

- INTRODUCTION TO MEASUREMENT TECHNIQUES  
OCTOBER 8-12, 2012
- INTRODUCTION TO CFD  
JANUARY 21-25, 2013
- CUBESAT TECHNOLOGY AND APPLICATIONS  
JANUARY 29 - FEBRUARY 1, 2013
- CFD FOR ATMOSPHERIC FLOWS AND WIND  
ENGINEERING  
MARCH 11-13, 2013
- RADIAL COMPRESSOR DESIGN  
MARCH 11-15, 2013
- ACCURATE AND EFFICIENT AEROACOUSTIC  
PREDICTION APPROACHES FOR AIRFRAME NOISE  
MARCH 25-28, 2013
- AEROENGINE DESIGN: FROM STATE OF THE ART  
TURBOFANS TOWARDS INNOVATIVE  
ARCHITECTURES  
APRIL 9-12, 2013
- FLUID DYNAMICS ASSOCIATED TO LAUNCHER  
DEVELOPERS (STO-AVT-VKI-206)  
APRIL 15-17, 2013
- RADIATION AND GAS-SURFACE INTERACTION  
PHENOMENA IN HIGH SPEED RE-ENTRY  
(STO-AVT-VKI-218)  
MAY 6-8, 2013
- TURBULENT COMBUSTION  
MAY 13-17, 2013
- SOURCE TERM CHARACTERIZATION OF THE  
CONSEQUENCES OF STORAGE TANK  
AGGRESSIONS (STO-AVT-VKI-219)  
JUNE 4-6, 2013
- TRANSITION AND TURBULENCE IN HIGH-SPEED  
FLOW  
JUNE 10-14, 2013
- FLOW CHARACTERISTICS AND PERFORMANCE OF  
SAFETY VALVES  
SEPTEMBER 9-11, 2013
- ACCURATE TEMPERATURE MEASUREMENTS  
SEPTEMBER 16-20, 2013
- 37<sup>TH</sup> COMPUTATIONAL FLUID DYNAMICS:  
ADJOINT METHODS IN CFD  
TO BE DETERMINED

## ONLINE REGISTRATION AVAILABLE

<https://www.vki.ac.be/registration>

It is highly recommended that the registration is sent at the latest 15 days before the beginning of the course. A letter of acceptance and additional information will be sent on receipt of the application form.

### COURSE FEE

The fee for the lecture series is 1350 euro, applicable to citizens of NATO countries contributing to the financing of the VKI (Belgium, Czech Republic, France, Germany, Hungary, Iceland, Italy, Luxemburg, Norway, Portugal, Spain and Turkey).

For citizens of other NATO countries and of NATO partner countries, the fee is 1760 euro. For non-NATO citizens the fee is 1920 euro. These prices include 21% VAT. The fee includes printed notes, lunches, beverages, and administrative costs.

Lectures will be given in English and printed notes will be distributed during registration.

### FELLOWSHIPS

To encourage greater participation in our Lecture Series programme by university members, the Institute has established a limited number of VKI Lecture Series fellowships for citizens of NATO countries contributing to the financing of the VKI, as well as for citizens of other NATO countries and NATO partner countries coming from a university in a VKI financing country.

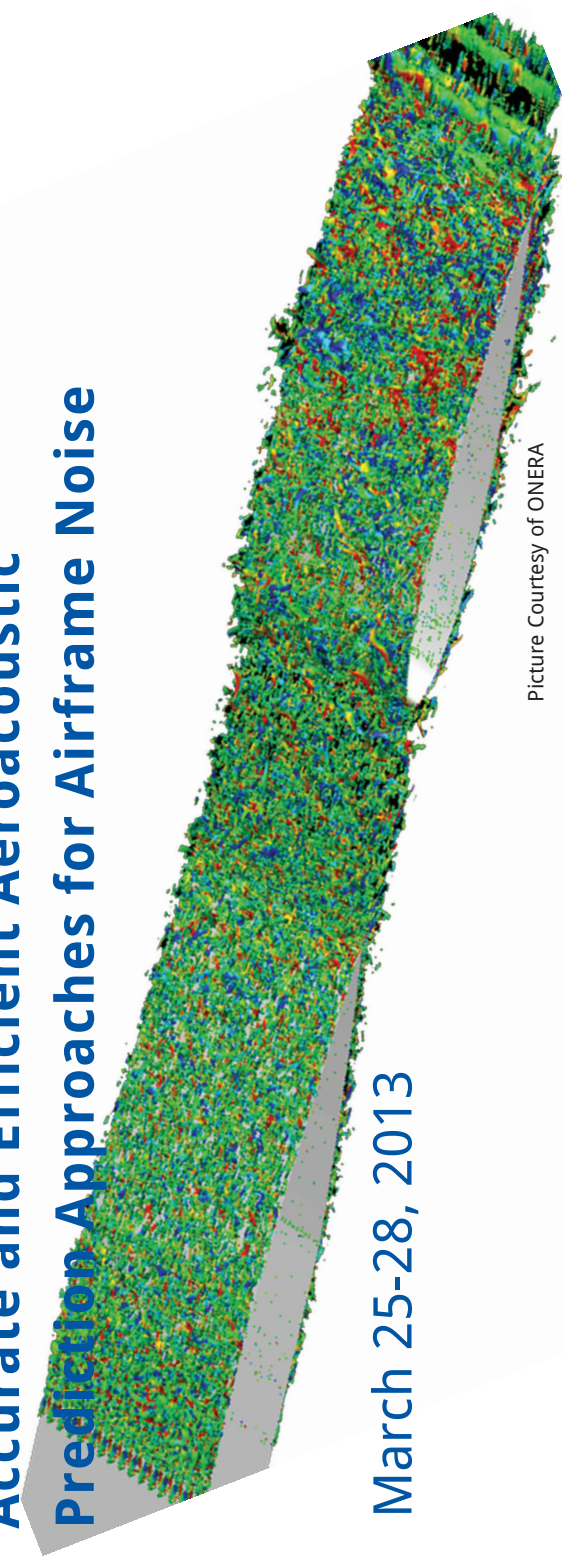
The recipient of such fellowship is entitled to attend the Lecture Series at a reduced fee, which will be 675 euro (VAT included) for assistants not having a Ph.D. degree and for Ph.D. candidates, and 300 euro (VAT included) for undergraduate students. For non-NATO citizens coming from a university in a VKI financing country, the fee is 960 euro (VAT included) for assistants not having a Ph.D. degree and for Ph.D. candidates, and 400 euro (VAT included) for undergraduate students.

