

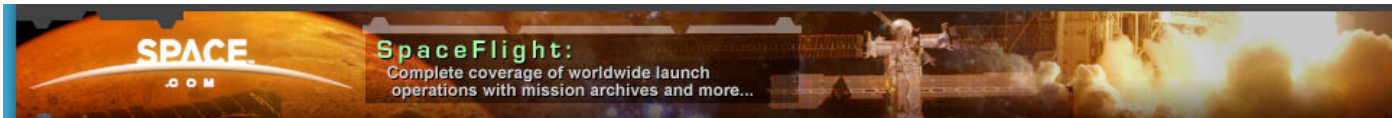


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New NASA Spacecraft to Probe Moon Dust
 By [Tariq Malik](#)
 Senior Editor
 posted: 10 April 2008
 6:34 pm ET

NASA is drawing up plans to probe the secrets of moon dust using a small orbiter that will ride piggyback on another spacecraft's rocket.

The \$80-million LADEE spacecraft is slated to launch alongside a lunar gravity-mapping probe in 2011 on a 100-day mission to study the moon's wisp-thin atmosphere and [ever-present dust](#), the agency said Thursday.

A clear understanding of the moon's atmosphere and its clingy dust will be vital for NASA as it moves forward with plans to return astronauts to the lunar surface [aboard its Altair lander](#) by 2020.

During the Apollo lunar landings between 1969 and 1972, NASA moonwalkers were [coated in lunar dust](#) during excursions and tracked it back inside their landers, where it gave off a smell [similar to gunpowder](#). The gritty material can be abrasive, made of sharp, glassy grains, be electrostatically charged and may even be toxic to astronauts if too much is inhaled, researchers have said.

"Moon dust was a real nuisance for Apollo astronauts," said NASA researcher Mian Abbas, whose team studies the interaction of lunar dust and solar wind at the National Space Science and Technology Center's Dusty Plasma Lab in Huntsville, Ala., in a statement. "It stuck to everything - spacesuits, equipment, instruments."

According to one NASA mission description, LADEE - short for Lunar Atmosphere and Dust Environment Explorer - is expected to carry at least two instruments, a spectrometer for atmosphere studies and a dust detector aimed at the moon's gritty regolith.

"These measurements will provide scientific insight into the lunar environment, and give our explorers a clearer understanding of what they'll be up against as they set up the first outpost and begin the process of settling the solar system," said Pete Worden, head of NASA's Ames Research Center in Moffett Field, Calif., which will oversee the LADEE mission, in a statement.

The LADEE orbiter is expected to ride in the back seat of an unmanned Delta 2 rocket behind NASA's [Gravity Recovery and Interior Laboratory](#) (GRAIL), a \$375-million orbiter designed to parse out the mysteries of the moon's gravitational field. The two spacecraft will separate only after they are en route to the moon, with LADEE expected to take about five months to enter orbit and check its systems.

LADEE and GRAIL will follow a flotilla of lunar probes, including Japan's Kaguya orbiter and China's Chang'e-1 spacecraft - both of which launched last year and are likely to their mission's extended.

India is preparing to launch its lunar orbiter, the Chandrayaan-1, later this year with NASA's Lunar Reconnaissance Orbiter (LRO) to follow later this year. A second NASA probe, the Lunar Crater Observation and Sensing Satellite, will also launch with LRO and purposely crash two vehicles into the moon to search for hidden water ice.

"LADEE represents a low-cost approach to science missions, enabling faster science return and more frequent missions," Worden said.

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Future explorers of the Moon must deal with a variety of lunar environmental issues, including surface electrification of dust. Another factor is the ever-present, sharp, abrasive, glassy dust of the lunar soil. Credit: NASA

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Dusted and dirty helmets and

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kyle_baron wrote:

Because the hard plastic helmets were impervious to the dust, the astronauts will have to wear a lightweight plastic armor over the entire body.

posted 4/10/2008 7:21:10 PM

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dubephnx wrote:

Moon dust is a bigger nuisance than exploding shuttles?? Didn't know that!

I'm hearing that the Ares Rockets have some vibration problems throughout the rocket, but NASA Engineers are trying to fix the problem with a few single-line, 2-direction shock absorbers to be located in the fuel systems tank locations. Not to be a critic, but standard shocks have low heat tolerances, because of all the rubber, fluids, O-rings, etc; and the location specifics for this solution has a lot of heat buildup at various times during acceleration and deceleration, as well as exiting and re-entering our atmosphere.

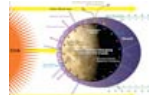
I'd rather see a full rocket fuselage flat-bodied steel structural strap-netting systems installed and attached along the cooler areas inside of the fuselage body-frame. It won't matter how much vibration is developed outside of the fuselage, because the fuselage will be able to take 100's of times more vibrations, and other types of physical forces, before approaching the amounts of vibrations the shock absorbers currently being tried out, are supposed to curtail!!

