

- Enhancing weather and climate forecasting (led by Portugal).
- Public health services (led by Canada).
- Natural disaster management (led by China, Canada and France).
- Improving space navigation (led by United States and Italy).
- Promoting sustainable development (led by Nigeria).
- Observation of near-earth objects (led by France).

He also spoke of the establishment of regional centres for space science and technical education, affiliated to the UN for example, operational in India since 1996, that were concerned with remote sensing, satellite meteorology, satellite communication and would likely to encompass space law in the future.

Nik Nasruddin Mahmud, Director, MACRES, Malaysia spoke about 'Earth observation from space-development and prospect for cooperation among developing nations'. Jim Dodge, Programme Director, Earth Sciences, NASA stressed that analysis of some NASA satellite data would be outsourced to India as 'there was too much data' and NASA would focus between 2000 and 2025 on 'social needs'.

Antonio Rodata, European Space Agency, while speaking on Global Navigation Satellite Systems (GNSS) technology, put out a plea that Europe and the whole world should be independent

of the United States Global Positioning System (GPS), as both economic and scientific independence was required for the future of space technology. He spoke of the European GNSS strategy and said that to build a common effort the network would be enlarged later to India. An official from the Chinese National Space Agency spoke on behalf of Guo Baozhu, who had language difficulties on 'Perspectives of space - China's future plans', and Greg Withee, CEOS Chair, NOAA outlined 'The future of space observation'.

K. Kasturirangan, Chairman Space Commission and Secretary, Department of Space gave a talk on 'Space for development - A vision for India' at the summit. He said that India's vision for development was a convergence of growth, rights and ethics in societal, technological, cultural and economic spheres. The challenges faced by India were adverse social indicators, poverty and inequity, and a depleting resource base. However, the enabling factors for higher economic performance were institutional mechanisms, core competence in science and technology, and democracy. He stressed the need for integration with the global economy, interventions to combat illiteracy and bridging the health divide between rural and urban people in India. He added that in a globalized economy, connectivity drives growth and mobility thereby reducing the digital

divide. Kasturirangan spelt out 'India's space vision' - to enhance quality of human life and to kindle the spirit of exploration for expanding the horizons of knowledge and creating capabilities for multi-dimensional progress. ISRO's mission was to 'develop frontier space technologies towards carrying out innovative applications of societal relevance in consonance with national priorities'. Towards this goal, Space in India had touched all aspects of space science such as satellite communications, earth-observation systems through multipurpose missions, while enabling interventions in land and water management, infrastructure and disaster management. Indian space research, including space transportation had taken up several challenges. The institutionalization mechanism had been strengthened by ISRO's interface with industry, international missions, academic institutes and global business partners, so that India could play an even greater role in a globally competitive and vibrant space industry serving domestic and international markets, said Kasturirangan. He stressed that the 'vision to mission to national endeavour' would be through innovative missions, theme-oriented satellites, institutional frameworks, down-the-line impacts and global outreach, laying the foundations of a prosperous and equitable society.

Nirupa Sen

Indian success stories in use of Space tools for social development

The Space summit had a space bridge demo of telemedicine, APNet and the biodiversity information system for national development using space technological tools.

Telemedicine: Initiatives have been taken by the Indian Space Research Organization (ISRO) for introducing telemedicine via satellite for making speciality treatment accessible to people in remote areas of India. Places around Bangalore, Kolkata and Tripura are networked with a hub using VSAT terminals. Port Blair, Andaman and Nicobar islands, Leh, Jammu and Kashmir and Lakshadweep are also being connected

for availing telemedicine facilities as are spacenet terminals for a private hospital in Chennai and a rural hospital in Argonda, Andhra Pradesh. ISRO's own hospital at Sriharikota would also be linked for telemedicine.

