

PSLV-C11 / CHANDRAYAAN-1 Mission

22 October, 2008

THE MISSION

PSLV-C11 carrying on-board the CHANDRAYAAN-1 Satellite lifted-off from the Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota at 06:22 AM (IST) on October 22, 2008. PSLV-C11 successfully launched the 1380 kg Chandrayaan-1 spacecraft into a transfer orbit with a perigee (nearest point to Earth) of 255 km and an apogee (farthest point to Earth) of 22,860 km, inclined at an angle of 17.9° to the Equator.

Chandrayaan-1, India's first mission to Moon was orbiting around the Moon at a height of 100 km from the lunar surface for chemical, mineralogical and photo-geologic mapping of the Moon. The spacecraft carried 11 scientific instruments built in India, USA, UK, Germany, Sweden and Bulgaria.



PSLV - C 1 1

THE LAUNCH VEHICLE

PSLV-C11 is the updated version of ISRO's Polar Satellite Launch Vehicle in its standard configuration as this is PSLV's 14th flight. Weighing 320 tonnes at lift-off, the vehicle uses larger strap-on motors (PSOM-XL) to achieve higher payload capability. PSOM-XL uses 12 tonnes of solid propellants instead of 9 tonnes used in the earlier configuration of PSLV.



PSLV-C11 is 44.4 m tall and has four stages using solid and liquid propulsion systems alternately. The first stage, carrying 138 tonne of propellant, is one of the largest solid propellant boosters in the world. Six solid propellant strap-on motors (PSOM-XL), each carrying twelve tonne of solid propellant, are strapped on to the first stage. The second stage carries 41.5 tonne of liquid propellant. The third stage uses 7.6 tonne of solid propellant and the fourth has a twin engine configuration with 2.5 tonne of liquid propellant. PSLV is the trusted workhorse launch vehicle of ISRO.

SPECIFICATIONS

Height	44.4 m
Lift-Off Mass	320 t
No of Stages	4
Payloads	CHANDRAYAAN-1
Orbit Height	100 km x 100 km (Lunar Orbit)
Inclination (deg)	17.9°
Launch Azimuth	102°
Apogee	22,860 km
Perigee	255 km
Launch Pad	Second Launch Pad (SDSC, SHAR)



CHANDRAYAAN-1

THE SATELLITE

CHANDRAYAAN-1, India's first mission to Moon performed high-resolution remote sensing of the Moon in visible, Near Infrared (NIR), low energy X-rays and high-energy X-ray regions. One of the objectives was to prepare a three-dimensional atlas (with high spatial and altitude resolution) of both near and far side of the Moon. It aimed at conducting chemical and mineralogical mapping of the entire lunar surface for distribution of mineral and chemical elements such as Magnesium, Aluminium, Silicon, Calcium, Iron and Titanium as well as high atomic number elements such as Radon, Uranium & Thorium with high spatial resolution.

With well-defined objectives, CHANDRAYAAN-1 mission intends to put an unmanned spacecraft into an orbit around the Moon and to perform remote sensing of our nearest celestial neighbour for about two years using 11 scientific instruments built in India and 5 other countries.

The primary objectives of CHANDRAYAAN-1 are:

- To place an unmanned spacecraft in an orbit around the Moon.
- To conduct mineralogical and chemical mapping of the lunar surface.
- To upgrade the technological base in the country.

After the successful completion of all the major mission objectives, the orbit had been raised to 200 km during May 2009. The satellite made more than 3400 orbits around the Moon and the mission was concluded when the communication with the spacecraft was lost on August 29, 2009.



SPECIFICATIONS

Weight	1380 kg
Power	700 W
Stabilisation	3-axis stabilised using Reaction Wheel and Attitude Control Thrusters, Sun Sensors, Star Sensors, Fibre Optic Gyros and Accelerometers for Attitude Determination
Type of Satellite	Planetary Observation
Payloads	<p>Scientific Payloads from India</p> <ul style="list-style-type: none">• Terrain Mapping Camera (TMC)• Hyper Spectral Imager (HySI)• Lunar Laser Ranging Instrument (LLRI)• High Energy X-ray Spectrometer (HEX)• Moon Impact Probe (MIP) <p>Scientific Payloads from Abroad</p> <ul style="list-style-type: none">• Chandrayaan-I X-ray Spectrometer (CIXS)• Near Infrared Spectrometer (SIR-2)• Sub keV Atom Reflecting Analyzer (SARA)• Miniature Synthetic Aperture Radar (Mini SAR)• Moon Mineralogy Mapper (M3)• Radiation Dose Monitor (RADOM)
Mission Life	2 Years