



❖ CSSTE-AP Newsletter ❖

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CSSTE-AP, A Centre for Regional Co-operation in Space Science and Technology Applications

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The Ministerial Conference on Space Applications for Development in Asia and the Pacific held in Beijing in September 1994 had certainly been an eye-opener for us to engage ourselves seriously in Space Applications. The purpose of the above conference was to launch a Regional Space Applications Programme for Development in Asia and the Pacific.

The Action Plan recommended at this conference was accepted by the Government of Sri Lanka and conferred the status of the Focal Point for Space Applications on the Arthur C. Clarke Institute for Modern Technologies. Some of the key issues relating to Space Applications discussed at the conference were the development of human resources in space applications especially for countries such as Sri Lanka, the development of scientific and technological infrastructure and the regional co-operation in the field of space applications.



In looking for avenues for human resources development in space applications, it was our good fortune that the Centre for Space Science and Technology Education in Asia and the Pacific (CSSTE-AP) was established in Dehra Dun, India, which is within easy reach from Sri Lanka.

The pace of activity in developing the infrastructure for the Centre and developing the courses in the four designated fields viz. Remote Sensing and GIS, Satellite Meteorology and Global Climate, Satellite Communication and Space Science was remarkable, to say the least.

With the commencement of the first International Course in RS/GIS in April 1996, now the entire cycle of conducting all four courses had been concluded and a new cycle of activities has already started. It is with much delight that I can state here that up to now we have had the opportunity in obtaining education and training for 9 persons from Sri Lanka in the different fields of Space Applications at absolutely no cost to us. This valuable facility accorded to us by the CSSTE-AP is certainly to be appreciated and even in monetary terms alone it amounts to around Rs. 10 million in Sri Lankan currency. It is not the money so much but the fact that we have these persons trained to contribute to our national effort is the more valuable outcome.

At the recently concluded First National Conference on Space Science and Technology Applications in Sri Lanka, four alumni of the CSSTE-AP presented valuable papers on diverse topics as listed below.

Eng. Saman Cooray : Motion Estimation and Compression Technologies for Digital Video Compression

Eng. Lassana Weeratunge : Low Rate Voice Codec Development

Dr. U.G. Senarath : Delineation and Evaluation of Ground Water Potential Zones using Remote Sensing and GIS

Mr. S.R. Jayasekara : Meteorological Data from Satellites

The CSSTE-AP has certainly enhanced the knowledge and ability of those trained at the Centre thereby contributing towards the fruition of national programmes related to Space Applications. Mr. Jayasekara by his further training has been able to contribute to a new project namely "Meteorological Data Receiving System for the Reception of Cloud Imagery from INSAT". He also continues with his project on the application of satellite derived Sea Surface Temperature data and he is assisted by specialists from India with whom he had made personal contacts during his period of training in India.

Mr. Saman Cooray who followed the Satellite Communications Course is presently engaged among other work, in data communication projects such as high resolution earth photos, telemetry, experimental data transmission and reception, mailbox etc. using Amateur Digital Satellites. Mr. Lassana Weeratunga also an alumnus of the CSSTE-AP is working on Satellite Master Antenna Television (SMATU) system design.

As a member of the Governing Board of the CSSTE-AP, it gives me much pleasure that the work initiated and conducted by the Centre has borne fruit in both areas of human resources development and regional co-operation in the area of Space Science and Technology Applications.

Inside This Issue	
<i>CSSTE-AP - A centre for Regional Co-operation</i>	1
<i>Student's Page</i>	2
<i>3rd RS & GIS Course SAC Linkages with CSSTE-AP</i>	3
<i>Director Speaks Announcement of Courses</i>	4

Prioritization and Management needs of Kawalkhad Watershed in Southern Himachal Pradesh using Remote Sensing and Geographical Information System

