

## **Agenda item - 10**

### **Space Weather**

**Madam Chairperson and Distinguished delegates,**

The Indian delegation would like to update on the developments and activities undertaken in the area of Space Weather.

One of the chief objectives of the Space weather studies in India is to evolve a mechanism to provide early warning of imminent space weather event to initiate preventive actions for safeguard of space-based assets from the possible damage. ISRO has taken up programmes specifically aimed at getting deeper understanding on Sun-Earth system and allied aspects of space weather.

**Madam Chairperson,**

Aditya L1 will be the first ever Indian space mission dedicated to study the Sun. The spacecraft will be placed in a halo orbit around the Lagrangian point 1 of the Sun-Earth system, a location particularly advantageous for observing the solar activities and its effect on space weather. It will be carrying seven payloads. Four payloads will directly monitor the Sun while the remaining payloads will carry out in-situ studies of particles and fields at the Lagrangian point, providing important scientific inputs to the study of propagation related effects in the interplanetary medium. Aditya-L1 is specifically designed to study Coronal Mass Ejection (CME) events very close to the photosphere and to derive the early velocity and acceleration parameters. Its X-ray payloads will track the evolution of solar flares, and parameters like the delayed particle spectrum and magnetic field changes will be measured at L1. These measurements will be vital to our space weather modelling efforts including propagation effects in the inner solar system.

India's Chandrayaan-2 Orbiter currently in lunar orbit carries two instruments capable of measuring energetic particle flux aiding space weather studies. Large Area Soft X-ray Spectrometer (CLASS), an X ray fluorescence (XRF) experiment records the particle flux around the moon during its transit through the geomagnetic tail furnishing valuable data for better understanding of space weather around the moon. Solar X-ray Monitor, XSM, measures soft X-ray spectrum from Sun. The high cadence X-ray spectral measurements during wide range of Solar flare classes will be useful in improving our understanding of the Solar corona and space weather.

Global Scientific Community has expressed interest in utilising data from Aditya-L1. Discussions are already underway with NASA, NOAA, ESA, and ASI-Italy.

**Madam Chairperson,**

India is also working on a realistic atmospheric model catering to country/region specific operational and scientific requirements. In this context, a reference atmosphere for Indian region for obtaining the temperature and density from ground till 1000 km in Thermosphere and Exosphere has been developed. The primary data sets used for the model have been obtained from measurements specific to Indian longitudes.

The neutral wind in the lower thermosphere ionosphere, though difficult to measure, is an important aspect of space weather effects. ISRO recently conducted an instrumented rocket flight, the second such flight in last two years, to measure the neutral winds in the thermosphere along with ionisation density with indigenously developed instruments onboard.

Strengthening and upgradation of the ground networks of experiments in the country for studying different aspects of space weather are being continuously undertaken, specifically by ISRO.

To meet this challenge, ISRO's Directorate of Space Situational Awareness and Management (DSSAM) has been specifically facilitating the Space Situational Awareness (SSA) goals for safety of India's space assets. The space weather monitoring, analysis and accurate prediction thereof are vital for this. To further this cause, India is planning for an International Space Weather Initiative (ISWI) web-based workshop along with UNOOSA later this year.

India believes that deliberations in this agenda will help in maximising the potential outcome of various endeavours towards space weather research and studies across the globe and to evolve a more synergistic framework.

**Thank you, Madam Chairperson.**