Devi Shetty, Narayana Hrudayalaya, Bangalore gave a live demonstration and showed how telemedicine could be used for accessing health care to people in remote areas of the country. This is a joint programme with ISRO. According to Shetty, India produces the largest number of children with heart disease in the world and 18% of Indians over the age of 30 are diabetics; India also

produces the largest number of babies in the world. This makes it imperative to have a cardiologist, diabetologist and a neonatologist in every small town of India, said Shetty. Since more than 95% of illness does not require operations, superspecialist care could be provided through telemedicine as disease management is based on history, data of body fluids and images, all of which are transferable live through use of satellites. ISRO's telecardiology programme connects 19 remote locations in India with over 5000 heart patients being treated in the last 15 months. The treatment offered is completely free of

charge. In the ISRO Karnataka telemedicine programme, 27 district hospitals have linked up to Taluk and Primary Health Centres and offer specialist services. The Yeshaswini Health Insurance for farmers of Karnataka, presently covering 50 lakh farmers and providing operations free of cost is a project that pays for the sustainability of the telemedicine programme. Tanzania, Africa has also received benefits of telemedicine with help from ISRO.

APNet: This is a project based on developmental communication jointly between the Government of Andhra Pradesh, ISRO and Bharat Electronics Limited. This network uses INSAT-3B satellite K-band transponder primarily

for education, health care and e-governance. Begun in 2000, the first phase involved using 400 receive terminals that connected schools, colleges and government organizations. This interconnectivity would help raise the quality of education. The second phase of the project, which is under way, would increase connectivity to 2000 terminals with features such as two-way communication, data broadcast and interactive applications. APNet is also shortly to be used for telemedicine applications.

Biodiversity information system: This project completed in October 2002 involves the use of space technological tools for characterization of biodiversity at a landscape level. Based on intensive

field sampling and mapping using satellite remote sensing and geospatial modelling tools, maps have been made of vegetation cover on a 1 : 250,000 scale. This has been put together in a web-enabled database which links gene-level information of plant species with spatial information in a BIOSPEC database of the ecological hot spot regions, namely northeastern India, Western Ghats, Western Himalays and Andaman and Nicobar Islands. This has been made possible with collaboration between the Department of Biotechnology and ISRO.

Nirupa Sen

Indian Science Congress: Some facts

To bring the 'best of the Congress', it was planned with speakers 'giving quality presentations', not compromising on the science, said K. Kasturirangan while briefing the press. He felt that the Congress could serve a wider purpose of helping the large scientific community in India. There is 'no forum to air aspirations', other than academy meetings which serve about 800 Fellows at the most, he added. Also, it was a place where children could speak and interact with their role models and feel inspired.

When asked about the spin offs for Bangalore University for co-hosting the Congress, Kasturirangan replied that 14 lecture halls had been refurbished and 'the systems would be left behind'. The university has now in place a full-fledged LAN system. Significant and with wide-reaching ramifications is the setting up in Bangalore University campus of the Regional Remote Sensing Service Centre (RRSSC). The RRSSC, functioning presently from temporary premises, has collaborations with user agencies such as Geological Survey of India, Ministry of

Agriculture, Government of Karnataka and several private industries, according to P. P. Nageswara Rao, ISRO. Working on the basis of 'no profit', and handshaking of skills, applications actively pursued with particular reference to Karnataka are the following:

- Inventory for crops and vegetables from Indian remote sensing data.
- An agro-climatic planning information bank operational in three districts of Karnataka – Shimoga, Tumkur and Bijapur.
- Characterization of the biological diversity of the Western Ghats.
- Satellite-based study of the drainage channel of the Vrushbhavathi river flowing alongside the Bangalore University campus.
- Suitability studies of the new airport beyond Devanahalli, Bangalore.
- Fertilizer movement and distribution within Karnataka and other regions in collaboration with IFFCO.

The RRSSC step could usher in closer collaboration between university and

agencies as envisaged in the new scientific policy-2003.

In the valedictory function, Kasturirangan announced setting up, at the earliest, of an ISRO Chair 'for space technology and its applications' in Bangalore University, Bangalore in the memory of Sir M. Visvesvaraya. This would cement and further strengthen agency-academic interaction for national development.

The General President Elect, Asis Datta, Jawaharlal Nehru University, New Delhi said the focal theme of the 91st session due to be held in Chandigarh during 3-7 January 2004 would be 'Science and society in the 21st century: quest for excellence', with genomics taking centre stage. Panjab University and the Institute of Microbial Technology, both at Chandigarh, will be the hosts.

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