

SPACE EXPLORATION SYMPOSIUM (A3)
Mars Exploration – Part 3 (3C)

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ADAPTIVE DUST REMOVAL DEVICE WITH DETECTOR FOR MARS SOLAR ARRAYS

Abstract

Abstract: The launch of YH-1 indicates the beginning of the implementation of China's Mars exploration program. However, under the Van der Waals force and electrostatic force, the Martian dust accumulation in the surface of solar arrays would result in the decrease of the power conversion efficiency, thus reducing the lifetime of Mars's probe. Therefore, this is a very important research issue about the adaptive Dust removal device with detector for Mars solar arrays. This paper mainly designs the electrostatics screen dust removal equipment with a series of detector (light detector, dust detector and gravity detector) and Micro-controller. Using the detectors and Micro-controller to detect the surrounding environment of Mars spacecraft, the dust removal equipment with these devices will stop working on the night of Mars, sandstorm and the level status of solar arrays, but start working when the output voltage is reduced to 40% on other cases. The design will reduce the energy consumption of dust removal equipment to interfere the normal work of the spacecraft, realize the plant automation to reduce the difficulty of the remote control, and improve the adaptive capacity of dust removal equipment on Mars spacecraft. This research can be applied Mars dust removal equipment from solar array.

Key words: detector; dust removal method; solar arrays; Mars exploration; electrostatics screen for dust removal