

THE SKY THIS MONTH

OCTOBER 2009

LCROSS: A MISSION THAT WILL IMPACT THE MOON

Your first question to the title for this month's issue will probably be: What is LCROSS?

LCROSS stands for Lunar CRater Observation and Sensing Satellite. Its primary mission will be to find water on our Moon. Why exactly do we need to find water on the Moon? If we are to explore space, astronauts will need to have a more convenient source of water for both drinking and for the critical fuel required for propulsion. Bringing it from the Earth will be extremely expensive and impractical as compared to using the Moon for this precious resource.

How will LCROSS find the water? Based on earlier studies performed by the Clementine and Lunar Prospector missions, there exists strong evidence that water exists in frozen form (ice) near the southern pole of the Moon. The main reason for this is that the Sun rarely shines within its craters' floors, thus the water cannot melt or evaporate quickly. LCROSS will impact (smash into) a crater in order to dredge up the crater's floor so that the water ice will be tossed up above the lunar surface. Once that happens, the water can be detected by sensitive detectors.

Which crater has been chosen for LCROSS to impact? As many know, the Moon has thousands of craters, but the candidate crater required for the LCROSS mission has to be located near the Moon's southern pole. Until September 28, LCROSS was to impact into the Cabeus A crater. However, NASA has changed the target based on new data obtained from many different probes that have been orbiting the Moon. The new target will be the Cabeus (proper) crater, which has shown to exhibit the greatest concentrations of hydrogen at the southern lunar pole. Water molecules are made of two elements: Hydrogen and Oxygen (H₂O). If a large amount of hydrogen is found, then water might not be far behind.

Why is the LCROSS project so important to you? Those with telescopes might be able to see the impact of the LCROSS probe with the Moon! When the probe hits the Cabeus crater, plumes of lunar dust will be ejected from the crater's floor. These plumes might be visible by those with telescopes here on the Earth!

When will LCROSS impact the Moon? The LCROSS probe will impact the **Cabeus crater at 7:30 a.m. EDT October 9, 2009**. At that time, the Moon will be 56 degrees above our western horizon and will be showing much of its available face (including the southern pole). The Sun will be only 2 degrees above our horizon, so it will not interfere much with the visibility of this event.

The Cabeus crater can be found near the southern pole of the Moon by using the illustration of Figure 1. Begin by finding the very large and easily visible crater Clavius. Next, find your way to the crater Moretus, Short, Newton, Newton A and finally Cabeus. Cabeus might not look like a crater, since we will be seeing it nearly along its edge.

