

Fact Sheet

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LUNAR CRATER OBSERVATION AND SENSING SATELLITE AT A GLANCE

Mission and Science Objectives

LCROSS's mission objective is to confirm the presence or absence of water ice in a permanently shadowed crater at the Moon's South Pole to help evaluate its suitability for future human activities.

LCROSS will be launched as a co-manifested payload with the Lunar Reconnaissance Orbiter. LCROSS will excavate the crater's permanently dark floor with two heavy impactors, the Centaur upper-stage and LCROSS spacecraft itself, to test the theory that ancient ices lies buried there. The impact will eject material from the crater's surface to create a plume that specialized instruments in space and astronomical observatories on the ground will be able to analyze for the presence of water, hydrocarbons and hydrated materials.

LCROSS also provides a modular, rapid-development spacecraft architecture for future missions that can be launched as co-manifested payloads.

Procuring Customer

NASA Ames Research Center

LCROSS Project Team

NASA Ames Research Center
Jet Propulsion Laboratory
Goddard Space Flight Center
Kennedy Space Center
United Launch Alliance

Spacecraft Design and Overall Integration

In addition to spacecraft design, development, integration and test, Northrop Grumman Space Technology is also responsible for building, integrating and testing avionics; flight software; launch site integration support; and mission operational technical support.

Science Operations

NASA Ames is responsible for Mission Management, Science, Operations, and developing and integrating the science payload.

Science Instruments

- Five cameras: One visible context camera, two near infrared (for water detection in the plume) and two mid-infrared (to examine how the temperature of the plume changes with time)
- Three spectrometers: One visible/ultraviolet and one near-infrared which are nadir pointed; another near-IR to examine occultation of the Sun by the plume

One photometer: Visible light, for luminescence of the impact flash

Spacecraft Specifications

Size Height ~78 inches, including solar array
Diameter ~130 inches

Weight

At Launch 1,978 lbs (897 kilograms)
Spacecraft 1,305 lbs (592 kg)
Instruments 49 lbs. (22 kg.)
Propellant 661 lbs. (300 kilograms)
Electrical Power:
Power (Solar Array) 655 W

Telemetry

2 S-band omni antennas and 2 medium-gain horns
Max Data Rate 1Mbps

Data Links

NASA Deep Space Network

Propulsion

Monopropellant Hydrazine
Four Lithium Ion batteries

Impact velocity

2.5 km/sec - 5,600 miles per hour

Total Mission Cost

\$79 million

Launch date, Vehicle and Launch Site

Atlas 5, Cape Canaveral, 2008

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