

The SITE magic

[Drawing room. Manav, Jigyasa, and Dadaji watching a World Cup match on TV.]

Manav (shouts) – Goal! I told you Argentina is the best team. They will certainly win the World Cup this time.

Jigyasa – How do you know? Are you a *jyotishi*? I'm sure Brazil will win.

Manav – What do you know about football? You don't even know about the player positions.

Dadaji – Oh, don't fight. Why can't you enjoy the match and wait for the results!

Manav – Dadaji, did you have satellite TV when you were young? Could you see matches being played in a far-off country?

Dadaji – Manav, we didn't have satellite TV with many channels like you have today, and we didn't watch football matches. But we could watch satellite TV in our village.

Jigyasa – Dadaji, you must be joking! You mean to say you had satellite TV in your village 35 years ago? Even today most villages do not have satellite TV. And 35 years ago we had only seven TV stations in the country and that too in big cities.

Manav – And we didn't have any satellite like the INSAT.

Dadaji – Both of you are right, my dear. There were not many TV stations and we didn't have any satellite to transmit TV signals. But still we did watch regular programmes on TV broadcast directly from satellite.

Manav – Dadaji, you mean to say you had DTH?

Dadaji – Of course! The TV we had in our village could receive signals directly from satellite, as we have in DTH services today.

Manav – I can't believe, Dadaji! How was it possible?

Dadaji – Ok, I'll tell you all about it tomorrow. Tomorrow is Sunday, so you don't have to go to school.

Jigyasa – Dadaji, can I invite my friends Neha and Vasudha?

Dadaji – Of course, ask them to come over around 10 in the morning. Now watch the match.

[Background sound of football match on TV]

[Changeover music]

[Morning at the breakfast table. Manav, Jigyasa and Akaash in discussion]

Manav – Papa, Dadaji was telling us that his village had satellite TV 35 years ago. Is it true?

Akaash – Of course, I was of your age at that time. I used to go to the village to spend the summer vacations with Dadaji, Dadima, and your Nikhil *chacha*, who also lived there. I saw the satellite TV during one of my visits.

Manav – But, Papa, how could you get satellite TV without a satellite?

Akaash – Who told you that there was no satellite? Of course, it was not an Indian satellite like our INSAT. It was an American satellite. Well *bachchhon*, I don't know much about it. Your grandpa knows all about it.

Manav – Yes, Papa, Dadaji has promised that he will tell us about it.

[Dadaji enters]

Manav and Jigyasa (together) – Good morning, Dadaji, we're waiting for you.

Akaash – So Papa, it's your turn today. These children keep asking questions to which I don't have any answer.

Dadaji – But, that's good, Akaash, children should ask questions. That is how they learn. (turning towards Jigyasa) Jigyasa, where are your friends?

Jigyasa – They must be on the way, Dadaji.

Dadaji – I hope all of you had your breakfast.

[The door bell rings]

Jigyasa – It must be Neha and Vasudha. I'll go.

[Sound of footsteps, Jigyasa opens the door]

Jigyasa – Hi, Neha. Hi Vasudha. We're waiting for you.

Neha and Vasudha (together) – Namaste Dadaji. *Namaste* Uncle.

Dadaji – *Khush raho bachche*. Sit down.

(turning towards Jigyasa) Jigyasa, get some *lassi* for your friends. They must be thirsty.

Neha – Thank you Dadaji.

[Jigyasa comes with a tray with glasses of lassi. Keeps the glasses on the table]

Neha – Dadaji, Jigyasa told me that you had satellite TV in your village 35 years ago? Is it true?

Dadaji – Of course, it's true, *beti*. But we didn't have colour TV those days. We only had black and white TV.

Vasudha – But how did you get the TV signals in your village?

Dadaji – Directly from the satellite.

Neha and Vasudha (together) – Wow!

Dadaji – The use of a satellite to broadcast programmes directly to TV receivers was part of an experiment called Satellite Instructional Television Experiment, or SITE in short. It was conceived as a means to find out how satellite TV could be used for mass education in a vast country like India.

Manav – But whose idea was it, Dadaji?

Dadaji – It was the brainchild of Prof. Satish Dhawan. Do you know who was he?

Manav – I have heard his name, but can't remember what he was.

Dadaji – He was one of the pioneers of India's space programme. He wanted to transform the vision of Dr. Vikram Sarabhai, the founder of India's space programme, of using space for education and development. But the credit for turning Dr. Sarabhai's vision into reality should go to Prof. Yash Pal, who built up the Space Applications Centre in Ahmedabad almost from scratch and played a leading role in getting SITE into operation.

Manav – Dadaji what does this Space Applications Centre do?

Dadaji – Well, I'm not quite sure. But your Papa may know about it. We'll ask him tomorrow.

