

# The Social Dividends from India's Space Industry

*The Indian Space Research Organization implements an active social development program*

India's space industry has achieved some major milestones including developing one of the most vibrant satellite manufacturing and launch sectors in the world today. However, the Indian space industry has also made important inroads in social development and empowerment at the grassroots level. The Government of India through the Department of Space and the Indian Space Research Organization (ISRO) has made huge contributions to social programs.

One of these programs is EDUSAT— a dedicated satellite for social development applications. It was launched in 2004 by the Geosynchronous Satellite Launch Vehicle developed by the ISRO. This satellite is specially configured to relay through audio-video medium, employing multimedia, multi-

centric system for interactive sessions. This satellite had multiple regional beams covering different parts of India. It also has Ku- and C-Band transponders with footprint covering the whole of the Indian subcontinent.

The main programs on EDUSAT include: 1) Distance Learning and TeleEducation; 2) TeleMedicine; 3) Village Resource Centers and 4) Disaster Management System. It is worthwhile to note that the entire EDUSAT-based programs were non-commercial in nature, dedicated for non-profit, social applications. Let us look at each of these programs briefly.

## Distance Learning

The TeleEducation Program has mainly two types of content delivery mechanisms: Satellite Interactive Terminal (SIT) and Receive Only Terminals (ROT).

An SIT based network has a Hub, Teaching Centre & Remote SITs. As the name suggests, the SIT remote has full two-way audio/video interaction between the remote station and the teaching end. Whereas an ROT based network is one-way and gets the lecture delivered at the remote end. Thus One Way TV; Interactive TV; Video Conferencing; web based instructions; etc. can be achieved through the network. Sixty four networks have been set up so far on Ku- and C-Band capacities. There are over 3,300+ SIT based interactive classrooms and 31,000+ ROT based classrooms thus totaling to over 34,000+ terminals. They are spread across 24 states covering the entire country including islands of Lakshadweep, Andaman & Nicobar; North Eastern states; Jammu & Kashmir; among others.



**The ISRO Telemedicine program include the provision of satellite-equipped trucks that move from village to village and provide vital medical diagnosis and other services remotely via satellite links.** (photo courtesy of the ISRO).

One of the innovative programs is for the Schools for the Blind. Ahmadabad is leading in promoting education, training, employment and rehabilitation for the blind. Considering the specific need, an altogether different kind of broadcast network configuration is established with live audio, and data which is read by blind persons through its printed impression in Braille.

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Another fully interactive network on Extended C-Band is called "INDO-US" network, linking the top 50+ engineering institutes across India. This is established to impart teaching by distinguished faculty from many universities in USA who are specialist in their respective fields, and would be visiting India to conduct courses.

Similarly, Pan-India networks have been established for the Indian Institute of Management's various centers; National Council of Science & Museums; Online transmission of digitized manuscripts from remote centers for archival is a network for Mahabharata Sansthan, to name a few.

*Continued on page 13.....*

### Health Care

Of the one billion Indian population, 75% live in villages. Most of the doctors have flocked to urban and semi-urban areas, leaving a mere 2% of doctors for the rural population. Hence an urgent necessity arose for innovative program, leading to the birth of ISRO's TeleHealth initiative.

ISRO's telemedicine program started in 2001. The facility connects remote District Hospitals with Super Specialty Hospitals in cities through a Satellite interactive link. This ensures expert's consultancy to the under-served masses. This program is broadly classified to provide Tele-consultations & Treatment; Continued Medical Education ensuring Training-s and dissipation of latest medical advancements; Enabling mobile rural health camps, especially for Ophthalmology and community health; And assistance during disaster times thru support and relief operations.

The ISRO's satellite based interactive network has enabled 380+ hospitals, health centers and 15+ mobile units connected with 60+ Super specialty hospital in major cities. It is estimated that over 150 thousand patients benefit from the Telemedicine program every year. The program is spread across states from Jammu & Kashmir to North East to Andaman & Nicobar, and Lakshadweep islands. The Telemedicine network also played an important during Tsunami relief operations.

### Village Resource Centers

The ISRO conceptualized and launched the "Village Resource Center" (VRC) program in association with NGOs and State & Central Government agencies. The program is simple, across 22+ states – union territories, small satellite interactive networks are created. It has an expert center and multiple remote sites, on a central hub. From the expert center vocational training and teaching is imparted, mostly in local – regional language by specialists in the area. The topics are varied, for example Basket weaving; Fishery; Animal Husbandry; Medicinal Plants; Floriculture; live

stock; water resources; Apiary; Tea Cultivation & Processing; Essential Oils; Women empowerment; Rural self employment; poverty alleviation; Micro credit; Computer Literacy; Carpentry; Electrical & other trades.

This catalyze capacity building in rural entrepreneurship and facilitate e-Governance and other services of social relevance. Short, medium and long term weather forecast at local level and agro meteorology advisory services are being enabled. As of now there are over 470+ VRCs all over India with multiple expert centers. The VRC's are connected with knowledge centers like Agricultural Universities, Skill development institutes and hospitals. As of now over 500,000+ people are benefited with over 6500+ programs over the VRC Network.

### Disaster Management

ISRO implemented a Disaster Management System (DMS) which provides imaging and communication toward efficient mitigation and management during disasters. The DMS program address calamities like floods, cyclones, drought, forest fires, tsunamis; land slides, earthquakes; etc. This includes preparing database for plotting hazardous and calamity prone zones, damage assessments, monitoring and response, as well as preparedness initiatives. Added to this is establishing satellite based reliable communication, deployment of emergency communication equipments, and research and development towards early warning systems.

To provide a robust emergency communication for disaster management at the behest of Ministry of Home Affairs (MHA), ISRO has designed and set up a Satellite based 100% redundant con-

figuration of the hub station, a CUG network for Voice, Data & Video communication. This links the National Control Room at MHA with DMS-DSC at NRSA, Important national level agencies; Prime Minister's Office & Residence; Key Govt. offices in Delhi; NIDM; NDMA; State level control rooms of hazard prone states; Chief Minister's offices; ISRO's office; and other vital government agencies.

To augment data and relief measures addressing specific areas, ISRO has developed and deployed Portable Satellite Phones (Type-D Terminals); IN-SAT based Distress Alert Transmitters for fishermen (DAT); Cyclone Warning Dissemination System (CWDS) & DTH based Digital Disaster Warning System in disaster prone areas (DDWS). As a part of research and development support to DMS remote sensing applications work on Tropical Cyclone Track Intensity and Landfall Prediction, Earthquake Precursor Studies, Coastal Vulnerability Mapping and Early Warning of Landslides are being carried out.

The DMS program is also supporting the many international initiatives by sharing data and information. Through International Charter "Space and Major Disasters" and Sentinel Asia (SA) initiative for supporting disaster management activities in the Asia-Pacific region, ISRO is providing IRS databases and other information for use during major calamities.

With its active social development programs and disaster management systems, the GVF has invited ISRO to participate and share resources with the GVF Disaster Resource Directory.



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