Lunar Dust Protection for Apollo Rover Mechanisms

Ron Creel - Lead for LSIC Dust Mitigation “Isolation Technologies” Subgroup

1 - Forward Chassis
2 - Mobility Subsystems
3 - Crew Station
4 - Aft Pallet

Lunar Communications Relay Unit (LCRU)

Note: Missing Left Front Fender Extension
(Required for Folding of Rover for Storage in Lunar Module)
Astronaut Brushing Dust from LRV Thermal Radiators

Kevlar Shield to Protect Rover from LM Lander Stirred Up Dust

Astronauts Lowered Protective Shield and Unfolded the Rover from LM Lander

Lunar Dust Brush

Astronaut Brushing Dust from LRV Thermal Radiators

Misleading Pre-Apollo 15 Earth TVAC Testing at the Manned Spacecraft Center, Using Apollo 12 Soil and Much Higher Pressure (10^{-6} Torr), Predicted Brushing Could Be Used on the Moon to Effectively Clean Thermal Control Surfaces and Crew Suits

Extensive Dust Cleaning Regrettably Did NOT Work on the Moon with Much Lower Environmental Pressure of 10^{-12} Torr
2 - Mobility Subsystems Dust Protection

Sealed Motors/Drives and Dust Seals (14) and Dust Shields (12) for Brakes

Post Mission - LRV Mission Support
Team Presented Signed Fender Extension to the Apollo 17 Crew

Suspension System - Gaskets on Bar Ends and Fluid Damper Dust Shield

Right Rear Fender Extensions Knocked Off on Apollo 16 and 17

Apollo 17 Fender Extensions Displayed at Cosmosphere Museum

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Commander Cernan indicated that a 4th EVA was **not possible due to dust getting into aft pallet swing arm hinges and other mechanisms.**

Lunar Module Pilot Schmitt encountered some difficulty in operating the Sun Shade of the Lunar Extravehicular Visor Assembly because of lunar dust in the slide mechanism.

Sample return container seals were also compromised on all LRV missions.

KC-135 testing required for “1/6 G” seatbelt redesign.
Swing Arm Hinges Failed to Close on All 3 Rovers after 3 EVAs

Geological Tools on Apollo 17
Aft Pallet

SEP Receiver Mounted on
Apollo 17 Aft Pallet Front Side

Surface Electrical Properties (SEP) Antenna

Apollo 15 and 16 Aft Pallets
Questions?