

India

Agenda Item - 11

Space Weather

Mr. Chairman and Distinguished delegates,

The Indian delegation takes this opportunity to update on the developments and activities undertaken in the area of Space Weather. While the main scientific objective of the space weather studies is to understand the Solar-Terrestrial relations, it also drives the mechanism to provide early warning of imminent space weather event to initiate preventive actions for the safeguard of space-based assets. ISRO has taken up programmes specifically aimed at getting deeper understanding on Sun-Earth system and allied aspects of space weather.

Mr. Chairman,

Aditya L1 will be the first Indian space mission dedicated to study the Sun. The spacecraft will be placed in a halo orbit around the first Lagrangian point of the Sun-Earth system, which is 1.5 million kilometres away from the Earth. Out of the seven payloads to be carried by Aditya L-1, four payloads will directly monitor the Sun, while three payloads will conduct in-situ studies of particles and fields at the Lagrangian point 1. These observations will provide important scientific inputs to the study of propagation related effects in the inner Heliosphere. Aditya-L1 is specifically designed to study the Coronal Mass Ejection (CME) events. The X-ray payloads will track the evolution of solar flares from soft to high energy X-rays, and parameters like the delayed particle spectrum and magnetic field changes will be measured at L1. These measurements will be vital to space weather modelling efforts including propagation effects in the inner solar system.

Mr. Chairman,

ISRO is also conceptualising satellite aeronomy missions in LEO orbit with two satellites at high and low inclinations in order to discern the latitudinal and longitudinal effects of the space weather on Earth's upper atmosphere.

Data from Aditya L1 mission, together with the LEO aeronomy missions, will help in understanding the linkage between the solar activities, inter-planetary propagation and its effect on the Earth ionosphere at all latitudes.

In addition to the plans for space-based observations, India also has a network of ionosphere measurement stations which will complement the data from this mission. INSWIM, the acronym for Indian Network for Space Weather Impact Monitoring, aims to obtain comprehensive measurements of ionospheric parameters from a network spanning across many strategically chosen locations in India for space weather studies. It envisages to study the space weather effects on the Indian ionospheric region and formulate an Ionospheric Model which would be helpful in ascertaining the impact of ionospheric variations on GPS/NavIC Radio signals.

Mr. Chairman,

India, envisages to study the space weather in an integrated configuration, from the vantage point of the First Sun-Earth Lagrangian Point to study the Sun; from Low Earth Orbit for the *in-situ* study of the Solar forcing on the Earth; as well as from the ground-based networks to understand the effects on the ionosphere, perturbations on the geomagnetic field, to name a few. These integrated observations will help understanding how does the Sun-Earth system get influenced by a wide variety of physical processes over multiple spatial and temporal scales.

Thank you, Mr. Chairman and distinguished delegates.

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