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Author: Ms. Kavya K. Manyapu
The Boeing Company and University of North Dakota, United States, kavyakamal@gmail.com

Dr. Pablo De Leon
University of North Dakota, United States, deleon@space.edu

# FEASIBILITY OF MULTI-TECHNOLOGY INTEGRATION STRATEGY FOR DUST MITIGATION OF PLANETARY SPACESUITS

**Abstract**

Dust contamination was shown to be a major issue during the Apollo missions that substantially degraded the performance of spacesuits, rovers, mechanisms, thermal control surfaces, solar arrays, and optical surfaces. The future of human space exploration of Moon and Mars is contingent upon developing technologies to address the concern of dust effects to reduce degradation of spacesuits (and other components), and facilitate astronauts to be thoroughly productive during long duration exploration activities. Historical data from the Apollo missions has compelled NASA to identify dust mitigation as its critical path prior to sending humans back to the lunar surface. As such, research is underway to characterize dust contamination, and several passive and active countermeasures have been proposed to mitigate dust contamination of spacesuits

This research proposes an integrated approach of combining both passive and active dust mitigation technologies for spacesuits in order to maximize the effects of dust mitigation. The study investigates the feasibility of applying a combination of technologies comprising of surface modification, electrostatics, and mechanical vibration to increase the efficiency of dust mitigation for spacesuits, thereby increasing the durability and reliability of suits for long-term planetary exploration missions. The study proposes future tests to evaluate the feasibility of combining the most technically and cost-effective dust mitigation technologies.