**MOON 101 – LIVING ON A DUSTY MOON.** K. W. Street[1], NASA Glenn Research Center (21000 Brookpark Road, Cleveland, OH 44135, Kenneth.W.Street@nasa.gov).

The Moon could serve as the launch pad for human exploration of Mars and the rest of our solar system because of reduced gravity and abundant resources. In 2004, President George W. Bush set forth a Vision for Space Exploration in which we return to the Moon for a sustainable presence. As background information, the first Apollo missions including a lunar roving vehicle (LRV) to transport the astronauts (Apollo 15 in 1971 and Apollo 17 in 1972) had specifications for operation in an environment of $\pm 120^{o}$C for as much as 2 years. In order to expedite the LRV delivery schedule, these requirements were eventually reduced to operation in 0-100$^{o}$C for only a few hours. The equipment such as the LRV performed on the lunar surface at least this long but as the missions progressed significant problems arose with the functioning of various parts of all equipment, including the LRV and its components, space suits, door seals to the living quarters, etc. The goal for lunar equipment in our eventual return to the Moon includes an extended lifetime (say for five years) to accommodate multiple visits of on the order of a month or more duration. This equipment must operate and survive in lunar regolith having particle sizes ranging from 30 nm to cm. The majority of equipment damage in the Apollo missions was caused by dust. In order to return to the Moon, the interaction of equipment and humans with lunar dust must be better understood. The five primary properties of the dust fraction (particles <20 um) that need to be characterized includes: particle size distribution; adhesion; abrasion; tribocharging & electrostatics; and surface chemistry & reactivity (especially corrosion). In order to ensure equipment reliability for lunar return, all equipment must be tested in a relevant environment which makes not only an understanding of these properties important but it will be necessary to duplicate these properties in terrestrial simulants for testing purposes.

**"I think dust is probably one of our greatest inhibitors to a nominal operation on the Moon. I think we can overcome other physiological or physical or mechanical problems except dust." - Gene Cernan, Apollo 17 (technical crew debriefing)**

The lecture will include a review of known conditions in the lunar environment, why these and other physical properties of dust are important, and how we are evaluating them. The lecture will conclude with the current status of NASA efforts to duplicate the lunar dust environment on earth for testing purposes.