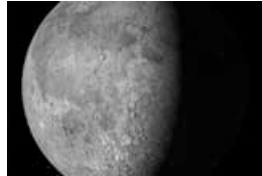




Send to a Friend | Bookmark del.icio.us | digg Submit to Digg | Mobile Space News | RSS | Yahoo! Buzz



How to Watch NASA's Probe Smack the Moon Friday

By **Joe Rao**
SPACE.com Skywatching Columnist
posted: 06 October 2009
03:16 pm ET

Get ready for a unique cosmic collision! Early this coming Friday morning (Oct. 9), NASA's Lunar Crater Observation and Sensing Satellite (LCROSS) will end its mission with a bang — literally.

Currently carrying with it the upper stage of the rocket that launched it on its way to the moon on June 18, the game plan is to send that spent rocket motor on a course to [smash into the lunar surface](#).

But just not anywhere on the lunar surface, but to a thoroughly scrutinized crater called Cabeus that lies near the moon's south pole and is enveloped in perpetual darkness. The hoped-for resultant effects will be to find hidden water ice frozen inside the crater.

And for seasoned skywatchers here on Earth, it should also produce a visible cloud of ejected material. However, only knowledgeable amateur astronomers with the right equipment will be able to detect the event. Others can watch the event live on NASA TV.

Smackdown!

The general belief among astronomers is that over the last few billion years, the moon has been bombarded by countless numbers of comets. The water from most of these comets completely sublimated away but if any settled at the bottom of a crater near the moon's poles, these permanently shadowed regions can keep the water from disappearing, [remaining as ice](#) for a very long time.

Cabeus is a relatively flat crater about 60 miles in diameter on the moon's south pole that scientists believe may be one of those special cases that might hold water ice in its perpetually shadowed top soil. NASA initially [selected a different target](#) for LCROSS, the nearby crater of Cabeus A, but switched to the larger Cabeus because data suggested it had a higher likelihood of containing hidden water ice.

The impact is scheduled to occur this Friday, Oct. 9 at 11:30 UT. That's 7:30 a.m. EDT; 4:30 a.m. PDT. To convert Universal Time to your local time, go [here](#).

Impact will happen less than 10 hours after the spent LCROSS Centaur rocket motor is released and its Shepherding Spacecraft maneuvers into position to trail the Centaur en route to the lunar surface. The 5,000-pound Centaur, is expected to slam into Cabeus at a sharp angle at a speed of 5,600 mph (9,010 kph).

If all goes according to schedule, the Shepherding vehicle, carrying nine science payloads, will follow the Centaur's plunge into the moon, beaming back data live to the Earth. Like a bullet hitting sand, the Centaur's explosive collision is expected to create a crater roughly 60 or 70 feet wide and perhaps as much as 16 feet deep, in the process dredging up approximately 385 tons of lunar dust and soil — enough to fill nearly 18 school buses. In addition to recording the collision, the Shepherding Satellite will fly through the regolith plume thrown up by the collision, just before it too slams into the lunar surface some four minutes later, kicking up its own smaller plume of debris.

But before it's sacrificed in the cause of science, the 1,500-pound Shepherding Spacecraft will utilize its specialized sensors and will look for water's telltale chemical signature within the larger debris plume created by the Centaur, possibly in the form of ice, hydrocarbons or hydrated materials.

advertisement

Download a **FREE audiobook** today!

audible.com

Learn More

Brought to you by

Starry Night

EXPLORE THE STORE

SPACE Community

IMAGINOVA

Welcome, Guest

Curious? Join our community!

Members: [Log In](#) | New? Register: [Join Now!](#)

[Discussion Board](#)

[e-Newsletter Sign Up](#)

Shop SPACE

telescope Store

ORION TELESCOPES & BINOCULARS

Buyer's/User's Guide to Astronomical Telescopes

\$25.95

[Explore More](#)

SPACE Daily Spotlight

IMAGES

CLICK TO VIEW

An artist's interpretation of NASA's LCROSS spacecraft observing the first impact of its rocket booster's upper stage before heading in for its' own crash into the Moon's South Pole. Credit: NASA.

CLICK TO VIEW

This NASA image shows the phase

How to watch

NASA wants the amateur astronomer community to join in a "citizen scientist" program. Jennifer Heldmann heads the LCROSS observing campaign. "We would like to have as many eyes and instruments watching the impact as possible because this is the way we'll get the most data and the most information as possible."

