Università degli Studi di Udine

Dottorato di Ricerca in Scienze dell'Ingegneria Energetica e Ambientale

Seminari del Corso di Dottorato – Settimana Dottorale 2017

The role of experimental research in the development process of an industrial gas turbine

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Sala riunioni piccola ex-DIEG

Abstract Despite tremendous improvements in the last decades after their introduction, Research and Development is not yet come to an end for gas turbines. Indeed, despite being the driver for combined cycles with efficiencies well over 62% coupled with extremely low emission and huge power outputs levels compared to the first land based gas turbine for power production produced by Brown Boveri in 1939, they are expected to be still dominant in the energy market in the mid-term future, due to an increased demand of electricity. However, the development of a new class of engines, like the latest H class generation requires a relevant economic effort also for big market players as General Electric, Siemens or Ansaldo.

In this seminar the development process of novel gas turbine components will be outlined, with a specific focus on the experimental validation of the design of gas turbine cooling systems and combustors, showing how tools like Infra-Red and Thermochromic Liquid Crystals Thermography, Particle Image Velocimetry, Laser Induced Fluorescence and Pressure Sensitive Paints can support the earls stage development, reducing the project risk and cost.

CV Claudio Mucignat was born in Pordenone (I) on May 28th 1983. In 2008 he took his Master Degree in Mechanical Engineering (M.Sc.) at the University of Udine, Italy, with highest marks and honours and defending a final thesis work about the design of a domestic Micro-CHP (Combined Heat and Power) unit based on a scroll expander. On may 2012 he took his Ph.D. degree in Energy and Chemical Technologies at the University of Udine with a thesis focuses on the experimental analysis on the effects of rotation on the aero thermal performance of gas turbine cooling systems. Beside the research activity strictly concerning the Ph.D. Thesis Claudio Mucignat has been also enrolled in other projects of the Turbo-machinery and Energy Systems research group, such as the flow field characterization inside gas turbine combustors, blade cut-back cooling systems in high speed subsonic cascades and gas turbine off design performance simulation.

In 2013, after a one-year Post Doc. Fellowship, he joined the R&D laboratories of Alstom Power in Birr, Switzerland. In this position he has been responsible for the experimental assessments of the thermal performance of cooling systems for H-class Gas Turbines for power generation and the aerodynamic validation on lean premix and reheat combustion systems. Currently he is a Lead Engineer in General Electric Power, were he is acting as Fluid Mechanics and Heat Transfer advanced measurements specialist.