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From Parts to Systems : Contribution of Tests on Performance Prediction and Assessment (1)

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ELECTROSTATIC DUST HAZARD PREDICTION AND CONTROL FOR LUNAR AND MARS MISSIONS

Abstract

Electrostatic-charged particles pose a major problem for future space missions and remains a significant issue for terrestrial industries (e.g., chemical, microelectronic and pharmaceutical industries amongst others). Major knowledge gaps exist in how dielectric and complex particles charge, discharge and interact. In order to go to the moon and Mars and set permanent bases on their surface, the problem of dust must be solved. For these reasons, NASA is already heavily invested in research funding for dust-related work and much more research investment in this area is anticipated in the future.

This talk will showcase the fundamental research, modeling, and applied science to address the risks created by electrostatic charged particulate materials on the moon and Mars. The presentation consists of three key areas that address electrostatic dust hazard prediction and control: (1) numerical models that can predict extraterrestrial dust plume/cloud formation, collision velocities and particle deposition; (2) electrostatic charging and surface interactions of relevant particulate materials; and (3) developing improved technologies for electrostatic discharge protection, the inhibition of dust deposition on equipment, as well as mitigation of potential inhalation risks.