National Aeronautics and Space Administration

LUNAR RECONNAISSANCE ORBITER: Seeing the Moon

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LRO—Lunar Reconnaissance Orbiter

http://nasa.gov/lro

Seeing the Moon

A picture is worth much more than a thousand words. Although scientists rely on a great variety of instruments to gather data about the Moon, detailed photographs remain one of the dominant sources of information.

There have been dramatic changes in cameras over the decades of Solar System exploration. The first photo of the Moon's far side was taken by the Soviet Luna 3 probe, using film that was automatically developed in the probe, then scanned and faxed back to Earth through an analog video signal. In NASA's Ranger program, spacecraft carried television cameras. The Apollo missions included a variety of cameras, including panoramic cameras and television cameras. The Lunar Reconnaissance Orbiter Camera (LROC) has incredibly high resolution that has been able to find the Apollo astronauts' tracks and landing sites from its orbit high above the Moon's surface.

Topography of the far side of the Moon from the LOLA instrument onboard LRO. Blues and greens represent lower elevations, while reds and yellows represent higher elevations. Comparing this topographic map with the image of the far side of the Moon on the front will make it easier to identify the South Pole-Aitken Basin. Credit NASA/GSFC/MIT

What the Camera Sees

Scientists were very surprised by the first photos from missions flying past and orbiting the Moon. The earliest photos of the Moon's far side showed a very different face than what we are used to seeing. While the side of the Moon that faces Earth has familiar dark regions that make up the Man in the Moon, or the Woman in the Moon, or the Rabbit in the Moon, the Moon's back side is dominated by the brighter heavily-cratered highlands, with very few dark maria. This difference has since been attributed to differences in the lunar crust—the crust of the near side is much thinner than the far side—but how and why the two sides are so different are still active areas of research.

Better cameras saw that the far side does have a very large region, south of the Moon's equator, which is darker. But it took photographic data combined with topographic data to determine that this is actually the largest and deepest crater on the Moon, and possibly in the Solar System! This region, called the South Pole-Aitken Basin, is about 2,500 km (1,600 miles) wide—as wide as the Atlantic Ocean between South America and Africa!

LROC has a Wide Angle Camera (WAC) and two Narrow Angle Cameras (NAC) which are working together to map out the entire lunar surface in extremely high resolution and multiple colors. They are examining the Moon's surface checking for hazards in potential landing sites, and observing the polar regions to see which areas have continuous illumination from the Sun. The data is being used for so much more—mapping out the Moon's topography, determining where various minerals are located, examining the features-- craters, volcanoes, lava flows—to learn more about the Moon's geologic history and what that tells us about the Earth's history as well.

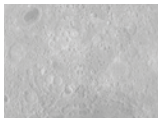
Images from cameras like LROC are worth so much more than a thousand words. Just as the looking at a photographer's collection can reveal information about the photographer, each lunar image captures information that ultimately reveals what the Moon has to tell us about our own world.

More Information
http://nasa.gov/lro
https://www.facebook.com/LunarReconnaissanceOrbiter
Twitter: @LRO_NASA

Goddard Space Flight Center manages the Lunar Reconnaissance Orbiter for NASA's Science Mission Directorate.

Image credit info:

Front left image: The near side of the Moon, as imaged by the Wide Angle Camera onboard LRO.
Credit NASA/GSFC/ASU



Front right image: The far side of the Moon, as imaged by the Wide Angle Camera onboard LRO.
Credit NASA/GSFC/ASU

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