Aerospace and Automotive Electrified Designs, Progression and Mutual Benefits

SPEAKERS

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About The Speakers:

Arif Salam:
Arif Salam is Chief Engineer for Electric Power Systems and Electromechanical Actuation Controllers at Honeywell Aerospace. He leads projects on electric propulsion systems and actuation controllers for UAM applications and is the Principal Investigator for an ARPA-E ASCEND project. With 20 years at Honeywell, his expertise spans electric propulsion, actuation controls, electric drives, and power generation systems. He has led key projects, including the NG Jammer power system and high-speed electric drives for ECS applications. Arif holds a BSEE and a master's in electrical and systems engineering and previously worked in industrial automation.

Evgeni Ganev:
Dr. Evgeni Ganev is the CEO of EMPS Consulting LLC, specializing in electrification of aerospace and automotive industries with a focus on electric and hybrid propulsion powertrains. With 40 years of engineering experience, including 30 years as Chief Engineer at Honeywell, he has contributed to platforms such as the F-22, F-35, Space Shuttle, B787, A350, and NASA's eTaxi. Dr. Ganev holds over 50 U.S. patents, has published extensively, and is an active member of AIAA, IEEE, SAE, and ASTM. He has received numerous awards, including the SAE Charles Manly Memorial Award.

ABSTRACT

The steady introduction of electric vehicles for ground applications has recently reached an inflection point for the market. It is projected that in some regions like China and Europe EVs will dominate in the next few years. These developments are putting pressure on aerospace and at the same time paving the way for key technology improvements of batteries, electric machines, and high-power electronics.
As nascent aerospace electric vehicles begin to emerge in the form of trainer aircraft and eVTOLs, there are many challenges to overcome for wide adoption and initial entry into service. These challenges stem from two elements inherent in aerospace, namely, safety and weight. Safety concerns drive many stringent regulations and standards while weight concerns drive development of lightweight technologies that normally would be adequate for ground applications.
In this short course, the power train systems and components common to automotive and aerospace applications will be discussed in-depth. The main vehicle and power train architectures will be reviewed, and the major requirements for systems and components will be analyzed. Similarities and differences between the two segments will be highlighted, and some of the unique challenges will be discussed.
To overcome these challenges and obstacles, new methodologies are required for faster development and rapid entry into service. The major obstacles impeding fast entry into service will be identified and solutions will be proposed. Tools and topics such as Artificial Intelligence (AI), Autonomous Flights, Accelerated Testing using hardware in the loop, Design for Certification, and Design for Manufacturability that will greatly contribute to accelerated introduction will be discussed. Other topics to be covered include performance priorities, results of comparative analysis, and benefits of electrification for automotive and aerospace industries.
This is a highly interactive short course that will benefit anyone interested in the electrification developments for aerospace and automotive industries.