**

**18.00 Bus departure to the hotels (Place Rogier)**

**TUESDAY - SEPTEMBER 15, 2009**

**9.00 KEY NOTE LECTURE**

(Title to be defined)

*Guillermo Paniagua, von Karman Institute, Turbomachinery and Propulsion Department - Belgium*

**SESSION 3**

- 9.45 PIV-Measurements of Film Cooling Flows considering the Exit Shape and Density Gradient**  
*Wilhelm Jessen, Peter Renze, Wolfgang Schröder*  
(*Institute of Aerodynamics, RWTH Aachen University-GERMANY*)
- 10.15 Coffee break**
- 10.45 CFD-assisted Turbine Nozzle Guide Vane Rig Design for High Negative Incidence Angles**  
*Luis Gallar, Vassilios Pachidis, Pericles Pilidis*  
(*Cranfield University – UNITED KINGDOM*)
- 11.15 CFD Assessment of Vortex Interactions in Turbines**  
*G. Persico<sup>1</sup>, A. Mora<sup>1</sup>, P. Gaetani<sup>1</sup>, M. Savini<sup>2</sup>*  
(*Politecnico di Milano - ITALY, University degli Studi di Bergamo - ITALY*)
- 11.45 Experimental and numerical investigation on the energy losses in compressible flow at pulse-converter type junctions**  
*Roberto Talón-Toledo<sup>1</sup>, José Pérez-García<sup>1</sup>, Enrique Sanmiguel-Rojas<sup>2</sup>*  
(*Departamento de Ingeniería Térmica y de Fluidos. Universidad Politécnica de Cartagena- SPAIN, Departamento de Ingeniería Mecánica y Minera. Universidad de Jaén- SPAIN*)

**LUNCH (from 12.15 to 13.30)**

**SESSION 4**

- 13.30 Integrated Optimization Study of a Subsonic Diffuser with Offset in Two Planes**  
*Russell Cummings, John Cox, Micah Paul, Aaron Byerley, Robert Decker*  
(*U.S. Air Force Academy- USA*)

- 14.00**      **Simulating Wind Tunnels: Comparison of CFD models for a transonic slotted test section**  
*Alexander Heidebrecht*  
 (DLR-GERMANY)
- 14.30**      **Numerical and Experimental Analysis of Oscillating Wing**  
*Marco La Mantia, Peter Dabnichki*  
 (Queen Mary University of London-UK)
- 15.00**      **Coffee break**

**SESSION 5**

- 15.30**      **Validation of Numerical Modeling of Supersonic Spatial Flows**  
*Anatoly Kharitonov<sup>1</sup>, Alexander Lutsky<sup>2</sup>, Andrey Shevchenko<sup>1</sup>*  
 (Khristianovich Institute of Theoretical and Applied Mechanics SB RUSSIA, Keldysh Institute of Applied Mathematics RAS, RUSSIA)
- 16.00**      **Validation of an Equilibrium Ablation CFD Solver with Low Temperature Ablation Experiments Using Dry Ice**  
*Ryan Gosse<sup>1</sup>, David Callaway<sup>2</sup>, Mark Reeder<sup>2</sup>, Ioannis Nompelis<sup>3</sup>, Graham Candler<sup>3</sup>*  
 (Air Force Research Lab-USA, Air Force Institute of Technology-USA, University of Minnesota-USA)
- 16.30**      **Static Aeroelasticity Analysis Using Discontinuous Galerkin CFD Solver**  
*Kanako Yasue, Keisuke Sawada*  
 (Tohoku University-JAPAN)
- 17.00**      **Integrated CFD and experimental study of supersonic vortex wakes and their interactions with a bow shock wave**  
*Andrey Shevchenko<sup>1</sup>, Anatoly Kharitonov<sup>1</sup>, Alexander Lutsky<sup>2</sup>*  
 (Khristianovich Institute of Theoretical and Applied Mechanics, Keldysh Institute of Applied Mathematics - RUSSIA)
- 17.30**      **Measurements-integrated simulations applied to the case of a planar co-flowing jet: results and experimental validation**  
*Gabriele Bellai<sup>1</sup>, Kentaro Imagawa<sup>2</sup>, Fredrik Lundell<sup>1</sup>, Hiroshi Higuchi<sup>3</sup>, Toshiyuki Hayase<sup>4</sup>*  
 (KTH mechanics, Royal Institute of Technology-SWEDEN, Graduate School of Engineering, Tohoku University-JAPAN, Department of Mechanical and Aerospace Engineering, Syracuse University-USA, Institute of fluid science, Tohoku University-JAPAN)
- 18.00**      **Bus departure to the hotels (Place Rogier)**

**Symposium Dinner**  
(from 19.30 to 22.30), Brussels

**WEDNESDAY - SEPTEMBER 16, 2009**

**9.00 KEY NOTE LECTURE:**

**Running on All Cylinders - The Integration of CFD and EFD for  
Ground Effect Aerodynamics Studies**

*Tracy J. Barber,*

*Laboratories School of Mechanical & Manufacturing Engineering  
University of New South Wales, AUSTRALIA*

**10.00 Coffee break**

**SESSION 6**

**10.30 Aerodynamics of a Savonius Wind Rotor**

*Sergio Montelpare, Renato Ricci, Valerio D'Alessandro, Giuseppe Di Giovine  
(Dipartimento di Energetica - Università Politecnica delle Marche-ITALY)*

**11.00 Numerical Assessment Validated Experimentally of a Modified Göttingen  
735 Aerofoil**

*Oussama Jadayel, Amne El Cheikh  
(University of Balamand-LEBANON)*

**LUNCH (from 12.00 to 13.00)**

**SESSION 7**

**14.00 Large-eddy simulation of flow around a circulation control airfoil as a  
benchmark for industrial CFD validation**

*Takafumi Nishino<sup>1</sup>, Seonghyeon Hahn<sup>2</sup>, Karim Shariff<sup>d</sup>  
(NASA Ames Research Center-USA, Center for Turbulence Research,  
Stanford University-USA)*

**14.30 A Joint Computational and Experimental Investigation of Wingtip  
Modifications for the KC-135R**

*Michael Arndt, Thomas Yechout, Halpert Joel, Daniel Prescott  
(United States Air Force Academy-USA)*

15.00 Coffee break

**SESSION 8**

15.30 **Integrating CFD into a wind tunnel testing based missile configuration design methodology**  
*Charles Crosby, Stephen Gobey*  
*(Denel Dynamics-SOUTH AFRICA)*

16.00 **Integrating Measurements and CFD: Calculating Wind Tunnel Wall and Support Interference**  
*Bart J.C. Horsten*  
*(Delft University of Technology-NETHERLANDS)*

16.30 **Integrating CFD and Experiment for Engineering Design and Development**  
*Prevani Kistan-Naidoo<sup>1</sup>, Stephen Gobey<sup>2</sup>*  
*(Armcor-SOUTH AFRICA, Denel Dynamics-SOUTH AFRICA)*

17.00 **Conclusions and announcement of 5<sup>th</sup> Symposium**

17.30 **Symposium closure**

17.35 **Bus departure to the hotels/train station (Place Rogier)**

XX