

# CSSTEAP Newsletter

January, 2012



Centre for Space Science & Technology  
Education in Asia and the Pacific (CSSTEAP)  
(Affiliated to the United Nations)

*..... on a mission of capacity building, under the initiative of the United Nations, for Asia and the Pacific Region in Space Science and Technology, through Excellence in Education, Training, and Research.*

## MEGHA-TROPIQUES LAUNCH

MEGHA - TROPIQUES LAUNCHED



### Inside this issue .....

- MEGHA-TROPIQUES Launch 1
- Governing Board and Advisory Committee Meetings of CSSTEAP 3
- Sixteenth Post Graduate course in Remote Sensing & Geographic Information System 6
- Eighth Post Graduate course in Satellite Communications 9
- Short Course on Remote Sensing & GIS Applications for Coastal Hazards Mitigation and Sustainable Development 10
- News from UN-OOSA The United Nations Basic Space Science Initiative (UBSSI) 11
- CSSTEAP Alumni Meets 16
- International collaboration 20
- Forthcoming symposia/workshops 22
- Ongoing and future courses 24

India's work horse Polar Satellite Launch Vehicle (PSLV-C18) successfully launched the Indo-French MEGHA-TROPIQUES Satellite on October 12, 2011. In its 19<sup>th</sup> successive successful flight, PSLV injected four satellites with a total payload mass of 1047 kg from Satish Dhawan Space Centre (SDSC, SHAR). These are Megha-Tropiques (India-France) weighing 1000 kg, JUGNU (IIT-Kanpur, India) weighing 3 kg, SRMSat (SRM University, Chennai, India) weighing 10.9 kg and VesselSat-1 from Luxembourg weighing 27.8 kg into an 867 km altitude intended Polar Sun-synchronous orbit. All the four satellites were placed in the

*Wishing all the readers a Very Happy & Prosperous 2012*

targeted orbits with high precision. Soon after separation of the MEGHA-TROPIQUES satellite from PSLV, ISRO's Telemetry Tracking and Command Network (ISTRAC), Bengaluru took its command and control.

MEGHA-TROPIQUES Satellite, a joint endeavour of ISRO and the French National Space Agency (CNES), is intended to study the water cycle and energy exchanges in the tropical region covering 20 degree on either side of the equator. It is a unique satellite for climate research that should aid scientists seeking to refine prediction models. The main objective of this mission is to understand the life cycle of convective systems that influences the tropical weather and climate and their role in associated energy and moisture budget of the atmosphere in tropical regions. MEGHA-TROPIQUES will provide scientific data on the contribution of the water cycle to the tropical atmosphere with information on condensed water in clouds, water vapor in the atmosphere, precipitation and evaporation.

Megha-Tropiques carries four instruments:

- A scanning Microwave Imager for Detection of Rain and Atmospheric Structures (MADRAS) (developed jointly by ISRO and CNES), operating at five frequencies (18, 23, 37, 89 and 157 Giga Hertz) to measure precipitation and cloud properties
- A scanner, for Radiation Budget (ScaRaB) developed by CNES, for measuring Earth radiation budget
- A sounder SAPHIR (developed by CNES) for Atmospheric Profiling of Humidity in the Inter-tropical region
- GPS Radio Occultation Sensor Atmospheric (ROSA) studies for vertical profiling of temperature and humidity (procured from Italy)

Data from these instruments is expected to enhance scientific knowledge in the field of climate research through study of water cycle and energy exchanges in the tropical region. Other than the scientific community of India and France, there are already 21 scientific teams from Australia, Brazil, Italy, Japan, Korea, Niger, Sweden, UK and USA awaiting data from MEGHA-TROPIQUES.

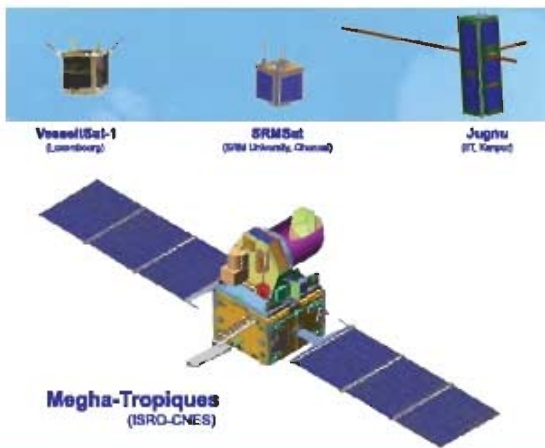
It is pertinent to note that MEGHA-TROPIQUES is only the second mission of this kind globally, next to the Tropical Rainfall Measurement Mission (TRMM) launched in 1997 by USA and Japan. USA and Japan are presently coordinating for establishing a Global Precipitation Measurement Mission with 8-Satellite Constellation.

VesselSat-1 weighing 27.8 kg is a microsatellite developed and built by LuxSpace of Luxembourg. The satellite carries two AIS (Automatic Identification System for ships) receivers to detect signals automatically transmitted by vessels at sea in the region covered by the satellite footprint each receiver is with a dipole antenna composed of two 1.7m deployable elements.

The nanosatellite SRMSat weighing 10.9 kg is developed by the students and faculty of SRM University, Chennai, India and its data will be useful to address the problem of global



*Megha-Tropiques under fabrication*



*Payloads of PSLV-C18*



warming and pollution levels in the atmosphere by monitoring Carbon-dioxide (CO<sub>2</sub>) and water vapour (H<sub>2</sub>O). The satellite uses a grating spectrometer, which observes absorption spectrum over a range of 900-1700nm in infrared range.

Another nanosatellite JUGNU weighing 3 kg is designed and developed by Indian Institute of Technology, Kanpur, India under the guidance of ISRO. The satellite is intended:

- To prove the indigenously developed camera system for imaging the Earth in the near infrared region and test image processing algorithms.
- Evaluate GPS receiver for its use in satellite navigation, and
- Test indigenously developed Microelectro-Mechanical Systems (MEMS) based Inertial Measurement Unit (IMU) in space.

