discovering

India's Mission to Moon - CHANDRAYAAN

Posted in: NewIndia Wednesday 27th, January 2010

priyanka R M
working in HP-mic...

Indian Space Research Organisation's(ISRO) Chandrayaan – Founder of water on Moon

Chandrayaan-1 was a scientific investigation – by spacecraft – of the Moon. The name Chandrayaan means "Chandra-Moon, Yaan-vehicle", –in Indian languages (Sanskrit and Hindi) , – the lunar spacecraft. Chandrayaan-1 is the first Indian planetary science and exploration mission. It is India's first unmanned lunar probe. It was launched by the Indian Space Research Organisation in October 2008, and operated until August 2009. The le was successfully inserted into lunar orbit on 8 November 2008.[

14 November 2008, the Moon Impact Probe separated from the drayaan orbiter at 20:06 and struck the south pole in a controlled manner, ng India the fourth country to place its flag on the Moon.[10] The probe cted near Shackleton Crater at 20:31 ejecting underground soil that could alysed for the presence of lunar water ice.

estimated cost for the project was Rs 386 crore (US$ 80 million).

ner President A P J Abdul Kalam, whose idea it was to include the ctor as part of Chandrayaan's cargo, described the achievement as "a gift ndit Jawaharlal Nehru" because the event happened on the 119th birth ersary of India's first prime minister. As the mini satellite began its live at 8.06 pm, its altimeter began recording measurements to prepare round for a rover to land on the lunar surface during a second mission ed for 2012.

r a two-year period, it was intended to survey the lunar surface to ice a complete map of its chemical characteristics and three-dimensional raphy. The polar regions are of special interest as they might contain ice. unar mission carries five ISRO payloads and six payloads from other space cies including NASA, ESA, and the Bulgarian Aerospace Agency, which were d free of cost.

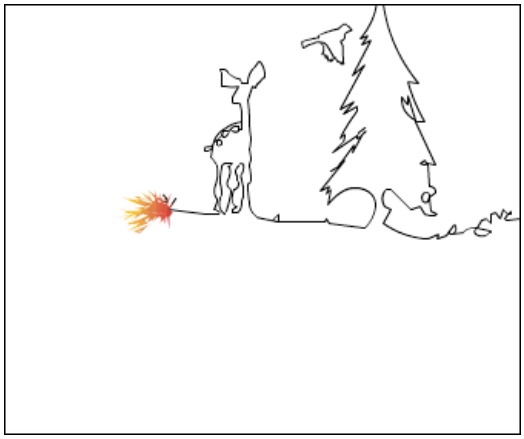
r suffering from several technical issues including failure of the star rs and poor thermal shielding, Chandrayaan stopped sending radio signals 30 AM IST on 29 August 2009 shortly after which, the ISRO officially red the mission over. Chandrayaan operated for 312 days as opposed to ntended two years but the mission achieved 95 percent of its planned tives.Among its many achievements was the discovery of the widespread nce of water molecules in lunar soil.

basic components of the chandrayaan-1 spacecraft are:

I. The scientific payloads: the instruments that will gather science data.
II. The solar array that provides power to the spacecraft. Chandrayaan also carries a battery that stores the power generated by the solar array and feeds it to other systems.
III. The thrusters perform fuel burns to change the spacecraft's trajectory and attitude.
IV. The various functional requirements of the spacecraft such as Attitude and Orbit Control, Command processing, House keeping telemetry, Sensor data processing, Thermal management, payload data handling operation, dual gimbaled data transmission antenna pointing , onboard mission management etc would be taken care by the Bus Management Unit (BMU).

Blogs archive

Jan 10(3) Nov 08(1) Oct 07(1)



More NewIndia blogs

Why does Facebook has lot of privacy issues?
Facebook, which agreed last August to implement new privacy safeguard...more >>

3 IDIOTS - a learning for moulding india
...more >>

India - Are we in right Direction
On the Day of the Republic India, Question ask to all our Brothers an...more >>

TRULY THOUGHT PROVOKING.....
...more >>

Lead-India
LeadIndia-Make Your Country Feel Proud There are two India'...more >>

view all>>

CXO Insights

7 Simple Rules to Ensure the Sales Executive's Commissio...
Souma Das
Area Vice President - India Sub Continent, Citrix Systems India

Corporate Governance and the role of it
Stephanie Moore
CMO, UST Global Inc

India's potential lies in her IT

V. The spacecraft also carries two star sensors and inertial reference unit based on miniaturised gyros providing absolute attitude.

