



## **Space-based Electric and Magnetic Sensor (SEAMS) for very Low-frequency Radio Astronomy**

A. Datta<sup>(1)</sup>, D.C. Gharpure<sup>(2)</sup>, S. Ananthakrishnan<sup>(2)</sup>, P. Janardhan<sup>(3)</sup>, A. Kulkarni<sup>(2)</sup>, N. Navale<sup>(2)</sup>, A. Nagulpe<sup>(2)</sup>, and R. Sali<sup>(2)</sup>

(1) Indian Institute of Technology Indore, India, e-mail: Abhirup.Datta@iiti.ac.in;

(2) S.P. Pune University, India, (3) Physical Research Laboratory, India

The SEAMS (Space-based Electric and Magnetic Sensor) is a proposed mission for very low frequency radio astronomy.

The SEAMS frequency range (0.3 to 16 MHz) has been chosen because it is a unique range which is beginning to be explored by space-based instruments, as the Earth's ionosphere is impervious to these frequencies; hence we need a space-based platform to study this frequency space. In this proposal, we approach the subject in 2 phases. In the first phase, we would like to locate the payload (albeit with reduced cost of components, etc) in either a low earth orbit or on the 4<sup>th</sup> stage of a PSLV that can be sustained for a few months. In this Phase, antenna elements with simple structure are planned to be flown to understand the global RF environment near the Earth, Auroral Kilometric Radiation (AKR), lightning and strong solar flares. A Development Model (DVM) is being made for the same. In the second phase, it is proposed to locate the payload on the far side of the Moon or in the Moon-Earth L2 orbit to avoid the RFI from Earth.

The SEAMS, in the final phase, will have an Electric Field Vector Sensor comprising of three electric monopole elements to measure LF radio emission and the Magnetic Field Vector Sensor (MFVS) comprising of a tri-axial magnetic loop antenna to measure the changes in the magnetic field ( $\Delta B$ ). The combined electric and magnetic field measurements are important as they make it possible to distinguish between different plasma processes. These data are relevant in solar system studies as well as cosmology.