Source: [www.isro.gov.in](http://www.isro.gov.in)

## GOVERNING BOARD AND ADVISORY COMMITTEE MEETINGS OF CSSTEAP

Sixteenth meeting of Governing Board (GB) of CSSTEAP was held on November 26, 2011 at New Delhi. The GB meeting was chaired by Dr. K Radhakrishnan, Chairman Governing Board CSSTEAP and Secretary, Department of Space, Govt. of India. Fourteen members of Governing Board of CSSTEAP viz., Dr. Viktor Kollenikov of United Nations-OOSA, Vienna; Dr. Hong Pong Gi (Incharge of S&T, Embassy of DPR, Korea); Dr. Thomas Djameluddin (LAPAN, Indonesia); Mr. Dmitriy Bogatskiy (Embassy of Kazakhstan); Dr. A.A. Abdykalykovich (President, International University for Innovation Technologies, Kyrgyzstan); Prof. Wan Rosman Wan Mohamed (Second Secretary, High Commissioner, Malaysia); Dr. Kyi Thwin (Acting Rector, Myanmar); Mr. Kartar Singh Bhalla (Hony. Consul General of Nauru); Mr. Yagya B Hamal (Minister-Counsellor, Embassy of Nepal); Mr. Robert O. Ferrer, Jr. (First Secretary, Embassy of Philippines); Dr. S. Panawennage (Director, ACCIMT, Sri Lanka); Dr. Surachai Ratanasermpong (Dy. Director, GISTDA, Thailand); Dr. Vladimir Rijkov (Director of State Special Designing Bureau, Uzbekistan) attended the meeting. Others who participated included Dr. P.S Roy, Director, CSSTEAP; Dr. R.R Navalgund (Director, SAC); Dr. J.N Goswami (Director, PRL); Dr. V.K Dadhwal (Director, NRSC); Dr. Shantanu Bhatawdekar (Associate Director, ISRO Hqrs, Bangalore); Mr. GRK Murthy (CCA, ISRO); Programme Coordinator, CSSTEAP; Course Directors of all courses and higher officials of various centres of Department of Space, Govt. of India.

Chairman, GB expressed satisfaction and placed on record the excellent support and guidance being provided by esteemed members of Governing Board in shaping the activities of the centre. He praised the excellent work done by Centre Director's of host institutions, faculty and staff in nurturing the Centre. The Board congratulated and



*Governing Board members alongwith dignitaries during meeting at New Delhi on 26<sup>th</sup> November 2011*



*Governing Board meeting at New Delhi on 26<sup>th</sup> November 2011*

complemented Dr. P.S Roy for the excellent leadership that has taken the Centre to newer heights.

Dr. Viktor Kotelnikov mentioned that the Centre has achieved greater heights in terms of excellence and serves as a role model, and inspires to other regional CSSTE's. He thanked Government of India and particularly ISRO for the support. He mentioned that UN-OOSA has provided support to the Centre in terms of joint activities like UN-SPIDER programme.

Dr. P.S Roy Director, CSSTEAP presented brief report on the achievements of the centre in the past one year. His presentation highlighted the Centre's programmes, achievements, activities, the host country support, etc. He mentioned that a few fellowships are being given to the deserving scholars after completion of PG diploma course to work at CSSTEAP towards completion of additional one-year research work leading to M.Tech. degree. He also presented about the courses that have been conducted during the last one year- 15<sup>th</sup> RS & GIS PG course, 7<sup>th</sup> SATMET PG course, 7<sup>th</sup> Space & Atmospheric Science PG course, workshop on Open source Geo-Spatial Tools and Short Course on 'Microwave Remote Sensing & its Applications'. Dr. Roy also mentioned that the Centre has conducted 36 PG courses and 24 short-term courses in the last 15 years in four disciplines benefitting around 1000 participants from 31 countries of the Asia and the Pacific region; and 28 participants from 17 countries outside Asia-Pacific region. A total of 109 scholars have been awarded M.Tech. degree and 85 scholars are currently pursuing their M.Tech. research work. He mentioned that during the last one year seven students that include three in RS & GIS, and four in SATCOM have been awarded M.Tech. degree. He added that host country is providing all necessary infrastructural support for functioning of the Centre. He also mentioned that CSSTEAP brings out several publications, course announcement brochures, memoirs and lecture notes both printed as well as in digital form for dissemination to students and institutions and these documents are being shared with other centers as well.



*Dr. K. Radhakrishnan Chairman, GB in discussion with the GB members*



*Dr. Viktor Kotelnikov Chairman, AC UN-OOSA, Vienna interacting with the AC members*

Dr. P.S Roy also apprised on the 'Alumni Meets' organized in the last one year. In order to develop network and establish meaningful linkages between CSSTEAP & its alumni, to obtain first hand feedback and to understand their role in promoting space technology. The alumni meets were organized in Dhaka (Bangladesh) on June 23, 2011; Colombo (Sri Lanka) on October 21, 2011 and in Thimpu (Bhutan) on November 15, 2011. All meets were attended by CSSTEAP alumni and senior officials of Government organizations and universities.

Dr. P.S Roy also apprised members on the new international collaborations in the last one year. He mentioned that CSSTEAP has renewed MoU with TWAS, Trieste, Italy which includes provision for student fellowships for research in selected institutions, it has now been enlarged by joining hands with UNESCO. CSSTEAP entered MoU with University of Illinois, Urbana-Champaign, USA for student and faculty exchange in the area of Atmospheric Science and Human Dimensions of the Climate Change. He also informed that MoU with ICIMOD for providing scholarships to the students



for undertaking M.Tech. research in their respective country is in final stages.

Several important issues like expansion of CSSTEAP in the Asia-Pacific region, review of the action items from the last GB meeting, the Centre's strategy and themes for the future courses, M.Tech. research programmes, Short Courses, alumni feedback, budget allocation for the centre, audit report and nominations for appointment of Deputy Director and Director, CSSTEAP were discussed.

Dr. Radhakrishnan thanked all the GB members for their valuable comments, fruitful discussion, active participation and for their support and cooperation. He expressed his sincere gratitude to all the GB members & UN-OOSA for their continued support and encouragement provided to the growth of the Centre, and to ISRO-DOS staff, Directors of NRSC, SAC, PRL, Course Directors, Course Coordinators of all the four courses for their dedicated support. Dr. Viktor Kotelnikov, UN-OOSA expressed satisfaction with the academic programmes of the centre. The GB expressed satisfaction of the functioning of the Centre and they also extended whole hearted support to the future activities of the Centre.

