Towards EDUSAT II

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Abstract

EDUSAT was launched in September 2004. Given a life span of about seven years, it would be available till 2011. In case the services need to be continued, a replacement of the satellite would be necessary. Given the requirement of a lead time of about two years for designing assembling and launching a spacecraft, the preparations should start latest by 2009 accordingly. It is therefore, it has been envisaged to the type and replacement required for EDUSAT including the associated changes involved according to the experience.

This paper is an attempt to briefly review the evolution of satellite based education system in the country and the achievements of EDUSAT. It examines the experiences with the present space and ground configurations and discusses the possible changes for improvement and continuity of services. The need for establishing structures for meeting the operational and managerial requirements is also discussed.

Background

The use of satellites for Education has a long and rich history in India started in early 1970's when the country had neither satellite building nor satellite launching capability. It was the unique feature of satellites to quickly and simultaneously reach all remote parts of the country that attracted the founder of the Space Program, Dr Vikram Sarabhai to develop plans for use of satellites to support education and information dissemination for National Development.

As a first step, to gain experience in this field, the ATS-6 satellite was obtained from USA for one year and the Satellite Instructional Television Experiment (SITE) was conducted in 1975-76. Under this experiment, programs for school children were transmitted in the morning, teachers training were conducted during vacations, and information oriented programs were transmitted every evening to about 2400 villages spread over 24 districts in six states of the country. It was this experiment that led to the establishment of

CIET-SIET studios for production and transmission of school oriented programs. It led to the initiation of the country-wide classroom of the UGC with CEC as the nodal agency and EMRCs and AVRCs in several universities, which have now grown into the Vyas Channel supported by the CEC and various EMMRCs. It was also instrumental in the initiation of the IGNOU transmissions which have grown into Gyandarshan I broadcast channel. All these networks became operational on the INSAT series of satellites, which were initially made in the country and launched by using foreign launch pad, but now satellites are made and launched indigenously.

All above networks were "Broadcast" networks. This mode of information dissemination had its limitations like high wastage, no interaction, and non-availability of suitable time etc.. To overcome these limitations, it was proposed to try out channels independent of the broadcast networks. The cost of satellite based interactive terminals was prohibitive (during late 80s) but the expansion of Telephone networks came as a boon and the "One way video and Two way audio" Teleconferencing networks were tried out for education and training. From 1992 to 1995, several trials and demonstrations of the network were held. The efficacy of such networks to train large number of field workers in Agriculture, forestry, Health, Education etc.. was demonstrated and several states like Karnataka, Gujarat, Orissa and MP established such networks for use on an operational basis. IGNOU, Open school land NCERT too organized trials and IGNOU established an operational network which evolved into Gyandarshan II interactive channel.

It was with this background that when ISRO successfully operationalised the PSLV, at that time EDUSAT was conceptualized to meet the communications requirements of the Education sector.

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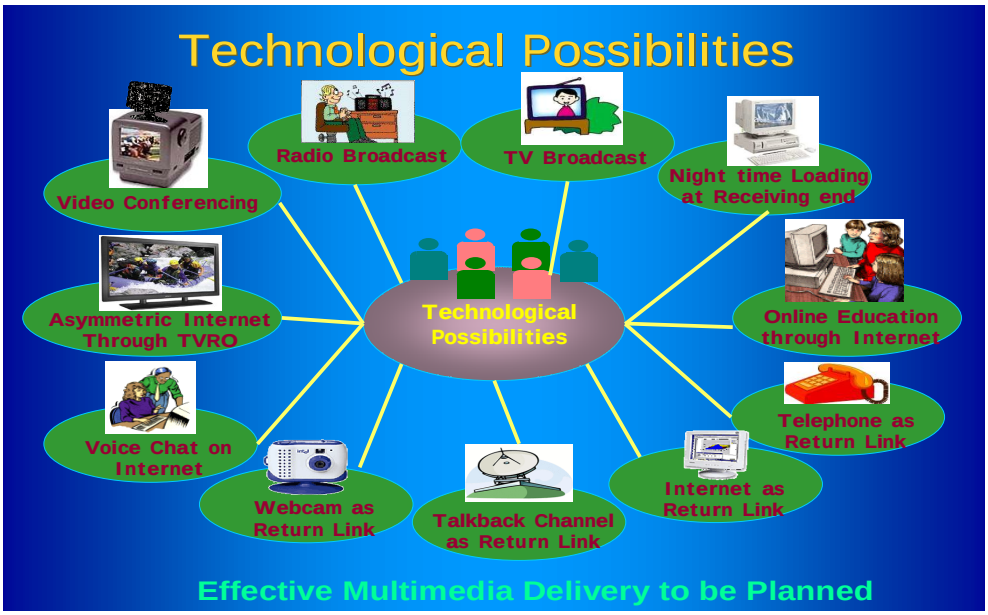
EDUSAT

