

EVA STALIN IAS ACADEMY - BEST IAS COACHING IN CHENNAI

12/24, Muthurangan Muthali St, West Tambaram, Chennai - 600045

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Aditya-L1 Mission



- Aditya L1 is the first space-based Indian mission to study the Sun.
- It will be launched by the PSLV-XL launch vehicle.
- The spacecraft shall be placed in a halo orbit around the Lagrange point 1 (L1) of the Sun-Earth system, which is about 1.5 million km from the Earth.
- A satellite placed in the halo orbit around the L1 point has the major advantage of continuously viewing the Sun without any occultation/eclipses.
- This will provide a greater advantage in observing solar activities and their effect on space weather in real-time.
- The spacecraft carries seven payloads to observe the photosphere, chromosphere and the outermost layers of the Sun (the corona) using electromagnetic and particle and magnetic field detectors.
- Using the special vantage point L1, four payloads directly view the Sun and the remaining three payloads carry out in-situ studies of particles and fields at the Lagrange point L1, thus providing important scientific studies of the propagatory effect of solar dynamics in the interplanetary medium.

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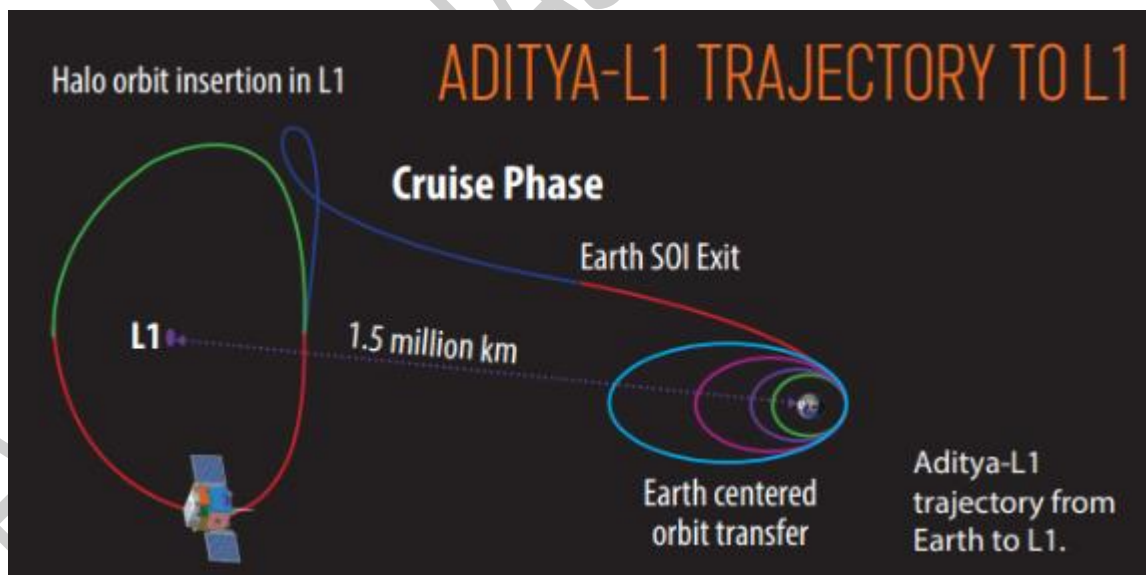
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- The other objectives of Aditya L1 mission will be to understand the drivers for space weather (origin, composition and dynamics of solar wind), and identify the sequence of processes that occur at multiple layers (chromosphere, base and extended corona) which eventually leads to solar eruptive events.

What are Lagrangian Points?

- Lagrangian points, also known as Lagrange points or libration points, are specific locations in space where the gravitational forces of two large bodies, such as a planet and its moon or a planet and the Sun, produce enhanced regions of gravitational equilibrium.
- In these points, the gravitational pull from the two bodies creates a stable or quasi-stable region where a third, smaller object can maintain a relatively constant position relative to the larger bodies.
- There are five primary Lagrangian points, labeled L1 through L5, in a Sun-Earth system.



L1 (Lagrange Point 1):

- It was found by mathematician Joseph Louis Lagrange.
- It is located about 1.5 million kilometers inside Earth's orbit, between the Sun and the Earth.
- The L1 point of the Earth-Sun system gives a clear view of the sun all the time, without any occultation/ eclipses.
- Once the Aditya L1 mission reaches the L1 Lagrange point, it will be injected to a halo orbit. A halo orbit is a type of orbit that allows the satellite to remain in a stable position between the Earth and the Sun.

Objectives of ISRO Aditya L1 Mission

- It will study Solar upper atmospheric (chromosphere and corona) dynamics.
- It will do the study of chromospheric and coronal heating, physics of the partially ionized plasma, initiation of the coronal mass ejections, and flares.
- It will observe the in-situ particle and plasma environment providing data for the study of particle dynamics from the Sun.
- It will study the physics of solar corona and its heating mechanism.
- Diagnostics of the coronal and coronal loops plasma as, Temperature, velocity and density.
- Development, dynamics and origin of CMEs.
- Identify the sequence of processes that occur at multiple layers (chromosphere, base and extended corona) which eventually leads to solar eruptive events.
- Magnetic field topology and magnetic field measurements in the solar corona.

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Aditya L1 Mission Payloads		
Type	Payload	Capability
Remote Sensing Payloads	Visible Emission Line Coronagraph(VELC)	Corona/Imaging & Spectroscopy
	Solar Ultraviolet Imaging Telescope (SUIT)	Photosphere and Chromosphere Imaging- Narrow & Broadband
	Solar Low Energy X-ray Spectrometer (SoLEXS)	Soft X-ray spectrometer: Sun-as-a-star observation
	High Energy L1 Orbiting X-ray Spectrometer(HEL1OS)	Hard X-ray spectrometer: Sun-as-a-star observation
In-situ Payloads	Aditya Solar wind Particle Experiment(ASPEX)	Solar wind/Particle Analyzer Protons and heavier Ions with directions
	Plasma Analyser Package For Aditya (PAPA)	Solar wind/Particle Analyzer Electrons and heavier Ions with directions
	Advanced Tri-axial High Resolution Digital Magnetometers	In-situ magnetic field (Bx, By and Bz).

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