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ELECTRICAL & COMPUTER ENGINEERING

ECE 2024 Colloquium Series

Friday, April 5, 2024
11:15pm – 12:05pm
ITE 336
(Refreshments in ITE 301 at 11 am)

Electric Power Trains for Aviation Electrified Propulsion

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Abstract:
The ARPA-E Aviation-class Synergistically Cooled Electric-motors with iNtegrated Drives (ASCEND) program supports the development of novel lightweight and ultra-efficient electric motors, drives, and associated thermal management system (collectively referred to as the all-electric powertrain) that will facilitate net-zero carbon emissions in the single-aisle, 150-200 passenger commercial aircraft segment. This FOA represents part of a wider ARPA-E effort in the development of enabling technologies for long-range (≥ 2,800 nautical miles), carbon neutral commercial aviation.

Electrified Aviation Propulsion (EAP) offers to promise reduction in aviation emissions by way of improvements in aircraft performance along with novel propulsion system architectures. One of the key technology enablers to meet this vision is through high performance Electric Drive Train (EDT) technologies, which promises revolutionary improvements in EDT's power density and efficiency, which will enable a wide range of EAP applications, and reduce both aviation and passenger vehicle carbon footprint. Integrated thermal management, designed to maximize system power density, enables efficient electrified aircraft.

The ULTRA-COMPACT technology will enable a wide range of EAP applications, beyond the single aisle airliner class, including regional air travel that could reduce both aviation and passenger vehicle CO2 footprint, near term conventional airliners employing parallel hybrid configurations and the even nearer term urban air mobility market. Regional aircraft flying between hubs routinely travel short distances (<500 nm) are prime candidates for electrification. A 50/50 hybrid series configuration could bring emissions and cost reductions for these applications.

Bio:
***Dr. Jagadeesh Tangudu, Associate Director**, is currently working as Technology Portfolio Manager, Strategic Technologies and Partnership Program Office overseeing both IRAD and CRAD in the areas of Electrification, Sustainability, Autonomy and AI/ML at RTRC. He received his bachelor's in engineering degree from Andhra University, India; the master's in engineering degree from Indian Institute of Science Bangalore, Bangalore, India, and the M.S. and Ph.D. degrees in electrical and computer engineering from University of Wisconsin-Madison, Madison. Since 2011, he has been with Raytheon Technologies Research Center (previously, United Technologies Research Center), East Hartford, CT, developing advanced electrical machines and Electrification related technologies for various RTX businesses including Wind, Elevator, Air conditioners, Aviation and Defense applications. Prior to his doctoral thesis work, he worked with GE Global Research Center and GE Energy for four years working on large turbo generator, next-generation locomotive electric machines.*