

VARIED ACTIVE INTERACTIVE ASTRONAUT TESTS OF DUST MOVEMENTS COMBINED WITH FUNGIBLE APOLLO 12 DUST DETECTOR EXPERIMENTS. Brian J. O'Brien¹ University of Western Australia
brianjobrien@ozemail.com.au.

Introduction: Our experiment is a vastly expanded set of variations of the Thermal Degradation Samples (TDS) Experiment by Alan Shepard on Apollo 14. An astronaut will drop, carry or otherwise manipulate and photograph lunar dust in situ on the Moon to give a variety of insights into adhesion, cohesion and movements of fine dust with regard to vertical, horizontal and other surfaces and designed apertures in such surfaces.

Ground-based collaborators will assist in suggesting variations of interest and include analyses and consideration of time variation effects from exposure times to solar wind and other factors of interest.

The author played leading roles in making known the cohesive forces of lunar dust from long-forgotten Apollo Image A14-77-10367) through his website animations <https://www.brianjobrien.com/cohesive-studies>. A wide variety of increased complexities of tests of movements and their photographic recording will immensely increase diversity of understandings. Such studies are immensely charismatic and attractive in STEM activities.

In conjunction, several simple bolt-on Apollo 12 Dust Detector Experiments will greatly increase the pioneering extent of fungible measurements as practicable as astronaut activities permit, including measurements at different heights above the lunar surface.

Additional sensitive cameras will use sunrise scattering off lunar dust particles to investigate the author's hypotheses that during lunar day the astronauts walk in a ground mist of free and mobile charged dust particles.

We have very high confidence that the direct outcomes of these experiments will be of immense values in risk management and technological adaptations that have otherwise proved unachievable to date.

We could suggest, if safety permits, that an astronaut carry to the Moon a variety of selected samples of simulated dust, in which case the major part of this experiment could be duplicated with the simulants, given new levels of confidence in Figures of Merit of simulants not readily available otherwise.

References: [1] Brian J. O'Brien, 2011, Review of Measurements of dust movements on the Moon during Apollo, Planet. Space Sci., 59, (14), 1709-1726, <http://dx.doi.org/10.1016/j.pss2011.04.016>.; (2) Brian

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