Eleventh meeting of CSSTEAP Advisory Committee (AC) was held on November 24, 2011 at New Delhi under the Chairmanship of Dr. Viktor Kotelnikov of United Nations-OOSA, Vienna. AC members are subject specialist and experts namely Prof. John Zillman (Australia) of RS & GIS, Dr. Volker Gaertner (EUMESTAT, Germany) and Dr. Ajit Tyagi (IMD, India) of Satellite Meteorology, Dr. Ong Jin Teong (Singapore) and Dr. Prahalada Rao (ISRO, India) of Satellite communications. Other members included Dr. Gnanamani, Dean (Academic), Andhra University, Dr. R.R. Navalgund, Director SAC, Dr. V.K. Dadhwal, Director, NRSC, Dr. P.S. Roy, Director, CSSTEAP, Dr. Shantanu Bhatawadekar, Associate Director (A), ISRO Hqrs and Dr. S.K. Saha, Dean (Academic), IIRS, Dehradun besides Dr. Sarnam Singh Program Coordinator, CSSTEAP, all the Course Directors and Course Coordinators attended the meeting. The committee took a review of the Centre's technical and academic activities since last meeting in 2008.

During the meeting, issues like revision of course curricula, implementation of earlier recommendations of Board of Studies (BOS), research activities in the form of M.Tech. at the centre, and designing of short courses were discussed. All the experts and AC members expressed satisfaction with the overall course structure and technical contents of the Post Graduate courses and expressed that the Centre should continue with the existing PG courses. AC suggested more emphasis needs to be given on Short Courses in the areas of satellite data assimilation for numerical weather prediction, climate change science, interpretation and analysis of data from present and future meteorological missions. Efforts to build linkages with other international and regional initiatives of the national/international organizations, viz. WMO, GEOSS, EUMETSAT etc. need to be made for promoting capacity building in operational weather forecasting, climate, agrometeorology and hydrometeorology. The committee recommended the organization of two new short courses on 'Overview of Small



*Advisory Committee meeting at New Delhi on 24<sup>th</sup> November 2011*



*Advisory Committee members during meeting at New Delhi*

Satellite Mission Planning' and 'Navigation and Satellite Positioning System' from the year 2012.

AC also suggested organization of theme and country specific short courses in different countries of the region with technical support of CSSTEAP and support from local institutions/organizations for hosting such initiative. AC appreciated the efforts made by the Centre towards organizing alumni meets in countries of Asia-Pacific region. This has been important in obtaining first hand feedback and understanding the alumni role in promoting space science and technology in their home country. CSSTEAP has so far organized four Alumni meets successfully: Nepal (October, 2010), Bangladesh (June 2011), Sri Lanka (October 2011) and in Bhutan (November 2011). AC recommended that such meets need to be continued in the future also. Advisory Committee also recommended that efforts should be made to provide support in the form of satellite data, software and technical guidance by the Centre to the course participants for continuation of Phase-II research activity. The AC appreciated the efforts of the Centre for excellent progress made, and expressed satisfaction at the achievements and also for the support from the host country. The AC also noted the committed efforts of the Centre, in particular Director, CSSTEAP for his excellent vision and the host institutions namely IIRS, NRSC, SAC and PRL who have made the centre to gain high level. The AC endorsed the courses, future programmes and technical activities of the Centre.

### SIXTEENTH POST GRADUATE COURSE IN REMOTE SENSING & GEOGRAPHIC INFORMATION SYSTEM

The 16<sup>th</sup> Post Graduate Course on Remote Sensing and Geographic Information System (RS&GIS) of CSSTEAP commenced on July 1, 2011 at Indian Institute of Remote Sensing (IIRS), ISRO, Dehradun, one of the host institutions of CSSTEAP. Total 22 participants from 12 countries of Asia-Pacific Region viz., India-2; Kazakhstan-2; Kyrgyzstan-2; Mongolia-2; Myanmar-2; Nepal-2; Philippines-2; Sri Lanka-1; Tajikistan-2; Thailand-2; Uzbekistan-1 and Vietnam-2 are attending the course.

The entire course is divided into two semesters. Semester-I consists of Module IA of 3 months and Module-IB of one month and Semester-II consists of Module-II of 2 months and Module-III of 3 months duration. After registration, first week started with 'induction week' where lectures on geographic perspective of India, social systems, customs and festivals of India were delivered. Director, CSSTEAP and Course Director and former Course Coordinator of CSSTEAP programme delivered a series of lectures on overview of space science, technology and applications, natural resources and environmental assessment. The inauguration of the 16<sup>th</sup> PG course was held on July 5, 2011 at IIRS, Dehradun. Dr. (Mrs). Geeta Varadan, Director, ADRIN, ISRO was the Chief Guest of the function. On this occasion, Director, CSSTEAP briefed about the objectives and the activities of the Centre. Dr. S.K. Saha, Course Director



*RS&GIS Course participants with dignitaries at Andhra University, Visakhapatnam*



*Course participants of 16<sup>th</sup> RS&GIS course with former Director, Prof. B.L. Deekshasulu, at CSSTEAP, Dehradun*



briefed about the structure of the academic programme. Chief Guest addressed the course participants and reiterated the importance of the technology in capacity building process. She also delivered a lecture on 'Real time analysis of EO data and its dissemination' for the benefit of students.

Semester-I consists of principles of RS, GIS, GPS, image analysis, recent trends in RS & GIS technology, Natural disasters, Environmental analysis, monitoring and management. Module-1A of Semester-I which is of three months duration, covers principles of Remote Sensing, Photogrammetry, Image analysis, GIS and GPS. This Module also covered theory, practical and tutorials on principles of Remote Sensing, photogrammetry, image analysis, GPS, GPS & GIS. Several field excursions were taken up during this module for ground truth collection and for Interpretation and analysis of satellite data. In GIS the broad topics covered were concepts of GIS, databases, data entry and editing, principles of cartography, map projections, vector and raster geodatabases, network, DEM, concepts of GPS, types of GPS, constellation, GPS application in surveys, mapping and navigation. The module was completed on September 30, 2011.

Educational visits to Andhra University, Visakhapatnam and National Remote Sensing Centre, Hyderabad were undertaken during October 7-16, 2011. At Andhra University, the educational records of all participants were scrutinized for fixing their M.Tech. eligibility. At Andhra University the participants attended eleven lectures on specialized topics on environmental analysis & management, marine, atmospheric science, watershed etc. A field visit in and around Visakhapatnam was also conducted for the benefit of the participants. The participants had opportunity to visit NRSC Satellite Data Receiving Station (IMGEOS) and other facilities at Shadnagar, near Hyderabad and also visited the technical facilities at NRSC, Hyderabad and attended specialized lectures on cyclone warning system, land use dynamics etc. During educational tours the course participants explored Indian rich heritage and cultural diversity.

