THE WILLIAM E. BOEING DEPARTMENT OF

AERONAUTICS & ASTRONAUTICS

... welcomes ...

DR. NOEL CLEMENS

UNIVERSITY OF TEXAS

Low-Frequency Unsteadiness of Shock Wave / Turbulent Boundary Layer Interactions

Shock wave / boundary layer interactions are an important feature of high-speed flow that occur in supersonic aircraft inlets, aircraft control surfaces, missile base flows, nozzles, and rotating machinery. These interactions are often associated with severe boundary layer separation, which is highly unsteady, and which exhibits high fluctuating pressure and heat loads. The unsteady motions are characterized by a wide range of frequencies, including low-frequency motions that are about two orders of magnitude lower than the integral-scale fluctuations in the upstream boundary layer. It is these low-frequency motions that are of most interest because they have been the most difficult to explain and model. Despite significant work over the past few decades, the source of the low-frequency motions remains a topic of intense debate. Some argue that the low-frequency unsteadiness is primarily driven by disturbances in the upstream boundary layer, whereas others argue that it is driven by an intrinsic instability of the separated flow. In this seminar I will discuss the experimental research that we have conducted on this topic over the past 20 years, including our recent work using 50 kHz particle image velocimetry to obtain time-resolved information of the separated flow unsteadiness. I will also propose a point-of-view that seems to reconcile the seemingly contradictory mechanisms that have been proposed in the literature.

WILLIAM E. BOEING
DEPARTMENT OF AERONAUTICS & ASTRONAUTICS
UNIVERSITY of WASHINGTON

Monday, November 14, 2016 @ 4:00pm
Johnson 075, UW Seattle

Visitor RSVP: contact@aa.washington.edu

THE WILLIAM E. BOEING DEPARTMENT OF
AERONAUTICS & ASTRONAUTICS

... Distinguished Guest Speaker ...

DR. NOEL T. CLEMENS
UNIVERSITY OF TEXAS

Department Chair
Bob R. Dorsey Professorship in Engineering
Cockrell Family Chair for Departmental Leadership

Dr. Noel Clemens holds the Bob R. Dorsey Professorship in the Department of Aerospace Engineering and Engineering Mechanics at The University of Texas at Austin and serves as department chair. He received a B.S. in Mechanical Engineering from the University of Massachusetts/Amherst in 1985, and M.S. and Ph.D. degrees in Mechanical Engineering from Stanford University in 1986 and 1991, respectively. From 1991 to 1993 he was a post-doctoral fellow at the Combustion Research Facility at Sandia National Laboratories in Livermore, CA. Dr. Clemens began as an Assistant Professor at UT in 1993 and was promoted to full professor in 2005. His areas of research include turbulent mixing, combustion, laser diagnostics, shock wave/boundary layer interactions, inlet unstart and high-speed flow control. He received the Presidential Faculty Fellow Award in 1995, the College's Faculty Excellence Award in 1997, the award for "Outstanding Teaching by an Assistant Professor" in 1998, the ASE/EM Department Teaching Award in 2000, and the Lockheed Martin Award for Excellence in Engineering Teaching in 2011. He is a Fellow of the American Physical Society and he served as Editor-in-Chief of Experiments in Fluids from 2009 to 2012.

Read more: http://www.ae.utexas.edu/faculty/faculty-directory/clemens

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