IEMDC 2021

IEMDC 2021 KEYNOTE SPEAKER

RODGER DYSON

Hybrid Gas Electric Propulsion
Technical Lead | NASA

BIO

Dr. Rodger Dyson has worked at NASA Glenn Research Center for over 30 years in Power, Propulsion, and Thermal Technologies supporting both aeronautics and space missions. He currently serves as the hybrid gas electric propulsion technical lead, NASA electric aircraft testbed principal investigator, NATO hybrid electric aircraft technology domain lead, founded the Power and Propulsion Systems Alliance hybrid electric technical area team, and leading a new thermal energy conversion initiative to recycle heat on aircraft. He is also a prolific inventor with 8 licensed patents in electric machines and engines, founder of two technology startup companies, and recently served as Chief Technology Officer at Nirvana Energy Systems.

ABSTRACT

Current Status and Future Plans for Electric Motors and Drives at NASA

Our work advances propulsion for aircraft while reducing energy consumption, noise, emissions and the cost of air travel. We are committed to investigating the use of alternative energy sources and improving the safety and expediency of flight. Electrified Aircraft Propulsion (EAP) is the use of propulsors (propellers or fans) driven by electric motors to propel aircraft ranging from air taxis to subsonic transports. NASA is developing technology, aircraft concepts, test aircraft, and ground test facilities to turn this idea from science fiction to reality. Specifically, motors and/or generators (Electric machines) are needed on all electrified aircraft. And NASA is sponsoring or performing work to achieve power densities 2-3 times the state of the art for machines in the MW or larger class. Three major machine types are being developed: permanent magnet, induction, and wound field. Power converters are also an essential component in most EAP aircraft concepts, as they are used to convert from ac to dc power, or vice versa. Silicon carbide and gallium nitride convertors are being developed with conventional cooling as well as a cryogenically cooled converter. Future plans include demonstrating integrated flight-ready systems in both ground and flight tests; collaborating with and leveraging ARPA-E EAP programs; and supporting FAA standards development for market acceptance and safety.