TETHERED POWER SYSTEMS FOR LUNAR MOBILITY AND POWER TRANSMISSION

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As lunar surface exploration through both robotic mobility platforms for extreme terrain access and Human Exploration and Operations (HEO) expand as part of the ARTEMIS program, projected demands for long-distance power transmission and distribution are increasing. Specifically, for HEO applications, nuclear fission or solar surface power delivery at high power (up to 10 kW) is required, at distances of 1 km or more. These power generation elements would be used for habitations, rover charging, instruments, and other critical elements of HEO surface activities. At the same time, the lunar surface has an enormous number of extreme terrain features, including pits, caves, lava tubes, and cold traps, which are extremely promising science targets that require rover systems capable of long-distance power transfer and tensile support, without line of sight. Tethered power systems, as described in this presentation, could be a critical enabling technology for both extreme environment exploration and surface power transfer. The system proposed in this presentation is a novel tether-based power transmission system to provide power over several meters to several kilometers to serve remote loads. The designed end-to-end tether power system would provide high efficiency (> 90 %), high-power (1 – 10 kW) transmission capabilities, creating a potential solution for rover access to extreme terrain, to meet the needs of NASA's lunar and deep-space surface activities.

DATE AND TIME
LOCATION
HOSTS
REGISTRATION

- Date: **17 Nov 2021**
- Time: **06:30 PM to 07:30 PM**
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- Pittsburgh, Pennsylvania
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- Pittsburgh SectionPittsburgh Section
- Co-sponsored by the Pittsburgh Power Electronics and Pittsburgh Electronic Packaging / Electron Device Societies
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- Ends **17 November 2021 12:00 PM**
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SPEAKERS

Dr. Ansel Barchowsky of Jet Propulsion Laboratory, California Institute of Technology

Topic:

Tethered Power Systems for Lunar Mobility and Power Transmission

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Biography:

Ansel Barchowsky received a B.S., M.S., and Ph.D. in Electrical Engineering from the University of Pittsburgh's Swanson School of Engineering in 2012, 2014, and 2017, respectively. He has been with the Jet Propulsion Laboratory, California Institute of Technology, for 4 years, as a member of the Power Electronics Technology and Engineering Group. He has been a designer of power conversion systems for Europa Clipper, Lunar Flashlight, BDPA, TYMPO and numerous research and development efforts.