

Implementation Document

EDUSAT Distance Learning Programme

Basics of Remote Sensing, Geographical Information System and Global Positioning System

For UG/PG Students in Universities / Institutions

Concept of EDUSAT Based Training in RS & GIS

IGNOU/UGC-CEC/CIET-NCERT/State Hub

Teaching Hub

IIRS

2 – way Communication

Distance Learning

Teaching End (IIRS)

Teaching End at Indian Institute of Remote Sensing

Classrooms at Receiving End

Participating Universities (46 No.)

◆ Anna University, Chennai	◆ Thanjavur, Tamil University	◆ H.N.B.G.U, Srinagar	◆ Gujarat University	◆ Shivaji Univ.
◆ Jamia Millia Islamia, Delhi	◆ Rajiv Gandhi Univ., Itanagar	◆ M.D.S. University, Ajmer	◆ CEPT University	◆ JSAC
◆ NIT, Warangal	◆ Kashmir University	◆ Baramulla University	◆ MG Science Institute	◆ Jhadrhapur Univ.
◆ Banasthali Univ., Rajasthan	◆ Mysore University	◆ Jammu University	◆ Gauhati University, Assam	◆ APSCOST Vijayawada
◆ JNU, Delhi	◆ Tripura University	◆ HARSAC	◆ Bharathiar University, Coimbatore	◆ The New College Kolhapur
◆ Pune University	◆ BIT, Ranchi	◆ Hissar	◆ PSG College, Coimbatore	◆ Silchar Univ. Assam
◆ Hari Singh Gour University	◆ IIT Roorkee	◆ Kurukshetra University	◆ Madras University	◆ ADM College
◆ Madurai Kamaraj University	◆ Presidency College, Kolkata	◆ GJUST	◆ Nagpur University	◆ Walchand College of Engg. Science

Other Universities if interested may also participate

Sponsored by

National Natural Resources Management System, DOS

Conducted at

Indian Institute of Remote Sensing

National Remote Sensing Centre

Dehradun, Uttarakhand

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EDUSAT based training program on Remote Sensing, GIS and GPS for Universities

1. About Indian Institute of Remote Sensing (IIRS):

The Indian Institute of Remote Sensing (National Remote Sensing Centre, Department of Space, Government of India) is a premier training and education institute dealing with Remote Sensing, Geoinformation Science & GPS Technology and their Applications. Since September 1, 2008 IIRS was inducted under the ISRO (Indian Space Research Organization) umbrella and became a government body. IIRS endeavor has been to train thematic experts from user community including academic institutions in RS & GIS technology/applications at Post Graduate level with the overall goal of 'technology transfer' and user awareness. The Institute has evolved many programs which are tuned to the different needs of various target groups.

IIRS conducts a variety of courses for the different categories of users including fresh postgraduate students viz., M. Tech., M.Sc., PG Diploma Courses, 4 months Certificate Courses, 2 months NNRMS sponsored courses for University Faculty, 2 weeks on demand Special Courses and 1 week duration Overview Course for Decision Makers.

IIRS has trained more than 7100 scientists/engineers including 610 foreign students from various countries of Asia and Africa. The latter have also benefited under SHARES Fellowship Program of the Department of Space, ITEC/SCAAP Fellowship Scheme of the Ministry of External Affairs, Government of India, and other Fellowship Schemes etc. In addition,

IIRS houses state of the art infrastructure facilities for both RS and GIS. It has experienced and internationally known teaching faculty with specialization in RS & GIS Technology and its applications.

IIRS is the host institute as well as, headquarters for the Centre for Space Science and Technology Education for Asia and Pacific (CSSTE-AP) region under United Nations. It is first of its kind established in the region and conducts regular postgraduate and short courses in Remote Sensing and GIS every year since 1996.

It should be noted that, IIRS has been recognized by National Natural Resources Management System (NNRMS) to conduct specialized courses for the duration of 8 weeks every year for University faculty at Postgraduate level so that they are able to impart education on specific subjects on Remote Sensing and GIS in their area of specialization and/or start new programs like M.Tech/M.Sc/ Postgraduate diploma with emphasis on RS & GIS application in their institutions. IIRS has trained more than 475 University faculty spread all over India. Many universities have been benefited from the IIRS training programs and have started RS & GIS courses at postgraduate level with institutional support from IIRS.

