<table>
<thead>
<tr>
<th><strong>Title</strong></th>
<th>Satellite communication beyond SITE: some observations from India</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Author(s)</strong></td>
<td>Agrawal, Binod C.</td>
</tr>
<tr>
<td><strong>Date</strong></td>
<td>1986</td>
</tr>
<tr>
<td><strong>URL</strong></td>
<td><a href="http://hdl.handle.net/10220/504">http://hdl.handle.net/10220/504</a></td>
</tr>
<tr>
<td><strong>Rights</strong></td>
<td></td>
</tr>
</tbody>
</table>
Satellite Communication Beyond SITE:
Some Observations From India

By

Binod C Agrawal
The aim of this paper is to document the development of satellite communication of television for national development after the successful completion of Satellite Instructional Television Experiment (SITE) in 1976. The attempt here is to describe some of the little known but significant experimental projects in India the use of satellite for broadcasting which might have paved the way for the operational use of satellite communication. The effort is focused on the personal experiences of the author while participating in several experiments in which satellites were used for telecasting television programmes on education and development. First, a background on the evolution of satellite communication concept for national telecasting.

The use of satellite communication in India from its inception is associated with compelling needs felt by the scientists to provide reliable and instantaneous means to reach and communicate, otherwise inaccessible with remote areas, of the country. Also, need was felt by few talented and imaginative scientists who were looking for 'non-conventional' means to solve some of the development problems of a country like India having layers of 'cultures' within a larger national 'cultural ethos', historical legacies and wastage accumulated over several millennia. Communication was thought to be an important means for integration and development on the belief that democracy demanded mono-lingual milieu for efficient and speedy information and exchange of ideas.

Satellite technology largely in its infancy stage during sixty's gave a way of hope to combine technological challenge to venture in the new growing field of science for fulfilling...
the cherished and most urgent national needs of development. So, backed by political as well as scientific leaderships without illusion and mysticism, the idea was mooted and accepted to experiment with satellite communication. International cooperation was sought and received largely free from political wrangles. What emerged as a result was a new path for communication in India with far reaching and unprecedented political, socio-cultural, technological and scientific implications. Within less than a decade, between 1975 to 1982, from an experimental to an operational system of satellite communication became a reality. It should also be mentioned in passing that it took about ten years from conception to experimentation. What has it done to the total communications system in India? It has provided improved, reliable and larger network of telecommunication facilities; large scale television coverage of the country both via direct broadcasting and terrestrial method. It has improved quality of national radio news service and regular weather forecast. All these are being done with the help of a multi-purpose Indian National Satellite (INSAT). With this short back drop, let me describe three satellite television experiments conducted in India between 1975 to 1982.

**Satellite Instructional Television Experiment (SITE)**

For a country of India's population of about 750 million souls, SITE intervention for development might have been a drop in the ocean. But in the communication history, SITE remained one of the biggest and most advanced techno-social experiments (Agrawal 1978). SITE was also one of the most successful Indo-American collaborative projects. SITE aimed at providing television instantaneous information to backward, remote rural areas to improve rural primary school education, provide teachers' training, help improve agricultural practices, health and hygiene, nutrition and contribute to family
planning and national integration. It was conducted in 2330 backward villages selected from over half million villages. According to the agreement, in technical terms, NASA provided Applications Technology Satellite-6 (ATS-6) for a period of one year for four hours every day. Other technical responsibilities like production and installation of Direct Reception System (DRS), maintenance, programme and television telecast were those of India. The actual experiment commenced on August 1, 1975 for a period of one year.

Among other things, during SITE year, four kinds of telecast techniques were used. First, pre-recorded direct telecasting through ATS-6 to DRS installed in the villages for community viewing from Ahmedabad Earth Station. Second, live and pre-recorded telecast from Delhi inserted between direct telecast from Ahmedabad for half an hour. Third, re-diffusion of direct telecast of Delhi on a terrestrial system of Kheda rural television. And, rediffusion of direct telecast of selected national events from the then existing television stations like Lucknow and Bombay. Technically all the four telecast techniques were found to be useful and feasible. Technology needed to telecast in these four modes was developed by Indian scientists and engineers.

