CSSTE-AP Newsletter

Quarterly Newsletter of Centre for Space Science and Technology Education in Asia and the Pacific (Affiliated to UN)

Volume 1 Issue 2 June, 1998

Third meeting of the Governing Board in progress

Third Meeting of the Governing Board assesses the progress

The Governing Board (GB) of the Centre has held its third meeting in Space Application Centre, Ahmedabad on March 10, 1998 under the Chairmanship of Dr. K. Kasturirangan, Chairman, Space Commission and Secretary, Department of Space (India). Members/ representatives from different countries - Mr. Ri Kun Phung (DPR Korea), Mr. Isnianto (Indonesia), Prof. R. Sanjasurren (Mongolia), Mr. Kartar Singh Bhalla (Nauru), Mr. Dipendra Bista (Nepal), Mr. Song Oh (Republic of Korea), Prof. Sam Karunaratne (Sri Lanka), Dr. Igor Ibragimev (Uzbekistan) and Dr. Adigun Ade Abiodun of UN-Office of Outer Space Affairs (UN-OOSA) attended the meeting. Dr. Kasturirangan was unanimously elected as the Chairman for another term of two years. The host country Agreement - an important instrument which defines the obligations of the Centre and the Govt. of India - has been signed..

Methods of expanding the membership of the Centre were discussed. Rules and procedures for the Centre were discussed and approved. Composition of the Advisory Committee was finalised. The GB members authorised the Chairman to approach, in co-ordination with UN/OOSA, member states in the region, other donor countries, financial institutions and other interested parties for obtaining financial support for the activities of the Centre. Reviewing the activities of the Centre, the Board members expressed extreme satisfaction on the working of the Centre and the support provided by the Government of India and other agencies.

CSSTE-AP is glad to announce that the PHILIPPINES has recently signed the agreement of the Centre on 28th April, 1998 and has become a GB member, raising the strength to 14. The agreement was signed by Hon'ble Jose P Del Rosario, Jr., Ambassador Extraordinary and Plenipotentiary of the Republic of Philippines to the Republic of India

Inside This Issue

	Page
3rd Meeting of the Governing Board	1
Forum Regional Centres for Space Science and Technology Education	2
Forum Space activities in the Republic of Korea	3
Student Page Project summaries	4
Activities in progress Training programmes	5
Background of CSSTE-AP Director speaks Coordinator of Latin American Centre visits CSSTE-AP	6

Regional Centres for Space Science and Technology Education: Leading the training of educators and scientists into the 21st century.

- Dr. N. Jasentuliyana, Deputy to the Director General, UN Office at Vienna and Director, UN-OOSA

Space technology has become a ubiquitous part of daily life today. Turn on the television and the programme that appears is most likely being broadcast via a satellite signal. Telecommunications has become cheaper and more accessible to greater numbers of people. Yet the applications derived from space technology can also be used in ways that are not so easily recognizable and in a variety of fashions - limited only by our human imaginations - to provide solutions to global problems.

Despite this revolutionary progress, many countries still lack the capabilities necessary to enjoy both the conveniences and the practical benefits brought about by these advances in space science and technology, particularly those that need assistance the most.

As an important step in an effort to reduce this disparity among States, the United Nations Programme on Space Applications organized a series of regional and international meetings from 1985-89 to garner ideas on the development of indigenous, local-level expertise in space science and technology.

The participants at these meetings concluded that there was an urgent need for educators and research and application scientists in the developing countries to have a higher level of knowledge and competency in the relevant disciplines if the developing countries were to be able to contribute effectively to the solution of global, regional and national environmental and resource management problems. These capabilities, the participants further noted, could only be acquired through intensive long-term education.

The United Nations Office for Outer Space Affairs initiated a project to establish these regional centres in each of the United Nations Economic and Social Commissions after a December 1990 General Assembly resolution called upon the United Nations to "lead, with the active support of its specialized agencies and other international organisations, an international effort to establish regional Centre for Space Science and Technology Education in existing national/regional educational institutions in the developing countries".