In conceptualizing the design of EDUSAT inputs were taken from educational institutions and experts. As school education is in the regional languages, it was considered desirable to have regional beams, which would give higher power. To meet the requirements of

the national institutes, national beams were incorporated. Accordingly Edusat had five regional beams in the Ku Band (North, South, West, East, and North-East.) and two national beams, one in the Ku Band and another in the Ext. C Band. By the time Edusat was launched the costs of interactive terminals (V-Sats) had reduced substantially. It was therefore decided that all interactive networks would be two way video V-Sat based networks. The transmissions would be IP based that would enable use of minimal bandwidth for larger number of users.



EDUSAT was capable of providing several services besides broadcasting and interactive networks. It could provide access to Internet; enable creation of large centralized databases of learning and teaching materials. It would enable night - time loading of teaching materials as well as a variety of audio based services. All possibilities were presented to heads of all educational institutes and HRD. The spacecraft was fabricated and launched in October 2004. It has a design life of six years and should need a replacement by end of 2010. Given the fact that the design, fabrication and launch of a satellite takes about two years now (Jan 2009) is probably the right time to review the experiences and achievements of EDUSAT I and provide inputs for conceptualizing the EDUSAT II system.

EDUSAT Achievements and Observations

The task of setting up user networks was primarily facilitated, spearheaded, implemented and controlled by ISRO. Several efforts were made to actively involve MHRD and the user agencies by holding several national and regional workshops. It was proposed that an independent agency should be set up by MHRD to facilitate and manage EDUSAT utilization. However this did not happen and ISRO had to take the lead to facilitate EDUSAT utilization. ISRO provided seed funding for the user networks and with substantial efforts set up a number of user networks as indicated in the Table given below. (These figures may be slightly old but would be accurate enough to cover this study.)

Edusat could have brought both quantitative and qualitative revolution in education. The quantitative expansion appears to have been achieved in being able to reach out to large numbers, thanks to the efforts of ISRO.

However, the qualitative revolution, which should have come introducing new services and better quality teaching with learning materials, has not been quite visible.

EDUSAT Users

National Beam

Name Of Agency	Number of Terminals
Ku – Band Coverage	
IGNOU	188
NCERT / CIET	90
CEC / UGC	62 (SITs) + 59 ROTs = 121
AICTE	102
VIGYAN PRASAR (DST)	48
SIDHI NETWORK (RGPEEE)	1084 (ROTs)
Ext. C-Band Coverage	
IDSP	220
INDO US – PROJECT	40
Rehabilitation Council of India	240 (ROTs)

Edusat Status of Regional Beam Networks

Ku – Band Regional Beams Status

Sr. No.	Name Of The State	Satellite Interactive Terminals (Sits)	Receive Only Terminals (Rots)
1	Jammu & Kashmir	95	—-
2	Punjab (Mohali)	290	—-
3	GNDU (Punjab)	05	—-
4	Haryana	509	9837
5	Rajasthan (Ext. C – Band)	82	300
6	Gujarat	30	10564
7	Tripura	50	—-
8	Nagaland	38	—-
9	Mizoram	28	—-
10	Meghalaya	50	—-
11	Jharkhand	11	—-
12	West Bengal	126	340
13	Karnataka	42	2130
14	Tamil Nadu	485	—-
15	Kerala	88	900
16	Lakshadweep	13	21
17	M.P. Bhoj Open University	38	—-
18	M.P. Education (Rsk)	65	—-
19	RGTU Bhopal	60	—-

20	M. P. Forest Dept.	52	—-
21	Orissa	30	80
22	Delhi	22	—-
23	Chhattisgarh	43	—-
24	Arunachal Pradesh	06	—-
25	Andhra Pradesh (Under Insat – 3b With 5 Networks)	—-	2100
26	Maharashtra	40	—-