From all accounts, SITE was a successful experiment and it achieved both its social and technical objectives, thereby paving the way for satellite based television system for India. One of the most significant findings of SITE social evaluation was that lack of formal education was not a barrier for learning from television. Females more than males gained knowledge from television viewing. One of the important learnings from SITE was that software planning needed longer period as compared to hardware planning. In satellite-broadcasting, choice of language for broadcasting was considered an extremely important element even when programmes
were telecast in four languages for six different states. It was suggested that a careful planning both in hardware and software would be required to solve the issue of language in satellite broadcasting (Agrawal 1978).

**Satellite Telecommunications Experiment Project (STEP)**

The Satellite Telecommunications Experiments Project (STEP) was a joint experiment of two Indian organisations namely Indian Space Research Organisation and Indian Post and Telegraphs Department. It was followed by SITE between 1977-79. The Franco-German SYMPHONIE Satellite was loaned to India for a period of two years by SYMPHONIE Organisation. This satellite was used for variety of telecommunications experiments. Two important television experiments in which SYMPHONIE was used were direct telecast of sport event from a neighbouring country and telecast of India's Republic Day Parade along with special live programmes produced and telecast from three different earth stations located several hundred kilometers from each other. In these experiments, apart from fixed earth stations, Transportable Remote Area Communication Terminal (TRACT) was also used in both experiments. It was transported to a high altitude in eastern Himalayan region and in the neighbouring country for these experiments. An evaluative study was conducted to understand the effects of live telecast on viewers. In January 1979, just after the live satellite telecast of Republic Day parade and special programme, more than 870 viewers in six cities were interviewed for this evaluation. More than two-thirds of the viewers correctly indicated that these programmes were telecast through SYMPHONIE Satellite. However, only about 50 per cent viewers could recognise that the special programme was telecast in which three earth stations participated for transmitting the programme. "Opinions were sought from the
viewers as to what kind of programmes would they like to see through satellite based television system...... The cultural/entertainment programmes like song, dances topped the list, followed by important national events, news and sports" (Agrawal 1979:10). The viewers of hilly and remote areas thought that "satellite based system was the only way for getting TV in a near future to enable them to remain in touch with the rest of the country" (Agrawal 1979:10).

The study reaffirmed that satellite based television was technically viable and can be used especially for the remote areas. Further, this study supported the view that "the hardware difficulties seem to be much less when compared to software difficulties in using Satellite for TV" (Agrawal 1979:10).

**APPLE Satellite Applications Programme**

India built its own experimental satellite APPLE (Ariane Passenger Payload Experiment) which was launched aboard the European Space Agency's Ariane Launch Vehicle from Kourou in French Guyana in June 1981. APPLE during its active in-orbit life of 27 months was used for conducting a number of advanced satellite communications and applications experiments. One of the important among application's experiments was a 'television course' conducted with the help of APPLE. This television course was first of its kind in India for an advance level teaching using distance learning method with the help of APPLE satellite. The aim of the course was to provide advance learning in "satellite communications" to final year under-graduate, graduate students of electronics and the professionals working in satellite operational system. This television course consisted of lecture notes and "video lectures". The lecture notes were provided for advance reading before viewing the video lectures. Two way voice link was also provided for 'after telecast' discussion between the students and the lecturers located several hundred kilometers away from the students.
The experiment involved APPLE satellite for nation-wide reach, television receive system in the selected institutions of higher learning, television programme production facilities and subject matter specialists and programme presenters. In this case all subject matter specialists of satellite communications also acted as programme presenters. The total system of programme production, transmission and reception involved a complex organisational, managerial and technological competence on the part of the organizers of the television course.

