

Using the ISS to Prepare for Exploration (01)
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SPACE ENVIRONMENTAL EFFECTS ON DUST MITIGATION TECHNOLOGY: A MISSE-X EXPERIMENT

Abstract

The exploration of the moon and Mars will require the implementation of a proven dust mitigation technology capable of removing dust from the surfaces of optical systems, solar panels, viewports, space-suits, and equipment. Over the past several years, we have been developing an active multi-coating technology that can efficiently perform this task. Our Electrodynamic Dust Shield (EDS) has been successfully tested at vacuum with Apollo 16 samples on a reduced gravity flight. The EDS has also been tested in the laboratory at partially simulated Martian environmental conditions. In this paper, we report on our development of a flight experiment for the Materials on ISS Experiment 10 (MISSE-X) to demonstrate the operation of the EDS while exposed to the space environment. The experiment seeks to demonstrate the feasibility of the Electrodynamic Dust Shield for dust control in harsh space environmental conditions, including thermal cycle and the presence of solar wind, cosmic rays, and ultra-short UV.