Those who live to the west of Mississippi River will have the best opportunity because the sky will still be dark. Those living east of the Mississippi will still have the moon in the sky, but either dawn twilight or — in the case of those living along the Atlantic Seaboard — sunrise will have occurred, making for a much brighter sky background. A dark backdrop will be an important prerequisite, since it's estimated that when the debris plume forms on it will be no brighter than a sixth-magnitude star (the threshold of naked-eye visibility), and quite likely even fainter.

If you want to attempt to see the impact yourself, here are [some important points](#) to be aware of:

First, you're going to need a moderately large telescope, somewhere on the order of at least 10 to 12 inches of aperture. Smaller telescopes will probably not be able to do the job and you will definitely not see anything using binoculars. You'll likely need to use magnifications in the 250 to 500-power range to have a legitimate chance of getting a glimpse of the dim impact plume.

Keep in mind that high power dilutes the brightness of an image, as well as aggravates any unsteadiness of detail. As a general rule of thumb that the maximum amount of magnification for any telescope is 50-power per inch of aperture.

"But wait a minute," you may protest, "my telescope comes with a special Barlow lens, that the manufacturer promises will double or even triple the magnification of my eyepiece."

True enough. In fact, that aforementioned 500-power is likely achieved by pushing the scope's highest power eyepiece with that very same Barlow lens, which ultimately will result in a dim, impossibly fuzzy image. If you're a beginner, you need to understand that that using a Barlow lens is similar to enlarging a photograph. The negative — like a telescope's image — contains only so much detail, which can be blown up only so far before all you can see is fuzz! So, if you have a 3-inch department store telescope — even if it is blessed with perfect optics — the claim of 500-power is more than *three* times the limit of the most practical magnification that it can provide.

The impact will take place at the lunar south pole, or on the lower limb of the moon along the dark portion immediately adjacent to the terminator (the line that separates the illuminated day side and the dark night side of the Moon). Try to keep the very bright sunlit portion of the moon out of the field of view as much as possible.

The plume is expected to be in the shape of a "V" but it will be exceedingly small in size relative to the moon itself. According to NASA's Brian H. Day, the dusty material is only expected to rise about 6 miles (10 km) above the lunar surface. From Earth, that would be equal to about one-quarter of 1 percent of the moon's apparent size or about 5.2 arc seconds.

To try and get an idea of just how large this is, point your telescope toward Jupiter which conveniently shines in the southern part of our current evening sky. Jupiter's disk currently measures 45-arc seconds in diameter; so the dust plume from LCROSS would appear only about 1/9 as large as that!

And the plume — if and when it's visible — will not last very long. The best guesstimates are that it will last no more than 2 minutes.

You can get more detailed viewing tips from NASA [here](#).

Observatories expected to participate in the study include the newly refurbished Hubble Space Telescope, Hawaii's Keck and Gemini telescopes, the Magdalena Ridge and Apache Ridge observatories in New Mexico, the MMT Observatory in Arizona and the Lunar Reconnaissance Orbiter (LRO) now circling the moon.

Lastly, you can watch the event live here on [NASA TV](#), beginning at 6:30 a.m. EDT/3:30 a.m. PDT.

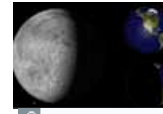
[Online Sky Maps and More](#)

[Sky Calendar & Moon Phases](#)

[POLL: Just How Important is Water on the Moon?](#)

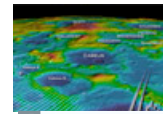
Joe Rao serves as an instructor and guest lecturer at New York's Hayden Planetarium. He writes about astronomy for The New York Times and other publications, and he is also an on-camera meteorologist for News 12 Westchester, New York.

of the Moon as seen from the Earth at the projected time of impact, 11:30 UTC on October 9, 2009. The impact will occur very near the lunar south pole.



[CLICK TO VIEW](#)

This NASA graphic depicts Earth and Moon lighting conditions at the expected time of impact (October 9, 2009, 7:30 am ET) of the LCROSS probe at the lunar south pole. Top right: the regions of Earth facing the moon during impact. Bottom right: Lighting conditions of the same view at impact time. Credit: NASA



[CLICK TO VIEW](#)

This mosaic, taken from a NASA animation, shows altitude measurements of the moon's south pole from the LOLA instrument aboard the Lunar Reconnaissance Orbiter. Some craters, including Cabeus A that will be hit by the LCROSS probe, are named in this view released Sept. 17, 2009. Credit: NASA/GSFC

MORE STORIES

- Controversial New Idea Surfaces on Origin of Moon's Water
- Our Changing View of the Moon
- What's Up Tonight: Sky Calendar
- Your Local Weather Forecast

MULTIMEDIA

- Video - Water on the Moon

The discovery of hydrogen at the Moon's South Pole hints at ice in the deep shadowed craters. Credit: Thomas Lucas & Dave Bro

- POLL: Just How Important is Water on the Moon?