Management of mountainous soil needs a careful planning because of steep slopes. If surface is not covered by vegetative cover, there could be severe erosion in the mountainous terrain. Major portion of Himachal Pradesh has steep slopes of Himalayan terrain. Preparation of inventory of various natural resources is difficult by traditional means. Remote sensing provides easy solution for this purpose. Voluminous data gathered with the help of remote sensing techniques are better handled and utilized with the help of GIS. In this case study, GIS helped to a great extent in preparation of erosion and natural resources inventory and their analysis for soil conservation planning. Kawalkhad watershed was further subdivided into 12 sub watershed. Physiographically, the area has been divided into three main land units viz. high hills (H), mid hills (M) and low hills (L). These units were further divided into subunits on the basis of slope, erosion and landuse. Soil loss estimation was done using Universal Soil Loss Equation (USLE) and the Sediment Yield Index (SYI) was computed as suggested by AIS & LUS (1991), for prioritization of the watershed. The major soils found in the area are Lithic/Typic Udorthents and Fluventic Eutrochrepts. The landuse comprises of dense forest degraded forest, cultivation and barren areas. Out of 12 sub watersheds, one (Ks12) covering 6.34 percent area, showed high degree of soil erosion and was rated as priority number 1 for treatment. The sub watersheds falling under second priority according to USLE were Ks1, Ks3 and Ks11 showing soil loss ranging from 33.47 to 40.18 tons/ha covered an area of about 17.75 percent. However, according to SYI, there were six watersheds under second priority category viz. Ks1, Ks2, Ks4, Ks8, Ks9, Ks10 and Ks11. These sub watershed covered an area of about 50.16 percent.



This is a summary of the one year follow up project of J.C. Sharma, student of first RS & GIS course (1996-97), being reviewed for the award of M.Tech. degree .

The sub watersheds falling under 3rd category of prioritizaion covering an area of 75.9% were Ks2, Ks4, Ks5, Ks6, Ks7, Ks8, Ks9 and Ks10 according to USLE and as per SYI, the sub watersheds falling under this category were Ks3, Ks5, Ks6, Ks7 and Ks1 covering an area of 51%. The conservation measures included closure of the area for free grazing, restriction for human being, runoff management and afforestation. Gullied lands need afforestation and plugging to check further gully erosion.

Profile of Alumni

R. Gulbakhor (Uzbekistan) is working at National Water & Land Resources Management Information Centre, Ministry of Agriculture and Water Economy with the responsibilities of widening of the National geographic and attribute data base to develop planning zones, economic and water management models in the framework of WARMAP (Water Resources Management and Agriculture Production in Central Asian Republics) programme, EUTASIS.

J.C. Sharma (India), Asstt. Scientist (Soils), Computer and Instrumentation Centre, Dr Y S Parmar University of Horticulture and Forestry, Nauni-Solan (HP) is associated as Principal/Co-Principal Investigator of prioritisation and management needs of *Kawal Khad* watershed in southern Himachal Pradesh, land/landcover dynamics of Dagroh watershed, cold desert resource inventory and digitisation of databases.

Hriday Lal Koirala (Nepal), Central Department of Geography, Tribhuvan University, Kathmandu, Nepal is teaching RS & GIS along with other regular subjects at the Master Degree of Geography and organised a three days short term GIS training for the teachers of Geography of Graduate College of Nepal. He is also involved in research and project works carried out by the Geography Department as a part of consultancy services. This task also involves digitizing the bio-physical databases of different districts of Nepal and so on.

Ms. D. Narangerel (Mongolia), is working at Mongolian Academy of Sciences Informatics and Remote Sensing Institute as a Scientific Researcher in the field of application of Remote Sensing and GIS. She took part in joint Mongolian-German scientific expedition to West Mongolia in Remote Sensing Group and have done measurements of biomass in near infrared and visible spectrum. She was involved in establishment of Mobile Ground Receiving Station to receive radar ERS-1, ERS-2 data., took part in joint field trip between Informatics and remote Sensing Institute of Remote Sensing Applications, Chinese Academy of Sciences and also made geological investigation of southern part of Mongolia.

