40 Years of IIRS and Beyond

Dear Alumni

Indian Institute of Remote Sensing (IIRS formerly Indian Photo Interpretation Institute -IPI) was established in 1966 with the collaboration of International Institute for Geo-information Science and Earth Observation (ITC), The Netherlands. IIRS and ITC have planned to celebrate 40 years of collaboration. The emphasis will be placed on prospects of future collaboration in thrust areas of RS & GIS technologies.

A session is devoted on Reminiscences about association with IIRS of its alumni. We would be happy to have you here, listen to your experiences of the time you spent here, how the knowledge has been beneficial to you and with the knowledge thus acquired , your contribution in making this world a better place to live. Do write to us to participate.

V.K. Jha

Dear Alumni

We have prepared a database of our alumni. You can browse it in our website http://www.iirs-nrsa.gov.in/ (Click on Students Section / Alumni List).
If your profile need changes kindly click on link Update your Profile, register with us and update your profile.

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FAO GLCN LCCS Workshop at IIRS

A workshop was organized at IIRS between March 27-31, 2006 to familiarize the participants from India on the Global Land Cover Network (GLCN) concept and the Land Cover Classification System (LCCS) jointly developed by FAO and UNEP. The workshop was attended by eleven scientists from eight different national and state organizations viz., National Remote Sensing Agency (NRSA), Hyderabad, Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad, Forest Survey of India (FSI), Dehradun, IASRI,

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New Delhi, CAZRI, Jodhpur, ARSAC, Guwahati, Regional Remote Sensing Service Centre (RRSSC), Jodhpur and Indian Institute of Remote Sensing (IIRS), Dehradun. The workshop was immensely benefitted by the participation of FAO LCCS Expert, Mr. Antonio Di Gregorio. The LCCS aims at harmonization of land cover classification system across countries and continents so that land cover and information could be compared internationally. Needless to mention, that this will greatly facilitate global land cover and climate changes studies. The workshop was funded by FAO through its India Office at New Delhi. The participants of the workshop appreciated the IIRS initiative and expressed happiness on overall contents and the quality of the workshop.

S.P.S. Kushwaha

Special Course for participants from INCT Algeria

ANTRIX had signed a contract with INCT (Institute National de Cartographie et de Télédétection), Ministry of Defence Algeria for setting up a reception station in their country. The contract also envisaged for providing theoretical and practical training on all aspects of remote sensing, data reception, production etc.

IIRS was identified for providing 8 weeks of theoretical training on earth observation concepts, techniques and information extraction of earth surface processes and features. Highly dedicated, hardworking 28 professionals attended the course with strong background in computer engineering, surveying and geodesy, cartography from INCT, Algeria.

The course began on 6th March 2006, with introductory exposure to technical English, operating systems both on windows and Linux and databases. Next 6 weeks covered topics on platform sensors spectral signature, microwave and thermal remote sensing, photogrammetry, Cartography, geodesy and image processing in such a manner so that it covers depth as well as breadth as desired by course participants.

The theoretical classes were supplemented by completely interactive practical exercises performed on high-end networked computer systems. The participants were exposed to variety of data products from Indian and International satellite sensors. Field visits were organized to places with different terrain conditions across doon valley to correlate subjects taught in class to that on ground. In field special emphasis was laid on acquisition of GPS data from different GPS receivers from handheld to precise geodetic receiver. The participants were taken to visit different organizations namely Survey of India and Forest survey of India.

The first phase of the ALGIERS training program was concluded on 29th April 2006, with a visit to the TAJMAHAL.

Shefali Agrawal

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Refresher Course for IFS Officers on Application of Remote Sensing and GIS in Forestry

The Forestry and Ecology Division, IIRS organized a refresher course for senior IFS officers during 10-14 July, 2006 which was sponsored by Ministry of Environment and Forest, Government of India. The course aimed at giving exposure to them on practical applications of remote sensing and GIS in day-to-day decision making. The course was attended by seventeen senior officers. The course was specially designed to provide better perspective on issues in forest management using remote sensing and GIS techniques. During the course, extensive discussions were held on different approaches. At the end of the course, the participants were of the view that by adopting remote sensing and GIS techniques, State Forest Departments can enhance decision making at apex level.

