Time & Location: June 26, 2020 at 5:00 PM in Virtual Defense
https://meet.lync.com/knightsucfedu39751-knights/andrewoodard21/WMZWR634
Title: An Experimental Validation of a Revised Paschen's Law Relating to the ESD of Aerospace Vehicle Surfaces

The proposed work seeks to experimentally validate a modified Paschen law which accounts for the effects of electron-ion pair removal between two electrodes within a dynamic gas medium. A test facility is designed to produce Mach 1.5 and Mach 2 flow with pressure ranges of [309 - 760] Torr and [169 - 760] Torr, respectively. Custom designed aluminum electrodes are mounted into the test section at desired gap distances. A high voltage power supply is utilized to charge the electrodes up to 60 kV until discharge occurs. Ignition cables are used to safely transmit the high voltage from the power supply to the electrodes. The discharge voltage of the electrodes is recorded over the respective range of pressures within the test section. An operational pressure range is calculated using isentropic and normal shock relations at the desired Mach numbers. Schlieren imaging is used to capture shock locations within the test section. A single-pixel image processing method is used to back calculate velocimetry measurements from the Schlieren images. The measured pressure and voltage values are plotted against the modified Paschen curve as a function of Mach number and electrode gap distance as a means of validation.

Major: Aerospace Engineering

Educational Career:
Bachelor's of Aerospace Engineering, BS, 2018, University of Central Florida

Committee in Charge:
Kareem Ahmed, Chair, Mechanical & Aerospace Engineering
Jayanta Kapat, Mechanical & Aerospace Engineering
Subith Vasu, Mechanical & Aerospace Engineering

Approved for distribution by Kareem Ahmed, Committee Chair, on June 8, 2020.

The public is welcome to attend.