2. About EDUSAT



EDUSAT is the first Indian satellite built exclusively for serving the educational sector and was **launched successfully by GSLV-F01 on 20-9-2004**. It is mainly intended to meet the demand for an interactive satellite based distance education system for the country. It strongly reflects India's commitment to use space technology for national development, especially for the development of the population in remote and rural locations.

The 1950 kg EDUSAT was launched from Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota, into a Geosynchronous Transfer Orbit (GTO) by ISRO's Geosynchronous Satellite Launch Vehicle (GSLV). The satellite is co-located with KALPANA-1 and INSAT-3C satellites at 74 deg East longitude. Compared to the satellites launched in the INSAT series so far, EDUSAT has several new technologies. The spacecraft is built around a standardized spacecraft bus called I-2K. It has a multiple spot beam antenna with 1.2 m reflector to direct the Ku band spot beams precisely towards their intended regions of India, a dual core bent heat pipe for thermal control, high efficiency multi-junction solar cells and an improved thruster configuration for optimized propellant use for orbit and orientation maintenance. The satellite uses radiatively cooled Ku-band Traveling Wave Tube Amplifiers (TWTAs) and dielectrically loaded C-band Demultiplexer for its communication payloads.

EDUSAT carries five Ku-band transponders providing spot beams, one Ku-band transponder providing a national beam and six Extended C-band transponders with national coverage beam. It will join the INSAT system that already has more than 130 transponders in C-band, Extended C-band and Ku-band providing a variety of telecommunication and television services. (<http://www.isro.gov.in>)

3. Why EDUSAT based training?

Contact based training though advantageous and beneficial, is not always possible for many to attend due to time limitations, financial constraints and importantly day-to-day commitments at work place. There are many types of training courses, which can be attended from a distance with different types of technology and tools. The first among them is the distance education (correspondence courses) supported either with or without study centers. The next one is “Internet based courses” replacing the conventional correspondence courses. The advanced type of courses are “e-learning” where the student can avail the content of the course through the internet, stream the lectures using the internet and have interaction with teachers on a specified date. They can be provided with FAQs (Frequently Asked Questions) and quiz materials for easy learning. The students can appear for examinations on a specified date and location.

The EDUSAT based training also follows more or less e-learning method and provides direct interaction with the teacher/expert when the lecture is delivered using EDUSAT satellite communication. It is advantageous because of its good quality reception and interactions are not constrained due to bandwidth problems of Internet.

4. EDUSAT utilization for the proposed training

The use of Remote Sensing, Geographic Information System (GIS), Global Positioning System (GPS) and associated geo-spatial technologies is increasing rapidly, creating an urgent demand for trained manpower. IIRS proposes to utilize the EDUSAT facility to strengthen institutions by sharing IIRS faculty expertise in running Geoinformatics programs, train students at undergraduate / postgraduate level at institutions that have established Geoinformatics facility with the funding support from NNRMS and other institutions/organizations that regularly approach IIRS for Geoinformatics expertise.

Under the EDUSAT training program, IIRS has established its own Teaching end Studio and Up-linking facility in the campus under national beam coverage of EDUSAT and link with the users. The First training course was conducted for twelve universities/institutions on “Basics of Remote Sensing, Geographical Information System and Global Positioning System” for 6 weeks duration during January 29 – 09 April 2007 with participation of 349 students registered for this course. In the second course the number of universities rose to 32. It was conducted during September 19 – December 3, 2007. Combined course report for the 1st two courses may be referred for total turnout of the participants at Annexure 1. In the third course more universities and students enrolled bringing up the count to 2000+ students from 40 odd universities across India. New universities can also participate in the forth coming courses conducted by IIRS.