Kunal Kumar Das

Special Training Programme on Applications of Remote Sensing and GIS in Ground Water Studies for CGWB Officers

A special two-weeks training programme on "Applications of Remote Sensing and GIS in Ground Water Studies" was organized for the officers of Central Ground Water Board (CGWB), Govt. of India, during March 13-24, 2006 at Indian Institute of Remote Sensing (IIRS), Dehra Dun. A total of 15 officers representing 13 Regional Offices including Unit Office of Delhi of CGWB attended this training programme.

The course was basically aimed at providing an understanding of the fundamentals of space-enabled techniques and GIS, and their applications in the field of hydrogeology, with specific reference to ground water targeting. The participants had the exposure on different image processing and GIS softwares, such as ERDAS Imagine, ArcGIS, GEOMATICA, ILWIS and ArcView, and also on GPS and mobile-GIS. Field excursion was conducted to Mussoorie-Dhanaulti area for local geological/ hydrogeological understanding. An excellent reference material was brought out through the sincere efforts of the faculty, which was provided to the participants in hard- and soft-forms.

The valedictory function was attended by Shri Shobh Nath, Member (EDMM and T&TT), CGWB, Dr. Sushil Gupta, Regional Director, Uttar Pradesh (UP) & Uttaranchal (UA) Regions, CGWB and other CGWB officials from UA Region Office located at Dehra Dun. Shri Shobh Nath, the chief guest, distributed the certificates to the participants.

It is hoped that the course will foster newer ideas, in terms of techniques and applications, into the minds of the practicing hydrogeologists. Further, it is expected to revive the collaboration between IIRS and CGWB.

S.K. Srivastav

Geo-Informatics Applications in Geo-Hazards IIRS NIDM Joint course under CASITA II Project

Indian Institute of Remote Sensing (NRSA) has organized Awareness Course on Geoinformatics Applications of Geo-Hazards during 10-14, July, 2006. This course was organized by IIRS in joint collaboration with National Institute of Disaster Management (NIDM), Ministry of Home Affairs, Govt. of India, as a part of the commitment of IIRS Under (CASITA-II) Project, which got support from Asian Disaster Preparedness Centre (ADPC), Bangkok, Thailand and International Institute for Geo-information Science and Earth Observation (ITC), The Netherlands.

This course is planned to provide awareness to administrators, who are involved in disaster management activities at grass root level. Keeping in view of the NIDM involvement with various central/state govts., NIDM was requested to select the course participants. 15 participants attended this course among them 10 were senior IAS officers, 3 state govt. eminent officers and 2 from NIDM, New Delhi.

The course was designed keeping in view of the background of the course participants. Lectures on Introduction to basic remote sensing and GIS were delivered. A lecture was arranged for information extraction using high-resolution images for disaster management. The course participants had hands on experience of using high-resolution images.

For the first time, a lecture was arranged through video chat by Dr. Cees van Westen from ITC, Netherlands on "**Introduction to Risk Assessment**".

Mr. Binod Doley delivered lectures on "**Basic Concepts of Disaster Management**" and "**Vulnerability Profiles and National Initiatives in Disaster Management**" lectures to give an idea about the national initiatives in disaster management.

Three more lectures Elements on '**Risk mapping, Vulnerability Assessment and Damage Assessment and Loss Estimation**' were arranged through video chat from Asian Disaster Preparedness Centre (ADPC), Bangkok, Thailand. This was very useful keeping in view of the expertise available with ADPC, which were very much appreciated by the course participants.

Lecture by Dr. V.S.Hegde, PD, DMSP to the course participants

Group Photograph of the course participants

The participants were briefed about the data generation through various disasters such as floods, drought, landslides, earthquake an forest fires. In addition to the classes/computer lab demonstrations, the participants were taken to Mussoorie and surrounding areas fo field visit to understand the satellite signatures with the ground truth.

