

NASA launches probes to scout the moon



By Irene Klotz

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CAPE CANAVERAL, Florida (Reuters) – An unmanned Atlas rocket blasted off from Cape Canaveral Air Force Station on Thursday carrying a pair of probes to map the moon and hunt for water.

The Lunar Reconnaissance Orbiter (LRO) is NASA's opening salvo in a new program aimed at returning astronauts to the moon by 2020. The orbiter is designed to map the moon's surface in unprecedented detail, with particular attention to the relatively unexplored polar regions.

"Our knowledge of the whole moon is actually quite poor," said Craig Tooley, LRO project manager. "We have much better maps of Mars than we do of our own moon."

The rocket carrying the orbiter and a small second spacecraft known as LCROSS lifted off at 5:32 p.m. EDT (2132 GMT). The journey to the moon will take four days.

LRO carries seven science instruments, including several cameras, infrared detectors and a laser altimeter to measure topography. The satellite also carries a telescope outfitted with synthetic human skin to assess how the radiation environment may affect human health.

Scientists have targeted 50 potential landing sites that will be imaged with LRO's highest-quality cameras, which are capable of seeing objects as small as about 50 centimeters, or 20 inches, in diameter. As a curiosity, LRO is expected to look for equipment left behind during the Apollo missions of 1969-72.

The spacecraft also will scout for minerals, make detailed temperature maps, find areas of maximum sunlight and chart the moon's topography.

"Not only will we identify the ups and downs on the moon, but also the slopes that are so critical to being able to land safely," said Mike Wargo, the chief lunar scientist for NASA's exploration division.

BIGGER CREWS ON THE MOON

The agency is preparing for a new wave of human expeditions to the moon, with bigger crews, longer stays and more flexibility to select scientifically interesting landing sites. Of particular interest are the polar caps, where permanently shadowed craters may hide pockets of frozen water.

All six of the Apollo missions landed around the moon's equatorial region.

Getting a look at the contents of a crater is the goal of LRO's companion spacecraft LCROSS, or the Lunar Crater Observation and Sensing Satellite. It will use the Atlas rocket's spent upper-stage Centaur motor as a 2,300-pound (1,035-kg) deadweight to crash into a crater and send up a plume of material for inspection.

Flying about four minutes behind the Centaur, LCROSS will scan the material kicked up during the impact for signs of water vapor, ice and other substances. The data will be radioed back to Earth real-time -- and streamed on the Internet -- before LCROSS follows the Centaur into the crater, ending its mission.

The newly repaired Hubble Space Telescope, a European space observatory and several telescopes on Earth are scheduled to join LCROSS in the observations.

"We have many eyes looking at a variety of different ways," said LCROSS lead scientist Tony Colaprete, from NASA's Ames Research Center in Mountain View, California.

The impact is targeted for a crater in the moon's south polar region and is scheduled to take place in October after some initial maps from LRO are available.

Until then, LCROSS and the Centaur motor will be put into a holding orbit around Earth.

Once LRO reaches the moon, it will spend about two months getting into position to begin its survey, which is scheduled to last a year. After the mapping is finished, the spacecraft is then expected to be turned over to NASA scientists for an extended two- to three-year mission. The initial mission is costing NASA about \$504 million.

(Editing by Jane Sutton and Philip Barbara)