5. COURSE OVERVIEW

- **Course Structure and Curriculum**

It is proposed to conduct training course on “**Remote Sensing, Geographical Information System and Global Positioning System**” for university students. The course program is structured into four modules as detailed below:

Remote Sensing & Digital Image Processing	- 2 Weeks
Global Positioning System	- 1 Week
Geographical Information Systems	- 2 Weeks
Applications and advances	- 1 Week
	Total – 6 Weeks

The details of course curriculum for each topic is given in the following table:

S.No.	Course Curriculum	Duration
1	<p>Remote sensing</p> <p>Principles of RS Platforms and Sensors Thermal Remote Sensing Microwave Remote Sensing Spectral Signature properties of Soil, Water and Vegetation Atmospheric interactions of EMR Elements of interpretation Indian Remote Sensing Satellite Programs Satellite data reception, products generation and ordering procedures Digital image analysis Preprocessing, enhancement techniques and Classification algorithms (Supervised and Unsupervised)</p>	<p>2 Weeks Total 21 hrs Lectures – 9 hrs;</p> <p>Interaction / Discussion – 8 hrs i.e. 30 Minute each after one hour lecture</p> <p>Demonstration / hands on- 4 hrs, i.e. 30 Minute each after one hour practical demonstration and discussion</p>
2	<p>Global Positioning System</p> <p>Overview of GPS/other Navigation System Signals, constellation and functionality Navigation Principles, code and carrier wave measurements GPS Errors Principles of Differential GPS Surveying Methods and integration with GIS themes Application case studies Comparison of different navigation systems</p>	<p>1 Week Total 6 hrs Lectures – 2 hrs;</p> <p>Interaction / Discussion – 2 hr i.e. 30 Minute each after one hour lecture</p> <p>Demonstration / hands on- 2 hr, i.e. 30 Minute each after one hour 1 demonstration and discussion</p>

3	<p>Geographical Information System</p> <p>Overview of GIS Spatial Data Models (Vector and Raster Models) Data formats and structures Non-Spatial data models (Hierarchical, Network and RDBMS data models) Inputting, editing and topology creation Hardware and Software requirements for GIS Coordinate systems, Datum and Projections Spatial Analysis (Vector as well as Raster) Digital Elevation Models and applications Network analysis Web resources for GIS</p>	<p>2 Weeks Total 21 hrs Lectures – 9 hrs;</p> <p>Interaction / Discussion – 8 hrs i.e. 30 Minute each after one hour lecture</p> <p>Demonstration / hands on- 4 hrs, i.e. 30 Minute each after one hour practical demonstration and discussion</p>
4	<p>RS and GIS Applications</p> <ul style="list-style-type: none"> ❑ Operational Remote Sensing Applications in India ❑ Agriculture– Total area and crop type, yield forecasting, Agrometeorology ❑ Soil survey and Mapping, Land evaluation and Soil Conservation Planning ❑ Forest Inventory, Ecosystem analysis & Biodiversity characterization and management ❑ Geology and Geomorphology, Hydrogeology & Engineering Geology with emphasis on Landslide studies ❑ Water Resources Assessment and development/Watershed Characterization, Irrigation Water Management & Flood and Drought monitoring ❑ Coastal Zone Management & Oceanography ❑ High resolution satellite images and Human Settlement Analysis 	<p>1 Week Total 12 hrs Lectures – 8 hrs;</p> <p>Interaction / Discussion – 4 hrs i.e. 30 Minute each after one hour lecture</p>

Course curriculum is under constant revision. Further changes in the course curriculum are underway. Newer concepts and newer ideas are being thought of being taught for the benefit of the student/user community.

- **Who can attend the training?**

The registered students who are undergoing final year undergraduate/ postgraduate courses are entitled to apply for the training program. Their applications have to be duly sponsored by the respective university/institute/college and forwarded through coordinators from the respective centers. Accommodation of individuals is not entertained.

- **Registration of participants**

The eligible candidates need to apply for the course well in advance through the resource faculty/focal point at one of the university/institute that is identified to receive the training program. Candidates are advised to visit the IIRS website (<http://www.iirs-nrsc.gov.in/>) for updated information on how to apply for the course.

- **Course fee involved**

There is no fee for this course. University / institution involved to conduct the course may charge the students to recover the operational expenses, if required. IIRS does not play a role in this connection.

- **Award of certificates**

IIRS will award certificates to the registered candidates who successfully complete the training program, in person at the institute or will be dispatched to the individuals. The University/Institution /College Coordinators will be responsible to complete the required formalities in this regard.

- **MOU requirements to avail the EDUSAT based training program**

The participating Universities / Institutions are required to confirm their participation in this program and agree to the following broad terms and conditions:

- University/Institute shall support its own EDUSAT classroom facility for the planned training.
- University/Institute shall meet the financial requirements on its own for the expenditure incurred on the training at their place.
- Identified focal point at the University/Institute shall coordinate the day-to-day activity requirements of the planned training program.
- University/Institute will be responsible for arranging the EDUSAT classroom for the scheduled training program, registering students for the training, attendance of the students and taking care of all needs, as and when required.
- Institute/University coordinator shall collect feedback at the end of each module for improvements to be made in future courses.

