

**Agenda Item – 15: Space Exploration and Innovation**

Mr. Chairman and Distinguished delegates

Space science research is one of the primary driving forces of Indian Space Research Organisation's (ISRO) activities starting from the early days of sounding rocket-based investigations of the upper atmosphere, as well as balloon-borne cosmic ray experiments.

With the successful missions of Chandrayaan-1, Mars Orbiter Mission and AstroSat, ISRO has clearly demonstrated end-to-end capability in planning and executing major science missions. As space is a common heritage of the humankind which is beyond any geographical barrier, Indian space programme is motivated to work together synergistically with the international space agencies for mutual benefit and sharing of resources and knowledge. In Chandrayaan-1 and AstroSat, ISRO enabled opportunities for contributions from national Institutes and International agencies on science payloads. XPoSat, a proposed Astronomy mission, will decipher Polarimetry, Spectroscopy and Timing information from the same platform for various bright astronomical sources in X-rays. It will be the first dedicated Indian satellite for Polarization measurement in medium-energy X-rays.

Mr. Chairman,

India has a sustained space exploration programme on planetary science, Heliophysics and Astronomy. Under the lunar exploration programme, Chandrayaan-2 is conducting remote sensing observations on the Moon from ~100 km polar circular orbit. So far Chandrayaan-2 has provided encouraging science results which are published in peer reviewed journals and proceedings of international meetings. The IIRS infrared spectrometer onboard Chandrayaan-2 mission has unambiguously detected the lunar water-ice by extending the wavelength range beyond 3 microns, which captured the absorption feature of the water ice. It has also estimated lunar surface temperature. The CHACE-2 mass spectrometer has achieved global mapping of Argon-40 in the lunar exosphere, while the CLASS instrument has detected trace elements like Mn and Cr on the lunar surface. Chandrayaan-2 DFSAR, with its capability to acquire images at multiple incident angles with multiple polarization modes, has been imaging the lunar surface at both L and S-band wavelengths. In addition, the full-polarimetric imaging capability of DFSAR provides new insights into the nature and distribution of lunar water-ice deposits. TMC-2 onboard Chandrayaan-2 measures the solar radiation reflected / scattered from the Moon's surface. It provides stereo triplet images for preparing detailed 3-D map of the complete lunar surface. Chandrayaan-2 is also equipped with one of the highest resolution cameras, OHRC, which is a panchromatic camera with a resolution of ~25 cm.

To complement the Chandrayaan-2 orbiter observations, The Chandrayaan-3 mission is proposed to study the elemental composition and other surface studies of the Moon, which is going to land at higher lunar latitudes. A feasibility study is going on for a joint exploration of the lunar poles, by ISRO and the Japanese Space Agency JAXA, especially to study the permanently shadowed regions of the Moon to explore the lunar volatiles, including water.

Mr. Chairman

The Aditya-L1 Heliophysics mission is getting ready, with a suit of seven payloads. Three in-situ observation payloads will study the energetics and composition of the solar wind particles and the interplanetary magnetic field, while four remote sensing payloads will study the Sun in a wide range of electromagnetic spectrum, spanning visible, Ultraviolet and X-Ray wavelengths. Recently, science results have been published by ISRO on the solar corona based on the studies conducted from the Mars Orbiter Mission platform, as well as on solar microflares, based on the solar observations from Chandrayaan-2 orbit.

Mr. Chairman

India also invests in human resource generation in space sciences. Trainings are imparted to the students to build satellites, scientific instruments, as well as analyse the data from the space missions. This is to ensure that the legacy of the space sciences continues with the amalgamation of fundamental science and cutting edge technologies. The fourth stage of the PSLV launch vehicle, the PS-4, is modified to function as experimental platform for conducting scientific experiments, covering both the aspects of 'science of space' and 'science from space'. Scientists from the academia and institutes are encouraged to contribute to the space exploration programme.

Mr Chairman,

The Indian delegation hereby provides an outline of the space endeavour of the country. We look forward to contribute more towards the better understanding of the universe, and appreciate the role of the humankind in the macrocosm.

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