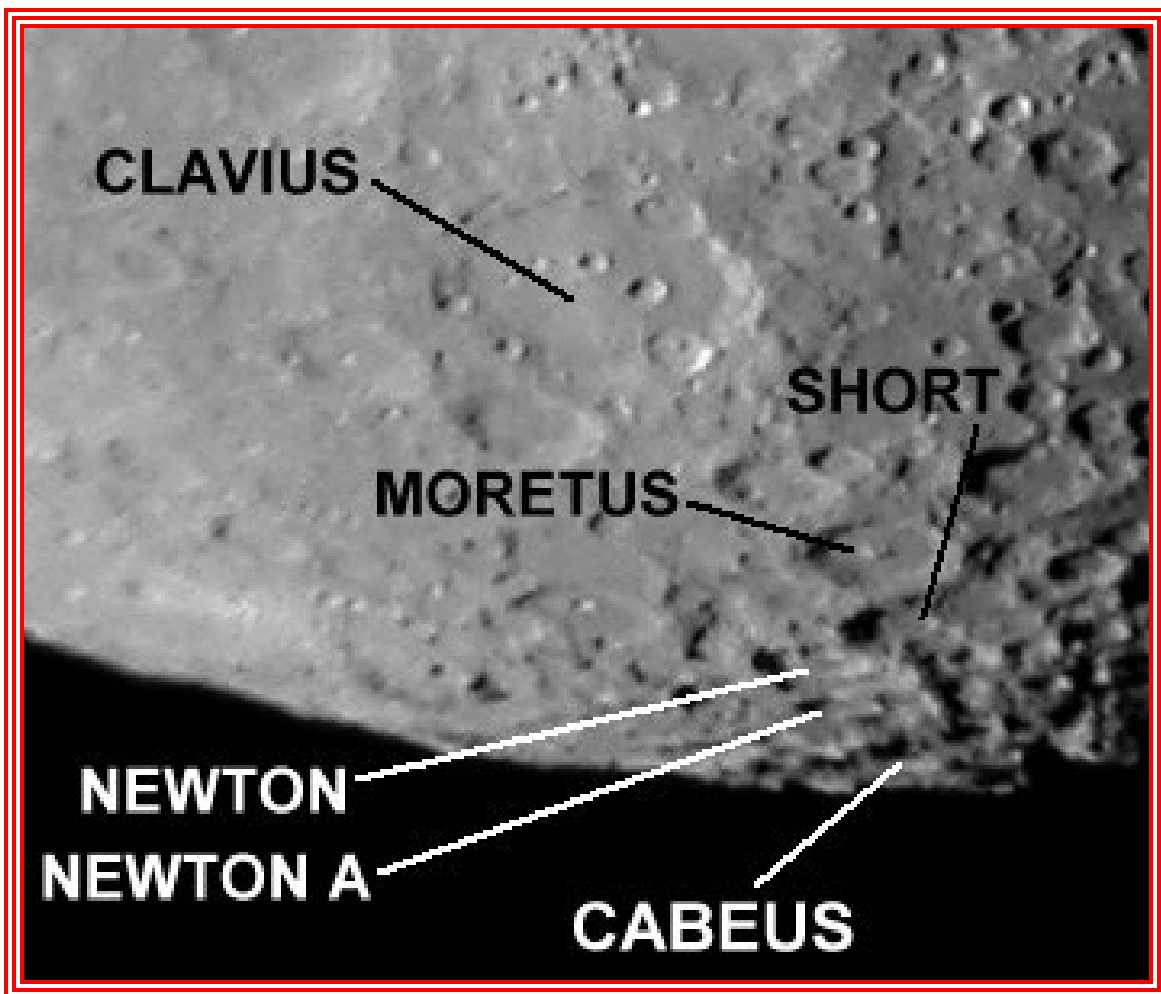


Figure 1: Map of the LCROSS Impact Site at Crater Cabeus. Image and labeling by the author.

It is not every day that we see a new impact on the Moon, so if you have a telescope or know someone who has access to a telescope, make sure to mark this event on your calendar!

A TRIO OF PLANETS

Nearly 24 hours after the LCROSS impact, you will have a chance to see three naked eye planets in a straight line!

At 6:30 a.m. on October 10th, you will be able to spot Mercury, Venus and Saturn forming a nearly straight line in the sky.

First, find brilliant Venus in the eastern sky. It will be the highest of the three and it will be difficult to miss! It will outshine all of the stars in the area. Next, find Saturn just below and to the right of Venus. Finally, if you dare, try to spot Mercury, which will appear just below and to the right of Saturn. Use the chart below to better find the planets.

If you have a telescope, all three planets will appear different from each other. Venus will appear like a nearly full disk, Saturn's rings will be extremely thin, if visible at all, and Mercury will appear to be a 70% disk if you can discern its disk at all.

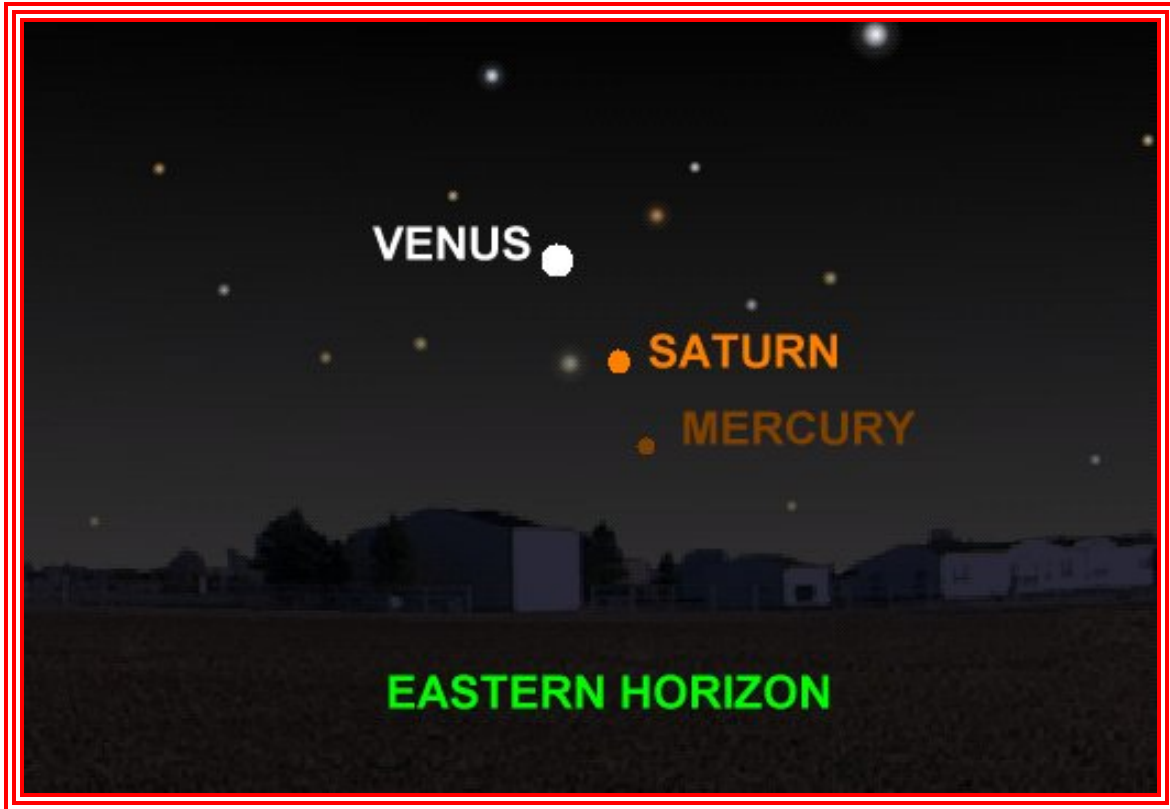


Figure 2: Venus, Saturn and Mercury at 6:30 a.m. October 10, 2009. Chart courtesy Software Bisque. Labeling by the author.

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