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- Life
- Sports
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Backgrounder: Introduction to LRO's instruments

08:55, June 19, 2009

NASA's two new lunar probes -- Lunar Reconnaissance Orbiter (LRO), Lunar CRater Observation and Sensing Satellite (LCROSS), lifted off Thursday on a landmark mission to scout water sources and landing sites in anticipation of leading astronauts back to the moon in 2020.

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LRO is a robotic scout equipped with seven instruments, which will gather crucial data on the lunar environment that will help astronauts prepare for long-duration lunar expeditions:

Cosmic Ray Telescope for the Effects of Radiation

The Cosmic Ray Telescope for the Effects of Radiation will characterize the lunar radiation environment, allowing scientists to determine potential hazards to astronauts.

Diviner Lunar Radiometer Experiment

The Diviner Lunar Radiometer will identify cold traps -- areas cold enough to preserve ice for billions of years -- and potential ice deposits as well as rough terrain, rock abundance, and other landing hazards.

Lyman Alpha Mapping Project

The Lyman Alpha Mapping Project will search for surface ice and frost in the polar regions and provide images of permanently shadowed regions illuminated only by starlight and the glow of interplanetary hydrogen emission, the Lyman Alpha line. The bottoms of deep craters at the lunar poles might be permanently shadowed. These areas will be very cold and might hold water ice.

Lunar Exploration Neutron Detector

The Lunar Exploration Neutron Detector (LEND) will create high-resolution maps of hydrogen distribution and gather information about the neutron component of the lunar radiation environment. LEND data will be analyzed to search for evidence of water ice

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near the moon's surface.

Lunar Orbiter Laser Altimeter

The Lunar Orbiter Laser Altimeter (LOLA) will measure landing site slopes, lunar surface roughness, and generate a high-resolution, three-dimensional map of the moon. LOLA also will measure and analyze the lunar topography to identify the permanently illuminated and permanently shadowed areas. Certain mountain peaks at the lunar poles might be permanently illuminated. These regions may be good places for a solar power station.

Lunar Reconnaissance Orbiter Camera

Two narrow-angle cameras on the Lunar Reconnaissance Orbiter Camera will make high-resolution, black-and-white images of the surface, capturing images of the poles with resolutions down to 1 meter (about 3.3 feet). A third, wide-angle camera, will take color and ultraviolet images over the complete lunar surface at 100-meter (almost 330-foot) resolution. These images will show polar lighting conditions, identify potential resources and hazards, and aid selection of safe landing sites.

Mini-RF

The Miniature Radio Frequency (Mini-RF) is an advanced radar that will be used to image the polar regions and search for water ice. In addition, it will be used to demonstrate the ability to communicate with an Earth-based ground station.

Source:Xinhua

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