Structural Strap-Netting is a new Technology developed from 2005-2007, and has proven to be an improvement for and or to anchor and braced structures/systems. Combined structures with structural strap-netting results in a combined compression and tension resistant structure/system, called Closed-Nets, that:

- A) Develops Moment Inertia Balancing of compression and tension resistance capabilities that sends impact loads through multiple net tributaries, as opposed to a single line of rigid linear tributaries.
- B) An in place circumferencial or spherical assembled Shock Absorber instead of isolated location and numerous linear shocks and/or reinforcing clips.
- C) Reduced Vibration Resonance throughout the entire accessorized structure/system (see A, also).
- D) Pre- Impacts, Loadings, and Pressurizations/Stresses: Momentum Conservation within the Closed-Netted Structure/System.
- E) Moment and Post- Impacts, Loadings, and Pressurizations/Stresses: Momentum Equilibrium within a Specified Spatial Envelope of the Closed-Netted portion or entire Structure/System, that maintains the designated shape of the structure through more conditions and repetitions of conditions than Anchor and Braced Structures/Systems, at a lower overall cost to construct the structure!!

Engineering Designers can designate the AMOUNTS of vibratory and energy motions to travel within each net with allowances specified at the net-ring to net-ring connecting assemblies and the lengths of the connection assembly fasteners. Not too complex of a system, as the installed structural strap-net's linking cords along the parallel to the rings can be designed and assembled for flexure, and some slight amounts of elasticities parallel along the rings can also be proportionately added as well, which gives the structural strap-net its capabilities to function as a shock-absorber, which then can also handle retaining and containing the accessorized structure frame/net's components and shape from warping, separating, and/or dislodging!!

space suits stowed inside Lunar Module after final Apollo 17 moonwalk in December 1972. Credit: NASA



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Understanding lunar surface charging and dust electrification and transport is an important step in preparing for serious resource utilization of the Moon. Courtesy: J.S. Halekas

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Nice little system, if you want to build faster spacecraft, safer Astronaut and Passenger holds, and so on.

posted 4/10/2008 8:21:55 PM

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dubephnx wrote:

Please revise in previous comment: (2nd to last paragraph) to: ...strap-nets linking cords at perpendicular to the rings...;and lenhgt to lengths. Thanks, RLD.

posted 4/10/2008 8:29:17 PM

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dbarden wrote:

Studies have shown that lunar dust can be damaging to the lungs if inhaled. As noted, the Apollo astronauts had to deal with the dust coating everything and when they returned to the lunar lander, after an EVA, they were confronted with the dust being air born, from the their space suits and they inhaled the floating dust. It has been discovered that each lunar dust particle has sharp edges and is basically silica, or glass. There is not an atmosphere or wind to smooth the particles, as dust on earth, over the eons of time. Those particles are just as they were when they were first formed. A way of controlling dust and dealing with the problem is crucial in future extended manned lunar missions. The moon holds many valuable resources for humans. To go back to the moon should be a major priority. I believe that it is more important than manned missions to Mars. I look forward to the day when we do return to the moon. Whether or not that will be in our lifetimes is anyone's guess.

posted 4/11/2008 8:52:37 AM

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dubephnx wrote:

As a building designer and inspector, I am quite the realist when it comes to things like the USS Enterprise from the Star Trek Shows having to push a button to "Bring up the Force Field Shields", as Captains Kirk, Picard, Archer, and additional, more than qualified to lead, the Crews Safely into battle. I am aware that a certain type of technology needs to be developed for those actions to occur!! Unfortunately, for the Enterprise and additional StarFleet Spacecraft to have protons, lasers, asteroids, etc; bounce off or away, some kind of hull protection is needed. In the TV Series and the Movies, this technology is an invisible anti-magnetic/proton repellant, electronically turned on by one of the Helmspersons, Engineers, or Science Officers. it is quite an interesting technology, entertainment-wise, making an invisible object a structural object.

My proven, built, and multiply tested, working Closed-Nets Technologies serve the same purposes of the Star Trek Spacecrafts' force-field-shields, and are designed into the spacecrafts at the assembly stages, and are continuously an in-place force-field-shield, that combats more than you'd expect.

posted 4/11/2008 2:08:02 PM

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TD wrote:

If Phoenix finds any evidence of life on Mars then lunar dust and regolith should be examined very carefully for living or dead spores. The Surveyor series of lunar probes gave evidence of the lunar dust being uplifted electrostatically, and the Surveyor III components, returned by Apollo 12, also had evidence that bacterial spores could remain viable on the moon. The book describing the possibilities is called "Imminent Discovery", and there's a free preview at http://stores.lulu.com/imminent_discovery , if you're interested.

posted 4/12/2008 8:15:58 AM

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Ruri wrote:

A possible solution to the moon dust problem might be to use a spacesuit you climb into similar to the Orlan suits but with a docking port on back. The suits are docked to the side of the hab, the astronauts then climb out the hatch in the back of the suit and moon dust is not tracked into the hab.

posted 4/13/2008 3:31:32 AM

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