



Chandrayaan-2: India's Scientific Community Has Learned Much

The Lunar Orbiter - With Seven Sensors Aboard - Is Expected To Function For Seven Years

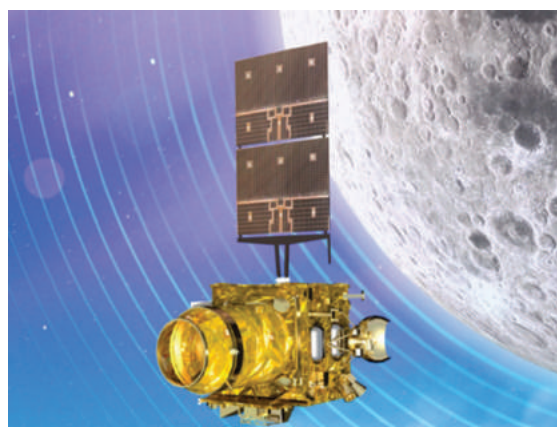
By Ajey Lele & Nivedita Das Kundu*

Indian Space Research Organisation (ISRO) could achieve partial success with its second mission to Moon called Chandrayaan-2. On September 07, 2019, ISRO could not get success with for performing the soft-landing of the Lander Vikram on the Moon's surface.

The journey of Vikram was towards the Moon was happening exactly as planned. It was to travel the last 35 km of the distance from the Moon in a very controlled fashion. The travel time 15 minutes.

The major challenge was to correctly reduce the velocity in a very timely manner. From few km per second the velocity was required to drop down to 2 meters per second for some distance just before landing and finally to almost zero while landing. Vikram did a clinical progress for first 12 minutes towards achieving the final goal of soft-landing on the moon.

Unfortunately, for the last three minutes possibly owing to the high speed or due to some other reason the deviation for the pre-decided track did happen and



The Orbiter. (Photo: IANS/ISRO)

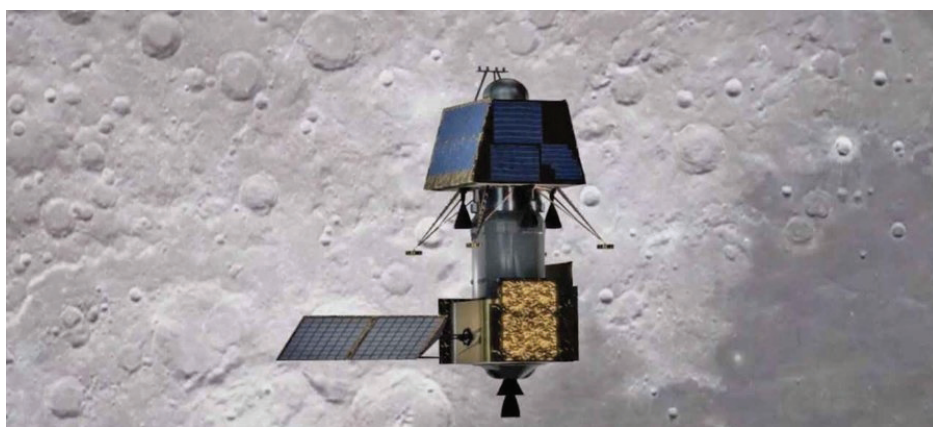
Vikram did the hard-landing. In all possibility, since the lander was not able to land correctly on the moon surface, hence, the further process of the release of the rover- Pragyan and its moving on the Moon surface did not materialised.

Vikram lost its contact with ISRO when it was just 2.1 km away from the Moon surface (track showed deviation). Currently, ISRO is doing the data assessment and they also get some assistance from NASA's Lunar Reconnaissance Orbiter (LRO), that has been orbiting the moon for 10 years. LRO passed over the Vikram landing site on last Tuesday, the report says that the Lunar Reconnaissance Orbiter

Camera (LROC) acquired images around the targeted landing site, but the exact location of the lander was not known it seems the lander may not be in the camera field of view.

This mission has two major components. One, the orbiter which actually is a satellite around the moon revolving at an altitude of around 100 km from the moon.

The designed life for this orbiter is one year. Interestingly, ISRO could save decent amount of a fuel during its journey to Moon and hence now expects that the orbiter may function for a period of seven years. It has eight sensors onboard now and would be studying the Moon surface for



The moon lander Vikram. Photo: IANS/ISRO)

next seven years. Essentially, these sensors would make assessment about the water deposits on the Moon's surface and also undertake the mineral mapping of the Moon's surface.

ISRO's first mission to moon, the Chandrayaan-1 which took place during 2008 has already given significant inputs in regards to the Moon's mineralogy.

Now, ISRO proposes to undertake development of a 3D atlas of the Moon's surface with the additional and more accurate data being given by Chandrayaan-2. All these inputs would of vital importance for ISRO while planning their Chandrayaan-3. This mission would be a joint mission with Japan and would be very

ambitious sample return mission.

This mission is expected to happen around 2022. Chandrayaan-2 has been a mission with learning value for ISRO in particular and India's scientific community in general.

This was actually supposed to be a joint mission with Russia. However, since Russia was not able to participate, ISRO scientists took on their own to develop a Lander-Rover system. All this learning would definably offer scientific, commercial as well as, strategic benefits to India in coming days.

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