

NASA Ames readies spacecraft to study moon's atmosphere

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The moon will soon become a very busy place, as robotic prospectors descend to search for valuables.

But before the crowds arrive, NASA Ames scientists will manage a mission to study the moon's still-serene atmosphere, using a low-cost spacecraft that launches from Virginia on Friday night, Sept. 6.

Plans were unveiled at a Thursday news briefing in the nation's capital about the \$280 million mission, called Lunar Atmosphere and Dust Environment Explorer, or LADEE. It is the first spacecraft designed, developed, built, integrated and tested at NASA Ames, based at Moffett Field in Mountain View, Calif.

"There are a lot of people with their fingers crossed, hoping for the best-and excited to see their baby fly," said Butler Hine, LADEE project manager.

In its unusually low orbit around the moon's equator, the craft will float through the thin envelope of atmosphere that surrounds the moon, studying the properties of this environment and lunar dust.

This will be important information for future [lunar explorers](#), so they know what to expect before they set up their first outposts.

Entrepreneurs are in a race to win the \$30 million Google Lunar X Prize, which will be awarded to the first privately funded team to place a robot on the Moon's surface that can trek 1,500 feet and transmit back high-definition video. The international "Moon Express" contest-spearheaded by former Microsoft innovator Naveen Jain and Mayfield [venture capitalist](#) Barney Pell-is expected to open the gates for other commercial missions.

But such missions kick up a lot of dust,

contaminated by fuel and other chemicals. It can take up to three months for the moon's surface to settle down after a landing.

"Now is a good time to go and look at it while it is in pristine state," said Sarah Noble, a LADEE program scientist at NASA headquarters in Washington, D.C. "Because the moon's atmosphere is so delicate and thin, it is easily disturbed by spacecraft landings."

LADEE was built using an NASA Ames-developed "modular common spacecraft bus" architecture, a spacecraft design that allows the space agency to develop, assemble and test multiple modules at the same time. The LADEE bus structure is made of a lightweight carbon composite with a mass of 547.2 pounds. It carries three instruments: a light spectrometer, a mass spectrometer and a dust analyzer.

Its propulsion system was built by Silicon Valley neighbor Space Systems/Loral, using commercial off-the-shelf systems.

The mission will help solve a long-standing mystery: Was [lunar dust](#), electrically charged by sunlight, responsible for the pre-sunrise glow above the lunar horizon detected during several Apollo missions?

It will also test laser communications in space, essential for future space missions. The radio signals that are used today are very slow, with limited bandwidth, said Don Cornwell, mission manager for the Lunar Laser Communications Demonstration at NASA's Goddard Space Flight Center in Greenbelt, Md.

This would create an interplanetary Internet, sending back data from future human explorations.

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