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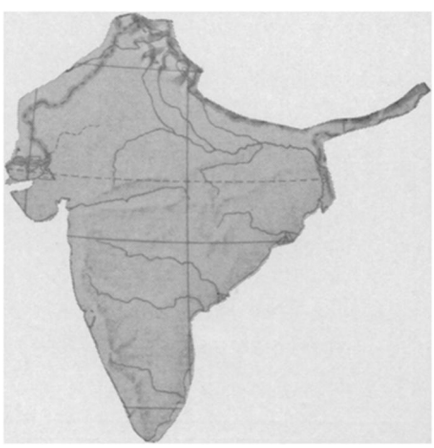

The next decade: TV by satellite

Conversation and education may flourish in India as satellites enter the picture

by S. K. Ghaswala

India entered its second decade of space research recently with the fabrication and successful test flight of the country's first fiber glass rocket motor.

It was in 1959, exactly 10 years ago, that India started on the road to space research by flying more than 100 balloons from Hyderabad in south India, some of which were the largest of their type in the world, having a capacity of more than 80,000 cubic meters. It was soon realized that the region between 40 and 200 kilometers, not covered by these balloons (which only flew up to 36 kilometers), needed intensive study by rockets.

As a result it was decided to establish a sounding rocket range on the geomagnetic equator at Thumba in south India. The Thumba Equatorial Rocket Launching Site (TERLS) has since grown into an international space research facility, with a Space Science and Technology Center added alongside in 1966.

Recently a decision was made to establish a second rocket launching station in Nellore district in Andhra Pradesh about 80 kilometers from Madras in south India. The site was deliberately located on the east coast to enable launching of satellites eastward over the region of the Bay of Bengal, allowing launches to be aided by the earth's rotation from west to east.

With the use of fiber glass rocket technology it is felt that India will be able to advance its first satellite launch from 1973 to 1970. This is the opinion of Dr. Vasant R. Gowarikar, head of the propellant engineering division of SSTC, and J. Abdul Kalam, head of the rocket engineering division of TERLS. The propellant developed by them for the fiber glass rocket motor has a specific impulse (efficiency rating) of 230 seconds, while still higher energy propellants are in the offing. (While high for India, this specific impulse is low for U.S. space launch vehicles, most of which range upward from about 260 seconds.)

The tiny village of Arvi, some 80 kilometers from Poona in Maharashtra state, will figure in the international satellite communications map when India's first satellite earth station is commissioned in January 1970. The country will then have access to large numbers of high-quality telecommunication channels, designed to meet the growing needs of India's international traffic. Initially, India will use 48 of the 1,200 channels to be provided by the Indian Ocean satellite for telephone, telegraph, telex and radiophoto services. Each channel will cost India $20,000 a year in rent to the International Telecommunications Satellite Corp., which has launched the satellite. The cost of the global satellite system is about $200 million, of which India's share is one-half percent.

While the Arvi station is being completed, a second satellite station is likely to be set up in Delhi; a team of engineers is busy making preparations for the final site. Apart from handling the international telecommunications traffic in the region, the Delhi station is also expected to be a stand-by for the Arvi station in an emergency.

In the light of these fast-moving developments, a program of TV distribution systems using satellites is being vigorously pursued. The pilot project, recently initiated by the Department of Atomic Energy to assess the effectiveness of TV in improving farm productivity in 80 villages around Delhi, has yielded promising results. It has been calculated that a giant television network based on a synchronous satellite can be set up to serve the country's 500,000 villages at a cost of less than $200 million, about a third of the amount that would be required for a conventional system using microwave towers and repeater stations to cover the same ground. However, the multiplicity of India's spoken languages—15 national languages plus hundreds of vernacular dialects—and the lack of electricity in the villages to power the TV receivers impose constraints. It is no wonder that the Government is thinking at present of installing on an experimental basis only 2,000 TV sets in selected villages, to receive programs directly from a satellite which the U.S. hopes to put over Indian skies by 1972.

The feasibility of audio-visual instruction with TV is also being explored by a group headed by Dr. Prasad Vepa of the Physical Research Laboratory in Ahmedabad and the Nehru Foundation for Development. In this project, TV sets were installed in 80 villages around Delhi; five control villages were selected in the same region but without TV. The results excited the experimenters: TV proved an effective teacher. The main stumbling block about TV is that, unlike short-wave radio, it requires line-of-sight transmission, with accordingly restricted range. This is exactly where satellite TV scores, for a single synchronous satellite can cover a range from West Asia to Japan.

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