



Spring 2017 Seminar Series

ARC FAULT TESTING TO SUPPORT STANDARDS DEVELOPMENT FOR ROBUST DC ELECTRICAL POWER SYSTEMS

FRIDAY APRIL 28, 2017

11:00 AM – HEC 450

Modern electrical power system designs in both airborne and terrestrial vehicles are utilizing dc at voltages above the traditional levels of 12 to 42 Vdc. Certain military aircraft are already employing 270 Vdc. Some commercial aircraft use 270 Vdc in a bipolar arrangement with a 540 Vdc differential. The use of high dc potentials create flash-over and arcing risks that are much more problematic than the traditional ac or low-voltage dc. At higher dc voltage levels, the propensity of arcing to continue undetected for significant periods of time creates a need to monitor and mitigate arcing conditions.

Recent arcing incidents in the field have evidenced the requirement to replicate 270 Vdc arcing events in a controlled laboratory environment, to better understand how electrical faults develop. Procedures are being investigated to reproduce typical arcing faults that could be experienced in aircraft, with a reasonable degree of repeatability. To this end, an aircraft generator has been used as a source to characterize and record arc fault events of various types. It is intended that appropriate results will be shared for SAE-International's standard development activities to support publication of test methods for validating the performance of prospective 270 Vdc arc mitigation technologies and equipment.

A brief review of the need for arc-fault detection will be presented. Background and rationale for the testing apparatus will be discussed along with the setup, methodology, and representative results from the initial phase of this work.

Daniel L. Schweickart

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Dr. Schweickart received the B.E.E. from the University of Dayton, the M.S.E.E. degree from the Ohio State University, and the Ph.D. degree in Electrical Engineering from the University of Texas at Arlington. He is a registered Professional Engineer in the State of Ohio. Prior to joining AFRL, he held positions with utility equipment manufacturers, the Department of Energy, and a consulting engineering firm. In his 30+ years at AFRL, his research has included partial discharge phenomena and insulation testing, advanced insulation systems for airborne power applications, and detection and mitigation of insulation breakdown events in aircraft power systems. Most recently, his expertise has been focused on investigations to support the development of industry standards for performance validation of 270 Vdc arc-fault detection equipment, which is vital to the safe and reliable utilization of 270 Vdc in aerospace vehicles. In 2012, Dr. Schweickart was recognized as a Fellow of the Institute of Electrical and Electronic Engineers.