The centres in each of these regions - Africa, Asia and the Pacific, Europe, Latin America and the Caribbean, and Western Asia- were to be created with the idea of bolstering the skills and knowledge of participants from developing countries in those aspects of space science and technology that could best contribute to sustainable economic and social development in their home countries.

The Programme on Space Applications enlisted the help of prominent educators in devising an education curricula for the centres. Their input led to the creation of model curricula for each of the subjects that were deemed to be most comprehensive and pertinent to development issues - remote sensing and geographic information systems, meteorological satellite applications, satellite communications and geo-positioning systems, and space and atmospheric sciences. This information was published in 1996 in a booklet entitled "Centres for Space Science and Technology Education : Education Curricula" (UN-document A/AC.105/649).

In addition to offering courses on these topics, each centre is also expected to foster continuing education programmes for its graduates as well as develop awareness programmes for policy and decision makers and the general public in the region

The first regional Centre for Space Science and Technology Education, affiliated to United Nations, was established for Asia and the Pacific in Dehradun, India, in November, 1995. Thus far, nearly 80 students have participated in four nine-month courses (two on remote sensing and geographic information system, one on satellite communications, and one in satellite meteorology and global climate) and one six month course in space sciences.

The hard work went into establishing the Centre for Asia and the Pacific best exemplifies the commitment of the countries in the region to further international and regional cooperation in outer space activities. The Government of India, particularly the Department of Space, was instrumental in making this Centre come alive and especially generous with its technical, infrastructural and financial support. Dr. K. Kasturirangan, Chairman of the Indian Space Research Organization (ISRO), spared no effort in the last few years in making the Centre and its programmes a success and deserves much credit, as do his colleages, particularly Prof. B.L. Deekshatulu, head of the Asian Centre.

The Centre for Asia and the Pacific stands today as the model institution for those soon to be established in Latin America and the Caribbean, Africa and Western Asia. Each should grow to become a centre of excellence in space science and technology education. And in the next 10 years, each centre should evolve into the region's focal point for a variety of functions - for the students and alumni of the programme as they form networks and contacts for future collaboration; as a source of information on projects that could enhance regional cooperation; and as a conduit for the United Nations, the Economic and Social Commission for Asia and the Pacific (ESCAP) and other international organizations to further promote opportunities for international coordination and cooperation in space-related activities.

Forum

Space Activities in the Republic of Korea

Dr. Shin-Haeng Moon, Member, Governing Board

During the late seventies and eighties, the Republic of Korea used space technologies on a developmental research basis, particularly in the inventory of natural resources, food production, land use mapping, coastal zone management, geological mapping and international communication. Although there have been an increase in interest to acquire and develop space technologies in Korea, there is still much to be done. The development of infrastructure, equipment and trained and skilled manpower has been slow, thus hindering widespread adoption of the technology.

These circumstances started to change slowly during the early nineties.

KAIST(Korea Advanced Institute of Science & Technology) Satellite Research Center (SRC) initiated a small experimental scientific satellite programme for the purpose of education and training of graduate students. Woo Ri Byul-1 was built with the technical assistance of University of Surrey, U.K., and was launched into the low earth orbit by the Ariane launch vehicle in a piggy back ride in August, 1992.

Subsequently, Woo Ri Byul-2 was launched into an orbit with inclination angle of 99 degree and at an altitude of 820km sun-synchronous circular orbit in September, 1993. KAIST was responsible for the development of satellite's electronic system as well as the management of the total system. Sam Sung Electronics Co. and Sam Sung Aerospace Co. were responsible for the development of CCD camera and the bus structure, respectively. Korean Aerospace Research Institute (KARI) participated in the environmental test of the system.

Through the Woo Ri Byul 1,2 programme, KAIST- SRC has accumulated experiences in designing microsatellite and ground tracking operations. Scientific activities such as voice and image data communication, picture taking of the Earth's surface and measurement of primary cosmic rays have been carried out.

