Lockheed Martin Spacecraft To Be Flown For NASA's GRAIL Lunar Mission

Discovery Program mission will map lunar gravity fields

The National Aeronautics and Space Administration's (NASA) newest mission will analyze the internal structure and gravitational forces of the Earth's moon. The Gravity Recovery And Interior Laboratory, or GRAIL, mission is the latest mission under NASA's Discovery Program. Lockheed Martin will design, build and operate the GRAIL spacecraft.

(Photo: http://www.newscom.com/cgi-bin/prnh/20071219/AQW101)

The $375-million GRAIL mission is led by principal investigator Maria Zuber of the Massachusetts Institute of Technology's (MIT) Department of Earth, Atmospheric and Planetary Sciences. NASA's Jet Propulsion Laboratory will manage the mission and will develop the science instrumentation.

"Our team is excited to be going back to the moon with an important science mission that will further NASA's exploration goals," said Jim Crocker, vice president of Sensing and Exploration Systems at Lockheed Martin Space Systems. "Even though man has walked on the moon, we still have much to learn and the GRAIL robotic mission will be instrumental to the challenge."

The lunar mission will use two identical spacecraft orbiting the moon in a low, polar orbit. The spacecraft are based on the flight-proven XSS-11 technology demonstration satellite developed for the Air Force Research Laboratory. They will use Ka-band ranging instruments to send signals between one another, and then relay the data back to Earth to be analyzed. Scientists will examine the minute differences in distance the signals traveled between spacecraft. This will give unprecedented insight into the gravitational changes over the entire moon.

Professor Zuber said, "Our entire science team is delighted to partner with Lockheed Martin, which offers unparalleled industry experience in planetary space exploration. The adaptation of the successful Earth-orbital XSS-11 spacecraft design enables NASA's Science Mission Directorate to benefit from technology investment external to the planetary program and contributes significantly to GRAIL's low-risk posture."

During the three-month science phase of the mission, GRAIL will create a global, high-accuracy, high-resolution lunar gravity map providing new understanding to the history and internal structure of the moon -- from crust to core. The mission is expected to launch in 2011.

"GRAIL will be the fifth Discovery mission we will have the privilege of working on," said John Henk, GRAIL program manager at Lockheed Martin Space Systems. "Every mission we develop has unique challenges. The key to the success of this mission will be developing two very smooth-running spacecraft to allow for precise intra-spacecraft distance measurements that indicate minute variations in the moon's gravity during their orbits."

Previously, Lockheed Martin designed and built the Lunar Prospector spacecraft; developed the aero shell entry system for the Mars Pathfinder mission; designed, built and operated the spacecraft for the Stardust mission; and designed, built and operated the Genesis spacecraft.

In addition to MIT, GRAIL's science team includes NASA Goddard Space Flight Center, JPL, the Carnegie Institution of Washington, the University of Arizona, the University of Paris and the Southwest Research Institute.

Lockheed Martin Space Systems Company, a major operating unit of Lockheed Martin Corporation, designs, develops, tests, manufactures and operates a full spectrum of advanced-technology systems for national security, civil and commercial customers. Chief products include human space flight systems; a full range of remote sensing, navigation, meteorological and communications satellites and instruments; space observatories and interplanetary spacecraft; laser radar; fleet ballistic missiles; and missile defense systems.

Headquartered in Bethesda, Md., Lockheed Martin employs about 140,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services. The corporation reported 2006 sales of $39.6 billion.

MEDIA CONTACT:
Gary Napier, Lockheed Martin Space Systems Company; (303) 971-4012
gary.p.napier@lmco.com

First Call Analyst:

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