- **Feedback mechanism**

A feedback mechanism is planned in which the students and all others concerned are advised to give their feedback at any time during the course. A feedback form through IIRS website can be utilized to send the feedbacks to the coordinator of the EDUSAT program. A formal feedback will be obtained from all the participants by the respective University coordinator, on completion of the course and will be utilized for improving the future courses.

- **Workshop on “Experience/Feedback of EDUSAT Program”**

A workshop may be held at the end of the project (after completing three training programs) in order to assess various aspects, such as, meeting the overall objective of the course, course content, lecture delivery, completion of practical, regular interactive

sessions, online quiz and assessment procedures and plan for the future training courses. It can be organized at IIRS or at any one of the participating universities / institutions.

- **Sponsorship of the program**

National Natural Resources Management System (NNRMS), Department of Space (DOS) has sponsored the training program, for conducting it at IIRS for the year 2009-10.

- **Contact person at IIRS**

The total project is divided into three parts: Initiation, setting-up the EDUSAT teaching end, Classrooms at universities, and implementation using the facilities. Shri. P.L.N. Raju, In-charge Geoinformatics Division has been identified as the Project Manager with overall responsibilities of the EDUSAT based Training Program. He will be assisted by Shri Prasun Kumar Gupta, Scientist “SC”, Geoinformatics Division, IIRS in up-gradation and standardization of services under EDUSAT.

6. CEC-UGC role in implementation of the program

EDUSAT is the first satellite designed, developed and launched solely for education, as a joint initiative of ISRO and MHRD (Ministry of Human Resource Department). It is intended to provide interactive satellite based higher education at country level, to be implemented by IGNOU, AICTE, ICAR, NCERT and UGC. IIRS will be utilizing UGC network through CEC (Consortium for Educational Communication), for the identified institutions and universities. Most of these institutions have already established SITs (Satellite Interactive Terminals) required for the proposed training. CEC will be providing the required slot of time for conducting the program on the national beam.









7. Proposed Plan



The EDUSAT based course was implemented in three phases over a period of three years. The implementation plan envisaged at the beginning of the program constituted of one phase a year. It began by identifying universities/institutions, formulation of the syllabus and setting up of a teaching studio at IIRS. The program was an instant success as soon as it went on air. The workshop at the end of the program gave valuable feedback. The second phase constituted to upgrading the course curriculum and expanding the list of participating universities/institutions. The final phase dealt with finalizing the course curriculum and finalizing the set up to run an IIRS certificate program on yearly basis.

The proposed plan of activities this year is as given on the next page. The feasibility of conducting an additional program this year (2009-10) is under consideration. Please visit IIRS website or contact EDUSAT project manager (IIRS) for latest updates.

S.No.	Activity	Months												
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
I. Basic Training Program (fourth in the series)														
1	Announcement	■	■											
2	Linking new universities		■	■	■									
3	Registration of students			■	■	■								
4	Testing and establishing linkages				■									
5	Scheduling of the program			■										
6	Conducting of the training program					■	■	■	■	■				
7	Non Linear editing h/w & s/w						■	■	■	■	■			
8	Completion of the program									■	■			
9	Awarding Certificates									■	■	■	■	
II. Starting New program (Advances in RS & GIS / Application program)														
10	Upgrading to new train net facility										■	■	■	
11	Linking with university network under new train net environment										■	■	■	
12	Announcement							■	■					
13	Registration of students								■	■	■			
14	Testing and establishing linkages											■		
15	Scheduling of the program										■			
16	Conducting of the training program											■	■	■
17	Completion of the program													■
III. Workshop activity														
18	Announcement											■	■	
19	One day Workshop													■
20	Summary report													■
IV. Final report on the EDUSAT Training Program														
														■