Woo Ri Byul-3 with CCD camera offering 15m resolution is scheduled to be launched by India sometime in 1999. SRC is developing 3-axis attitude control system, high-speed image data transmission system, solar panel deploying technique, data collection system for ocean research, cosmic ray detector and CCD camera with 15m resolution.

To meet the increased demand of domestic and international communication and broadcasting, Korea Telecommunication Corporation launched "KOREASAT-1A" communication satellite into geostationary orbit at Cape Canaveral in July 18, 1995. Due to the difficulties during launch, it's operational life time decreased considerably. The second 'KOREASAT' was launched successfully on January, 1996. The third "KOREASAT' is scheduled to be launched on August, 1999. Once 'KOREASAT' series reaches the operational status sometime next year, the impact it brings to Korean economic and social development will be tremendous. KOREASAT will make an epoch and generate new momentum in the future Korean space activities.

KARI (Korea Aerospace Research Institute) launched a new scientific satellite program, KOMPSAT, in 1995. KOMPSAT is a low earth orbit satellite with an altitude of 800km and weighs 500kg. KOMPSAT is developed jointly with TRW, an U.S.aerospace, co., to maximize related technology transfer. Many Korean Universities and Aerospace companies join the program for design, manufacturing and testing of the various subsystems. KOMPSAT is scheduled to be launched in 1999. We expect the Korean aerospace industry's space technology capabilities will make a quantum jump through this program.

Certainly, Korean space community is making a small but important step forward at the threshold of the 21st space -century.

This year's events at CSSTE-AP

11th June 1998
Inauguration of the first PG course in Space Sciences at Ahmedabad

30th June 1998
Valedictory of the second PG course in RS/GIS at New Delhi

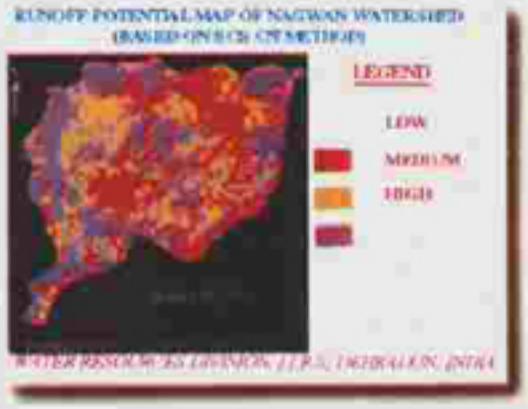
5th October 1998
Commencement of the 3rd PG course in RS/GIS at Dehradun

30th November, 1998
Completion of the first PG course in Satellite Meteorology and first PG course in Space Sciences both at Ahmedabad

FORUM

Student Page

Hydrological Modelling using Remote Sensing and GIS



Since hydrology is linked to processes at the earth's surface, its connection to the topographic , and remotely sensed spatial databases can function as important source of information in a Geographic Information System (GIS). Prediction of surface runoff is one of the most useful hydrologic capabilities in GIS. This has been demonstrated in a work carried out by **Mr. Pondari Satyanarayana** of Andhra University, India in his project. He has carried out flood forecasting of Nagwan watershed of the Damodar river basin, India using a hydrological model and GIS. The objective was to test to what extent the integration of a hydrologic model and a GIS can contribute to the quantitative assessment of flood effects. Towards this, the HEC-1 hydrologic model that needs five sets of variable inputs , such as. *precipitation, sub-basin area, infiltration rate, surface runoff rate and flood routing*., has been used. The results show that the computed hydrographs at the outlet of Nagwan watershed are found to be quite similar to the observed hrdrographs, except that the time to peak was more by about 2 hours in computed hydrograph. The best-calibrated model parameters are used to validate the model's ability to predict the flood pattern at the watershed outlet. With the very limited rainfall runoff event data, the model could not be well calibrated, but an attempt has been made to derive the input parameters required for the loss methods (curve number, Holton method), surface runoff methods (Clark's, dimensionless unit hrdrographs) and flood routing (Muskingam method)

The summaries appearing on this page are of the one year follow up projects being reviewed for the award of M.Tech degree to the students of first RS/GIS course (1996-97).