Third RS and GIS Course

The third (1998-99) post graduate course on Remote Sensing and Geographic Information System (RS & GIS) which started in October, 1998, is progressing well at Indian Institute of Remote Sensing, Dehradun, the host institution of CSSTE-AP. 21 officer trainees from 11 countries (including three from India) of the Asia-Pacific region are attending the course. The Module-I ended in December, 1998 and the Module-II is closing in March 1999. Module -II consists of both optional and compulsory stream. The optional stream covers several disciplines such as Agriculture and Soils; Forestry and Ecology; Geosciences; Water Resources; Human Settlement and Urban Analysis and Marine Sciences. The topics covered in compulsory streams are advances in RS & GIS, Satellite Meteorology; Earth Processes; Sustainable Development and Integrated Resource Management and Environmental Analysis, Monitoring Management and Global issues. The core faculty of this module consists of experienced faculty of IIRS. Some specialised faculty from several Indian organisations viz. NRSA, Hyderabad; IIT, Roorkee; NEHU, Shillong; Mysore University, Mysore; IISC, Bangalore; PRL, Ahmedabad; SAC, Ahmedabad, CSRE (IIT-Bombay) were also invited to deliver guest lecture on specific topics. International distinguished scientist Prof. Shunji Murai, Asian Institute of Technology (AIT), Thailand also delivered a number of lectures. The performance of course participants was assessed through written examinations, class and practical tests at periodic interval during the entire duration of this module. As part of educational tour participants undertook a technical visit to ISRO Satellite Centre (ISAC) and Regional Remote Sensing Service Centre (RRSSC) at Bangalore and National Remote Sensing Agency (NRSA) and Satellite Earth Station at Hyderabad. The participants also had a glimpse of India's diverse rich culture and heritage during their excursions in the cities. The course ends in June '99.



SAC Linkages with CSSTE-AP

A.K.S. Gopalan,

Director, Space Application Centre



India's applications driven space programme is aimed at socio-economic development of the country through utilisation of space technology. The Ahmedabad based Space Applications Centre (SAC) - one of the prime Centres of the Indian Space Research Organisation (ISRO) - is realising the policy that India should remain second to none in utilising the space technology for the benefit of mankind. It is engaged in active research and development work in applications of satellite based communications, meteorology and remote sensing. It has developed satellite payloads for telecommunication and TV Broadcasting, sensors for remote sensing applications of earth resources survey, meteorology and oceanography; designed and built Earth Stations, developed state of the art software for processing the remote sensing data received from various satellites in different bands of electromagnetic spectrum and with different resolutions and conducted applications programmes for operational use of space technology, under the overall umbrella of ISRO's space programmes. To carry out these activities, the Centre has developed necessary infrastructure in a campus spread over 90 acres of land with a staff of over 2000 persons.

SAC has state of the art R&D laboratories for development, fabrication and testing of the above satellite payloads and ground hardware. These include apart from normal electronics laboratories, clean environment Communications Systems Lab (CSL) - where communication transponders are tested, Microwave Integrated Circuits (MIC) and Surface Acoustic Wave (SAW) devices fabrication lab, Electro-optics lab for Electro-optical sensors, image processing labs for carrying out satellite data processing and remote sensing applications based on GIS technology, Environmental test labs including the large Thermovac chamber and vibration tables, full-fledged QA labs and state of the art electronic and mechanical fabrication labs-to mention a few, SAC has made important contributions to ISRO's main projects like INSAT and IRS series of satellites. It has also successfully undertaken several collaborative applications programmes with the user agencies.

After the formation of CSSTE-AP, SAC has made major contributions towards achieving its desired goals of imparting training to working level scientists and engineers of the Asia-Pacific region. Under the aegis of UN-CSSTE-AP, SAC has been conducting Post Graduate level training programmes of nine months duration in the fields of satellite communications and meteorology. These are followed by participants carrying out a one year pilot project in their respective countries.