Module-1B of Semester-I was of one month duration on recent trends in RS & GIS and environmental analysis & management from October 3-21, 2011. Guest Lectures were organized on 'Meteorological satellite and sensors', 'weather analysis, forecasting and modelling', 'Earth observation system for climate and climate change' by Dr. PK Thapliyal, SAC, Ahmedabad and on 'Forest fire & forest information system' by Dr. Rajshekar, NRSC, Hyderabad.

In order to provide a wider exposure in the field of Geoinformatics Technology & Applications, CSSTEAP had provided opportunity for eight course participants of current 16<sup>th</sup> RS & GIS and one from 15<sup>th</sup> RS& GIS batch (currently pursuing M.Tech. research work at CSSTEAP) to participate in ISPRS workshop and ISRS symposium held at Bhopal during November 8-11, 2011 where they were benefitted with the technical knowledge and the interaction with eminent scientists across India and abroad. Two participants



*Participants of 16<sup>th</sup> RS&GIS course at ISPRS Workshop and ISRS Symposium in Bhopal.*



*Dr. Atul K. Jain from University of Illinois, USA delivering lecture to the participants of 16<sup>th</sup> RS&GIS course*

Ms. Rushanka Amrutkar, India and Mr. Gayantha Roshana, Sri Lanka presented papers in the ISRS symposium. Module-II of two months duration started October 31, 2011 and ended on January 3, 2012. This year four optional electives viz., Advances in RS & GIS, Agriculture & Soils, Marine & Atmospheric Science and Water Resources are being offered. Seven students have opted for Advances in RS & GIS while four in Marine & Atmospheric Science, four in Agriculture & Soils and seven in Water Resources. Theory lectures and practical exercise in the above mentioned thematic disciplines are in progress.

The major components of course syllabus were covered by the faculty of IIRS and additional Guest lectures by National and international Guest faculty on specialized topics was also arranged for the academic benefit of the course participants. The guest lecturers were from various Indian Organizations/Institutes/ Universities such as IMD; TIFR Mumbai, IIT Kharagpur, IIT Roorkee, NRSC, Hyderabad, IARI, New Delhi; ARIES, Nainital; SAC, Ahmedabad, Andhra University, Visakhapatnam etc. Prof. Atul K Jain International Guest Faculty from University of Illinois, USA delivered series of expert lectures on Global Carbon Cycle, Global Climate change and Land use & Land cover change during November 21-23, 2011. Specialized Guest lectures on Advances in Digital image processing, soft computing and Machine learning during November 30-December 2, 2011 by Former Director, CSSTEAP Dr. B.L Deekshatulu were also arranged.

The academic program of the course was organized through class room lectures, tutorials, practical, multimedia self learning packages, field excursion, seminar, etc. State of art software and hardware for digital image processing and GIS analysis were used for computer-based practical exercises. Lecture notes in the form of printed books and supplementary reading materials were distributed well in advance to the course participants to help easy assimilation of the subject in the class and also for future reading. Soft-copy of the lecture notes was also distributed. Academic performance of the course participants was evaluated through periodic internal, semester and external examinations in the form of written and practical examinations, class test, tutorials seminar and assignments. The Semester-I external examinations were held from October 24-29, 2011 and Semester-II external examination will be held from January 4-7, 2012.

English coaching was imparted to 13 students to improve spoken and written English proficiency with more emphasis on pronunciation/accent, grammar and vocabulary from July to September, 2011. Significant progress has been observed in proficiency of the students. All the lectures including English language are being recorded live and are being accessed by the students for their understanding. On the social front, the participants had glimpses of Indian festivities by their active participation in various festivals such as Dussehra, Diwali, Id-ul-Fitr, Christmas etc.

The third and final module of three months started from January 09, 2012 and will be completing on March 31 2012. This module is basically designed to carry out pilot project



*SATCOM Course participants during their technical visit to ISDN facility, Bailalu, near Bengaluru*



*SATCOM Course participants at Mysore Palace*



work by the course participants. Course participants have developed pilot project proposals with the help of supervisors and focal points. All the participants made a presentation on their proposed project highlighting objectives, study area, proposed methodology to Director, CSSTEAP on December 19, 2011.

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## EIGHTH POST GRADUATE COURSE IN SATELLITE COMMUNICATIONS

The 8<sup>th</sup> Post Graduate course on Satellite Communications started on August 1, 2011 at Bopal Campus of Space Applications Centre Ahmedabad. Total of 17 participants from 10 countries viz., Algeria-1; Bhutan-1; Bangladesh-1; India-4; Kazakhstan-1; Mongolia-3; Myanmar-1; Nepal-3; Sri Lanka-1 and Uzbekistan-1 are attending the course. The formal inaugural session of the course was held on 1<sup>st</sup> August 2011 at conference hall of Bopal campus. Dr. R.R. Navalgund Director, SAC, Ahmedabad and Shri. V.S. Palsule, Director, DECU and focal persons for the course from SAC alongwith the participants of the course attended the inaugural session. Director, SAC welcomed the participants and Dr. A.S. Durai, Course Director SATCOM introduced the course and the profile of the students. Each participants introduced themselves with a brief introduction of their organization and nature of work carried by them. Dr. R.R. Navalgund, Director, SAC briefed the students about the activities of SAC and introduced the focal persons who in turn briefed the students about their papers.

This PG course consists of two semesters and is being conducted from August 2011 to April 2012. Each paper covers specific areas of Satellite Communications. Semester - I consists of Orientation course, Introduction to Communications, Satellite communication system, Earth station technology, Modulation, multiplexing and multiple-access and seminars. Semester-II consists of papers on Digital Signal Processing, Broadcasting using communications Satellites, Applications and trends in Satellite Communications, Operational Communication Satellite Systems, Network Planning, Management and Operational Issues. The topics covered in the pilot project will be oriented towards the one year project to be carried out in the home country. All papers except Orientation course, Seminars and Pilot project have separate papers on the laboratory work.

Till date Semester-I course has been completed, which includes theory, practical experiments and evaluation. Semester-I theory and practical examinations were completed on November 25, 2011. Students were asked to give seminars on societal applications using satellite communication. The topics chosen for the seminar were on communication for disaster management in Bhutan, Village Resource Information System for Uzbekistan, Tele-health for



*SATCOM Course participants during their visit to NARL, Gadanki*



*Dr. P.P. Kale, Former Director, SAC delivering lecture to the SATCOM participants in SAC, Ahmedabad*

Algeria, Tele education System for Nepal and Entertainment system for Mongolia. As a part of practical the students were given exposure to Earth station at Bopal Campus other than laboratory experiments.