Chandrayaan-1 mission was aimed at high-resolution remote sensing of unar surface in visible, near Infrared, low energy X-rays and high-energy regions. **Specific scientific goals are**:

i. To prepare a three-dimensional atlas (with a high spatial and altitude resolution of 5-10 m) of both near and far side of the moon.
ii. To conduct chemical and mineralogical mapping of the entire lunar surface for distribution of mineral and chemical elements such as Magnesium, Aluminum, Silicon, Calcium, Iron and Titanium as well as high atomic number elements such as Radon, Uranium & Thorium with high spatial resolution.
iii. By simultaneous photo geological and chemical mapping, we will be able to identify different geological units, which will test the hypothesis for the origin and early evolutionary history of the moon and help in determining the nature of the lunar crust.
iii.

of the Areas of Study was Chemical stratigraphy of lunar crust by remote ng of the central uplands of large lunar craters, and of the South Pole n Region (SPAR), where interior material may be expected (Stratigraphy, a h of geology, studies rock layers and layering).

ndrayaan-1 was sent to the Moon in a series of orbit-increasing euvres around Earth instead of a direct trajectory to the Moon. At launch pacecraft was inserted into geostationary transfer orbit (GTO) with an ee of 22,860 km and a perigee of 255 km. The apogee was increased with es of five orbit burns conducted over a period of 13 days after launch. The of closest approach (the point at which two bodies are the closest) is l the Perigree. The point of farthest excursion is called the Apogee.

Moon Mineralogy Mapper (M3), an imaging spectrometer, was one of the struments on board Chandrayaan-I that came to a premature end on 29 st. M3 was aimed at providing the first mineral map of the entire lunar ce.

ar scientists have for decades contended with the possibility of water itories. They are now increasingly "confident that the decades-long debate er," a report says. "The moon, in fact, has water in all sorts of places; not ocked up in minerals, but scattered throughout the broken-up surface, potentially, in blocks or sheets of ice at depth." The results from the 's Lunar Reconnaissance Orbiter are also "offering a wide array of watery ls."

ndrayaan-1 has detected water on the moon. The findings overturn long- beliefs that the surface of the moon was dry, potentially paving the way cientists to one day set up a permanent research base on the moon. M3 ted absorption features near 2.8-3.0 μm on the surface of the Moon. For e bodies, such features are typically attributed to hydroxyl- and/or water- ng materials. On the Moon, the feature is seen as a widely distributed ption that appears strongest at cooler high latitudes and at several fresh pathic craters. The general lack of correlation of this feature in sunlit M3 with neutron spectrometer H abundance data suggests that the formation retention of OH and H2O is an ongoing surficial process. OH/H2O uction processes may feed polar cold traps and make the lunar regolith a date source of volatiles for human exploration. The data from drayaan-1 has revealed how the moon "produces its own water." Much like sponge, it absorbs charged particles emitted by the sun, which then ct with oxygen on the lunar surface to produce water. A scientific ment on Chandrayaan-1 — the Sub keV Atom Reflecting Analyser or SARA ade this discovery that was published in the latest edition of the Planetary pace Science journal.

ideo camera captured the probe's descent and a spectrometer measured s of lunar gas and dust. The Chandrayaan orbiter is analysing the dust d up by the probe when it crashed on the moon's surface. Video footage of robe's descent and data from the probe's instruments have been relayed e spacecraft and ground stations for analysis. The spacecraft, which takes

: two hours to go around the moon, was behind the celestial body when npact occurred.

ɔgntition and Award for Indian Space Research Organisation's drayaan Mission

AIAA American Institute of Aeronautics and Astronautics has selected s Chandrayaan-1 mission as one of the recipient's of its annual, AIAA E 2009, awards, which recognize key contributions to space science and ology.

International Lunar Exploration Working Group (ILEWG) chose the drayaan-1 team for giving the International Cooperation award, M, durai, project director, Chandrayaan-1.The Chandrayaan team of the n Space Research Organisation (ISRO) was chosen for the award for nmodation and tests of the most international lunar payload ever (from 20 ries consisting of India, the European Space Agency representing 17 ean countries, NASA and Bulgaria) and the successful launch of the probe SLV rocket on 22 October and the lunar insertion of the spacecraft carried ubsequently.

