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How to watch NASA's big crash on the moon
Rocket motor to smash into lunar south pole Friday to find hidden water ice

By Joe Rao
Skywatching columnist
updated 1:46 p.m. MT, Tues., Oct . 6, 2009

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

The probe — also known by its acronym, LCROSS — is currently carrying along the upper stage of the rocket that launched it on its way to the moon on June 18. NASA's game plan is to send that spent rocket motor on a course to smash into the lunar surface. Not just 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 result will be to find hidden water frozen inside the crater.

For seasoned skywatchers here on Earth, the event 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.

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Launch

NASA to 'bomb' the moon

Oct. 6: NASA will crash a rocket into the surface of the moon Friday, sending a probe to follow behind the rocket to send live pictures of the huge explosion back to us here on earth. NBC's Brian Williams reports.

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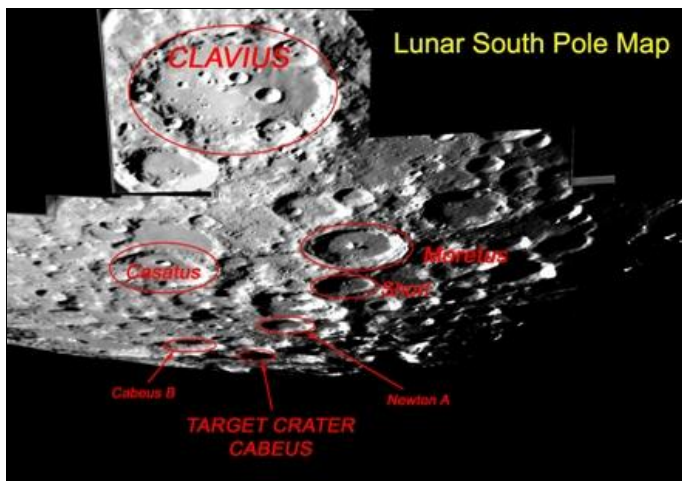
### Smackdown!

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, those permanently shadowed regions can keep the water from disappearing **and lock it up as ice** for a very long time.

Cabeus is a relatively flat crater about 60 miles (100 kilometers) in diameter on the moon's south pole. Scientists believe the crater may be one of those special cases that holds 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 7:30 a.m. ET. That's 4:30 a.m. PT, or 11:30 UT. To convert Universal Time to your local time, **go here**.

Impact will occur less than 10 hours after the spent Centaur rocket motor is released and the LCROSS "shepherding spacecraft" maneuvers into position to trail the Centaur en route to the lunar surface. The 5,000-pound (2,270-kilogram) Centaur is expected to slam into Cabeus at a sharp angle at a speed of 5,600 mph (9,000 kilometers per hour).



NASA / NMSU

This map shows the location of the crater Cabeus near the moon's south pole.

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 Earth. Like a bullet hitting sand, the Centaur stage's explosive collision is expected to create a crater roughly 60 or 70 feet wide (20 meters wide) and perhaps as much as 16 feet (5 meters) 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 spacecraft 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.

In the minutes leading up to its sacrifice to the cause of science, the 1,500-pound (700-kilogram) shepherding spacecraft will use its

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specialized sensors to 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.

**How to watch**

NASA wants amateur astronomers 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," she said.

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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 be able to see the moon, but they'll also have to contend with morning twilight or, in the case of those living along the Atlantic Seaboard, daylight after sunrise. That makes for a much brighter sky background.

To see LCROSS' effect, a dark backdrop will be an important prerequisite, since it's estimated that the debris plume will be no brighter than a sixth-magnitude star (the threshold of naked-eye [visibility](#)), and quite likely even fainter.

If you want to try seeing the impact yourself, you need to be aware of [some important points](#).

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