During this period the students attended the Independence day programme at SAC. They also had glimpses of Indian culture and community by attending Navaratri Garba festival.

As a part of educational tour they have visited some of the ISRO and other Scientific Organisations in southern India from October 22, 2011 to November 6, 2011. They also visited places of cultural and historical importance like Gandhi Asram, Step-well, Gandhinagar Akshar Dham temple, etc.

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## SHORT COURSE ON REMOTE SENSING & GIS APPLICATIONS FOR COASTAL HAZARDS MITIGATION AND SUSTAINABLE DEVELOPMENT

On request from UN-ESCAP, CSSTEAP jointly organized a Special Course on 'Remote Sensing and GIS applications for Coastal Hazards Mitigation and Sustainable Development' during December 5-16, 2011 focusing Pacific countries at Indian Institute of Remote Sensing, Dehradun. A total of 11 participants representing Palau-1, Papua New Guinea-2, Fiji-4, Tuvalu-2 and Bangladesh-2 attended the course. International air travel expenses were borne by UN-ESCAP while their accommodation, logistics, pocket allowance, training material, etc were taken care by CSSTEAP. Two members from UN-ESCAP, Dr. Sanjay Srivastava, Regional Advisor, Disaster Risk Reduction Division and Mr. Ram S. Tiwaree, Economic Affairs Officer, Information and Communications Technology and Disaster Risk Reduction Division were also present as representatives from UN-ESCAP from December 4-8, 2011. They also interacted with the participations and delivered lectures on the role of UN-ESCAP in the region towards the Disaster Risk Reduction.

The syllabus was designed with emphasis to issues related to disasters, mitigation and management particularly coastal hazards apart from high resolution remote sensing and information extraction, digital image analysis and GIS. Theme specific lectures, practical and case studies were delivered. This was also supplemented with a field and ground truth visit. Specialized guest lectures on storm surge prediction using numerical model by Prof. A.D Rao, IIT Delhi; Coastal hazard, coastal erosion and prevention by Prof. K.N Rao, Andhra University, Visakhapatnam; Early warning systems for Tsunami and case studies by Dr. T Srinivasa Kumar, INCOIS, Hyderabad were arranged for the benefit of the participants.



*Course Participants of Coastal Hazards Mitigation and Sustainable Development alongwith Director, CSSTEAP and faculty of IIRS*



*Course Participants of Coastal Hazards Mitigation and Sustainable Development with Chief Guest after receiving certificates*



The valedictory function was organized on December 16, 2011. Dr. Anil Kumar Gupta, Director, Wadia Institute of Himalayan Geology, Dehradun was the Chief Guest on the function organized. He distributed the certificates to the participants and also delivered the valedictory address.

A formal feedback was taken from the participants. All the participants rated the course to be very informative and useful and were satisfied with the methodology and course material. The participants requested for future collaborations and bi-lateral research projects on RS & GIS technology applications with UN-ESCAP and CSSTEAP. The summary of the feedback was also provided to UN-ESCAP.

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## NEWS FROM UN-OOSA

### THE UNITED NATIONS BASIC SPACE SCIENCE INITIATIVE (UBSSI)

The United Nations Basic Space Science Initiative (UBSSI) is a long-term effort for the development of astronomy and space science through regional and international cooperation. It covers an active transfer of technology and knowledge, and the role of education on a worldwide basis, particularly in developing nations. To address the status of astronomy in Asia and the Pacific, Latin America and the Caribbean, Africa, and Western Asia, a series of workshops on Basic Space Science (BSS) were carried out between 1991 and 2004 in the following countries: India (1991), Costa Rica and Colombia (1992), Nigeria (1993), Egypt (1994), Sri Lanka (1995), Germany (1996), Honduras (1997), Jordan (1999), France (2000), Mauritius (2001), Argentina (2002), and China (2004). Detailed information is available at (<http://neutrino.aquaphoenix.com/un-esa/>). In line with one of the major recommendations emanating from these workshops, the establishment of astronomical facilities in developing nations for research and education programmes at the university level was initiated.

Pursuant to resolutions of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and its Scientific and Technical Subcommittee, since 2005, these workshops focused on the International Heliophysical Year 2007 (IH2007) and took place in the following countries: the United Arab Emirates (2005), India (2006), Japan (2007), Bulgaria (2008), the Republic of Korea (2009). More detailed information can be obtained from the website of the United Nations Office for Outer Space Affairs (UNOOSA) at: (<http://www.unoosa.org/oosa/SAP/bss/ihy2007/index.html>).

After deliberations at the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS), beginning in 2010, the workshops focused on the International Space Weather Initiative (ISWI) as part of its three-year work plan. Detailed information is available at (<http://www.stil.bas.bg/ISWI/>). Workshops on the ISWI have been scheduled to be hosted by Egypt (2010) for the benefit of developing countries in Western Asia, Nigeria (2011) for



Africa, and Ecuador (2012) for Latin America and the Caribbean. Currently, 14 IHY/ISWI instrument arrays with more than 600 instruments are operational in 95 countries.

In addition, to aid the Global Navigation Satellite systems (GNSS) user community in dealing with the effects of space weather and ionospheric disturbances on GNSS performance, ISWI is supported by the programme on GNSS applications implemented by the United Nations Office for Outer Space Affairs in its capacity as the Executive Secretariat of the International Committee on GNSS (ICG). ICG is contributing to and co-sponsoring several of the ISWI activities. Detailed information is available at the ICG Information portal at (<http://www.icgsecretariat.org>).

Further to the achievements reported at and the negotiations undertaken during the UN/Egypt Workshop on ISWI, organized in 2010, the following Resolution was unanimously adopted by the participants of the UN/Nigeria Workshop on ISWI, hosted by Nigeria in 2011. First results of the implementation of the following Resolution will be reported at the UN/Ecuador Workshop on ISWI, hosted by Ecuador in 2012.