The request to be considered for an award must accompany the application to attend the Lecture Series, and the applicant must provide **a recommendation letter from his or her professor**; if not done so, the request will not be taken into consideration. All possible alternative sources of funding should be investigated before aid is requested under this scheme, so that those most in need will benefit.

von KARMAN INSTITUTE FOR FLUID DYNAMICS

Accurate and Efficient Aeroacoustic  
Prediction Approaches for Airframe Noise

March 25-28, 2013



Picture Courtesy of ONERA

## INTRODUCTION

Aircraft noise remains a key societal and economical concern, and ambitious targets for noise reduction have to be achieved to ensure a sustainable air transport. Meeting those ambitious objectives requires unprecedented joint efforts for the modelling, prediction, and eventually mitigation of aircraft noise. The latest developments thereto will be exposed during this Lecture Series, by top-rank international experts in the field. In particular, advanced scale-resolved and stochastic approaches will be described and applied to generic but representative configurations relevant to flap, slat and landing gear noise issues. Based on validations with extensive experimental databases collected in the framework of the EC FP7 VALIANT project, the limitations and perspectives for the further evolution of state-of-the-art simulation methods will be discussed.

The Lecture Series director is Prof. C. Schram from the von Karman Institute for Fluid Dynamics.



VON KARMAN INSTITUTE FOR  
FLUID DYNAMICS

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## PRELIMINARY SCHEDULE

### Monday 25 March 2013

- 08:45 Registration
- 09:00 Welcome Address
- 09:15 Fundamentals of aeroacoustic analogies  
*C. Schram, von Karman Institute, Belgium*
- 10:15 Coffee Break
- 10:45 State-of-the-art CAA approaches  
*R. Ewert, DLR, Germany*
- 12:00 Lunch Break
- 14:00 Research priorities for airframe noise
- 15:15 Coffee Break
- 15:45 An overview of sound-generating mechanisms in high-lift devices and landing gears  
*M. Roger, Ecole Centrale de Lyon, France*
- 17:00 Reception

### Tuesday 26 March 2013

- 09:00 Analytical methods for airframe noise prediction  
*M. Roger*
- 10:15 Coffee Break
- 10:45 Application of analytical methods to airframe noise prediction  
*M. Roger*
- 12:00 Lunch Break
- 14:00 Acoustic beamforming for the ranking of aircraft noise  
*P. Sijtsma, NLR, The Netherlands*
- 15:15 Coffee Break
- 15:45 Designing validation experiments in aeroacoustics  
*E. Manoha, ONERA, France*

### Wednesday 27 March 2013

- 9:00 Stochastic approaches for airframe noise prediction  
*R. Ewert*
- 10:15 Coffee Break
- 10:45 Application of stochastic approaches for airframe noise prediction  
*R. Ewert*
- 12:00 Lunch Break
- 14:00 Advanced zonal RANS / LES methods for aeroacoustics  
*M. Terracol, ONERA, France*
- 15:15 Coffee Break
- 15:45 Generation of turbulent inflow conditions for aeroacoustics  
*M. Schur, NTS, Russia*

### Thursday 28 March 2013

- 9:00 Source modelling for boundary and finite element methods  
*P. Martinez, LMS, Belgium*
- 10:15 Coffee Break
- 10:45 Compressible LES for airframe noise  
*L. Gicquel, Cerfacs, France*
- 12:00 Lunch Break
- 14:00 Edge-based methods in CAA  
*T. Kozubskaya, Russian Academy of Sciences, Russia*
- 15:15 Coffee Break
- 15:45 Potential effects of Rhie & Chow type interpolations in airframe noise simulations  
*T. Knacke, Technische Universität Berlin, Germany*
- 17:00 End of Lecture Series

### Friday 29 March 2013 - Valiant Workshop

#### FREE REGISTRATION FOR THE WORKSHOP ONLY

- 9:00 Presentation of the VALIANT benchmark cases  
*C. Schram*
- 10:15 Coffee Break
- 10:45 Two-struts interaction noise as a generic landing gear problem  
*T. Kozubskaya*
- 12:00 Lunch Break
- 14:00 Predicting the noise produced by slotted wing components  
*T. Knacke*
- 15:15 Coffee Break
- 15:45 Wing-flap aerodynamic and acoustic installation effects  
*M. Roger*
- 17:00 Capturing flow-acoustic resonances in the slat cove  
*E. Manoha*



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