Issues of Urban Environment in Kathmandu Valley

A project work titled "*Issues of Urban Environment in Kathmandu Valley*" using aerial remote sensing data at 1:50,000 scale has been carried out by **Mr. Hriday Lal Koirala**, Lecturer of Geography, Tribhuvan University, Nepal. All relevant spatial and attribute data were put in the PC Arc/Info environment for analysis. This study shows that population growth rate is alarmingly high : 4.52 per cent per annum in the Kathmandu municipal area. The urban area has increased from 4.8 per cent of total land in 1984 to 17.62 percent in 1998. The agriculture land decreased from 64 percent in 1984 to 43.72 percent in 1998, in the valley. The facilities like good road, parks/gardens, hospitals etc. are mainly accessible to the people of central part of the urban area. At the periphery, people are affected by industrial pollution, airport noise, dust pollution and river stink. All the rivers have become sewer and people living along these rivers are facing menace of obnoxious smell, particularly during summer. Dust particulate concentration is 2 to 6 times higher than the accepted WHO norm of .70 mg/m3. Around one-third of the total population in the Kathumandu municipal area is affected by these pollutions. By creating different buffer zones around these agents of pollution, the number of people affected by each agent was calculated. Then, by overlaying , the number of people affected by all these agents simultaneously has been calculated

Since the responsibility of planning and managing urban growth rests with several organizations, non coordination and absence of any statutory provision is a major issue. A central planning and monitoring agency with remote sensing and GIS facilities is the need of the hour as recommended by the project work.

Assessment of Desertification Using Remote Sensing & GIS in Panzhihua Area in China

The study of desertification was carried out by **Mr. Li Fabin** of China. The objective of study was to make assessment of the process of desertification due to various natural and manmade activities. RS & GIS techniques were used to study various factors resulting in the process of desertification. Five main categories, viz., soil degradation, sandy desertification due to wind erosion, land inferiority due to gully erosion, desertification towards stones due to water erosion and desertification towards sand and stone due to debris flow, were considered for this purpose. Various intensities of desertification, viz., slight, moderate, severe and very severe, were taken as classes of intensity of desertification. The area taken for study is one of the most important steel and rare metal base of China - Panziahua, located in South-Western Sichuan Province . This region is a transitional zone from Tibet Plateau to Yunnan-Guizhou Plateau. For this study, Thematic Mapper imagery in Bands 1,2,3,4,5 & 7 were used and ground truth was collected for green leaf coverage of 50 sampling sites. In addition, topographic maps at 1:50,000 scale, water and soil loss map, annual precipitation map and socio-economic data from field was used. It was found that main causes of desertification were due to gully erosion, sheet erosion and debris flow. It was also found that human intervention such as increase in population, cultivation and increase in live stock resulted in over grazing, excessive land reclamation and reckless felling of woods.

First PG Course in Satellite Meteorology and Global Climate, Ahmedabad

Chairman, GB of CSSTE-AP *(second from right)*

Students for this course have come from

Bangladesh
India
Indonesia
Iran
Kazakhstan
Mongolia
Nepal
Philippines
Sri Lanka
Uzbekistan