8. List of Faculty members involved (2006-09)

S.No.	Photo	Name	Area of Specialization	Designation And Department	Contact details
I. Remote Sensing Module					
1		Dr. George Joseph	Director, CSSTE-AP	Director, CSSTEAP	0135-2740787 cssteap@iirs.gov.in
2		Dr. V.K. Dadhwal	Agricultural Remote Sensing and Global Change	DEAN, IIRS	0135-2744583 dean@iirs.gov.in
3		Mrs. Minakshi Kumar	Image Processing & Remote Sensing	Scientist/Engr. 'SE', PRSD	0135-2524116 meenakshi@iirs.gov.in
4		Mrs. Shefali Agarwal	Remote Sensing & GIS	Scientist/Engr. 'SE', PRSD	0135-2524112 shefali_a@iirs.gov.in
II. GPS Module					
1		Dr. Anil Kumar	Photogrammetry, Remote Sensing & GPS	Scientist/Engr. 'SD', PRSD	0135-2524114 anil@iirs.gov.in
2		Mr. P.L.N. Raju	Geoinformatics & GPS	Scientist/Engr. 'SF' (In-charge), Geoinformatics	0135-2524123 raju@iirs.gov.in
3		Mr. Ashutosh Bharadwaj	Civil Engg, RS, GIS and GPS	Scientist 'SD' PRSD	0135-2524166 ashutos_iirs@iirs.gov.in
III. GIS Module					
1		Mr. P.L.N. Raju	Geoinformatics & GPS	Scientist/Engr. 'SF' (In-charge), Geoinformatics	0135-2524123 raju@iirs.gov.in
2		Mr. C. Jeganathan	Geoinformatics, Image Processing & S/W Development	Scientist/Engr. 'SE', Geoinformatics	0135-2524125 jeganiirs@iirs.gov.in

3		Ms. Vandita Srivastava	Geoinformatics, Image Processing	Scientist/Engr. 'SD' Geoinformatics	0135- 2524127 vandita@iirs.gov.in
4		Mr. Sameer Saran	Decision Support System, RDBMS, GIS	Scientist/Engr. 'SD' Geoinformatics	0135- 2524128 sameer@iirs.gov.in
5		Mr. K. Ram Mohan Rao	DBMS, Internet GIS & Security challenges	Scientist/Engr. 'SC' Geoinformatics	0135-2524129 rammohan@iirs.gov.in
6		Dr. Yogesh Kant	Remote Sensing applications to Environmental Physics	Scientist/Engr. 'SD' Geoinformatics	0135- 2524228 yogesh@iirs.gov.in
IV. RS&GIS Application					
1		Dr. S.K. Saha	Agricultural Remote Sensing	Scientist 'SG' Agriculture	0135- 2524337 sksaha@iirs.gov.in
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4		R.C. Lakhera	Geology, Geomorphology	Scientist 'SG' Geoscience	0135-2524338 lakhera@iirs.gov.in
5		Dr. Sadhana Jain	Civil Engg. And Town Planning	Scientist 'SD', Human Settlement	0135-2524190 sadhana@iirs.gov.in
6		Dr. S.P.S. Kushwaha	Forest Remote Sensing and Ecology	Scientist/Engr. /Engr. 'SG'	0135-2524170 spskushwaha@iirs.gov.in
7		Dr. D. Mitra	Geomorphology and Coastal Management	Scientist 'SE' Marine sciences	0135-2524181 mitra@iirs.gov.in

9. List of Participated Universities with Contact Information 2006 – 09

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15	PSG College	Mr. Ranganathan	(O):0422-4397123,4397901 (M) : 09843847072 vrnathan54@yahoo.com

16	Gauhati University	Dr. Shyamanta Chakraborty	(M) : 0985997618 (O):50361-2570599 ugcascgu@rediffmail.com
17	Gujarat University	Dr. Dinesh Goswami	(M) : 09909911419 (O) : 079- 26302409, 26309278 harsh007bond@yahoo.com , edusat.em2rc.ahd@gmail.com
18	CEPT University	Prof. Anjana Vyas	(O) : 079- 26302470 (Ext. 132) anjanavyas@yahoo.com
19	MG Science Insitute		
20	University of Madras	T. Vasantha Kumaran	(M) : 09444200409, 09444443654 thangavelukumaran@gmail.com
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29	Guru Jambheshwer University		
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33	Jadavpur	Anirban Mukhopadhyay	(M) : 09831432302

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38	Presidency College	Mr. Gour Gopal Ray	(M) : 09231580079 gourgopalray@yahoo.co.in