HOT TOPICS



The Space Top 10s



Vote for your Space Favorites



Space Trivia



Multimedia Features



SPACE.com Reader Favorites



Space Wallpapers



Space Video Collection

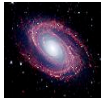


Space Image Gallery Collection

Comments (16)

You must be logged in to post a comment: [Log In](#) | [Register](#)

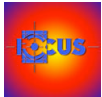
Post a Comment Sort by:



thebluescorpion wrote: posted 06 October 2009, 3:40 pm ET

Of course Im in NYC now without my telescope and the bright city lights.. Thankful for NASA TV :)

[Reply](#) | [Recommend \(10\)](#) | [Report Abuse](#)



Rado wrote: posted 06 October 2009, 4:32 pm ET

"Get ready for a unique cosmic collision! Early this coming Friday morning (Oct. 9), NASA's Lunar Crater Observation and Sensing Satellite (LCROSS) will end its mission with a bang %u2014 literally."

In fact, there will be hardly any bang. Only the vibration spreading through ejecta dust and through the ground. No air on the Moon.

[Reply](#) | [Recommend \(3\)](#) | [Report Abuse](#)



J_M_Weikle wrote: posted 06 October 2009, 4:37 pm ET

Maybe I missed something, what observational satellite is NASA using to gather the information from the resulting dust particles? Is the Hubbel Telescope being used to 'see' the hydroxyl molecules?

May it be a Historic Splash Impact!

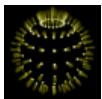
[Reply](#) | [Recommend \(3\)](#) | [Report Abuse](#)



spazhoward wrote: posted 06 October 2009, 4:58 pm ET

The LCROSS "shepherding vehicle" carries instruments that will make scientific observations. It is currently still attached to the Centaur rocket stage that carried both it and the LRO to the moon. The LRO went into lunar orbit and began observations several weeks ago; meanwhile, the Centaur and LCROSS have been slowly adjusting their wide orbit in order to economically set up a collision with the lunar south pole. About 10 hours before lunar impact, the shepherding vehicle will separate from the Centaur. The large Centaur stage will impact with the moon first and create a dust plume that will be analyzed. The shepherding vehicle will follow right behind, making observations before itself colliding with the moon about 4 minutes later.

[Reply](#) | [Recommend \(7\)](#) | [Report Abuse](#)



invisible_ghost wrote: posted 06 October 2009, 5:44 pm ET

The large Centaur stage will impact with the Cabeus crater. Hope they do not plan on sending any humans there after the fact. Can you imagine all the fine slivers of razor sharp metal lying all over the impact site just waiting to cut or gouge a hole

in an astronaut's boot. Hope most of it vaporizes on impact. Then we can scan the material kicked up and see all the vaporized Centaur material along with the moon material.

[Reply](#) | [Recommend \(0\)](#) | [Report Abuse](#)



Rickstar wrote: posted 06 October 2009, 6:05 pm ET

Will President Obama be watching this impact event, during his sky-watching night, at the White House back-yard star party??? ...If not, they really should sync up the 2 events, me thinks!...

[Reply](#) | [Recommend \(3\)](#) | [Report Abuse](#)

[Expand to View Replies \(3\)](#)



Mr_RSeay wrote: posted 06 October 2009, 8:36 pm ET

Uhhh. I hope the Man In the Moon won't take it personally..

[Reply](#) | [Recommend \(1\)](#) | [Report Abuse](#)



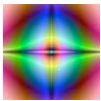
Delphinus100 wrote: posted 07 October 2009, 3:32 am ET

"Can you imagine all the fine slivers of razor sharp metal lying all over the impact site just waiting to cut or gouge a hole in an astronaut's boot."

Why would that necessarily be a result? If anything, at a near right angle impact, the light metal structure will likely instantly crumple and compress into the surface. (now, it would be rather more interesting to find the locations where the Lunar Module ascent stages came back down, at very shallow angles and likely spread well across the landscape)

And considering what's expected of them (and not unlike heavy-duty Earth footwear), the boots are probably the toughest part of any Moonsuit...

