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THE NEW CONCEPT OF REGOLITH CLEANING TECHNOLOGY

Abstract

The new concept of regolith cleaning technology is unveiled, that is Konica-Minolta and Toyota Motor Corporation collaborative developing system. We would solve big problem smartly that we should face in exploration on the Lunar or Mars, that is persistent dust. Especially on the lunar surface, because of the vacuum and no-moist environment, and direct exposure by sun, regolith could be electrically charged. As the result of it, regolith kicked by rovers or moonwalker could be sticked strongly to rovers or EVA suits of moonwalkers. Konica-Minolta is over 150 years international company, the main business area is office Multi-Functional-Printers (MFP). Some of MFPs has toner cleaning system. The toner is resin particle with electric static. So, we considered the MFP toner cleaning system could be able to apply to lunar regolith cleaning. The configuration of this cleaning system are cleaning brush, a collection roller, and a scraper. First, the cleaning brush is pressed against the object to be cleaned (e.g., solar panels or radiators) to remove regolith from it. The regolith on cleaning brush is then transferred to the collection roller, and finally, the regolith is gathered by a scraper and placed into a collection box or discarded. There are two key points of this system. First, the cleaning brush is gently pressed against the object, allowing for cleaning without damaging surfaces of object. Second, in addition to the physical removal of regolith by the cleaning brush, static electricity is used for more efficient cleaning. Charged regolith may not be completely removed by simply pressing the cleaning brush. However, this system can control the potential to clean the charged regolith more effectively. Currently this system matures to TRL3 level by confirming almost 100We will continue collaboration with Toyota Motor Corporation and development and implement to lunar rover of the system.