Five "viewing centres" located over thousand kilometers apart from each other were selected for this experiment. The students came to view the 17 hours of television lectures in English language at these viewing centres distributed over four days. An evaluative study was conducted to measure "the impact of distance learning and the organizational aspects of giving such courses via satellite" (Agrawal 1983:2). In order to measure the impact of TV lectures on the students before and after tests were administered. In total, 116 students participated in the television lecture course averaging about 23 students per centre. Both survey and observational methods were used for the data collection.

The evaluative study indicated that television lectures through satellite were successful in imparting knowledge to the students. Further, "television as a medium of distance learning, at least in this course, provided equal learning opportunity to the students" (Agrawal 1983:17). Though there were differences in the knowledge scores between the students belonging to the institutions of high prestige and state run engineering colleges the television lectures helped in equalizing these differences. This finding lent support to the view that the use of satellite communication would help improve overall educational standard especially, if such courses are
given in conjunction with two way communication facility, which was available in this course.

The television lecture experiment with APPLE satellite opened up new possibilities for distance learning, especially, in the higher and technical education where English is the medium of instruction. The same may hold true for any technical education in the fields like medicine, engineering and management. However, one must examine the economics vis-a-vis the conventional method of giving similar courses and its software aspects.

Indian National Satellite (INSAT) System

Since INSAT-1A the first domestic multi-purpose national satellite became operational in April, 1982, there has been many fold expansion of television telecast in India. To-day, the entire country can receive TV signals on direct reception system and about 70 per cent of the population can receive TV signal on conventional system. It has been made possible by installing more than 160 low power transmitters capable of receiving INSAT signals and relaying them on terrestrial system within 7-10 kilometers radius. There was an initial set back when INSAT-1A satellite was deactivated due to several technical problems in September, 1982. But most important point for consideration is that INTELSAT was hired for continuing the television telecast. Later on the Russian satellite SATIONAR was rented for the same purpose until INSAT-1B became operational in mid 1983. This kind of television expansion is phenomenal from any standard in a multi-linguistic country like India. At present, INSAT is used for telecasting all the programmes from Delhi and is being received on all low power transmitters which are located in more than a dozen distinct linguistic regions. It is also being used for networking programmes of different television stations for national telecast.
Another use of INSAT has been one hour educational telecast for undergraduate students of some 5000 colleges. Initially programmes produced in English speaking countries along with few Indian produced programmes were telecast. One academic year of telecasting was completed in this April 1986. Initial pre-testing of the programmes were conducted to test their suitability for Indian students. In the field of sports, there has been an extensive use of INSAT for national telecast. The languages used for commentary are English and Hindi. Having high visual content in sports programmes, the need for multiple audio has not been strongly felt. But over a period of time this issue will be evolved to overcome this problem. There will be further expansion of television with the help of satellite in India.

Concluding Remarks

The analyses presented so far is indicative of the direction in which satellite communication in India is moving. There is no doubt that the hardware developments will continue to progress to provide perfection in the use of satellite for television telecast. The same can be said with qualification for software development because of the cultural complexity and linguistic multiplicity. The initial use of satellite for telecast continued to be in the same direction as initially thought during SITE. Software problems remained an important area of research for the optimal and meaningful use of satellite. It is yet to be investigated as to how best satellite can be utilized in the national and regional television telecast system? Further, research is also required for developing innovative software for this purpose. However, the remarkable achievement is its continual use in spite of few technical but more software difficulties.
Notes

1. For further detail see Karnik and Sampath ed. (1977).


3. For further details see "APPLE Applications Seminar" Proceedings (1983).
References Cited

Agrawal, Binod C.


1979 Republic Day via Satellite: A Social Experiment within STEP. Ahmedabad: Space Applications Centre.


APPLE Applications Seminar.


Karnik, K. and N. Sampath eds.


Satellite Telecommunications Experiments Project.