The first CSSTE-AP course in Satellite Meteorology and Global Climate started at Space Applications Centre, Ahmedabad from March 2, 1998. 17 participants from 10 countries are attending this 9 months course. The course began with a 4 day workshop dedicated to Prof. V. Suomi, the father of satellite meteorology from March 9-12 on *Emerging Trends in Satellite Meteorology - Technology and Applications*. The workshop was attended by over 80 scientists from India and abroad (ESA, NOAA, University of Wisconsin). The course and workshop were inaugurated by Dr. K. Kasturirangan, Chairman, ISRO/Governing Board, CSSTE-AP. Other dignitaries at the workshop included Dr. Abiodun of UN-OOSA, Dr. R.R. Kelkar, Director General - India Meteorological Department, besides some of the Governing Board members of CSSTE-AP. During this occasion, the first issue of newsletter of CSSTE-AP was released by Dr. Abiodun. A memoir in remembrance of Prof. Suomi was released by Dr. Kelkar. Dr. Kasturirangan released a souvenir on the workshop and the course. As part of the facilities for the conduct of the course, a new computer lab has been established with ten workstations and a server dedicated exclusively for the students. The first unit of the course comprising of three modules, covering concepts in Meteorology, Satellite Meteorology, imagery applications etc. has just been completed. The second unit dealing with parameter retrieval, digital data applications and numerical modelling is currently on. The participants went on a study tour to Goa and Bangalore during May 9-16. At Goa, they were on a short ship cruise on " Sagar Kanya" of Antarctic Study Centre of Govt. of India and got to know about the instruments for marine environment measurements. At ISRO Satellite Centre, Bangalore they were shown around various test facilities, the INSAT-2E flight model and the permanent exhibition. The course is scheduled for completion by November 1998.

Second PG Course in Remote Sensing and GIS, Dehradun

Students for this course have come from

Bangladesh
Bhutan
Cambodia
India
Iran
Kyrghyzstan
Lao PDR
Mongolia
Myanmar
Nepal
Philippines
Sri Lanka
Uzbekistan
Vietnam

The second post graduate course on remote sensing and GIS commenced at the Indian Institute of Remote Sensing (IIRS) on October 1st, 1997. The first phase of the course is scheduled for completion on June 30th, 1998. The course is being attended by 23 participants from 14 countries of Asia- Pacific region. The course is structured into three modules, each of three months duration. The first module dwelt upon the fundamentals of remote sensing and GIS. The second module covered the remote sensing and GIS application in natural resources survey and environment. The course participants are expected to complete a project work during the third module. Experts from IIRS, other agencies & organisations in India as well as from abroad (Japan, Nepal & Germany) participated in the teaching programme as faculty. members.

In addition to class room lectures, a number of field visits were arranged to demonstrate to participants the practical aspects of field data collection and analysis. A number of educational visits were also arranged as part of the course to give the participants an opportunity of visiting relevant establishments in different parts of India. The places visited by the participants were Regional Remote Sensing Service Centre and ISRO Satellite Centre at Bangalore, National Remote Sensing Agency at Hyderabad, G.B. Pant Institute of Himalayan Environment and Development at Almora and several scientific institutions at Dehradun, such as, Survey of India, Forest Survey of India and Forest Research Institute. The course participants attended the International Society for Photogrammetry & Remote Sensing (ISPRS) symposium on *Earth Observation System for Sustainable Development* and the pre-symposium tutorials on *Electro-Optical Sensors for Remote Sensing* and *Image Pre-processing* at Bangalore.

Students on an excursion to the Taj Mahal

During the course of the training, laboratory and library facilities of IIRS were made available to the students. They had sufficient hands-on experience on state-of-the-art computer systems equipped with modern digital image processing and GIS softwares. Video lectures, computer based multimedia training modules and internet were accessible by the students.

On completion of thematic projects in the third module, the trainees would obtain a post graduate diploma and will return to their home countries. Following this, they will be required to complete a year long project work under proper guidance and depending on certain eligibility criteria, their work will be evaluated towards the award of M.Tech degree from Andhra University.