V. Hari Prasa

Training Programme in RS & GIS for officers of ASI

Tailor made short training programme of 04 weeks duration on "Remote Sensing and GIS" was organized during 26th June to 21st July 2006 for Scientific Personnel of the Human Ecology Section of Anthropological Survey of India (ASI), Government of India. 08 officer trainees from Head office, Kolkata and Regional Centers (Nagpur, Kolkata, Shillong, Port Blair) attended the training.

The requirement of the officer trainees was to get trained in Remote Sensing and GIS for mapping of Biosphere Reserves of the country with special reference to land use, settlement pattern and forestry. Considering the requirement of this special training, the lectures and practicals (including field visits) were shared by Photogrammetry and Remote Sensing Division (PRSD), Geoinformatic Division (GID), Forestry and Ecology Division (FED) and Human Settlment Analysis Division (HUSAD).

For the benefit of course participants, guest lectures were delivered by faculty from Wildlife Institute of India, Dehradun and NRSA Data Centre, NRSA, Hyderabad (through video conferencing facility).

B.D. Bhara

Website Launch on Indian Bioresource Information Network

Indian Bioresourece Information Network web portal has been developed. It hosts spatial and non-spatial data generated under the joint project of Department of Space and Department of Biotechnology, Government of India on Biodiversity Characterization at landscape level using Remote Sensing and Geographic Information System and non-spatial databases of University Agricultural Sciences, Bangalore. The website called www.ibin.co.in was launched by Union Minister for Science and Technology in New Delhi on 25th July 2006. It is linked to Biodiversity Information System (www.bisindia.org) developed at IIRS. This is first of its kind of database and will be available to scientific community in the country. The network seeks the otherwise independent databases and information on the country's biodiversity as one window system for the benefit of researchers, bio-resource managers, policy makers, decision makers, entrepreneurs and the common man. The database contains spatial data on satellite images, maps of vegetation cover type, fragmentation status, disturbance index and biological richness and non-spatial data on plant species of India, animal groups (microbial fauna, birds etc. of Western Ghats), location, uses etc. The database is hosted at NRSA/IIRS and UAS.
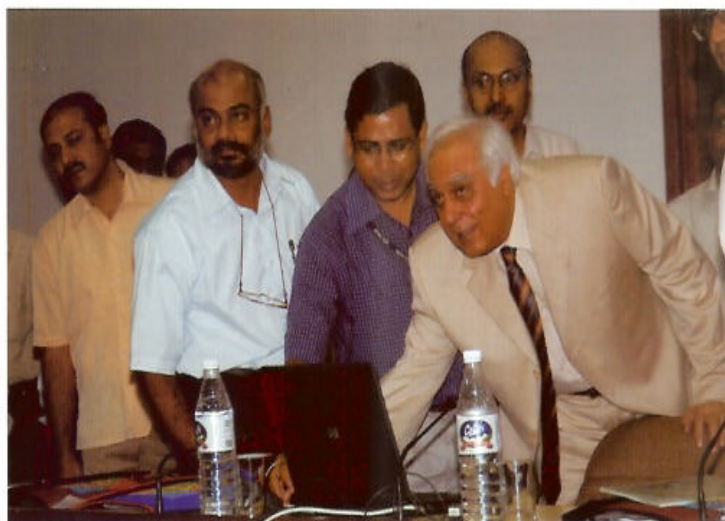
Release of Atlas of Biodiversity Characterization at landscape level using RS and GIS

The Phase II of the ongoing project on Biodiversity Characterization has been accomplished jointly by Department of Space and Department of Biotechnology in Madhya Pradesh, Jharkhand, Chhattishgarg, U.P. Vindhyans, West Bengal, Orissa, Andhra Pradesh, Tamilnadu, Karnataka (part). The research findings of the project have been brought out in the form of atlas. Dr. Kapil Sibbal, Honorable Minister for Science & Technology released the Atlas and Executive Summary on 25th July 2006 in New Delhi. The atlas contains the output maps of Vegetation Cover types, Fragmentation, Disturbance Regimes and Biological Richness. Other imminent personalities present on this occasion were Dr. M.S. Swaminathan and Dr. A.K. Sharma.

