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Chief Editor's Voice

CELEBRATING THE ANNIVERSARY OF ADITYA L1 MISSION

The Indian Space Research Organization's (ISRO) fist solar mission Aditya L1 spacecraft was launched on September 2, 2023 and was inserted in its targeted halo orbit on January 6, 2024. Travelling about 1.5 million kilometer over 125 days India's first Aditya Mission has successfully reached its destination L1 point which is considered as the closest to the sun. There are five Lagrangian points. These celestial sweet spots, named after the famous French mathematician Joseph Luis Lagrange, where the gravitational forces between celestial bodies like the Sun and the Earth create a balance with the centripetal force on the artificial satellite. Any satellite placed near Lagrange point L1 would move in harmony with the Earth's orbit, providing uninterrupted observations of the sun without being obscured by the Moon or the Earth. It helps space science to provide the much desired information to the world.

Aditya is another name of Surya in Sanskrit, which means the one which illuminates the entire world. In Hinduism the sun is represented by the deity Surya who is the source of light and life. Surya is often depicted with four arms and three eyes and is driving a chariot of seven horses. Sun is worshipped as the god of light and energy in many temples across. Astrologically and according to yogic philosophy sun is very important. One of the popular yoga is known as Suryanamaskar, means Salutation to sun. In India several festivals are celebrated on the basis of the movement of Sun like Makara Sankranti, Pongal, Basantapanchami etc. It all shows that the Sun is an inseparable phenomenon of human life and living. Its movement always influences the human activities such as agriculture, science and industrial activities. In the modern digital world space science is giving much emphasis on the detailed study of sun, its dynamics and movements. The mythological descriptions of sun at times help the scientific innovations.

This solar mission goes beyond scientific curiosity and carries several implications for the industry and society. While Aditya L1 Mission primarily pursues scientific goals, its impacts extend to critical aspects of industry and society. In a digital world, common man's daily activities as well as the corporate business innovations are carried out on the basis of internet connections and telecommunication networks. The Aditya L1 is expected to study the impact of space weather on the telecommunications and navigational networks, high frequency radio communications, satellite traffic on polar routes, electric power grids and oil pipelines at high altitude of earth. High energy particles expelled from the sun (Corona Mass Ejection - CME) are potentially harmful to Earth. It poses a threat to the satellites orbiting our planet, upon which we increasingly rely on for communication, internet and GPS services. In total its impact and the degree of disruption to our modern daily life is unimaginable.

Being located at the L1 point allows Aditya L1 to monitor solar activities before they reach earth. This early detection capability is crucial for space weather forecasting, providing advanced warnings that can protect satellites, power grids and communication systems on the earth. It also plays a vital role in understanding Earth's climate drivers, showcasing India's contributions to climate science. Aditya L1 mission demonstrates India's rising role in space research, advancing our understanding of the sun's impact on Earth's climate and technology, with far reaching consequences for our planet's environment.

The total cost of Aditya L1 mission is around 3.78 billion India Rupees (45.5 million USD) which include the cost towards the Research and Development, testing phases and the high end equipment and expertise that are critical for studying the Sun's corona. ISRO is known for its cost-effective space missions and its focus on making each space mission beneficial to the society. The Aditya L1 satellite weighing about 500 kg is intended to observe sun's photosphere (Soft and solid x-rays, Chromospheres (UV) and Corona (Visual and NIR). Aditya L1 is significant for providing unprecedented insights into solar activities like solar flares and CMEs, which affect space weather and impacts Earth's environment including agriculture and weather. It advances global scientific knowledge and improves space weather forecasting.

Space missions like Chandrayaan or Aditya L1 deliver not just technological and strategic advantages to the country; they result in very tangible benefits in economic and investment terms as well. One very direct impact, which is already becoming visible, is on India's ability to attract and retain technology talent. Successful missions like Chandrayaan, Mangalyaan or Aditya L1 ensure that India is seen as a destination that offers serious opportunities in space research and technology sectors. Space is already been seen as a serious alternative to information technology for the brightest minds of India.

It will help strengthen the study and research of solar physics. Aditya L1 will provide new insights into solar activities such as coronal mass ejection and solar fares, which impact the Earth's environmental and space weather. During this one year study and observation India gained the scientific capability of becoming a global hub of solar system science. It helps India to unravel the mysteries of the sun, including the physics of the solar corona, the dynamics of the solar upper atmosphere and the origin of corona mass ejections

India is way ahead of many countries in space science. Its space programme has helped the country in many ways. It attracted the young minds by creating appropriate jobs for them. It helped the country to retain its talents and stop the talent drain. In the present digital world the new India enjoys the power of space science and satellite communication. The information given by satellites is beneficial in climate studies and disaster management. It helps industry through its broadband communication network. Agriculture is now-a-days depended much on the information provided by the space science in helping them to plan the agricultural activities. On the whole the space science protects the man and his environment. It also supports the Modi government's much desired dream of Vikasit Bharat.