INTERVIEW

# In Conversation with Dr K Sivan

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– Dr. K. Sivan

**Excerpts from Email Interview given to B.K. Kiranmai, our Bengaluru representative**

**Dr. Vikram A. Sarabhai, the Father of Indian Space Programme had envisioned that the space resources have the potential to address the real problems of man and society. Satellite Instructional Television Experiment (SITE) was the largest sociological experiment in the world. It was on Education. Kindly brief about that.**

Indeed, SITE was the largest sociological experiment in the world considering its large outreach. This satellite communications experiment was performed for one year during 1975-76 by ISRO and involved 2400 villages in six states. As part of this experiment, chicken mesh antennas of about 10 feet diameter capable of receiving TV signals directly from a satellite were established along with special TV sets. During SITE, TV programmes on subjects such as health, hygiene, family planning and agriculture were beamed through the American ATS-6 satellite, which revolved round the earth in the 36,000 km high geostationary orbit. This programme exposed our rural folk to the various important issues of day to day life and broadened their outlook. Technologically, SITE experience enabled us to evolve our INSAT system for rapid expansion of the country's telecommunication, TV broadcasting and weather monitoring infrastructure.

**ISRO has been part and parcel of Tele/distance Education. EDUSAT was one of the pioneering programme. How it was conceived? Which are the other initiatives?**

The EDUSAT programme was conceived based on the rich experience we gained in utilising communication satellites for telecommunication and TV broadcasting. First, this valuable experience was gained through the pioneering SITE programme, and later APPLE and INSAT utilisation programme. During the 1990s, many educational and training programmes which enriched our large student and teacher community at different levels were conceived and implemented by beaming those programmes across the country through satellite. This enabled us to understand the specific requirements of our large student community and paved the way for the conception of EDUSAT programme. During this programme, GSAT-3 or EDUSAT, a dedicated satellite for the educational field, was launched by our GSLV and utilised for enhancing the outreach as well as the quality of the formal as well as

informal education sectors. These were mainly intended for semi urban and rural students. Even today, transmission of educational programmes through satellites is continuing based on the EDUSAT experience.

**ISRO has been encouraging student community in a big way in developing satellites. What is the present scenario?**

To enthuse our large student community, especially engineering student community about spaceflight in general and satellites in particular, ISRO has encouraged them to build micro and nano satellites and has launch them in our trusted workhorse PSLV. Besides, ISRO has helped them in the design, development and testing of those satellites. Till now, ten student satellites developed by different universities of our country have been launched successfully, providing rich experience to students on intricacies of satellite building, and inspiring them to take up prominent challenges in their professional life later.

**Recently DHRUV (MHRD Programme) was launched from ISRO headquarters. How do you foresee it?**

DHRUV, the Pradhan Mantri Innovative Learning Programme, is a unique initiative. The Programme was started to identify and encourage talented children to enrich their skills and knowledge. Gifted children will be mentored and nurtured by renowned experts in different areas in centres of excellence across the country, so that they can reach their full potential. DHRUV acts as a platform to explore the talent of outshining and meritorious students, and help them achieve excellence in their specific areas of interest may it be science, performing arts or creative writing. In this way, these talented students will not only realise their full potential but also contribute to the society in a big way. It is expected that many of the students selected will reach the highest levels in their chosen fields and bring laurels to their community, State and Nation.

With children drawn from all over the country, the DHRUV programme reflects the true spirit of EK Bharat Shreshth Bharat. Not only this, the students will now act as a beacon for the 33 crore students in the country and lay down a unique path for them to follow. I really appreciate the initiatives taken by the Government under the guidance of Prime Minister's Vision. I am glad that DHRUV programme was launched from ISRO headquarters.

**You are a son of a farmer and have closely witnessed the villages all along. The Prime Minister's vision is to double the income of farmers by 2022. In that direction, how do you visualise the role of space technology in imparting informal education to farmers?**

All along ISRO has been striving to develop and utilise space technology for the benefit of the common man, including the farmer. During SITE programme, TV documentaries on agriculture made in vernacular languages were beamed to farmers on improving agricultural practices. Later during APPLE and INSAT utilisation programmes, TV documentaries specific to various subjects on agriculture were made and telecast through satellites and they have been continuing. Similarly, our weather monitoring satellites like Kalpana and INSAT-3D have become instrumental in the accurate weather prediction and climate studies which has an important bearing on our farmers. At the same time, our Remote Sensing satellites have enabled our agricultural scientists to detect crop diseases, accurately estimate crop acreage, crop yield, soil quality, which ultimately will bring benefits to the farmers. Thus space technology is helping farmers in many ways.