10. List of Participating New Universities in Fourth EDUSAT Course

S.No.	Universities	Coordinator	Contact Details
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3	FRI , Dehradun	Shri Amit Asthana Dr. SD Sharma	(M) : 9410153241 amitasthana37@hotmail.com amit@icfre.org
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11. Feedback from the Universities

- **Second EDUSAT Workshop Feedback**

After 3 successful broadcasts of the program all the participating universities and new universities expressed their desire to continue their affiliation with the IIRS EDUSAT training courses in the future. There were suggestions to present the lectures/presentations in multi lingual mode, if possible. It was communicated clearly by all participants that the EDUSAT program is very beneficial as the participants are exposed to National level operational activity in RS & GIS. A national level calendar for IIRS EDUSAT Program needs to be worked out and mandatory UGC guidelines have to be made for participation in EDUSAT programs. The success and effectiveness of this program was demonstrated when the request to run the EDUSAT training program twice in a year was expressed in unequivocal voice. Other points of feedback included providing motivation/incentive for University Coordinator, further standardizing the evaluation procedure for awarding certificates, compulsory attendance to all registered participants and use of advanced technologies like pod casting for propagation of EDUSAT training programs.

- **Feedback prior to 2nd EDUSAT Workshop**

All the EDUSAT program participants expressed that it was a unique opportunity for them to be interacting with eminent scientists of ISRO centers. The lecture content, presentations and demonstrations was reported to be excellent. The method of teaching, interactions, quiz sessions and examination formats was appreciated and liked by the student community. The problems faced in the initial transmission/broadcast phases were numerous, and the same was reflected in the statement from university coordinators. While the technology used in the transmission of EDUSAT programs was still in its nascent phases, issues like unclear speech & video and undecipherable text of presentations on projector/TV sets was faced by all. We also received requests to extend the duration of courses, schedule the broadcasts keeping regional holidays in mind, date formatting files and documents kept on FTP server directories, providing study materials in advance and maintaining internet groups of participating students.

Annexure 1

TOTAL NUMBER OF PARTICIPANTS IN EDUSAT COURSE (till 2009), Indian Institute of Remote Sensing

S. No.	Name of University	Total Students
1	Pune University	190
2	NIT, Warangal	49
3	Anna Univ., Chennai	62
4	Jamia Milia, Islamia	14
5	Banasthali Univ.	205
6	JNU, Delhi	70
7	Hari Singh Gour Univ.	81
8	Madurai Kamaraj Univ	82
9	Thanjavur, Tamil Univ.	27
10	Rajiv Gandhi Univ	38
11	Kashmir Univ.	32
12	Mysore Univ.	05
13	Tripura Univ.	14
14	BIT, Ranchi	125
15	IIT Roorkee	12
16	Presidency College, Kolkata	23
17	H.N.B.G.U, Srinagar	16
18	M.D.S. University, Ajmer	62
19	Baramulla University	40
20	Jammu University	52
21	HARSAC	12
22	Hissar	13
23	Kurukshetra Univ.	25
24	GJUST	10
25	Gujarat University	16
26	CEPT University	245
27	MG Science Institute	06
28	Gauhati Univ., Assam	78
29	Bharathiar Univ.Coimbatore	11
30	PSG College, Coimbatore	139
31	Madras University	26
32	Nagpur University	51
33	Shivaji Univ.	105
34	JSAC	08
35	Jadhavpur Univ.	14
36	APSCOST Vijayawada	14
37	IARI Delhi	26
38	Silchar Univ. Assam	10
39	ADM College	43
40	Walchand College of Engg.	11
	TOTAL	2062

Abbreviations

CEC	Consortium for Educational Communication
CSSTE-AP	Centre for Space Science and Technology Education in Asia Pacific
DOS	Department of Space
GIS	Geographical Information System
GPS	Global Positioning System
IGNOU	Indira Gandhi National Open University
IIRS	Indian Institute of Remote Sensing
INSAT	Indian National Satellite
ISRO	Indian Space Research Organisation
ITEC	International Technical and Economic Cooperation
NITTTR	National Institute of Technical Teachers Training and Research
NNRMS	National Natural Resources Management System
NRSC	National Remote Sensing Centre
ROT	Receive Only Terminal
SCAAP	Special Commonwealth African Assistance Plan
SIT	Satellite Interactive Terminal
UGC	University Grants Commission