## BUJA ISWI RESOLUTION

1. The United Nations should lead, with the active support of Japan and relevant scientific organizations, an international effort to establish an International Centre for Space Weather Science and Education in an existing national educational and research Institution. Space 4 Environment Research Center (SERC) at Kyushu University ([http://www.serc.kyushu-u.ac.jp/index\\_e.html](http://www.serc.kyushu-u.ac.jp/index_e.html)), Japan, offered to host this Centre.
2. This Centre should grow into a network of national and regional centers, focusing on space weather, around the world all dedicated to advancement of space weather research and education.
3. The Centre would provide Capacity Building and technical guidance to nations that wish to engage in space weather science and education. Capacity Building consists of three main components:
  - (i) Training/deployment on instrumentation. Space weather monitoring, for either operations or research, requires continuous data recording. This data come from precision instruments, either on the ground or in space. Such instruments require proper maintenance. Recent reviews did show that the number of individuals skilled for operating and maintaining these specialized instruments is declining on a global scale.
  - (ii) Training on data analysis. Raw data must be inspected, corrected, calibrated, interpreted, transformed, and archived. Most of these activities require sophisticated software and long-term experience handling this data. Using software demands advanced training for users of the data.
  - (iii) Education/training on space weather science. With processed and archived data available, the final process is to perform scientific investigations

**INTERNATIONAL SPACE WEATHER INITIATIVE (ISWI) 2011**  
**UN/NIGERIA WORKSHOP**  
 October 17th - 21st, 2011, Abuja, Nigeria

International Scientific Organizing Committee

|  |                             |
|--|-----------------------------|
| 1. Alamy, M. (France)                      | 11. Ouyang, F.              |
| 2. Chilingarian, A. (Armenia)              | 12. Okunev, I. I.           |
| 3. Cohen, M. (USA)                         | 13. Ouyang, F. N.           |
| 4. Davis, J. (USA)                         | 14. Okunev, I. I.           |
| 5. Georgescu, E. (Romania)                 | 15. Omalika, K. C.          |
| 6. Gerasimov, A. (RU)                      | 16. Ouyang, F.              |
| 7. Gendron, N. (USA) [Co-Chair]            | 17. Ouyang, F. E.           |
| 8. Grew, K. (USA)                          | 18. Rabin, A. B. [Co-Chair] |
| 9. Gulamov, S. (United Nations) [Co-Chair] |                             |
| 10. Muhrezi, A. (Egypt)                    |                             |
| 11. Drake, P. N. (NIGERIA) [Co-Chair]      |                             |
| 12. Fehlecker, M. (South Africa)           |                             |
| 13. Rabin, A. B. (NIGERIA) [Co-Chair]      |                             |
| 14. Assafra, J. P. (Brazil)                |                             |
| 15. Shibata, K. (Japan)                    |                             |
| 16. Wang, C. (China)                       |                             |
| 17. Yudin, E. (USA)                        |                             |
| 18. Yamoto, K. (Japan)                     |                             |

Local Organizing Committee

|                              |
|------------------------------|
| 1. Ajayi, S.                 |
| 2. Adenomon, R. I.           |
| 3. Ayanfemi, B. O.           |
| 4. Olayinka, F.              |
| 5. Fajana, F. O.             |
| 6. Faleke, S. E.             |
| 7. Hausbold, H. J. (Germany) |
| 8. Thononcho, A. A.          |
| 9. Eweyigba, J. O.           |
| 10. Mohammed, S. O.          |
| 11. Ouyang, F.               |
| 12. Ouyang, F. N.            |
| 13. Ouyang, P. N. [Co-Chair] |
| 14. Okunev, I. I.            |
| 15. Omalika, K. C.           |
| 16. Ouyang, F.               |
| 17. Ouyang, F. E.            |
| 18. Rabin, A. B. [Co-Chair]  |

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Hosted by: Center for Basic Space Science (CBSS)

Logos: IAU, SERC, ICG

*UN/Nigeria Workshop on the International Space Weather Initiative, Abuja, Nigeria, 17-21 October 2011*



based on this data, and to publish the research findings in the International scientific literature. The ability to perform this final process generally requires a Ph.D./M.Sc. level education, which can only be provided by supervisors who are experts in the space sciences at the university level.

4. Space weather work is roughly divided into two spheres:
  - (i) Operational activities, and
  - (ii) Research and educational activities.
 Operational work can be handled by already existing national space related institutions.

Research and education is the domain of advanced research institutions and universities. The Centre, recommended in this "Abuja ISWI Resolution" must be part of such an advanced research institution or university. Moreover, a proven record of capacity building is an essential prerequisite for this Centre.

5. The Centre must be an institution with a proven record in organizing international activities. These activities include space weather schools, space weather workshops, observation campaigns, installation of instruments in different regions of the world, training of instrument host staff and students, and international outreach programmes. The Centre must possess experience in promoting and supporting international programmes such as ISWI.
6. The Centre would cooperate with the UN-affiliated Regional Centres for Space Science and Technology Education, located in India, Mexico/Brazil, Morocco, and Nigeria (<http://www.unoosa.org/oosa/en/SAP/centres/index.html>), and other centres of excellence in space science and technology education.
7. The Centre for Basic Space Science at the University of Nigeria (<http://www.cbssonline.com/>), Nsukka, Nigeria, offered to act as a Regional Centre for Space Weather Science and Education.

## PRELIMINARY ANNOUNCEMENT FOR THE COMMEMORATION OF THE 10<sup>TH</sup> ANNIVERSARY OF THE ESTABLISHMENT OF SERC

### The First Ten Years of Space Environment Research Centre (SERC) (2002-2012)

SERC was established at Kyushu University in 2002 as an Institute for the joint use of Kyushu University as a collaboration among the Faculty of Mathematics, the Faculty of Engineering Sciences, the Faculty of Engineering, the Faculty of Information Science and Electrical Engineering, and the Faculty of Sciences. It was decided that the first



### Agenda

- Commemorate the 10<sup>th</sup> anniversary of SERC
  - Inaugurate the International Center for Space Weather Science and Education (ICSWSE)
  - Observe the significance of the 14<sup>th</sup> of March 2012
- The fundamental purpose of this event is to review where SERC has been, where it is today, and where it plans to go.



The commemoration function will take place in Fukuoka Japan on 14 March 2012.

Executive Director of SERC would be Professor Kiyohumi Yumoto.

In the beginning, this Center promoted the diagnosis of the geospace plasma environment and examined the problem of space debris. Additionally, this Center undertook research on electromagnetic disturbances that originated with the Sun. The tools for this research were ground-based magnetometers (to observe the Earth's magnetic field) and radars (to observe the ionosphere). These magnetometers formed a network called CPMN (Circum Pacific Magnetic Network).

