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I like a hot sauce. My bloody marys are known to cure squints
Jeremy Clarkson

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From The Times

October 3, 2009

Moon crash will create six-mile plume of dust as Nasa searches for water

Mark Henderson, Science Editor

12 COMMENTS | RECOMMEND? (5)

A Nasa spacecraft will deliberately crash into the Moon next week on a mission that could enhance the prospects of establishing a manned lunar base.

Only two weeks after three probes discovered water on the Moon, the Lunar Crater Observation and Sensing Satellite (LCROSS) will blast two huge chunks out of its surface to establish whether it exists in a form that could be exploited by astronauts.

In the early hours of Friday morning, the LCROSS probe will separate from the Centaur upper stage of the rocket that carried it to lunar orbit, and send the spent module crashing into the Cabeus crater at the Moon's south pole.

When the 2.4-tonne Centaur hits at 12.31pm BST, at a speed of 2.5km per second (1.6 miles per sec), it will throw up a plume of debris 10km (6 miles) high.



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The LCROSS probe will then fly through the plume and analyse its contents with a battery of sophisticated instruments, before itself crashing into a different spot in the same crater four minutes later, to create a second cloud of dust and rubble.

The impacts, which will be visible from Earth through telescopes with mirrors of at least ten inches, will be studied both from the ground and with lunar orbiters, for traces of water and ice.

The goal is to confirm whether deep craters at the Moon's poles,

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which never see the Sun, hold large quantities of water. Such a resource could potentially be tapped by future missions to the Moon for drinking water, oxygen and fuel, improving the outlook for a long-term human presence.

The culmination of the LCROSS mission follows the announcement last week that three probes, including India's first lunar orbiter, had discovered traces of water all over the Moon's surface. The water found by the Chandrayaan-1, Deep Impact and Cassini probes, however, is extremely scarce and inaccessible. It appears to exist only in the top millimetre or so of lunar soil regolith, tightly bound to minerals, and would be difficult for astronauts to use.

Large quantities of water at the poles, where hydrogen has been detected by several probes, would be a much more attractive resource for a lunar base. LCROSS should now establish whether or not it exists in at least one polar crater.

"It is an exciting time for water on the Moon," said Dr Anthony Colaprete, the principal investigator for LCROSS. "Last week was great fun, and hopefully it's about to get much more fun. You'd have a hard time using what Chandrayaan-1 saw as a resource. If deep craters really do have 1 to 2 per cent hydrogen [as observations suggest], and in water not minerals, that would be much more exploitable."

As many polar craters are permanently in shadow, they are considered to be potential "cold traps" for water that reaches the Moon through the impact of asteroids and comets. Water of the sort discovered by Chandrayaan-1 could also migrate to these craters, as it sublimates during the hot lunar day and condenses into craters on reaching cold polar regions.

"These cold traps in permanently-shaded craters could have been accumulating water and building up over a billion years or more," Dr Colaprete said, "That's what we're going to excavate and look at."

The LCROSS impacts will test this hypothesis directly, by raising huge clouds of debris from the bottom of a deep lunar crater of the sort where ice is likely to collect. The Centaur and LCROSS will crash into the Cabeus crater, which is 98km (60 miles) across and of unknown depth: as it is permanently in shadow, this has been impossible to measure.

"The shadows are only so deep, so if you can make an impact that throws eject a few kilometres into the air, it goes from shadow into sunlight," Dr Colaprete said.

The Centaur impact will leave a crater about 20 metres in diameter, and about 3m to 4m deep. "It's about the size of a tennis court," Dr Colaprete said. The explosion will have the energy of at least a tonne of TNT. The impact of LCROSS itself will be about two thirds as large.

NASA's Lunar Reconnaissance Orbiter probe (LRO), which launched with LCROSS on June 18, will monitor the impacts, as will the Hubble Space Telescope and ground-based telescopes. The impact time was chosen to offer the best possible viewing conditions from the Keck and Subaru observatories in Hawaii.

Nasa this week changed the impact site to Cabeus from the smaller nearby Cabeus A crater, because data from the LRO suggested that the bigger crater contained more hydrogen and was thus more likely to contain ice.

Cabeus was not the first choice because a mountain on its northern side could obscure the view of the debris from Earth-based telescopes.

"We've moved to a crater that's a mixed blessing," Dr Colaprete said.

"There's a large hill in front of the impact site, but a deep shadow behind, so there will be less material in view but a higher contrast.

British astronomers will not be able to watch directly, as the impacts will occur in daylight, but large observatories will be able to see the Centaur separate from the LCROSS spacecraft.

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YOUR COMMENTS

12 Comments (Displaying 1-10)

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Eve Torres wrote:

Duh u all! Think the beings who live there will put up with that! Seen some of the images, they live there!

October 5, 2009 4:56 PM BST

RECOMMEND? (1)

william brodie wrote:

nasa reported that the moon rang like a bell ie its hollow .its a interesting read who built the moon? .its my favorite movie THE TIME MACHINE where the moon breaks up and falls 2 earth after a explosion .immanuel velikovskys archive the earth without the moon

October 4, 2009 12:32 PM BST

RECOMMEND? (1)

Otto Peuron wrote:

Reading comments like this make me glad there is no democracy when it comes to scientific exploration.

October 4, 2009 10:43 AM BST

RECOMMEND? (3)

chris simpson wrote:

Kevin Law

Well stated. A few of us are aware and awake but only a few.

Why "bomb" the moon to try and find water?. I know NASA has its "theories" but this just doesnt feel right. I have seen photos from the 60's-early 70's that show clouds on the moon. Were these "water" clouds or something like methane, who knows. But wouldnt a probe with drilling capability be better?

From a previous NASA experiment, "the moon rang like a bell" according to scientists who witnessed the crashing of one space craft. So we know its basically hollow!So what will this do?

October 4, 2009 7:25 AM BST

RECOMMEND? (2)

jojot circusboy wrote:

What is the deal with the picture of the moon? Is it an artist mock up or is it actual photo in the visible spectrum? Just looks odd.

October 4, 2009 4:29 AM BST

RECOMMEND? (1)

Ljubisa Lazarevic wrote:

To me, this looks like asteroid impact experiment. Otherwise why visibility from Earth is so important. Maybe they hope to see that water from Earth.

October 3, 2009 11:27 PM BST

RECOMMEND?

Fred Upwithit-Hall wrote:

I went to a pub on the moon once.
Awful place, no atmosphere.....

October 3, 2009 9:20 PM BST

RECOMMEND? (7)

Kevin Law wrote:

grahame gibson - define 'dying' - the earth is around four and a half billion years old and i think it will take a lot more than a tiny increase in co2 levels (if they exist) to 'kill' the planet. try picking up a stratigraphy book and looking at all the changes that have taken place on the earth in geologic history. it makes any anthropological

changes that MIGHT be taking place now seem utterly insignificant. but then scientific ignorance has never been much of a guide to predicting the future.

October 3, 2009 2:27 PM BST
RECOMMEND? (12)

Peter Wilmot wrote:

Wouldn't it be cheaper to send Yuri Geller there?

October 3, 2009 11:23 AM BST
RECOMMEND? (4)

jayil london wrote:

"Nasa searches for water on Moon"

Where there's water there's rain.

October 3, 2009 9:08 AM BST
RECOMMEND? (2)

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