[Reply](#) | [Recommend \(0\)](#) | [Report Abuse](#)



ernestborg9 wrote: posted 07 October 2009, 4:05 am ET

Remember kids...no texting while spacecruising!

[Reply](#) | [Recommend \(0\)](#) | [Report Abuse](#)



MarkStanaway wrote: posted 07 October 2009, 7:43 am ET

This is going to be something really worth watching thanks to NASA TV.

I just hope any residual H₂ and O₂ has well and truly vented from the Centaur stage as we would not want to compromise any positive readings of these molecules.

[Reply](#) | [Recommend \(2\)](#) | [Report Abuse](#)

[Expand to View Replies \(1\)](#)

Showing 1-10 of 16 comments [1](#) [2](#) [Next »](#) [Last](#)

Post a Comment

You must be logged in to post a comment: [Log In](#) | [Register](#)

You are currently not logged in.
You must be logged in to leave a comment.

Submit Comment

User Comment Guidelines: It may take up to a minute for your comment to appear. Posting of comments requires membership in the Imaginova Community, which is subject to our [Terms of Service](#). Imaginova reserves the right to remove, without notice, any comment for any reason whatsoever.

Marketplace Links

- **BP**
There's energy security in energy diversity.
- **One-stop destination for the lowest domestic airfares**
Search all airlines, including Southwest now!
- **HP ProLiant Servers**
The HP portfolio of servers-leading technology that respects the bottom line. Powerful ProLiant technology at a price that's worth a second look.
- **Facing a Dilemma? Let Geek Logik help.**
Use Algebra to inform your decisions
- **Orion Telescopes & Binoculars**
Let us magnify your stargazing experience!

[Meade Telescope for Sale](#)

Premier Meade Telescope Dealer
Fast Shipping. Helpful Service.
www.astronomics.com

[Earth 3d Space Screensaver](#)

Watch the Globe on Your Desktop Hi Res., Dynamic, Free. Get it?
3DEarth.CrawlerTools.com

Ads by Google

SPACE Top Stories

[Targeting the Moon: Observatories Gear Up for Friday Lunar Crash](#)

LIVE SCIENCE Top Stories

[See-Through Frogs Discovered](#)

[Early Humans Had Nutcracker Jaws](#)

- [Controversial New Idea Surfaces on Origin of Moon's Water](#)
- [Video Show - Getting Back to Luna: Why the Moon?](#)
- [Astronauts Build Stephen Colbert's Space Treadmill](#)
- [Dirty Stars Make Great Hosts for New Worlds](#)
- [How to Watch NASA's Probe Smack the Moon Friday](#)
- [Enormous New Ring Found Distantly Orbiting Saturn](#)
- [Orbital Debris Cleanup Takes Center Stage](#)
- [Doorstep Astronomy: The Moon and a Star Cluster](#)
- [White House to Throw Star Party Wednesday](#)
- [FORUM: Can Meteors Split in Two?](#)
- [Our Changing View of the Moon](#)
- [Circus Billionaire Says Space Trip Worth Every Penny](#)
- [NASA Astronaut Frank Caldeiro, 51, Dies](#)
- [Space Traffic, Meteor Showers Threaten Next Shuttle Launch Date](#)

- [Marijuana May Disrupt Brain Development](#)
- [Timing of Seasons Is Changing](#)
- [Belly Buttons May Signal a Woman's Vigor](#)
- [Traffic Noise Causes Heart Attacks](#)
- [The Problem with Evolution Surveys](#)
- [Erectile Dysfunction Predicts Heart Disease](#)



[Site Map](#) | [News](#) | [SpaceFlight](#) | [Science](#) | [Technology](#) | [Entertainment](#) | [SpaceViews](#) | [NightSky](#) | [Ad Astra](#) | [SETI](#) | [Hot Topics](#)
[Image Galleries](#) | [Videos](#) | [Reader Favorites](#) | [Image of the Day](#) | [Amazing Images](#) | [Wallpapers](#) | [Games](#) | [Community](#) | [Reviews](#)
[about us](#) | [FREE Email Newsletter](#) | [message boards](#) | [register at SPACE.com](#) | [contact us](#) | [advertise with us](#) | [terms & conditions](#) | [privacy statement](#)
[DMCA/Copyright](#)
[XML](#) [What is This?](#)
 © 2007 Imaginova Corp. All rights reserved..