Sarnam Singh

Process - based Soil Erosion Modeling

The research project titled "Soil erosion assessment at catchment scale using satellite data and GIS in Himalayan region : A case study in Sitla Rao watershed" was initiated in 2003 to study soil hydrological processes and process-based modeling of runoff and erosion in Himalayan landscape. Sitla Rao, a tributary of Asan river falls in western doon valley in Dehradun district of Uttaranchal. Under the project, field instruments such as automatic weather station (one), self-recording raingauge (2 Nos.) and one stage level runoff (discharge) recorder were established at Langha village in Sitla Rao watershed. The site is also being developed as study site to meet the research and training requirements of the various training and education program of the Institute. The project mainly focuses on process-based simulation modeling to asses soil erosion and runoff generation employing remote sensing data and GIS. The data generated will provide the real field based hands-on experience to the trainees working in these fields.

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A number of required spatial data sets over this site have been prepared. High resolution IRS LISS IV satellite data (13th Nov. 2004) was used to prepare land use / land cover map and soil map at 1: 25,000 scale. The soils were characterized for their hydrological and soil erodebility characteristics. Stereo Cartosat-1 data (4th July 2006) was obtained recently to prepare a high resolution digital elevation model (DEM) and generate slope and other terrain parameters needed for spatial hydrological and soil erosion modeling.

Predicting soil erosion by water is an important natural resource management activity for evaluating the impacts of upland erosion on sediment delivery, soil productivity, and offsite water quality. Among various soil erosion models, Water Erosio Prediction Project (WEPP), a new generation, continuous process based soil erosion prediction model has been used in the study. Th model is based on fundamentals of infiltration theory, hydrology, soil physics, plant science, hydraulics, and erosion mechanics (Flanaga and Nearing, 1995). It computes spatial and temporal distributions of surface runoff, soil loss and sediment deposition from overlan flow on hillslopes and soil loss and sediment deposition from concentrated flow in small channels. The WEPP model is delivered in tw versions as hillslope and watershed. Both versions were used and the salient results observed are as follows:

(i) WEPP model run on hillslope scale helped to understand the infiltration and surface runoff generation and soil loss pattern alon hillslope. It revealed that runoff water infiltrated into mid backslope and lead to saturation of soils at lower backslope that resulte exfiltration and triggered high rate of rill and interrill erosion at lower backslope. It simulated soil loss that varies between 1.2 kg/m^2 hilltop position and a maximum of 4.0 kg/ m^2 at lower backslope position. It indicated high susceptibility of lower backslope to so erosion.

(ii) WEPP watershed version (2002.7) was run at catchment scale and validated with WEPP simulated surface runoff for selected rai events. The surface runoff generated for rain events of low to medium rain intensity by WEPP model matched with observation (r^2 = 0.69) while its performance was poor for high rain intensity. Simulated and measured runoff from all the rain events comprising low t high rain intensity showed low regression coefficient ($r^2 = 0.25$). WEPP model provide explicit spatial and temporal estimate of so erosion and surface runoff generation of hillslope and in the watershed. Results bring out utility of WEPP model after calibration for so and water conservation planning at micro / mini watershed level.

Two students carried out their dissertation in 2006 addressing to soil erosion and runoff modeling in the Sitla Rao watershed. They are:

(i)   Soil erosion risk modeling and Current erosion damage assessment using remote sensing and GIS

(ii) Modelling watershed runoff and sediment yield using remote sensing and GIS

In the current year, soil moisture and surface roughness estimation is being done with temporal ENVISAT data. The field work is i progress. The generated data base will be used in another process based model KINEROS (Woolhiser et al., 1990) which is planne in the study. A runoff collection tank has been constructed in the current rainy season for sampling of surface runoff to estimate suspende sediment and soil nutrients loss at catchment scale.