Over the past ten years, this Center developed into two main areas of research activities. One was to pursue research on fundamental aspects of plasma physics, which covers space plasmas, fusion plasmas, and industrial applications of plasmas. Additionally, there was a need to develop the mathematical and informatic aspects of plasmas. This entire effort, therefore, was a major inter-disciplinary undertaking inside of Kyushu University.

The other main area of effort at SERC during the past ten years was the deployment of MAGDAS (MAGnetic Data Acquisition System) on a global scale. Unlike the CPMN system, each MAGDAS magnetometer sends its data in real time to SERC for continuous monitoring of the Earth's magnetic field. The first MAGDAS magnetometer started operating at Hualien, Taiwan, in May of 2005. Today there are 63 MAGDAS magnetometers in operation all over the world -- this is an expansion rate of 10 magnetometers per year, or nearly one per month. Thus MAGDAS is by far the largest real time magnetometer network in the world. In addition, as part of this real time observation effort, SERC maintains FM-CW radars in Russia, Japan, and the Philippines.

To summarize the first ten years of SERC: SERC concentrated on establishing a foundation for research into basic plasma physics and it concentrated on deploying the world's largest real time network of magnetometers. Note that this was mainly a domestic enterprise -- to shore up the essential skills and know-how of Japanese scientists and engineers. During the next ten years, SERC will extend this enterprise to a global scale.

IHY (International Heliophysical Year, from 2005 to 2009) and ISWI (International Space Weather Initiative, from 2010 to 2012)

[conducted under the auspices of the United Nations]

To ensure the success of the MAGDAS Project, SERC became heavily involved with IHY and ISWI, as a major purpose of IHY/ISWI is to get more developing nations involved in space science. Here, MAGDAS contributed enormously -- through the installation of instruments in Asia and the Pacific, Africa, and Latin America and the



Caribbean. SERC experts have trained local personnel (staff and students) to maintain MAGDAS instruments. SERC invited them to SERC for additional scientific and technical training. For this purpose, SERC conducted MAGDAS schools. Scholarships were provided to MAGDAS hosts so that they were able to attend IHY/ISWI workshops. All these efforts are part of SERC's Capacity Building agenda, which is also the agenda of IHY/ISWI.

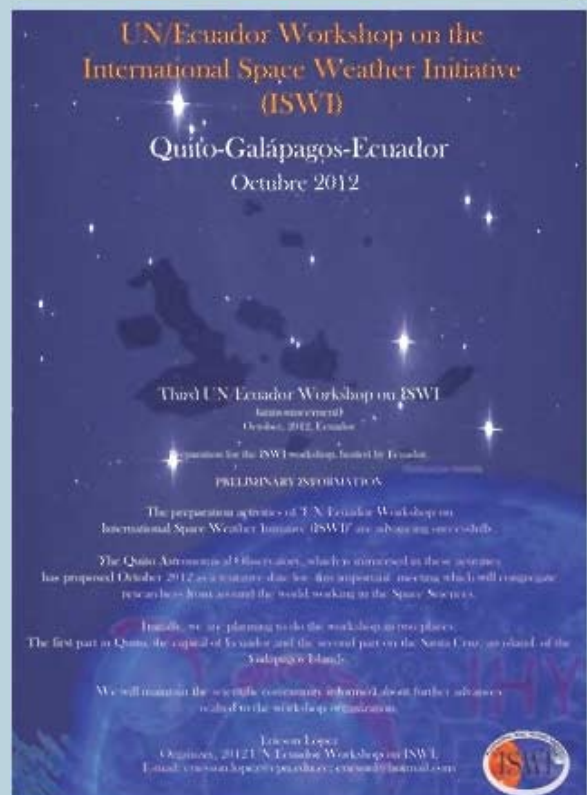
### The Next Ten Years beyond 2012

During the first ten years, SERC concentrated on two major areas of research activities as outlined above. During the next ten years, SERC will expand to the international stage. Accordingly, SERC will take the initiative on several new international enterprises that are being planned presently. Selected examples (five) are as follows:

1. The next stage of ISWI. The first stage of ISWI (2010-2012) will be concluded in 2012. This must be followed up with a new international program, which is still in the planning stages. SERC intends to take a leading role in the new program.
2. MAGDAS Schools. SERC conducted a major MAGDAS School in Nigeria during the summer of 2011 at Redeemer's University near Lagos. The next one is scheduled for Bandung, Indonesia, during the summer of 2012.
3. Capacity Building. In support of the MAGDAS Project, SERC will continue to push forward with Capacity Building, which involves teaching MAGDAS instrument hosts the skills needed for (1) instrument operation, (2) data analysis, and (3) doing world-class science with the collected MAGDAS data.
4. Establishment of ICSWSE. This is the International Center for Space Weather Science and Education. Details of this new center are contained in the Abuja ISWI Resolution, which was adopted by the participants of the "UN/Nigeria Workshop on ISWI" (October 2011). Here reference is made to the ISWI Newsletter Volume 3, Number 101.
5. Center of centers. One role of ICSWSE is to cooperate (in the field of space weather) with the UN-affiliated Regional Centres for Space Science and Technology Education (located in Nigeria, Morocco, India, Brazil, and Mexico).

### The Significance of the 14<sup>th</sup> of March 2012

Albert Einstein (the man who created the Theories of Relativity) was born on 14 March 1879. It is well-known that in 1922 he undertook a tour of Japan with his wife, which included several speaking engagements, including a famous lecture at Kyoto University. But it is not well-known that he also visited Fukuoka and Kitakyushu, and gave a lecture at Kyushu University. During this 14th March 2012 event at SERC, it is being proposed to release



some documents (regarding Einstein's visit to Fukuoka in 1922) that have always existed in Japanese, but never in English.

Dr. Hans Haubold,  
 UN-OOSA

## CSSTEAP ALUMNI MEETS

CSSTEAP established in 1996 has till date trained 1033 students from 33 countries of Asia & the Pacific region. Sri Lanka is one of the member countries of CSSTEAP, GB and also used the facilities of CSSTEAP capacity building. The alumni meet brings together students of different courses from the same country on common platform and facilitate the centre to know about their achievements and how the Centre helped them in grooming their professional research career.