**Tell us about 'Young Scientist Programme' (Yuvika) initiated by ISRO.**

Today, science and technology are the essential components in the development of any country and they play a major role for improving the quality, safety and security of life of humans. Thus, providing help for inculcating scientific temper in the students assumes added significance. Today, space technology is virtually touching every facet of life of common man. Yuvika programme is primarily aimed at imparting basic knowledge on space technology and its applications as well as space science to the younger ones with the intent of arousing their interest in the emerging areas of Space activities. The two-week long residential training programme involves invited talks and experience sharing by the eminent scientists, facility and lab visits, hands on training, exclusive sessions for discussions with experts and more importantly, a feedback session. The first batch of 110 selected students representing every state and union territory have already participated in the two week Yuvika resident training programme during May 2019. This task of bringing together students from different parts of the country helps the task of national integration as well.

**ISRO has exhibited its capability of precisely launching (104) satellites. This is because of mastering the techniques of launch expertise which brought global recognition. What are the salient features of forthcoming programmes of ISRO.**

In the forthcoming months, we will be launching many communication and earth observation satellites to ensure the continuity of the services provided by such satellites already serving from their orbital home. At the same time, we are striving towards continuously enhancing their service capabilities vis-a-vis their predecessors.

This year, we also endeavouring in earnest to realise Chandryaan-3 mission with a lander and a rover. Plans are also in the offing to launch Aditya-1 satellite for studying the Sun. More importantly, the Honorable Prime minister has already provided us a challenge to realise the Indian Human Spaceflight programme Gaganyaan by 2022. This is a formidable challenge towards which the entire ISRO has geared up and working hard to develop the essential technologies and ensure its success.

**India is aiming to be $5 trillion economy by 2024-25. How tools and education in science and technology can contribute?**

Tools of science and technology can definitely act like a catalyst to the economic development of the country. In this regard, space technology has already proven its worth by facilitating the rapid development of our telecommunications, TV broadcasting, weather monitoring, educational, healthcare, transportation and banking infrastructure as well as in the planning, implementation and review of various developmental tasks. Now it is even contributing to the governance. In future, with more broadband communication satellites, more capable earth observation satellites as well as navigation satellites, the potential for more significant development definitely exists. Science and technology education provides the necessary skilled manpower for these tasks and enables the indigenous development of potent tools of science and technology as well as their utilisation. Thus, the role of science and technology education in enabling the proper, adequate and sustainable capacity building is very important indeed.

**As part of enhanced outreach programme, ISRO launched 'Samwad with Students' What is the framework of this programme?**

Today, it is as important to inspire and galvanise our large student community at different levels, especially at the primary and secondary level, to take up science and technology education more seriously and pursue it with dedication and hard work, as it is to develop various technologies. In this regard, interaction of scientists with students goes a long way in awakening the curiosity and creativity lying inside our student community. With this in mind, as well as with the intention of making our young students proud of their country's achievements in space through the narrative of ISRO scientists themselves, we began this 'Samwad with Students' programme.

I am sure that nothing prevents the present generation of students from even semi urban and rural areas to achieve excellence in their chosen domain in future and assume high offices in that domain, provided they are effectively inspired. With this in mind, I have talked to young student community in many parts of our country and their curious questions have simply overwhelmed me and enabled me to understand the significance of such programmes. ❑

## About Dr. K. Sivan, Chairman ISRO, Secretary DoS

Dr. K Sivan joined ISRO in 1982 and was inducted into PSLV Project. He specialises in Aerospace engineering, Space Transportation Systems Engineering, Launch vehicle and mission design, control & guidance design and mission simulation software design, Mission synthesis, simulation, analysis and validation of flight systems.

He has significantly contributed towards end-to-end mission planning, design, integration and analysis. His innovative contributions, particularly the strategies adopted in mission design enabled the consistent performance of PSLV. This has also proved to be a good foundation for other launch vehicles of ISRO, like, GSLV MkII & MkIII including RLV-TD. He is the chief architect of 6D trajectory simulation software, SITARA, which is the backbone of the real-time and non-real-time trajectory simulations of all ISRO launch vehicles. He was responsible for commissioning world-class simulation facility in ISRO for mission synthesis and analysis, which is used for mission design, sub-system level validation and integrated validation of avionics systems in all ISRO launch vehicles. He developed and implemented an innovative 'day-of launch wind biasing strategy' that enables rocket launch on any day, under varied weather and wind conditions. He was the chief mission architect for successful launch of 104 satellites in a single mission of PSLV. He has received many awards including Doctor of Science (Honoris Causa) from selected universities.

Source: *www.isro.gov.in*