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Flanagan, D. C., Nearing, M. A. 1995. USDA - Water Erosion Prediction Project Hillslope Profile and Watershed Model Documentation. NSERL Report 10, USDA-ARS National Soil Erosion Research Laboratory, West Lafayette, IN. (See also: http://topsoil.nserl. purdue.edu/weppmain/wepp.html. Woolhiser, D.A., R.E. Smith, and D.C. Goodrich, 1990. KINEROS, A kinematic runoff and erosion model: Documentation and User Manual. U.S. Department of Agriculture, Agricultural Research Service, ARS-77, 130 pp.

Dr. K. Radhakrishnan, Director, NRSA along with members of NCMC (NRSA Central Management Council) visited the research site on 24th April, 2006 during the meeting of NCMC at IIRS and were appraised with the preliminary results of the study and the data (daily rainfall and runoff) being collected since July 2003.

Suresh Kumar and Sameer Saran

Dr. K. Radhakrishnan, Director, NRSA and NCMC members at Runoff Recording site established in Sitla Rao watershed

Corner Reflector Installation at the Field Site for Microwave ENVISAT ASAR Passes

The present work is part of the research study entitled "Role of microwave remote sensing for spatially distributed water erosion modeling in a Himalayan catchment". This research work is being carried out at Sitla Rao watershed with ENVISAT ASAR data which requires multiple remote sensing data rectified with a high precision. Appropriate technique for the delineation of the features in ENVISAT ASAR data is use of corner reflectors for Ground Control Points (GCPs) collection. In the study area five corner reflectors were fabricated and installed in the field. The design of the corner reflector with a movable base for the smooth orientation with respect to azimuth and elevation of the corner reflector was fabricated. The requirement of the corner reflector is that two surfaces meet at a 90 degree angle that are pointed toward an incident beam. A triangular trihedral corner reflector presents three reflective surfaces arranged at 90-degree angles and requires less precision in pointing the reflector towards the radar beam. The trihedral corner reflectors were designed such that, the opening of the reflectors forms an equilateral triangle with 2.43 meter per side. The angle from the bore sight to the reflectors plates is 30 degrees. The bottom point of the reflector was set on a circular stand that allowed the reflector to be moved in the azimuthal direction as well as to be elevated to the desired elevation angle. The circular stand was fixed into the ground such that the bottom point of the corner reflector is at ground level. The exact position of the reflectors was determined using a Differential Global Positioning System (DGPS). These positions were forwarded to the European Space Agency (ESA) according to which they have supplied the azimuth angle as well as the elevation angle at each position to which the corner reflectors are oriented in order to face the ASAR beam thus enabling the corner reflector to reflect the beam back to the satellite sensor (Table1). The distance from the ground by

Table 1: Orientation parameters for corner reflectors

CR_No	Height	Swath	Track	Azimuth	Elevation	CR_angle	Inclination angle	sin(inc)	X (m)	Order1_Acq_date
CR1	678.9	IS2	55	258.181	67.857	30	37.857	0.61369	1.421018	
			62	101.946	69.643	30	39.643	0.638	1.477307	8/5/2006 4:57:41
			291	101.596	64.817	30	34.817	0.57096	1.322063	8/21/2006 4:54:51

which the reflector has to be elevated is calculated by using the sine of the desired inclination: Sin (i) = x/h i.e. x = h Sin (i) where, i is the inclination angle (elevation angle - angle of bore sight to the reflector plate), h is the height of the reflector, and x is the perpendicular distance from the reflector base to the ground. A total of 5 such corner reflectors were installed in the field. These corner reflectors were distributed in such a way so as to cover the entire study area and to allow maximum accuracy at the time of georeferencing. The positions of the corner reflectors were selected in those areas that would have a lower 'db' value as compared to the corner reflectors radar cross section thus facilitating easy identification of these bright spots in the image.
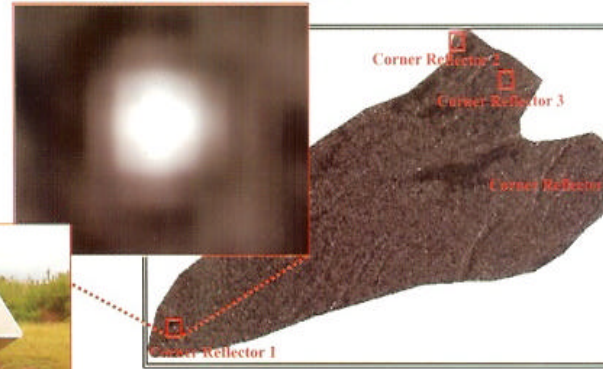
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ENVISAT ASAR Alternating Polarisation Mode Precision Image (ASA APP 1P) SWATH IS2 POL HH

