

KLEIN LECTURE in Aerospace Engineering

Graduate Aerospace Laboratories of the California Institute of Technology

The Reach and Relevance of the Indian Space Program

The Indian Space Program was initiated in a small fishing hamlet near Thiruvananthapuram in the state of Kerala in the early 1960's, not much later than the beginning of the global space era. There have always been questions as to why a developing country like India should spend money on space activity. This question has persisted through the decades. But the Indian Space vision is different from the rest of the world. Our first Prime Minister, Pandit Jawaharlal Nehru, stated "*It is science alone that can solve the problems of hunger and poverty..... The future belongs to science and to those who make friends with science.*" The guiding vision of the Indian Space Program articulated by Dr. Vikram Sarabhai confirms this sentiment in letter and spirit.

In India, space-based applications focus on food and water security, weather and climate, environment and ecosystem, education and health care, skill development, rural communication, infrastructure development, disaster management support, smart governance and sustainable development. We have ensured and sustained constellations of satellites for Earth Observation, Communication and Meteorology. A satellite-based navigation system is being established. These space assets are essential in delivering the fruits of several application programs that have become the mainstay of the Indian Space Program. Also, the strategic values of space assets are being increasingly recognized.

Dr. K. Radhakrishnan

Chairman of the Indian Space Research Organization (ISRO)

Dr. Koppillil Radhakrishnan is Chairman of the Space Commission; Secretary, Government of India Department of Space; and Chairman of the Indian Space Research Organization (ISRO). He drives the synergy of 16,000 strong "Team ISRO" and spearheads the country's Space Program. A graduate of Electrical Engineering from Kerala University (1970), and a Post Graduate in Management from Indian Institute of Management, Bangalore (1976), Dr. Radhakrishnan obtained his PhD from the Indian Institute of Technology, Kharagpur (2000). He is a Fellow of the Indian National Academy of Science, a Fellow of the Indian National Academy of Engineering, an Honorary Life Fellow of Institution of Engineers, India, and an Honorary Fellow of the Institution of Electronics & Telecommunications Engineers, India. Dr. Radhakrishnan has been awarded "Padma Bhushan," the third highest Civilian Award in India in 2014 for his outstanding contribution to Science and Engineering in India.

Dr. Radhakrishnan is the recipient of numerous accolades including the Allan D. Emil Memorial Award (2014) of the International Astronautical Federation, Distinguished Alumnus Award of IIT Kharagpur (2010), and IIM Bangalore (2010), the Vikram Sarabhai Memorial Award of Indian Science Congress (2010), and Social Sciences Award (2009) of the International Academy of Astronautics.

After starting his career as an Avionics Engineer in ISRO's Vikram Sarabhai Space Centre (VSSC) in 1971, Dr. Radhakrishnan has had a distinguished career of more than 42 years in space engineering, space applications and program management. Prior to assuming the role of Chairman, ISRO, he had been the Director of VSSC, the lead center of Launch Vehicle Development in ISRO. Earlier he had been Director for the National Remote Sensing Centre and founding Director of the Indian National Centre of Ocean Information Systems.

In the last four years, Dr. Radhakrishnan has spearheaded "Team ISRO," executing 29 space missions, an unprecedented accomplishment in its history. In this quest, India's space capabilities for satellite navigation, strategic communications, microwave radar imaging and tropical climate studies have been established, in addition to ensuring continuity and capacity for operational space services. While the nine successful PSLV missions during 2010-2013 signify the ability to execute a wide range of satellite launch missions reliably, the concerted efforts towards a reliable GSLV with Indian Cryogenic Engine & Stage achieved a spectacular success on January 5, 2014. Under his effective leadership, India's first planetary exploration -- the Mars Orbiter Mission -- was conceived, planned and executed with a great deal of originality. A clear programmatic direction to the year 2020 has been strategized to focus the country's needs and aspirations in all areas of the Indian Space Program.



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**1 p.m., Lees-Kubota Lecture Hall
California Institute of Technology**

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This series of lectures is given in memory of Professor Arthur Louis "Maj" Klein (1898-1983), a faculty member of GALCIT from 1929 until his death. In addition to his significant contributions as a teacher of aeronautical engineering, Klein was responsible for the engineering and building of the GALCIT 10-foot wind tunnel and made significant contributions to aircraft design.

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