Chandrayaan found ice on Moon

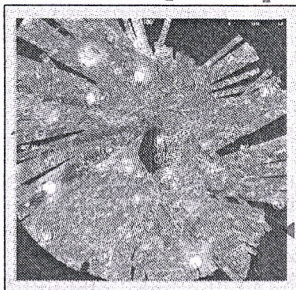
Discovery Of 40 Craters Of Water Ice A Boost For Astronauts: Experts

Srinivas Laxman | TNN

Mumbai: India's Chandrayaan-1 is akin to Sachin Tendulkar reaching new milestones with every stride. The prestigious Rs 386-crore mission's most recent lunar mark is the discovery of 600 million metric tons of water ice on the moon's north pole.

The announcement about the breakthrough, which is bound to have far-reaching consequences, was made on Monday at the 41st Lunar and Planetary Science Congress organized by the Houston-based Lunar and Planetary Institute. The discovery was made by a Nasa payload on board Chandrayaan-1 called Mini-Sar (miniature synthetic aperture radar), a lightweight instrument that weighs 10 kg. It found more than 40 small craters with water ice, the size of the craters ranging between one to nine miles.

Giant Leap In Space Exploration



- Nasa's radar experiment aboard Chandrayaan-1, the Mini-Sar, finds 40 small craters containing ice near the Moon's north pole
- Ice must be at least a couple of metres thick to give the signature seen by Chandrayaan-1, says Nasa

Green spots indicate craters on moon which contain ice

"Now we can say with a fair degree of confidence that a sustainable human presence on the Moon is possible... using the resources we find there"

Paul Spudis | LUNAR AND PLANETARY INSTITUTE, HOUSTON

Mini-Sar collected strips of data while flying over the lunar poles. Each strip is eight km wide and between 150-300 km long. By June 23, 2009, it had completed its first polar imaging campaign and mapped more than 90% of both the moon's poles. The results are to be published in an US journal called Geophysical Research Letters.

The ice was found in the permanently shadowed crater of the moon's north pole. Similar conditions of perpetual night exist at the lunar south pole too. Although the total amount of ice depends upon the thickness in each lunar crater, it is estimated that there could be at least 1.3 trillion pounds of water ice on the moon.

According to space experts, the discovery of water ice anywhere on the moon is extremely important because it can serve as a natural resource for astronauts on future lunar landing missions.

▶ Continued on Page 12

Chandrayaan found ice on moon

▶ Continued from Page 1

The ice could be melted into drinking water or be separated into its components of oxygen and hydrogen to provide breathing air and rocket fuel for launching interplanetary missions from the moon.

In September 2009, Isro's moon impact probe and the hyper spectral imaging camera (Hysi) along with Nasa's moon minerology mapper announced the discovery of water molecules on the moon. But, these were not of a large quantity. In contrast the Mini-Sar is stated to found huge quantities of water ice.

Nasa's lunar crater observation and sensing satellite (LCross) detected water vapour when its slammed into the moon surface at 5 pm (IST) on October 9 last year.

Speaking to TOI from Houston on Tuesday, director of the Ahmedabad-based Physical Research Labarotory (PRL) J N Goswami, who is attending the lunar meet, said a number of craters were thoroughly studied before a formal announcement was made on Monday. "This is definitely an important discovery; it took us five months to evaluate the findings since we had to convince the scientific community," he said. Goswami is the principal scientific investigator of the Chandrayaan-1 mission.

He explained that Indian scientists were a part of the team which examined the findings. "We had access to the data. After it was analysed by Nasa, the details were sent to us for further analysis. We had to make sure that everything was okay." The announcement was finally made at 4 pm (Houston time) on Monday.

M Chakraborty of the Space Applications Centre in Ahmedabad was the other Indian scientist who analysed data from Mini-Sar. Jason Crusan, programme executive of Nasa's Space Operations Missions Directorate in Washington, observed: "After analyzing the data our science team determined a strong indication of water ice, a finding which will give future missions a new target to further explore and exploit."

S Satish, Isro chief spokesperson, said: "These results certainly open new vistas towards establishing human colonies on the moon. More interesting results are awaited which will throw fresh light about the geological features of the moon."

An earlier report prepared by Goswami and Chakraborty along with a team of international scientists, says: "The possible existence of ice in the polar cold traps of the moon continues to be debated. The Clementine spacecraft (Nasa) conducted an experiment in 1994 which supported the idea of ice deposit within Shackleton crater near the south pole. However, this interpretation has been debated and there is still disagreement whether observed polarization anomalies are caused by the presence of water, it said. Their report further added that despite this uncertainty, there is little argument related to the discovery by Nasa's lunar prospector in 1998 of enhanced hydrogen levels in the polar region. The question was whether this hydrogen is in the form of water ice, it said.

Paul Spudis, principal investigator of Mini-Sar, has stated that the "emerging picture from the multiple measurements and resulting data of the instruments on lunar missions indicates that water creation, migration, deposition, and retention are occurring on the moon". According to him, the results from all the moon missions are totally revolutionizing one's view of the moon.

According to space experts, the discovery of water by the various missions has triggered what is known as lunar water politics. When Chandrayaan-1 and Nasa's Lunar Reconnaissance Orbiter jointly participated in a bi-static experiment about 30 minutes after midnight on August 21 last year, Spudis said that the mission was a failure because Chandrayaan's antenna was not pointing towards the moon.

Times of India. 3/3/10 Page No. 1.