

Turbulence and Flow Control Research Group Seminar Series CITY UNIVERSITY LONDON



“Characterisation and control of the blunt trailing edge wake”

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ABSTRACT

Blunt trailing edges are often used to improve the structural characteristics of airfoils in high load situations and/or reduce wave drag on transonic wings. However, the wake generated behind blunt trailing edges can lead to higher-pressure drag, unsteady aerodynamic loading and higher noise emission. This presentation will describe an active flow control methodology known as “distributed forcing”, which leverages a secondary instability present in the wake to achieve a large change in the blunt trailing edge wake with minimal energy input. The results of an experiment using dielectric barrier discharge plasma actuators as the flow control input will be presented and highlight the conditions under which the von Karman vortex street can be suppressed in the wake. Finally, a flow state estimation methodology using only wall pressure fluctuation measurements at the base of the flow to estimate the velocity field in the wake of the model will be discussed. The motivation for developing this estimator is the eventual implementation of a closed-loop control methodology to further improve the efficiency and robustness of the flow control system for blunt trailing edge wakes.

SPEAKER'S BIO

Philippe Lavoie is Associate Professor at the University of Toronto Institute for Aerospace Studies (UTIAS) and Associate Director for the Center for Research in Sustainable Aviation based at UTIAS. His research areas include turbulence, flow control and experimental aerodynamics. His current research is focused on studying flow structures and instabilities associated with transitional and turbulent flows as a precursor to their control, as well as the implementation of modern active flow control techniques to improve the characteristics of these phenomena. Prof. Lavoie is the recipient of an Early Researcher Award from the Government of Ontario.

VENUE, DATE & TIME

City University London (click on figures for further details).

Room: C310

Building: Tait

Date: 26th May, 2015

Time: 12:00

ORGANIZERS

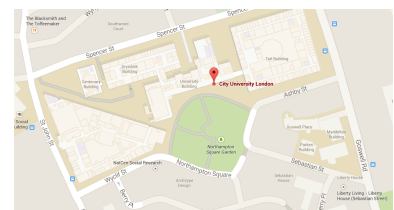
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City University's map.

