Multi-Use Coating for Abrasion Prevention, Wear Protection, and Lunar Dust Removal

PH2 Proposal: 08-2 X5.02-9672

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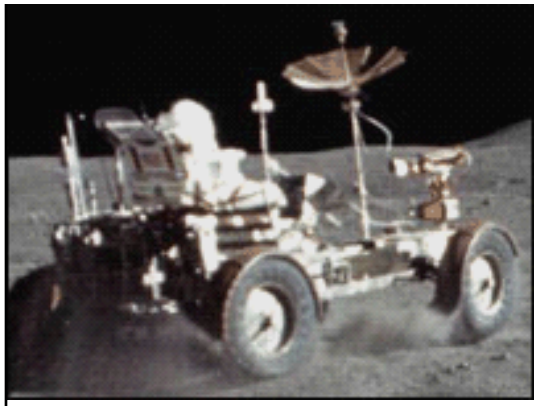
Identification and Significance of the Innovation

- Eliminate negative effects of lunar dust on crew and equipment.
- Develop and apply abrasion and wear prevention coatings for lunar and space environments to spacecraft material substrates.
- Target surfaces undergoing abrasion and wear – any surface or component whose use will be impaired by contact with or inclusion of lunar dust – i.e. machine components, gimbals, bearings
- Multi-use coating allows prevention of wear and abrasion by using hard materials and by removing the lunar dust.
- Incorporate dust removal mechanism to facilitate dust removal such electric fields, waves, and curtains.

Expected TRL Range at End of Contract: 5



(L) Dust raised by a lunar rover during the Apollo 16 mission in 1972. *(NASA)* Developed surfaces will be abrasion and wear resistant as well as incorporate dust removal capability for all lunar surface operation equipment/surfaces where dust deposition interferes with or destroys function.

Technical Objectives & Phase 2 Work Plan

- Optimize coatings for wear and abrasion resistance. Perform pin-on-disk testing under vacuum with lunar simulant.
- Evaluate coatings for incorporation of dust mitigation technologies (i.e. electrostatic curtain concept, surface engineering)
- Supply coated panels for testing with ion beams and sweepers at GSFC (Sparcle) and KSC
- Develop active surface dust removal electric field and wave traces and circuitry with University of Arkansas at Little Rock
- Fabricate and test panels with active dust removal surfaces in vacuum
- Optimize dust removal technology for use with ALTAIR and ISS
- Test seals with dust removal
- Supply NASA with panels and circuitry for active dust removal

NASA & Non-NASA Applications

All lunar surface and space operations – rovers, robotic systems, prospecting equipment, habitat materials, ISS & ISRU components, gimbals, actuators, thermal radiators, power systems, communications equipment, airlock systems/seals, bearings, solar panels

Defense/Commercial Sector – wear components of the U.S. Army's Objective Force Warrior uniforms, air intakes and ventilation systems for heavy equipment and vehicles (e.g. tanks, HMMWVs) in desert environments, plus commercial counterparts of all above-listed NASA applications

Firm Contacts

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NON-PROPRIETARY DATA