

2010 Departmental Seminar

Wednesday 1 September 2010

2.00 pm

HP Seminar Room NZi3

Making aircraft engines quieter. Progress towards optimised acoustic treatments for advanced turbofans

Prof. Jeremy Astley, Director of Rolls-Royce UTC in Gas Turbine Noise, ISVR, Southampton, UK

Abstract:

Background: Aircraft noise has long been a major concern to residents near airports, and the strengthening of local regulations on community noise has ensured that the reduction of noise generated at take-off and approach remains an essential consideration for airframers and aero-engine manufacturers in developing new aircraft. In a broader context, the environmental impact of air transport poses a major threat to its continued provision as a convenient form of mass transport. The imperative to reduce the three major environmental impacts noise, air quality and emissions is now critical to the future health of the aviation sector. This requires an integrated strategy. It is generally possible, for example to, to reduce noise at the expense of fuel burn and carbon emissions, but such trade-offs must be scrutinised very carefully in an integrated approach. In general, noise benefits today must be secured without compromising specific fuel consumption or air quality.

Content: In the first part of this presentation, the remarkable record of the aviation industry in reducing aircraft noise over the last fifty years is reviewed, and current targets for noise reduction are assessed in the light of current and future technologies to mitigate noise.

In the second portion of the talk, the application and utility of automated optimisation methods is presented for optimising acoustic treatments in the ducted portions of turbofan engines.

Bio-Sketch: Dr Jeremy Astley joined the Institute of Sound and Vibration in March 2001 as Professor of Computational Acoustics, and is attached to the Rolls-Royce University Technology Centre in Gas Turbine Noise. He graduated in Mathematics from the University of Canterbury in Christchurch New Zealand and completed a PhD in mathematics at Bristol University in 1973. Since then he has held academic positions at the University of Nottingham, the University of Missouri-Rolla, and the University of Canterbury. He has also held visiting fellowships at the Universities of Hull and Durham. He is a fellow the Royal Society of New Zealand and of the Institution of Professional Engineers of New Zealand and the recipient of a Doctorate of Engineering in 2000 for contributions to Finite Elements in Acoustics. He is currently the Director of the Rolls-Royce Technology Centre for Gas Turbine Noise at the ISVR.