Inset 1: Backscatter due to Corner Reflector 1

Corner Reflector 2
Corner Reflector 3
Corner Reflector

Corner Reflector 1

Inset 2: Corner Reflector on Ground

Sameer S

Retrieval of Marine Aerosol Optical Depth (AOD) using IRS-P4 (OCM) Sensor

The aerosol optical depth (AOD) is an important parameter for monitoring earth atmosphere radiation budget study. Presently AOD is provided by several polar orbiting satellites on daily basis. In the present study an attempt is made to retrieve the marine aerosol optical depth using IRS-P4 OCM data. Since water leaving radiance is negligible in red and infrared part of the spectrum, IRS-P4 OCM band-8 is used to retrieve the AOD values over ocean. In absence of water leaving radiance, the total radiance detected by the sensor is due to molecular scattering and aerosol scattering. The molecular scattering can be computed using the radiative transfer equations and radiance due to aerosol scattering can be retrieved. Later aerosol optical depth can be determined from the aerosol scattered radiance. The extension of study area is shown in **figure 1**.

The AOD image from IRS-P4-OCM sensor is presented in **figure 2**. For an initial assessment, the retrieved AOD values of IRS-P4 OCM and SeaWiFS of 25 March 2006 are compared. For comparison, the segments of the ocean which are cloud free and sediment free representing coastal region as well as oceanic region were selected. The present analysis suggests that the AOD retrieved from OCM sensor is in good agreement with the retrieved

AOD from other contemporary sensors like SeaWiFS. The comparison of IRS-P4 OCM and SeaWiFS data are presented
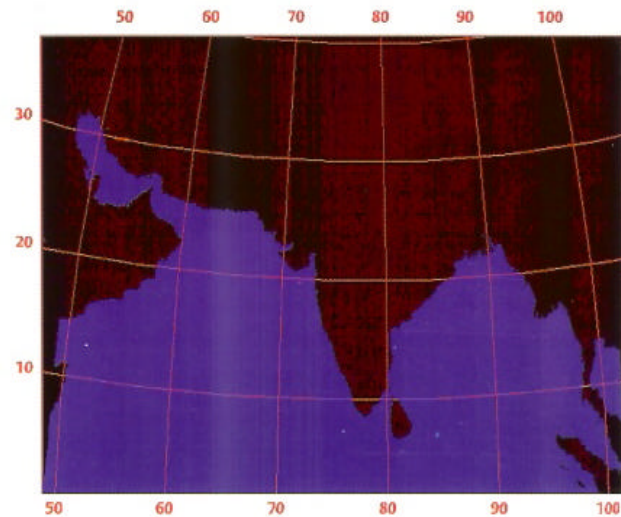
Figure 1. Map showing coverage of Study
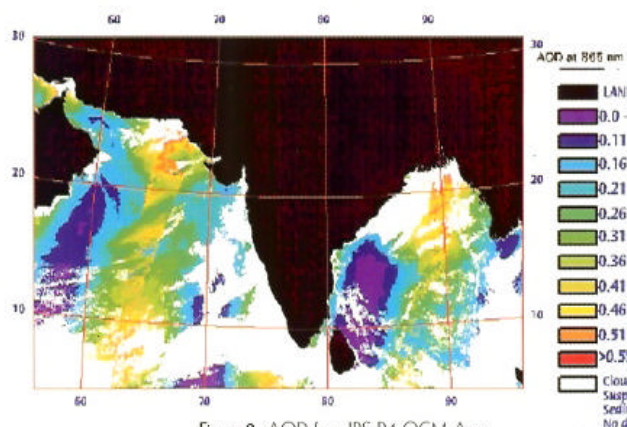
25-26 March 2006 AOD from IRS-P4 OCM Data

