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Mini-RF

Exploring the Lunar Poles

Nasa Radar Tandem Searches For Ice On The Moon

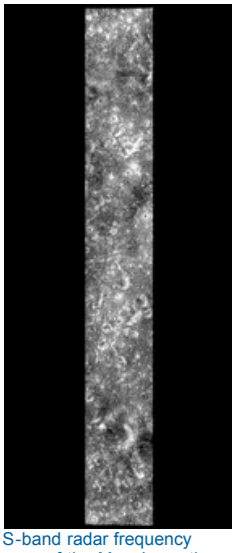
WASHINGTON -- With the Mini-RF instrument, a synthetic aperture radar flying aboard NASA's Lunar Reconnaissance Orbiter, or LRO, the space agency now has two powerful tools searching for ice on the moon.

This week operators powered up and began preparing Mini-RF (Miniature Radio Frequency) for its primary mission, to create detailed images of the moon's darkest areas, scan the lunar surface for hints of water ice and demonstrate new communications technologies.

LRO, launched June 18 from Cape Canaveral Air Force Station, Fla., and reached the moon June 25. Its seven science instruments now are being checked out and brought online.

The LRO Mini-RF is a version of the radar already circling the moon on the Indian Space Research Organization's Chandrayaan-1 spacecraft. Since Chandrayaan-1 orbital operations began in late 2008, its Mini-RF, also known as Mini-SAR (Synthetic Aperture Radar), has mapped about 80 percent of both of the moon's poles and provided images of areas never seen from Earth. Its second imaging period is set to begin in mid-August, opening the possibility of unique, joint measurements between Chandrayaan-1 and LRO that would enhance the hunt for ice.

"The Mini-RF team has reached a significant milestone, two payloads now in operation at the moon, "says Jason Crusan, program executive for the Mini-RF program, from NASA's Space Operations Mission Directorate, Washington, D.C. "Having two very complementary instruments orbiting the moon on two different spacecraft shows how truly international the exploration of the moon can be."



S-band radar frequency scan of the Moon's southern pole.

(Credit: NASA/JHUAPL/LPI)

Mini-RF sends radio pulses to the moon from the orbiting spacecraft and then precisely records the radio echoes that bounce back from the surface, along with their timing and frequency. From these data scientists can build images of the moon that not only show the terrain in areas they otherwise couldn't see, such as the permanently-shadowed areas near the lunar poles, but also contain information on the physical nature of the terrain.

"We're uncovering the moon's coldest, darkest regions, looking into craters and at other mysterious areas that never receive sunlight, yet preserve materials from the solar system's earliest days," says Ben Bussey, Mini-RF deputy principal investigator from the Johns Hopkins University Applied Physics Laboratory (APL) in Laurel, Md. "The exploration potential of these regions is also significant, since any ice deposits we locate would be valuable to future human lunar explorers."

The Mini-RF instruments were designed, built and tested by a team from across the United States. APL hosts the operations center and performed the final integration and testing on both instruments. They were developed and built by the Naval Air Warfare Center and several other commercial and government contributors, including Sandia National Laboratories, Raytheon, Northrop Grumman and BAE Systems. Instrument principal investigators Stewart Nozette (LRO) and Paul Spudis (Chandrayaan-1) are from the Universities Space Research Association's Lunar and Planetary Institute. NASA's Space Operations Mission Directorate, NASA Headquarters, manages the Mini-RF program.

For more information on the Lunar Reconnaissance Orbiter mission, visit:
http://www.nasa.gov/lro

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