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Lunar Reconnaissance Orbiter

The **Lunar Reconnaissance Orbiter** (**LRO**) is an unmanned orbiter planned for launch to the Moon in October 2008 aboard an Atlas V [1]. It is an early element of the implementation of the United States Vision for Space Exploration and its objectives are primarily to support that policy, such as surveying lunar resources and identifying possible landing sites. The preliminary design review was completed in February 2006 and the critical design review was completed in November of 2006.[2]

Areas of investigation will include:[3]

- Selenodetic global topography

- Characterization of deep space radiation in Lunar orbit
- The lunar polar regions, including possible water ice deposits and the lighting environment
- High-resolution mapping (max 0.5 m) to assist in the selection and characterization of future landing sites

Under development by NASA's Goddard Space Flight Center, LRO is planned to be a large and sophisticated spacecraft in a polar orbit for a nominal mission of one Earth year. An optional extended phase of the mission (up to 5 years) could provide a communications relay for other future ground lunar missions, such as moon lander or rover. The orbiter will carry a complement of six instruments and one technology demonstration:

- CRaTER - The primary goal of CRaTER is to characterize the global lunar radiation environment and its biological impacts.
- DLRE - The Diviner Lunar Radiometer Experiment will measure lunar surface thermal emission to provide essential information for future surface operations and exploration.
- LAMP - Reflected Lyman _ sky-glow and starlight produce sufficient signal for even a small UV instrument like LAMP to see in the Moon's permanently shadowed regions.
- LEND - LEND will provide measurements, create maps, detecting possible near-surface water ice deposits.
- LOLA - The Lunar Orbiter Laser Altimeter (LOLA) investigation will provide a precise global lunar topographic model and geodetic grid that will serve as the foundation of this essential understanding.
- LROC - The Lunar Reconnaissance Orbiter Camera (LROC) has been designed to address the measurement requirements of landing site certification and polar illumination.
- Mini-RF - Demonstrate new lightweight SAR and communications technologies, locate potential water-ice.

LRO's high-resolution mapping will show some of the larger pieces of equipment previously left on the Moon, and will return approximately 70-100TB of image data.

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LCROSS

Piggy-backing on the launch of LRO will be the **Lunar CRater Observation and Sensing Satellite** (**LCROSS**), which is designed to watch as the launch vehicle's Centaur upper stage impacts a permanently shadowed region near either the north or south pole of the Moon. Spectral analysis of the resulting impact plume will help to confirm preliminary findings by the Clementine mission which hinted that there may be water ice in the permanently shadowed regions. LCROSS will fly through the debris plume, then approximately 10 minutes later will itself impact into a different part of the crater. The two impacts, which should be easily visible to amateur astronomers, will also be monitored by Earth-based observatories and possibly by other orbital assets. The addition of the LCROSS payload came about after NASA changed LRO to a larger rocket from the Delta II. It was chosen from 19 other proposals.[4] LCROSS is being managed by NASA's Ames Research Center and built by Northrop Grumman. The LCROSS preliminary design review was completed on 2006-09-08. The LCROSS mission passed its Mission Confirmation Review on 2007-02-02.[5].

See also

- Moon
- Future lunar missions
- Exploration of the Moon
- Lunar ice

References

1. **^** Lockheed Martin's Atlas V Selected To Launch Lunar Reconnaissance Orbiter. Lockheed Martin (2006-07-28). Retrieved on 2006-08-31.
2. **^** Lunar Reconnaissance Orbiter Successfully Completes Critical Design Review (2006-12-07). Retrieved on 2007-02-06.
3. **^** Savage, Donald; Gretchen Cook-Anderson (2004-12-22). NASA Selects Investigations for Lunar Reconnaissance Orbiter. NASA News. Retrieved on 2006-05-18.
4. **^** Tariq Malik. "NASA Adds Moon Crashing Probes to LRO Mission", 2006-04-10. Retrieved on 2006-04-11.
5. **^** "NASA Moon-Impactor Mission Passes Major Review", 2007-02-02.

External links

- Lunar Reconnaissance Orbiter Acquisition Program
- Lunar Reconnaissance Orbiter at GSFC
- CRaTER Instrument Home Page
- LROC Instrument Home Page

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- **Lunar-A** - JAXA (Japan) **Lunar Orbiter** and Penetrator Mission (Cancelled)

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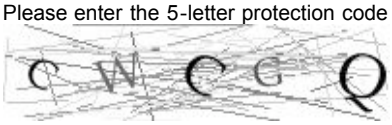

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