

Science returns from ISRO's future planetary missions: Venus and Mars

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Abstract

ISRO is planning to fly Mangalyaan- 2 and Venus orbiter on Mars and Venus during solar cycle 25. The five payloads: (1) VODEX (2) XSM (3) Lightning (4) Radiation Monitor and (5) Ion-Neutral Mass Spectrometer have been short listed for atmospheric measurements on Venus. The four other ionospheric payloads: (1) Langmuir Probe with electric fields (LPEX), (2) Energetic Ion Spectrometer (EIS), (3) MODEX and (4) Radio Occultation (RO) experiment have been selected for Mangalyaan-2. Some of these instruments have never been flown on Mars and Venus. We are making these payloads at PRL to be flown by ISRO satellites in the orbits of Mars and Venus. The objectives of these payloads are to study the atmospheres, ionospheres and exospheres of these planets due to solar EUV and particle interactions in solar cycle 25, which is expected to occur between 2023 and 2028 with a sunspot of $\sim 100-130$. These radiations are continuously emitting from the sun and have different response characteristics to the atmospheres of Venus and Mars. The merits and demerits of these two remote control on these planets' atmosphere is not fully established. At times these events are either simultaneous or one follows other at the source. However, electromagnetic radiation reach first in the atmospheres of Venus and Mars and give rise to related phenomena. The particle radiation reach much later on these planets. Therefore, there is always certain time lag between two types of responses. In the present conference I will talk on the possible science outcome from the above experiments which have been never flown in the environments of Venus and Mars.