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# MOON DAILY

the discovery, exploration and application of luna

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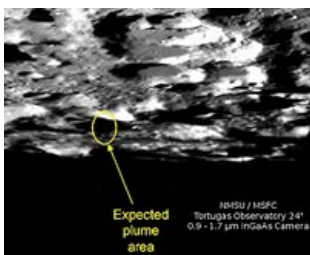
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MOON DAILY

## NMSU Astronomers Search For Presence Of Water

by Staff Writers  
Sunspot NM (SPX) Oct 06, 2009

In the pre-dawn hours of Oct. 9, as many people in New Mexico are still asleep or barely stirring, a momentous event will be happening in [outer space](#) that could help define future space travel.



New Mexico State University astronomers say the impact from the rocket may be visible from Earth through telescopes at least 10 inches in diameter. Observers should be able to see a bright spot in the target crater, known as Cabeus, when the plume rises into the sunlight. The impact is scheduled to occur Oct. 9 at exactly 5:31:45 a.m. MDT. (Photo courtesy of R. Hamilton, C. Miller, R. M. Suggs [NASA/MSFC], N. Chanover)

That event is a rocket smashing into a permanently shadowed crater on the [moon](#), and New Mexico State University astronomers have a front-row seat on all the action.

NMSU is taking part in a NASA experiment to learn if water exists on the [moon](#). The Lunar CRater Observation and Sensing Satellite (LCROSS) is a piggyback mission to the Lunar Reconnaissance Orbiter (LRO) that launched June 18 from Cape Canaveral, Fla. The two components of the LCROSS mission, the Shepherding Spacecraft and the Centaur upper stage rocket, were launched together with the LRO.

The orbiter separated soon after the launch and the spacecraft has since guided the rocket toward the moon.

The rocket will hit a crater near the south pole of the moon with a force twice that of a bullet and should kick up lunar debris that researchers at observatories around the world will study for the presence of water.

NMSU astronomers will play an integral part in capturing the images from the plume of lunar debris that is expected to rise after the impact.

"Material will be thrown up several miles until it gets to the point where the sun is shining. The debris will eventually rise up into the sunlight where everyone can see it," said Chas Miller, an NMSU graduate student involved in the project.

"We'll be looking for the dark part of the crater, and we'll see brightness and expanding light. That's what we're hoping to see."

Instrumentation aboard the shepherding spacecraft is designed to

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search for evidence of water ice on the moon as the rocket crashes. The spacecraft will crash on the moon four minutes after the rocket.

Three teams of NMSU astronomers will be divided between Apache Point Observatory (APO) in Sunspot and Tortugas Mountain Observatory in Las Cruces to capture the moment in images and video for later analysis.

"This mission can highlight the capabilities we have," said Nancy Chanover, an assistant professor at NMSU and principal investigator of Apache Point's part in the mission. "If we are successful, I can envision other types of missions or experiments where certain capabilities are needed; if we can showcase what we can do with the Apache Point and Tortugas observatories, it may open a lot of doors for future collaborations."

Chanover said researchers are fairly certain that the water on Earth today was delivered to the inner solar system by comets early in the history of our solar system. Comets, which are mostly made up of water, hit [planets](#) much more frequently earlier in the history of our solar system.

"We'd like to understand how water is distributed elsewhere in the inner solar system, like the moon, because that could give us information, such as how long ago that delivery took place," she said. "Getting an inventory of water in the entire inner solar system can help us improve our understanding of how that water was delivered."

Certain areas on the moon are permanently shadowed, leading researchers to the idea that water left over from comets could exist in these spots. If water is found on the moon, future [space missions](#) could take on a dramatically new shape.

The last manned mission to the moon was in 1972 with Apollo 17. Ryan Hamilton, an NMSU graduate student involved in the project, said that eventually astronauts will be sent back to the moon, but the trip could be costly because astronauts have to carry all of their supplies, including water, with them.

If water is found on the moon, astronauts could use it as a source of fuel or in preparing other materials for building, as well as for personal use, making this mission a possible stepping stone to having more of a permanent presence on the moon.

"There are a lot of places where there could be water in shadowed craters on the moon and on other planets," Hamilton said. "The big question is whether the water and ice are really there like we think they are."

Astronomers have been practicing for the big event for a while to ensure that everything will be prepared on Oct. 9. On that day, they will be collecting photographic and video images throughout and after the impact. Although it is not clear how long the debris plume will be visible, Miller estimated it could be seen for as many as five or 10 minutes after impact.

A satellite in orbit around the moon will also capture images of the impact.

Chanover said limited information will be available immediately following the impact and that astronomers will spend about four months analyzing the data before full results are presented to the public and archived in the Planetary Data System.

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Astronomers may have a front-row seat to watch the impact, but amateur stargazers can also be a part of the early morning event. Anyone with a [telescope](#) at least 10 inches in diameter should be able to view the impact. Miller said it could take up to 30 seconds after impact for the plume to rise up over the ridge and be seen by observers. He said it will appear to observers as a bright spot in the target crater, known as Cabeus.

The rocket is expected to hit the moon on Oct. 9 at exactly 5:31:45 a.m. MDT.

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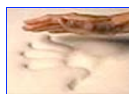
 

#### MOON DAILY

## LCROSS Viewer's Guide

Huntsville AL (SPX) Oct 06, 2009

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