IEEE-PEAL Prominent Technical Lecturer Event

Who **Prof. Alexander C. "Sandy" Smith;** School of Electrical and Electronic Engineering,

University of Manchester, United Kingdom

Date **Monday, July 9, 2019**

Place **University of Dayton Research Institute, River Campus – Rm. S1050 (Auditorium)**

1700 South Patterson Blvd, Dayton, OH (originally NCR-HQ building)

Parking Park in lot to right of main building. Proceed to Auditorium via adjacent rear entrance.

When **6:00 pm** Light Buffet and Refreshments (complimentary):

6:30 pm Featured Presentation by Prof. "Sandy" Smith

For PEAL and/or IEEE Section members; members may bring one non-IEEE member as a guest

RSVP Please reply through the PEAL website (http://sites.ieee.org/dayton-peal/) by noon, 2 July 2018, whether attending as self or self plus guest. Questions should be directed to Ms. Seana McNeal (seana.mcneal@us.af.mil) or Dr. Dan Schweickart, (daniel.schweickart@us.af.mil)

Subject **Superconducting/cryogenic technologies for hybrid-electric aerospace propulsion**

Abstract There is significantly growing interest in hybrid-electric technologies for aerospace application. This can extend from low-level 'more-electrification' to improve efficiency, flexibility, and controllability to high-level 'hybrid-electric' concepts that use electrical machine propulsion (multiple-fan concepts) with gas turbines now driving the generators that provide the propulsion power. Several recent studies of hybrid-electric aerospace concepts have shown that these could be feasible using today's technologies for small aircraft. The key performance targets for electrical machine propulsion in aerospace are efficiency and high power densities. For scale-up to larger platforms, there needs to be a significant step-change in the electrical machine power densities as well as improving efficiencies. One of the key technologies that could potentially create a step change is superconductivity. Superconductivity is still an immature technology for aerospace application, but it is developing. There are certainly challenges but it has the potential to build superconducting machines with power densities significantly higher than the latest machine technologies – from existing technologies at 20kW/kg to the aerospace targets of 50+ kW/kg.

Speaker's Bio

Prof. Smith received the B.Sc. (Eng) and Ph.D. degrees from Aberdeen University, Aberdeen, U.K., in 1977 and 1980, respectively. He has held academic appointments at Imperial College, London, (1983–1990), and Cambridge University, Cambridge, (1990–1997). In 1997, he joined Invensys Brook Crompton, Huddersfield, as Head of Research responsible for motor technology. In 2000, he joined the University of Manchester as a Senior Lecturer, promoted to Reader in Electrical Machines in 2003, and Professor of Electrical Machines in 2007. In 2004, he was appointed the Director of the Rolls-Royce University Technology Centre on Electrical Systems for Extreme Environments at the University of Manchester. His research interests include design and modelling of motors, generators, superconducting machines and systems. He is a member of the Rolls-Royce Advisory Board for Submarines (ETWG) and the Specialist Advisory Board on Smart, Connected and More-Electric Systems for the Aerospace Technology Institute. He is a Fellow of the Institute of Engineering and Technology (formerly IEE), Senior Member of the IEEE and is currently the Editor-in-Chief of the IET Journal Electrical Systems in Transportation.