



Lunar **CR**ater **O**bservation and **S**ensing **S**atellite

LCROSS

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LCROSS is an acronym for **L**unar **CR**ater **O**bservation and **S**ensing **S**atellite. The satellite is a crucial portion of a scientific mission of discovery, sponsored by the National Aeronautics and Space Administration (NASA), scheduled to launch on April 24, 2009. The primary mission objective is to confirm the existence or absence of water within a pre-selected section of terrain located on the polar region of the Moon. The LCROSS mission will search for water, using information learned from the Clementine and Lunar Prospector missions. Since transporting water and other goods from the Earth to the moon's surface is expensive, finding natural resources, such as water ice, on the moon could help expedite lunar exploration. This objective is crucial to NASA and the American public because it will define future Moon exploration and activity. If accessible, vital, natural resources are indeed discovered to exist on the Moon, it is possible that NASA may some day attempt to establish a long-term residence on the surface of the Moon. By going to the moon for extended periods of time, a new generation of explorers will learn how to work safely in a harsh environment. A lunar outpost is a stepping stone to potential exploration of other bodies in our solar system. Additionally, the moon offers many clues about when the planets were formed.

In regard to space exploration, President George W. Bush said, "Mankind is drawn to the heavens for the same reason we were once drawn into unknown lands and across the open sea. We choose to explore space because doing so improves our lives, and lifts our national spirit". Overall, a prospective lunar station would be a significant milestone of importance in human history. The only feasible method of accomplishing this goal is to discover water on the Moon. Therefore, the LCROSS Mission is imperative to future space exploration.

At the launch in April, the Shepherding Spacecraft and Centaur rocket will be launched together with another spacecraft called the Lunar Reconnaissance Orbiter (LRO). All three are connected to each other for launch, but then the LRO separates about two hours subsequent to launch. The spacecraft will then orbit the Earth several times while diagnostic checks are performed before initiating their approach toward the Moon. The LCROSS Mission is going to conduct its search for water by directly impacting a suspected area containing water with the Centaur rocket. Colliding with the Moon at over 9,000 kilometers per hour, the rocket will cause a massive plume of lunar debris to explode from the surface and escape towards space. The disturbed debris will then be analyzed by the Shepherding Spacecraft just before it also crashes into the moon. The Lunar Reconnaissance Orbiter spacecraft will also make measurements from orbit around the moon. Both the Shepherding Spacecraft and the LRO will collect data on the material and send its findings directly to NASA to be researched and analyzed by scientists. The Shepherding Spacecraft will gather the data for over four minutes, following roughly the same path of the rocket before it inevitably crashes into the moon itself. The entire process has been methodically planned and is thus expected to occur without complications. Predictably, the plume of debris is expected to stretch about thirty miles out from the surface of the Moon and be visible to amateur astronomers with basic telescopes.



GAVRT – Goldstone Apple Valley Radio Telescope Program
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