O is also planning a second version of Chandrayaan named Chandrayaan cording to former ISRO Chairman G. Madhavan Nair, "The Indian Space arch Organisation (ISRO) hopes to land two motorised rovers- one Russian nother Indian - on the Moon in 2013, as a part of its second Chandrayaan on. The rover will be designed to move on wheels on the lunar surface, up samples of soil or rocks, do on-site chemical analysis and send the data e mother-spacecraft Chandrayaan II, which will be orbiting above.

v was the Moon formed?

re are various theories on the evolution of Earth and Moon system. ntly four main hypotheses have been considered to explain the origin of loon: 1. Simultaneous Formation: Earth and the Moon were formed from olar nebula near each other. This theory is able to explain why the Earth he Moon rocks are isotopically so similar, but cannot explain why the Moon oleted in Iron (Fe).

Capture: Moon formed somewhere else in the Solar System where the iron nt was lower. After it formed, it drifted close to the Earth and was red by the Earth's gravitational field. This theory cannot explain why the and the Moon rocks are isotopically similar but explains the high angular entum of the Earth-Moon system.

Fission: According to this hypothesis, the Moon broke off from the hot n Earth while the Earth was spinning very rapidly. This hypothesis can in why the Earth and the Moon rocks are similar, chemically and ically, and the low iron content of the Moon, but is not able to explain the angular momentum of the Earth-Moon system.

Giant-Impact: This hypothesis suggests that a body about 1-3 times the of Mars impacted on the Earth during the last stages of the Earth's tion, after the Earth's iron core has already formed. When the impact red, it ejected a large part of the Earth into space and the ejecta then n orbiting the Earth. The material blasted off the Earth coalesced into the . This hypothesis is

to explain (a) the missing Moon iron as most of the material blasted into would have been depleted in iron, (b) Moon rocks and Earth rocks are ically similar and (c) why the Moon's orbit as well as the Earth's orbit are . The giant impact hypothesis however have some difficulties since rical models predict that a large fraction of the Moon would come from the ctor, leading to the same dilemma as the Capture theory.

here water-ice present on the Moon?

comets and meteorites continuously bombard the surface of the Moon. of these objects contain water and as a result of their impact may leave molecules on the lunar surface. Solar wind hydrogen bombarding the surface continuously may also lead to production of water molecule gh interaction with oxygen present in the lunar soils. Due to solar heating of this water evaporate and lost into space very fast. However, the nt hypothesis is that some of the water molecules may reach areas that

ermanently shadowed from sunlight and gets trapped and significant s of water/water ice may be present in such regions of the Moon.

to the very slight "tilt" (~ 1.5°) of the Moon's axis, some of the deep rs particularly near the polar regions never receive any light from the Sun y are permanently shadowed and can act as permanent trap of water cules and in such craters scientists expect to find water in frozen form, if it re at all.

Radar reflectivity experiments performed by Clementine hinted at the bility of existence of large amounts of water frozen on these permanently owed regions of the moon.

ar Prospector's neutron spectrometer detected bursts of slow neutrons the moon's poles, suggesting presence of hydrogen atoms and hence ble presence of water/ice. However, these experiments could not decisively m the presence of water/ice on moon, which still remains a mystery.

here is water ice present on the Moon then we would not have to transport from Earth to the Moon, which would be extremely expensive. But ad will be able to rely on lunar ice. This is important for a cost-effective habitation.

at is the temperature on the moon?

moon undergoes extremes in temperature - the side of the Moon ving sunlight becomes scorching hot at about 130 ºC, and freezing cold at ºC on the night side.

here any Life on moon?

far none of the lunar missions have detected any signature of presence of n the Moon.

< previous post

next post >

Write your comment now

priyanka R M's latest postings

India's Mission to Moon- CHANDRAYAAN
Indian Space Research Organisation's(ISRO) Chandrayaan – Founder of water on Moon Chandrayaan-1 was a scientific investigation – by s ...more >>

Basic Networking know how's
Basic Networking know how's DNS Domain Name Service: Translating human-friendly computer hostnames into IP addresses MAC Address- Media Ac ...more >>

A few Tips and Tricks on Operating sy...
A few Tips and Tricks on Operating systems *view File extensions:To view the file extensions of a fileGo to control panel->folder optio ...more >>

belief
hi this is my first blog! so co-operate plz! belated wishes of gandhi jayanthi to all silicon india users. When i was in high school i nev ...more >>

view all>>