Vertical Flight Society

Short Course on eVTOL Aeromechanics & Acoustic Prediction Software

Thu, Jan 31 @ 1 pm - 5 pm and Fri, Feb 1 @ 8 am - 5 pm
Sheraton Mesa Hotel at Wrigleyville West, Mesa, Arizona, USA
$450/pp

Instructors

- Dr. Ken Brentner, Penn State
- Dan Wachspress, Continuum Dynamics
- Dr. Rob McDonald, Uber Elevate
- Alex Gary, Uber Elevate

Summary

In conjunction with the 8th Biennial Autonomous VTOL Technical Meeting & 6th Annual Electric VTOL Symposium being held Jan. 29-31, 2019, at the Sheraton Mesa Hotel, the Vertical Flight Society is pleased to provide a groundbreaking course on eVTOL aeromechanics and acoustic prediction software. This 1½ day short course will provide an introduction to electric VTOL aeromechanics and acoustics, including several hours each on teaching the operations of three software codes:

- Penn State University's PSU-WOPWOP noise prediction code for VTOL aircraft
- Continuum Dynamics, Inc.'s Comprehensive Hierarchical Aeromechanics Rotorcraft Model (CHARM), which models the aeromechanics of VTOL aircraft in general flight conditions
- NASA's OpenVSP (Vehicle Sketch Pad) geometry modeling tool for conceptual aircraft design.

Students will be provided with the download links in advance to install the software on their laptops prior to the class. During the class, the instructors will walk the students through each of the software products to provide an introductory level of proficiency in each, with sample exercises. Finally, the students will be led through an end-to-end modeling process of an eVTOL configuration. Upon completion of the course, students will have the basic knowledge necessary to be able to conduct acoustic predictions of unique VTOL aircraft. *The focus of this course is the conceptual modeling, aeromechanics analysis (aerodynamics and dynamics), and noise prediction for the acoustic analysis of eVTOL configurations.*

About the Instructors

Professor Ken Brentner has been a faculty member for the past 18 years in the Department of Aerospace Engineering at Penn State University. His research interests focus on rotorcraft and aircraft

aeroacoustics, computational aeroacoustics, fluid mechanics, computational fluid dynamics, and high performance computing. Brentner and his research team has developed the rotorcraft noise prediction code PSU-WOPWOP that is able to predict noise from a rotorcraft with multiple rotors in both steady and maneuvering flight. Prior to joining Penn State, Brentner was a Senior Research Engineer at the NASA Langley Research Center for 17 years.

Dan Wachspress is a Senior Associate at Continuum Dynamics, Inc. where he has worked on research, development and implementation of VTOL aircraft aeromechanics and aeroacoustic computer models for over thirty-five years. Wachspress is the principal developer of the CHARM comprehensive VTOL aircraft analysis that CDI has recently tailored for use by eVTOL aircraft manufacturers to analyze and design the aeromechanics and acoustics characteristics of new eVTOL aircraft concepts utilizing an automated coupling with the PSU-WOPWOP acoustic prediction code.

Dr. Rob McDonald recently joined Uber Elevate after eleven years on the faculty at Cal Poly, San Luis Obispo. At Uber, he is the Head of Elevate Vehicle Engineering, where he leads a small engineering team working to advance eVTOL vehicle design. McDonald has been involved in the development and evolution of Vehicle Sketch Pad since 2006. He helped to secure its Open Source release from NASA in 2012 and oversaw a near total re-write leading to the 3.0 release in 2015.

Alex Gary, an aerospace engineering graduate of Cal Pol, San Luis Obispo, recently joined Uber Elevate and developed the scripts to create CHARM input files from OpenVSP models. He has been a part of the OpenVSP development team since 2012.

Additional Information

Registration: This course is being held in conjunction with the Autonomous VTOL conference and eVTOL Symposium. Additional information and registration for either or both events can be found at https://vtol.org/autonomous. Note that the course overlaps with the conference and symposium on Thursday afternoon, Jan. 31. There is also a short course on Electric VTOL Design on Monday, January 28th (8:00 am - 5:00 pm).

Hotel: The meeting is being held at the beautiful Sheraton Mesa Hotel at Wrigleyville West in Mesa with discounted rates available to attendees. Please support the event and stay at the conference hotel! **You must book by Jan. 14** and use this link to get the special event rate: https://www.starwoodmeeting.com/events/start.action?id=1808177595&key=1E97A7A8