Figure 2. AOD from IRS-P4 OCM Area.

in Figure 3.The deviation of the points from the matching line **(Figure 3)** is due to the different time periods of satellite coverage. Since, the distribution of aerosol concentration depends on many climatic factors and the time of data acquired by OCM and SeaWiFS differs, the spread of points from the marching line may be attributed to any change in climatic condition. The IRS-P4 OCM data is available for the entire ICARB cruise period (March to May 2006). The daily data is being processed and the validation work will be carried out simultaneously with SeaWiFS and MODIS data. The other atmospheric parameters available from various satellite sensors will be taken into account to study the aerosol climatology in the Arabian Sea and Bay of Bengal.
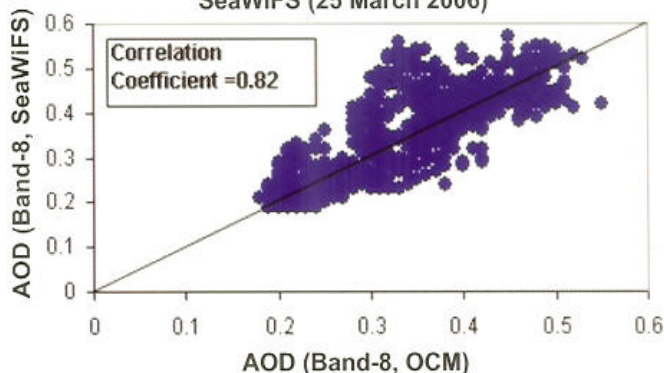
A.K. Mishra and V.K. Dadhwal

Figure 3. The correlation between AOD values retrieved from IRS-P4 OCM data with Sea WiFS data.

IIRS Launches satellite (EDUSAT) based training for the first time on "Remote Sensing, GIS and GPS"

The use of Remote Sensing, Geographic Information System (GIS), Global Positioning (GPS) and associated geo-spatial technologies is increasing rapidly, creating an urgent demand for more trained manpower. IIRS proposes to utilize the EDUSAT(a joint venture of ISRO/DOS and MHRD, dedicated Education Satellite System to utilize at all levels of education in India). Initially it is proposed to strengthen the existing network of institutions where IIRS has cooperation or accreditation for education programs; sharing of faculty expertise in running Geoinformatics
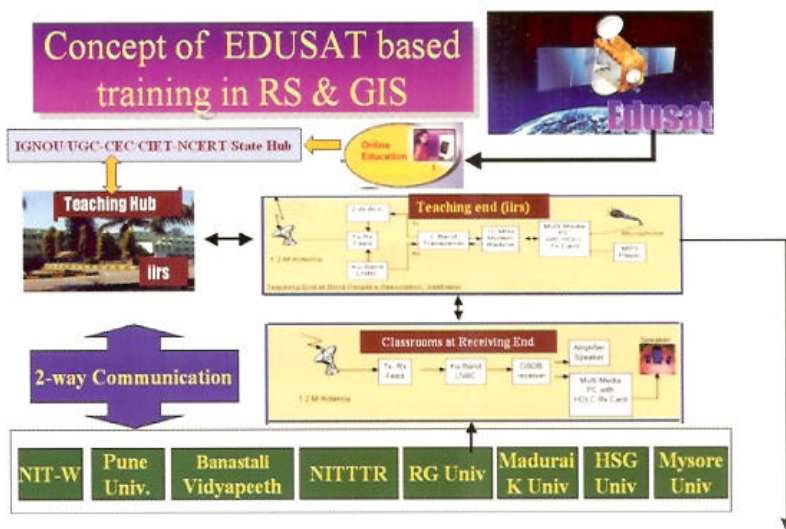
Universities/Institutions other than IIRS collaborative institutions

Figure showing a Concept of EDUSAT based training at IIRS

programs initiated by other institutions with IIRS support; train the students of undergraduate / postgraduate courses at institutions that have established Geoinformatics facility with the funding support from NNRMS and other institutions/organizations that regularly approach IIRS, NRSA, Department of Space for Geoinformatics expertise.

