



American Institute of Aeronautics and Astronautics

St. Louis Section

Tuesday, October 29, 2019

Preston M. Green Hall

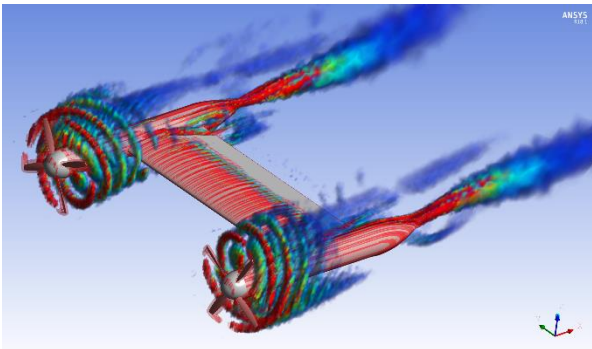
Rodin Auditorium (Basement)

1 Brookings Dr.

St. Louis, MO 63130

Active Wingtip Vortex Cancellation in a Propeller-Driven UAV with Distributed Electric Propulsion

Presented by Dr. Ramesh Agarwal, Professor at Washington University in St. Louis



As battery and electric motor technology continues to advance rapidly, propeller-driven electric UAV/aircraft are likely to become a significant part of the aviation market in the near future. One proposed design configuration for electric UAV involves using large, wing-tip mounted propellers to actively cancel wingtip vortices; a method called active wingtip vortex cancellation (AWVC). By reclaiming part of the kinetic energy that would otherwise

be lost to tip vortex formation, drag is decreased. In addition, the tip-mounted propeller causes the span-wise lift distribution to remain more uniform at the wingtips, increasing the lift. In this talk, CFD simulations of this configuration will be presented, which accurately compare to wind tunnel data. The results show that large increases in lift and net thrust are possible solely through the phenomenon of AWVC. This talk will also describe CFD for more exotic UAV and aircraft AWVC configurations, as well as distributed propulsion with more propellers mounted on the wing.

Professor Ramesh K. Agarwal is the William Palm Professor of Engineering in the department of Mechanical Engineering and Materials Science at Washington University in St. Louis. Over a period of forty five years, Professor Agarwal has worked in many areas of Computational Science and Engineering. He is the author or coauthor of over 600 journal and conference publications.

Schedule

5:00 – 5:30 Sign-in / social
5:30 – 6:30 Presentation
6:30 – 7:00 Additional questions or
follow-on conversations

Menu

Sandwiches and
light refreshments

Ticket Price

Free

Reservation by 10 AM Friday, October 25

Send reservation by email*: stlaiaa@gmail.com

Contact [John Schaefer](#) for questions

* In email, please include name and # tickets

