**AIDAA**

Educational Series & Academy

STRUCTURAL DYNAMICS AND ACOUSTICS OF AEROSPACE AND AIR TRANSPORTATION VEHICLES

This webinar deals with structural dynamics and acoustic design of aerospace and air transportation vehicles. The vibro-acoustic response of aerospace and air vehicles is a rather complex phenomenon, which is normally studied considering the dynamics and acoustics of sub-components, such as fuselage sections, wings, flaps, and landing gears, etc. Therefore, the webinar will focus specifically on the vibro-acoustics analysis of elementary mechanical components (e.g. lightweight aluminium framework and panel structures, double-wall structures, composite panels and shells, etc.), from a different point of view (theoretical, numerical and experimental). Several topics will be discussed, such as interior noise mitigation, noise transmission control and vibration attenuation. The physics, design and implementation of both passive vibration attenuation and sound insulation treatments/techniques and active semi-active control systems will be discussed in detail.
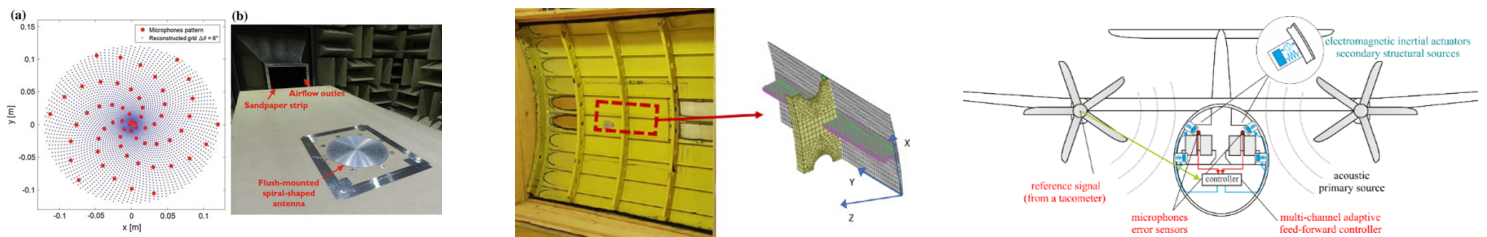
LEARNING OBJECTIVES

- ·Aircraft noise: methods and technologies
- ·Lightweight composite sandwich panels with vibration reduction properties (band gaps)
- ·Passive and Active control systems
- ·Machine Learning in noise and vibration engineering and some examples
- ·Experimental evaluation of vibro-acoustic response of panels under Turbulent Boundary Layer and Diffuse Acoustic Field excitation

TIMELINE

14.00 – 14.15
Welcome: Giuseppe Petrone
14.15 – 15.00
Giuseppe Petrone "Aircraft noise: methods and technologies "
15.00 – 15.45
Christan Adams "Machine Learning in noise and vibration engineering and some examples"
16:00 - 16:45
Paolo Gardonio "Passive and Active control systems"
16:45 – 17:30
Olivier Robin "Experimental evaluation of vibro-acoustic response of panels under Turbulent Boundary Layer and Diffuse Acoustic Field excitations"
17:30 – 18:15
Viviana Meruane "Lightweight composite sandwich panels with vibration reduction properties"
18.15 – 18.30
Round Table/Question Time

Target audience: This webinar is addressed to graduate students, scientists, and engineers with an interest in the effects of vibration and noise emissions from an engineering and technology point of view.

Dates and time: 29 September 2022, 14:00-18:30 CEST

REGISTRATION AND CONTACTS

Course Code: 20220929

This course is part of the 2022 institutional activity for AIDAA members. The registration requires the purchase of one of the packages described here https://www.aidaa.it/package-list/, and the completion of the online form available on AIDAA webpage.

Course platform: Webex, a link will be sent via email as the registration is complete**.**
At the end of each course, **attendance certificates** will be sent to participants via email.

For further info, please, contact **academy@aidaa.it**

SPEAKERS

Giuseppe Petrone is an assistant professor at the University of Napoli Federico II. He received a PhD in Aerospace, Naval and Quality engineering at the University of Napoli Federico II in 2014 and an MSc in Aerospace engineering at the University of Napoli Federico II in 2010. His research activities are mainly in the area of mechanical and aerospace engineering and are related to vibrations, acoustics, structural health monitoring, and dynamic and control of homogeneous and composite materials (in particular natural fibres) and sandwich structures. Dr Petrone advises more than 70 undergraduate and graduate students, participated in several European and national projects and published more than 66 articles in international peer-reviewed journals.

Paolo Gardonio is a full professor at Università di Udine (I), since 2009. In 1995 he received a PhD degree in Applied Mechanics from the Università di Padova (I) and then joined the ISVR at the University of Southampton (UK), where, in 2006, he was promoted to full Professor of systems dynamics and control.

Christian Adams is a lecturer at the Technical University of Darmstadt, Germany. In 2019 he received a PhD degree in Mechanical Engineering at the Technical University of Darmstadt. He researches acoustic designs of machinery to improve their acoustic quality. He organizes sessions on machine learning in vibroacoustics at national and international conferences to bring together experts in the machine learning field. In 2022 he was awarded the Lothar Cremer Award of the German Acoustical Society for his outstanding contributions as a young scientist.

Viviana Meruane is an Associate Professor in the Department of Mechanical Engineering at Universidad de Chile. She is the head of the Laboratory of Mechanical Vibrations and Rotordynamics at Universidad de Chile. Her research interests include structural dynamics, experimental modal analysis, model updating, damage assessment, condition monitoring and machine learning. Dr Meruane has advised more than 45 undergraduate and graduate students. For her credits, Dr Meruane has participated in 16 research projects funded by Chilean government agencies and published 49 ISI articles and one book chapter. She has attended and presented research papers at more than 41 national and international conferences.

Olivier Robin is Assistant Professor since September 2021 (Engineering faculty, Mech. Eng. Dept, Université de Sherbrooke, Qc, Canada). He holds a PhD in Mechanical Engineering (2013, Sherbrooke) and an MSc in Transportation Acoustics (2006, Le Mans, France). He has a 20-year of experience in acoustics/vibration research and development [technician (2002-2004), engineer (2007-2009), research assistant (2014-2021)]. His research is focused on (1) contactless vibration measurement methods using cameras for industrial structures, wood and eco-materials; (2) field and laboratory characterization of classical/metamaterials and structures for sound and vibration control; (3) environmental noise reduction for humans and animals.