To achieve these objectives SAC has created international level class rooms which are equipped with latest audio-visual aids. The state of the art laboratories and computer facilities are available to the course participants for doing their practicals and carrying out the pilot projects, which are part of their nine months' programme. SAC is also providing excellent hostel facilities for the participants. The courses are based on standard curricula recommended through Granada convention of the UN. The faculty includes practicing scientists/engineers and senior Professors from leading organisations and institutes in India. Some eminent persons in the field from abroad are also included in the faculty. SAC has so far successfully conducted one Post Graduate course in each, satellite communications and satellite meteorology and Global climate. The course on satellite communications was held during January-September, 1997. Thirteen participants from 9 countries participated in the programme. The course on Meteorology and Global Climate was held during March-November, 1998. It was attended by 17 participants from 10 countries. A short term workshop on related topics was simultaneously held with both these courses. The

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second Post Graduate course on satellite communications has been announced and is scheduled to start on July 1, 1999.

SAC has been planning enhancement of its basic infrastructure facilities including labs, class rooms, hostels, etc. which will prove very useful for future activities of CSSTE-AP at Ahmedabad e.g., on the job training, Advance Course leading to Ph.D. degree. It is expected that in future several theme-specific workshops, short term courses on related topics would be organised. Through these it is expected that SAC would be able to establish a wide network of linkages for CSSTE-AP related activities with several reputed organisations. These linkages will help in conducting advanced courses, workshops and research programmes and establishing nodes at different parts of the region. The course participants are expected to provide multiplying effect after returning to their respective countries. This in turn will help in capacity building in these areas of space science and technology and would help in social and economic advancement of the member countries in the region-as envisaged in the objectives outlined by UN-OOSA.

Director Speaks

With the completion of one full cycle of courses in all the four disciplines of our interest, a firm beginning has been made in capacity building. With the education programmes now on their own course, our next priority is consolidation of infrastructure, establishing networks and exploring new programmes. It is heartening to see that our students are being associated in space related programmes in their countries and a virtual manpower already exists and is involuntarily furthering our objectives.

Finally, I am happy that a few students have been recently awarded the M.Tech degrees of Andhra University through our centre. This is a proud moment for all of us as one of the primary goals of the Centre has been fulfilled. Some students have pursued active research and participated in international conferences. Some have even participated in international research campaigns. While carving a professional niche for themselves in the world, they are carrying along with them the mark of excellence for which we strived together.

- Prof. B.L. Deekshatulu

Welcome

CSSTE-AP cordially greets the birth of its colleagues the African Regional Centre for Space Science and Technology (AF-CSSTE) in French at Casablanca, Morocco and the AF-CSSTE - in English at Lagos, Nigeria in October/November, 1998.

Wish them speedy/healthy growth.

Short term course on Digital Signal Processing

A short term Course on Digital Signal Processing was jointly conducted by CSSTE-AP and ISRO at Space Applications Centre, Ahmedabad during January 18, 1999-February 12, 1999. Twenty participants from Sri Lanka, Mauritius, Maldives, Fiji Islands and India attended the course.

The Valedictory function was held at Vikram Hall, Space Applications Centre on February 12, 1999. Prof. K.R. Srivathsan, Head, Electrical and Communication Engineering Dept., IIT, Kanpur delivered the valedictory address and distributed the certificates to the participants. Prof B.L. Dekshatulu, Director, CSSTE-AP, Shri A.K.S. Gopalan, Director, Space Applications Centre and other senior officials of Space Applications Centre were also present during the function.



4th P.G. Course in Remote Sensing and Geographic Information System

Duration: 9 Months
(1st Oct. 1999 to 30th June 2000)
Venue: Indian Institute of Remote Sensing,
Dehradun, India
Last Date of Application: 30th June 1999

Short course on Digital Image Processing for Environmental Management - A Remote Sensing Perspective

Duration: 30th Aug., 1999 to 24th Sep., 1999
Venue: Indian Institute of Remote Sensing,
Dehradun, India
Last Date of Application: 28th May 1999

For inquiries on the above courses, please contact:

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CSSTE-AP welcomes the views and opinions of the readers of the newsletter. Short communications on space science and technology education which may be relevant to Asia Pacific region are also welcome. Views expressed in the articles of the newsletter are those of the authors and do not necessarily reflect the official views of the Centre

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