Under the proposed EDUSAT facility, IIRS has established its own Teaching end Studio and Up-linking facility at IIRS premises under national beam coverage of EDUSAT and link with users. Initially eight universities/institutions (i.e. National Institute of Technology, Warangal; Pune University; Rajeev Gandhi University, Itanagar, Arunachal Pradesh; Madhurai Kamaraj University, Madhurai; Harishankar Gaur University, Sagar; Mysore University, Mysore; National Institute of Technical Teachers Training and Research, Chandigarh and Banastali Vidyapeth, Banastali) are considered under first pilot phase for conducting 6 weeks training on Remote

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Sensing and GIS and to be expanded to sixteen more institutions / universities in the coming two years time. It is also possible to extend the training facility to other institutes/universities which are under Consortium of Educational Communication (CEC), UGC network of National Beam of EDUSAT or Receive Only Terminal (ROTs) to receive in broadcast mode.

Training on Remote Sensing, GIS and GPS, first of it's kind will be launched at IIRS for 6 weeks duration, during November 13 - December 22, 2006 for the above said eight universities.

P.L.N. Raju and V.K. Dadhwal

FAO visitors at IIRS

The IIRS received two distinguished visitors from FAO Regional Office for Asia and the Pacific at Bangkok, Dr. He Changchui, Assistant Director General and Regional Representative and Dr. Masakazu Kashio, Forest Resources Officer in the afternoon of 18th April, 2006. They were in Dehradun to attend recent Asia Pacific Forestry Conference. Their main interest in visiting IIRS was to have discussions on the feasibility of application of remote sensing and geographic information system for regional scale forest inventories in Asia and the Pacific Region. They specifically desired to know whether remote sensing could be used for Rattans monitoring. They were briefed on the role of IIRS and CSSTEAP in training and education in the field of remote sensing, GIS/ Geo informatics in Asia-Pacific Region in general, and the education and research activities of the Forestry and Ecology Division in particular. The visitors appreciated the contribution of IIRS and CSSTEAP in capacity building and thanked IIRS for taking initiative in popularizing the FAO Land Cover Classification System (LCCS) in India.

S.P.S. Kushwaha

Interaction of JRFs with Dr. K. Radhakrishnan

The Research Fellows involved in the various projects in IIRS/NRSA are the backbone of the Research and Development activities. Dr. K. Radhakrishnan, Director, NRSA called upon all the research fellows for interaction at Hyderabad on 29th August 2006. Eleven JRFs from IIRS took part in the meeting and made a presentation. Director, NRSA was apprised about the research activities, contributions in the projects, publications, Ph.D. registration and status. It was for the first time that such a joint review was organized.

IGBP Meeting of SWG Carbon Cycle and Global Climate

Under Geosphere and Biosphere programme of ISRO several research and developmental activities have been taken in the last 15 years. The sub-working on Carbon Cycle and Global Climate of Working Groups III met on 1st and 2nd August 2006 at IIRS to deliberate the research finding of the ongoing activities. The group also deliberated in detail about the activities in the 11th Five Year Plan. The main focus of the group was to study the Primary Productivity and Carbon Pool in India in different ecosystems.

Awards

Dr. R.D.Garg received Best Paper award for the paper Generation of Digital Elevation Model of Doon Valley using Cartosat-1 Stereo Data (R.D. Garg, S. Agrawal, S.K. Mittal) at Hindi Technical Seminar NRSA Hyderabad on 5th May 2006.

Dr. P.K. Joshi has won the prestigious INSA Young Scientist Medal for 2006, for his outstanding contributions in the area of Agricultural Sciences - Forestry. The medal, instituted in 1974 by the Indian National Science Academy (INSA and awarded on an annual basis) is intended to honor talented young Indian scientist, below the age of 35 years, in recognition of their outstanding contributions in a branch of science or technology coming within the purview of the Academy. Dr. Joshi is the first person from IIRS to receive this prestigious award.