Summary

Name Of The Beam	No. Of The Operational Networks
National Beam	09
Regional Beams	38
No. of Terminals Installed and Commissioned	
National Beam	750 Sits + 1383 Rots
Regional Beams	2298 Sits + 26272 Rots
Total	3048 Sits + 27655 Rots

The EDUSAT networks have been primarily used for Broadcasting Educational Programs (as was done in SITE) or for live interactive classes (as was done in TDCC). The extent of usage has varied from network to network. Some states have been very active while in other states there have been delays. For Example in the state of UP, Edusat activity has not even taken off while in states like Haryana and Gujarat large networks have been established and effectively utilized.

Observations

- It was realized at a very early stage that several large states like MP, Maharashtra, Rajasthan etc. were not fully covered by any single regional beam. These states

had to be provided bandwidth on the national beam. This lead to spare capacity on some regional beams and over loading of the national beam.

♦ The configuration was such that each user was required to invest substantially in a hub. (This was provided by ISRO)

♦ The connectivity between national and regional beams was not possible. If a state network wanted to use / redistribute the signal of a national beam it was not possible.

♦ The primary mode of use has been either broadcasting or conduct of live interactive classes. Very little, if any, use was made in the off line mode.

♦ Internet connectivity was not made available either due to fear of over-load or viruses.

♦ The absence of off line usage lead to the satellite being almost unused during off office hours. The usage for educational purpose between 6.00pm and 9.00am has been very minimal.

♦ Centralized data bases of teaching / learning materials could have been created for on going use. This has not happened; even existing data bases and data banks have not been connected. Further, the library data is also not connected to Edusat.

♦ EDUSAT could have led to greater interaction amongst Faculty of same discipline. A more intensive activation of the Gateway could have helped.

♦ Organisations like Doordarshan and Telecommunications could easily integrate satellites into their operational use because of strong in-house engineering capability. MHRD failed to do so. Unfortunately, the organizational involvement of MHRD has been rather minimal to that extent and couldn't conceptualize to make EDUSAT an integral part of the MHRD Educational Technology Infrastructure of the country.

EDUSAT II

Some suggestions that flow out of the EDUSAT experiences are as follows:

♦ Have only national beams on EDUSAT. The concept of regional beams has not been given any special advantage rather created limitations. Using one transponder

of Ext C Band for providing continuity of service, while all others in the Ku Band will facilitate reception of any program by any terminal eliminating the need of separate hubs.

♦ The user agencies should be permitted to use service provider for setting up ground networks asking to use Hub of the service provider. This would reduce the investment required by the user avoiding to install their own hub and enable a larger number of service providers to set up ground networks speeding the creation of larger no of networks.

♦ Attempt should be made to combine all broadcast channels together into a single DTH bouquet for making system efficient and cost effective. The receive terminal should be a simple, inexpensive DTH receiver and should be able to receive any of the channels.

♦ Special effort needs to be made to reach out to remote areas. The availability of ground based networks has improved substantially in the urban and semi-urban areas; therefore, the need of EDUSAT for urban areas will be seriously questioned. When the bandwidth available on ground networks is much higher, further, the planning commission is interested to provide broadband experience to students of professional institutes.

♦ Internet should be made available to users on Edusat. This could greatly enhance the utilization during non office hours and would be of great value to the users.

♦ Library services should be provided to remote colleges through Edusat and it is suggested to provide all e-journals on Edusat networks.

♦ It would be appropriate if organization like INFLIBNET is involved with Edusat gateway.

♦ MHRD should create a pool of central agencies for Edusat utilization where CEC, IGNOU, CIET, CBSC, AICTE should be represented on this central pool. INFLIBNET should be given responsibility of creating and managing data bases as it is already involved in this activity. This agency should plan and facilitate Edusat utilization and be responsible for routine operations.

Conclusion

Edusat I, was launched in Oct 2004, has led to the expansion of networks and their use for broadcasting and interactive live classes. These networks must be used to bring in educational innovations, provide better learning resources to enrich the teaching learning process at remote villages. It is essential that MHRD and all other educational agencies to come forward to create structured mechanisms for effective use of Edusat II in due period of time, where CEC and INFLIBNET under UGC can play a lead role.

About Author

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