Background of CSSTE-AP

In response to the UN General Assembly Resolution (45/72 of 11th December, 1990) endorsing the recommendations of UNISPACE-82 the United Nations Office of Outer Space Affairs (UN-OOSA) prepared a project document (A/AC.105/534) envisaging the establishment of Centres for Space Science & Technology Education in the developing countries. The objective of the Centres is to enhance the capabilities of the member states in different areas of space science & technology that can advance their social and economic development. The first of such centres, named as Centre for Space Science & Technology Education in Asia & the Pacific (CSSTE-AP) was established in India in November, 1995. Government of India has made available appropriate facility and expertise to the Centre through the Indian Institute of Remote Sensing (IIRS), Space Application Centre (SAC) & Physical Research Laboratory (PRL). The Centre is an education and research institution that is capable of high attainments in the development and transmission of knowledge in the fields of space science & technology. The initial emphasis of the Centre shall be to concentrate on in-depth education, research and applications programmes, linkages to the global programmes/databases, execution of pilot projects, continuing education and awareness and appraisal programmes. The Centre offers Post Graduate level courses in the fields of (a) Remote Sensing and Geographic Information System, (b) Satellite Communications, (c) Satellite Meteorology and Global Climate, (d) Space Sciences. A set of standard curricula developed by the United Nations is adapted for the educational programmes. The Centre is affiliated to the United Nations and its education programmes are recognised by Andhra University, India. As of now, the Centre has already conducted one PG course each in Remote Sensing & GIS and Satellite Communications. The 2nd course in RS/GIS, 1st PG course in Satellite Meteorology and 1st PG course in Space Sciences are in progress.

Director speaks

The Centre is well in the middle of its third year and with the PG course in Space Sciences commenced from 1st June, 1998, we have come a full circle. The activities have gained a strong momentum with the sense of involvement shown by students, teachers and the supporting staff. Support has come by quite easily at every level - from the Governing Board, the host country and fellowship donors to the countries that have evinced interest by sponsoring the participants for our programmes. This reinforces the feeling that our objectives are of consensus, purposeful and that they are timely as well as a part of our combined destiny. We have also received fresh applauds from the GB which met recently.

Hence, our efforts in future should be addressed towards drawing new support and linkages to our programmes as much as we should apply our minds to see how best we can associate the benefits of our endeavour to the social and economic well being of the participating States. This is one relevant outlook of the Centre, having been established in the Economic and Social commission of the Asia and the Pacific. However, these ideals would just not materialise without large scale participation and confidence in the programmes the Centre conducts from time to time. Therefore, I wish to see that we are asked by the organisations in the region as to how they can associate themselves with the Centre. I am sure there are many ways - for will and way compliment each other.Finally, I invite the past students to write to us regularly and inform us of the ways and means of supporting them further in their professional persuits. It is these small efforts to being in touch that make us discover common interests in the region.

-Prof. B.L. Deekshatulu

Coordinator of Latin American Centre visits CSSTE-AP

Centre for Space Science and Technology Education is being established in the Latin America and the Caribbean. Dr. A. Tania Maria Sausen of National Institute for Space Research, Sao Jos DOS Campos, SP, Brazil, who is the focal point for the establishment of this Centre, was on a special mission to CSSTE-AP between 22nd and 26th February, 1998. She visited the training sites of CSSTE-AP at Dehradun and Ahmedabad and discussed the mode of functioning. During her visit, she was shown the facilities established for each educational course and appraised of the various technical activities pursued by the faculty of the Centre.

Dr. Tania Maria Sausen (right) at IIRS facility

Governing Board of CSSTE-AP

Dr. K. Kasturirangan, Chairman,
India
Dr. Chose Tae Song,
DPR Korea
Prof. H. Wiryosumarto,
Indonesia
Dr. Y.K. Akynzhanov,
Kazakastan
Mr. Tynmbek Omoonbekov,
Kyrghyzstan
Mr. Dunstan Melling Uridau,
Malaysia
Mr. Regnuren Bat-Erdene,
Mongolia
Mr. Kartar Singh Bhalla,
Nauru
Mr. Dipendra Bist,
Nepal
Dr. Moon Shin Haeng,
Republic of Korea
Prof. Sam Karunaratne,
Sri Lanka
Dr. Kamil Muminov,
Uzbekistan
Mr. Jose P Del Rosario Jr.
Philippines
Dr. N. Jasentuliyana,
United Nations

CSSTE-AP (Affiliated to UN)
IIRS Campus, 4, Kalidas Road, Dehradun 248001, INDIA
Phone: +91-135-740737, Fax: +91-135-740785
e-mail: cssteap@del2.vsnl.net.in

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