



## IEEE GRSS Distinguished Lecture Series

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# Space Based Low Frequency Radio Astronomy and Building a Space Payload

Co-Organized by  
Centre for Remote Sensing and Surveillance Technologies,  
Multimedia University &  
IEEE GRSS Malaysia Chapter



Centre for Remote Sensing and Surveillance Technologies

**Speaker: Prof. Subra Ananthkrishnan**

Department of Electronic Science,  
The University of Pune

**Time/Date: 10:30am to 12:00pm, Thursday, 18 August 2016**

**Venue: Conference Room, 3<sup>rd</sup> Floor, LIFE Building, Multimedia University, Jalan Ayer Keroh Lama, 75450 Melaka.**

### About the Lecture:

In this talk, we describe briefly the importance of low frequency radio astronomy (<20 MHz) and then how one can develop space instrumentation for the same. The opacity of the ionosphere at lower frequencies (< 20 MHz) requires that the largely overlooked study of the low frequency universe can be done only from outer space. This is an important frequency regime (~ 0.3 to around 20 MHz), since it could yield valuable information about the interaction between solar wind and the Earth's magnetosphere, decametric radiation from other planets within the solar system and continuum emission from pulsars and very high red shift ( $z \sim 500$ ) cosmic radio sources. For high angular resolution and sensitivity, there is need for an interferometric array. Dipole antennas are the preferred choice as receiving elements for their inherently large effective area. However, the large size and weight of low frequency half wave dipoles is an expensive payload and electrically short antennas have to be developed for small satellites or cube-sats. As a beginning towards this effort, the Space Electromagnetic and Plasma Sensor (SEAPS) project consists of an electric field vector sensor (EFVS) – a tri-axial arrangement of monopoles in a mutually orthogonal configuration and a magnetic field vector sensor (MFVS) which is also in a similar setup, both operating between 0.3 – 20 MHz. A laboratory prototype has been built and the results are encouraging. It has been an interesting effort over the past 3-4 years. All these will be described.

### About the Speaker:



**Prof. Subra Ananthakrishnan** , MTech (Radio Physics & Electronics, Calcutta University 1966), PhD (Physics –Radio Astronomy), 1976, Bombay University, was an academic member of the radio astronomy group of the Tata Institute of Fundamental Research (TIFR) and later its Pune unit, the NCRA for 41 years. This group set up the large Ooty and GMRT radio telescopes. He retired as the Observatory Director (2004) of GMRT, Khodad, Narayangaon and as a Senior Professor of NCRA-TIFR in 2007. Since then he is an Adjunct Professor in Electronic Science at the University of Pune, and was a Raja Ramanna Fellow during 2007-2012 and is an INSA Senior Scientist now. His interests include Astronomy, Antennas,

Electromagnetics and communication systems in which areas he has a large no. of publications. He is also involved in many major national projects in India such as ASTROSAT (X-ray and UV payloads), a 3.6 m optical telescope and a 21 m dia. Gamma-ray telescope, each costing several million dollars. He is well known internationally in radio astronomy and was also associated with the Square Kilometre Array and helped in deciding its location.

A fellow of all the three Indian National Science Academies, he received the prestigious International INSA Vainu-Bappu Memorial Award in 2010 for his outstanding contributions in the setting up of Ooty and GMRT telescopes and for their good utilization.

Apart from being a Governor's nominee in the academic council of Pune University & President's nominee in the Kashmir Central University, India he was re-elected for a second 3 year term as Vice-President of the International Radio Science Union (URSI), Ghent, Belgium. He has about 130+ papers with about 1600 citations and h-index of 18.