Neha – But, Dadaji, for satellite TV transmission we need a satellite in the geostationary orbit. You said you had satellite TV in your village 35 years ago. But our INSAT came only in 1982. Then how could you have satellite TV?

Dadaji – Oh, that was not a problem. We loaned a geostationary satellite from the American space agency NASA.

Manav – But how?

Dadaji – NASA had a geostationary satellite called *ATS-6* already in orbit. It was the first satellite capable of transmitting television programmes directly to community receivers. The satellite was originally placed over the Pacific Ocean, but on the request of ISRO it was moved to a spot over Kenya so that its signals could be received in India.

Neha – But Dadaji, who watched the programmes?

Dadaji – For SITE, direct reception TV receivers, with 3-metre dish antennae were set up in 2,400 villages in parts of six states – Rajasthan, Bihar, Orissa, Madhya Pradesh, Karnataka and Andhra Pradesh.

The transmissions started on 1st August 1975 when 2,400 community TV sets came alive in the small villages spread across the country, receiving programmes directly from the satellite. The interesting thing is that SITE was just an experiment; in fact, a unique experiment and probably the only one of its kind in the world.

Manav – But Dadaji, why was it called an experiment?

Dadaji – Simple. It was done primarily to find out how TV programmes broadcast via satellite can help people in villages in education, farming, and health care. That is why the villages selected had different populations and were located in different linguistic, cultural, climatic and agricultural regions of the country.

Another important aspect of the SITE – and one never tried before – was the simultaneous broadcast of two languages along with the picture to help people in understanding the programmes in the different states.

The simple direct reception community television sets and the efficiency of their maintenance were sufficient to keep 90% of the sets working at any time. One and a half hours of broadcasting in the morning was devoted to school children and two hours in the evening to general audiences, which averaged 100 people per set. It was during SITE that special attention was directed towards children in the age group of 5-12.

I still remember the thrill of watching TV for the first time in our village.

[Changeover music]

[Village scene. Sound of birds, cow children playing.]

Guptaji – Bete Vinod (Manav's Dadaji), get ready quickly.

Vinod – Why Papa?

Guptaji – Arre, don't you remember, we've to go to watch the TV.

Vinod – Yes, Papa, I remember. I'll just take a minute.

Guptaji – Come let's go.

[Sound of cycle bell]

[Sound of excited children, women, talking]

Person – Arre, Guptaji has come. Namaste Guptaji. Arre Vinod! When did you come?

Vinod – Only a few days back, uncle.

Person – Very good. Vinod you sit there. I'll bring a chair for Guptaji. The show will start in a few minutes.

Vinod – Uncle what is that big dish-like thing over there?

Person – Oh, that’s the antenna. It receives the TV signals from the satellite up there and we see the programme on the TV set.

Vinod – Wow! Isn’t that really interesting? And the picture will appear in that box?

Person – Oh, that’s the TV set. Yes the picture will appear on the front screen. The programme will start soon. Let me switch it on.

[Roar and clapping of children as the TV is switched on, voice of the announcer, sounds of the programme (sound bytes may be obtained from SAC)]

Person2 – Children, no noise now. Keep silence. Watch the programme now.

[Changeover music]

Dadaji – I still remember the programmes I saw that day on TV. I couldn’t imagine that moving pictures could appear on a screen fitted to a box without a film projector, as I had seen in cinema halls.

Neha – But, Dadaji, had you not see a TV before?

Dadaji – No, *beti*. In my city there was no TV. So it was a new experience for me watching the programme on the small screen in front of the box.

Manav – You were going to tell us about the programme you saw that evening.

Dadaji – Yes. The first programme was on electricity. It showed the different ways electricity is generated, using generators and battery and the different ways electricity is used in our daily life. I saw the inside of a power plant for the first time on the TV. I was so excited.

Manav – Were there other programmes also?

Dadaji – Of course. The second programme that evening was on the different methods of lifting water used in villages. It explained the principle of the pulley system used in lifting water from well and of the lever system used in hand pumps. Everyone was so excited because had ever explained these things to them so simply. There was also a programme on the Ramlila.

Jigyasa – But Dadaji, who made the programmes? And how were they broadcast via satellite?

Dadaji – Well, it is a long story. I can only say that a lot of effort and hard work had to be put in to make SITE a reality.

As you know, the spacecraft was provided by the United States, but the ground segment, the organisation and management and the programming were entirely the responsibility of India. Particularly important were the cooperative aspects of the project, involving the Indian Space

Research Organisation and the Ministry of Information and Broadcasting as well as other authorities at both Centre and State levels.

Manav – Dadaji how were the programmes sent to the satellite for broadcast?

Dadaji – From earth stations. We had one earth station at Arvi near Pune. Another one was set up in Delhi for SITE. It was totally designed and built by Indian scientists and engineers.

I'll tell you more about it later.

[Changeover music.]

[Evening at home. News coming on TV.]

