Agenda Item – 14: Space Exploration and Innovation

Mr. Chair and Distinguished delegates

India has been pursuing the space exploration programme from scientific motivation. Presently, India is preparing for Lunar mission Chandrayaan-3, comprising a Lander, Rover, and Propulsion module; Solar mission Aditya-L1, comprising an observatory-class spacecraft to be placed in a halo orbit around the first Sun-Earth Lagrange point, and the XPoSat mission to study the polarisation of the X-ray from astronomical sources. India's space agency ISRO and the Japanese space agency JAXA are engaged into a feasibility study on a joint lunar mission called LUPEX, aimed to explore the volatiles and hydration features in the lunar south-pole.

The Chandrayaan-2 orbiter, from 100 km circular polar orbit around the Moon, has been producing significant science results. The Orbital-High-Resolution-Camera onboard Chandrayaan-2 detected a double-crater system due to a rocket booster impact on the lunar surface. With a spatial resolution of 25cm, OHRC demonstrated the capability of high-resolution imaging, leading to the estimation of the age of a young crater through the boulder distribution analysis.

Chandrayaan-2-Large-Area-Soft-X-ray-Spectrometer derived the first surface-map of lunar sodium. Chandrayaan-2 Dual-frequency-SAR has enabled the generation of first-ever dielectric constant maps of the lunar polar regions. A novel technique for automated mineral resource mapping of the lunar surface has also been developed. Both low and high-Ca pyroxene-bearing noritic and gabbroic lithologies are identified in and around the Gardner crater using the data from IIRS spectrometer of Chandrayaan-2. The Dual-Frequency-Radio-Science experiment Chandrayaan-2 suggested large enhancements in electron density in the lunar wake region, which provided clues towards achieving a fair understanding of the lunar wake region.

Mr. Chair,

Chandrayaan-2 also contributed significantly to solar observation. Using the observations from the XSM instrument in Chandrayaan-2, analysis of X-ray spectra for three representative C class flares led to the novel conclusion that the flaring plasma has multiple temperature components, suggesting interplay between heated coronal and evaporated chromospheric plasma. Presence of nanoflares was inferred using XSM observations during the minimum of solar cycle 24, and the model developed for the distribution of nanoflare agrees remarkably well with observations.

Mr. Chair,

The AstroSat's Ultra-Violet imaging telescope (UVIT) has witnessed live formation of dwarf galaxies by detecting massive young star-forming complexes beyond the visible boundary of faraway dwarf galaxies. A new Jupiter size exoplanet, named TOI 4603b, with high density, thirteen times more massive than planet Jupiter, located 731 light years away from Earth, has been discovered by the Physical Research Laboratory (PRL), Ahmedabad, India. This discovery is important because

the planet falls into the transition mass range of massive giant planets and low-mass brown dwarfs, of which fewer than five are currently known.

Mr. Chair,

Recently, the Government of India has approved the LIGO-India for Gravitational-Wave research. A brainstorming meeting at International Center for Theoretical Sciences (ICTS), Bengaluru on the concept of Moon as a platform for Gravitational Wave Astronomy with a network of seismometers has been organised, with international participation.

Mr Chair,

India is also promoting start-ups for bringing in innovation and cost-effective solutions to space technology, thereby ensuring capability-to-capacity transfer to enable a competitive, yet cooperative space-technology-ecosystem. In this endeavour, India's first privately built rocket was launched in November 2022.

The Indian Government has approved National Quantum Mission in order to scale up scientific and industrial R&D, for building India as a quantum-enabled nation. The mission aims at developing intermediate-scale quantum computers, quantum communication systems, quantum sensing and metrology devices, as well as quantum materials.

Mr Chair,

The Indian delegation hereby submits the major achievements in space exploration and innovation of the country. India looks forward to contributing to the global efforts of space exploration and innovation, with extending the scope for international cooperation.

Thank you Mr. Chair and distinguished delegates.