Manav – Papa, Dadaji told us that you can tell us about Space Application Centre. Where is it, Papa?

Akaash – Oh, now you'll be after me!

Jigyasa – Please Papa, tell us something about it.

Akaash – Ok, ok. But I'd like a cup of tea first. Did you have some snacks?

Manav and Jigyasa (together) – Yes, Papa.

[Sound of cups and plates, sound of stirring with spoon.]

Akaash – So, you want to know about Space Applications Centre?

Jigyasa – Yes, Papa.

Akaash – Have you heard the name of Indian Space Research Organisation?

Manav – Yes, Papa. They make and launch satellites. It is also known as ISRO.

Akaash – You're perfectly right. Space Applications Centre or SAC is a unit of ISRO. It is located in Ahmedabad. Do you know how INSAT satellites relay radio and TV programmes?

Jigyasa and Manav (together) – No Papa.

Akaash – Actually the satellites act as TV towers in space. They broadcast TV programmes from space which are received by dish antennas on ground. The signals are first sent to the satellite from ground using a dish antenna. The satellite carries instruments called transponders, which receive these signals from ground, amplify them and then beam them towards the ground. These transponders are developed and fabricated at SAC.

Manav – Papa, the INSAT also carries instruments for taking cloud pictures and monitoring the weather. Does SAC also make them?

Akaash – You're absolutely right, Manav. SAC also makes the meteorological payloads for the INSATs.

Jigyasa – Papa, ISRO also makes remote sensing satellites like the IRS, and Cartosat. Does ISRO make the payloads for the also?

Akaash – Yes, my dear. The multispectral cameras and other payloads used in the IRS satellites for remote sensing are also designed and fabricated at SAC. In addition, the direct broadcast TV receiving sets and dish antennas used during the SITE programme were developed at this centre.

Manav – We can say that without SAC no Indian satellite would be of any use.

Akaash – You may be right, because without payloads satellites are of no use.

[After a pause] Oh! It's already quite late. Let's have dinner now. We'll talk later.

[Changover music]

[Evening at home. Dadaji and children chatting.]

Dadaji – Did Akaash tell you about Space Applications Centre?

Manav – Yes, Dadaji. Now you tell us more about SITE.

Dadaji – Prof Yash Pal was the scientist under whose leadership the entire SITE project was carried out. Let's hear about his experiences.

[Bytes of interview with Prof Yash Pal, 3-4 min.]

Dadaji – The interesting thing is that not all the villages which were selected for SITE had electricity. So, about 150 battery-operated sets were deployed in un-electrified villages as part of SITE.

But more difficult was programme production. Many hurdles had to be overcome before proper programmes could be designed and produced for SITE telecasts. A studio had to be arranged and a production team had to be put together before anything could move.

Interestingly, many well known film and drama personalities such as Habib Tanvir, Dina Pathak and M.S. Sathyu actively helped in the production of the programmes.

The main topics covered by the SITE programmes were education, agriculture, health, nutrition and population control, but a large number of science programmes were also produced.

Neha – Dadaji, how many programmes were made?

Dadaji – A total of 160 science programmes, each of about 10-12 minutes' duration, were produced in Hindi and dubbed in Oriya. Almost 1,200 minutes of Gujarati programmes were also produced at Ahmedabad. These science programmes were pre-tested in Madhya Pradesh, Orissa, Rajasthan, and Mumbai.

Jigyasa – Were the science programmes like what we see on TV today?

Dadaji – Of course, there was no colour TV in those days, so all programmes were in black-and-white. The science programmes for SITE were mainly designed to make children realise that science is everywhere – that their immediate environment can be questioned, understood, explained and manipulated by them, using the scientific method; and to emphasise the learning of the scientific method. The programmes were prepared keeping in mind the fact that the only laboratory most of these children could access was their natural environment, their play and their homes.

In addition, about 50,000 rural teachers were enrolled during the experiment in a multimedia package, training them in the teaching of mathematics and general science.

Manav – But Dadaji, the SITE programme last only for two years. What happened after that?

Dadaji – You're right, Manav. The SITE programme lasted only for two years, but it provided great impetus to India's space program and led in subsequent years to the establishment of a national television network utilising a communication satellite to link a large number of terrestrial broadcast stations and transmitters.

Technologically speaking, the achievement of SITE was amazing, especially because it was done in so short a time. Sociologically also, quite a few gains were seen.

As the world's first direct broadcast satellite television system, SITE proved the value of using satellites for education in developing countries. It also demonstrated that India had the capabilities to do this kind of things.

Neha – Now I understand why SITE was so important for us. Today we watch TV programmes relayed by our INSAT satellites, but it was during SITE that Indian scientists and engineers gathered the experience of broadcasting from space that they are using when using the INSATs.

Manav – I didn't know so much about SITE. Dadaji has opened my eyes. Thank you, Dadaji.