Based on the recommendations of CSSTEAP Governing Board to obtain more concrete feedback from the alumni of CSSTEAP, it was considered to organize alumni meets in the South-East Asia Pacific countries. This is be useful to obtain first hand feedback and understand the alumni role in promoting space science and technology in their home countries. The objective of the meet is the reunion of alumni and the Centre and to know experiences about their achievements and how the Centre helped them in grooming their professional research career. CSSTEAP has so far organized successfully four Alumni meet in Nepal (October, 2010), Bangladesh (June 2011), Sri Lanka (October 2011) and in Bhutan (November 2011).

### Alumni Meet at Colombo, Sri Lanka

On an invitation from UN-OOSA, Dr. S. K. Saha, Course Director, RS & GIS, CSSTEAP and Head, AS&D, IIRS (ISRO), Dehradun visited Colombo, Sri Lanka during October 17 - 22, 2011, as a member of UN-OOSA International Technical Advisory Mission (TAM) of UN-SPIDER, to suggest the space inputs in Disaster Management in Sri Lanka.

Dr. S.K Saha, RS & GIS Course Director, CSSTEAP took an opportunity to conduct alumni meet in Colombo on October 21, 2011. CSSTEAP has 53 alumni from Sri Lanka under various courses (PG Course - 38 and Short Course -15) being organized at IIRS, SAC and PRL. Out of 53 alumni invited, 12 number of alumni from Disaster Management Centre (DMC); UNDP Regional Office, Arthur C Clarke Institute for Modern Technologies; Department of Meteorology (DOM); Survey & Mapping (SM); Sri Lanka Port Authority attended the meet. Most of Sri Lankan CSSTEAP Alumni were out of the country for higher studies and hence could not participate in the Alumni meet. Mr. S. Panawennage, Director, Arthur C Clark Centre of Modern Technology and GB Member, CSSTEAP was the Chief Guest of the function. Senior officials of DMC, DOM & SM also participated in the meet and made presentation on their organizational activities and suggested enhanced role of



*Meeting with the CSSTEAP alumni in Colombo, Sri Lanka*

CSSTEAP. UN-SPIDER Technical Advisory mission members are also invited to participate in the meeting and share their experiences in the field of space science and technology applications. Senior Executive from private entrepreneur Digital Globe (DG) AP region also attended the meet and made presentation on various satellite data products of DG.

Dr. S.K.Saha welcomed the gathering and briefed on the Centre's current activities and future programmes including capacity building contributions of CSSTEAP to Sri Lanka. UN-SPIDER representative made presentation on the role and activities of UN-SPIDER in Disaster Management and use of space technology for Disaster Risk Reduction. UN-ESCAP representative (one of the members of TAM of UN-SPIDER) briefed about contribution of UN-ESCAP to Sri Lanka through CSSTEAP programmes. Two senior officials representing DMC, and DOM made presentations on their experiences and achievements.

The main observations from the presentations made were:

- The Chief Guest Mr. S. Panawennage, Governing Board member from Sri Lanka highlighted the contributions of CSSTEAP in the capacity building endeavor for the Sri Lanka, since the establishment of the centre. The contributions of CSSTEAP for creating critical technical mass for Sri Lanka for supporting the activities related to utilization of space science and technology for national development were also appreciated by him. Mr. Panawennage also applauded the contributions and support received from host country India through ISRO/DOS for the functioning and running various activities of CSSTEAP.
- The professional knowledge acquired through theory, practical exercises and pilot project work by the students from academic programs of CSSTEAP have helped them to enhance their working capability in the area of space science and technology in their home organizations /institutions. However, lack of appropriate satellite data products; software and day-to-day technical guidance has been the main impediments to raise the level of knowledge of the students.
- CSSTEAP alumni based on the PG diploma / M.Tech. degree obtained from CSSTEAP have taken lead role as team leader and are assigned important projects to handle independently.
- Due to lack of manpower in the Govt. organizations, on return the students are put to routine jobs and hardly there is any support to undertake M. Tech. research projects in their home country.
- The organizational representatives suggested relaxing academic qualifications and considering professional



*Mr. S Panawennage, GB member from Arthur C. Clarke Centre for Modern Technology, Sri Lanka addressing to CSSTEAP alumni*



experiences for the admission of P.G. educational programmes CSSTEAP. They also suggested short courses on Microwave remote sensing, Disaster Management with emphasis on Floods, Drought, Coastal and Geological Hazards; Early warning systems for weather and disasters; RS & GIS based crop production forecasting; Open source Geo-spatial tools etc.

- DMC suggested to organize special short courses on Disaster Management jointly with CSSTEAP and UN-SPIDER in Sri Lanka so that large number of officials can be benefited from the programme. DMC agreed to provide facilities and local support.
- UN-SPIDER and UN-ESCAP will strengthen their supports to CSSTEAP's capacity building activities with financial and technical contributions.
- Representative of Digital Globe, AP region agreed to provide high resolution satellite data products to Sri Lankan CSSTEAP alumni for their M. Tech. research work

#### Recommendations by Alumni :

- Most of alumni present in the meet mentioned that due to non-availability of suitable satellite data products, lack of software and local supervisor has been the main hurdles for not pursuing M. Tech. research work. They suggested that more opportunity should be provided in offering fellowships to the students from Sri Lanka for pursuing M. Tech. research work at CSSTEAP.
- The alumni formed a CSSTEAP alumni forum and identified Mr. Srimal Priyantha Samansir Assistant Director IT GIS, Disaster Management Centre, Ministry of Disaster Management & Human Rights, Sri Lanka as Convenor.
- The alumni forum agreed to provide technical help and support for running ongoing academic programs on RS & GIS in various universities/ institutes and also research activities in various govt. organizations of Sri Lanka.

#### Alumni Meet at Thimpu, Bhutan

On an invitation from ICIMOD, Dr. P.S. Roy Director, CSSTEAP visited Thimpu, Bhutan to participate in the International Symposium on "Benefitting from Earth Observation : Bridging the data gap for adaptation to climate change in the Hindu-Kush Himalayan region" during November 14-18, 2011. Director, CSSTEAP took an opportunity to organise CSSTEAP alumni meet with CSSTEAP and IIRS past students at Thimpu, Bhutan on November 15, 2011. CSSTEAP as well as IIRS has alumni from Bhutan under various courses (PG and



*Urban landscape of Thimpu, Bhutan*

short) being organized at IIRS, SAC and PRL. More than 25 officials from Bhutan have so far been benefitted by CSSTEAP programmes. Besides alumni, senior officials from Bhutan National Land Commission, Bhutan Power Corporation and Thimpu Thromde were invited for the meeting. Dr. V. Jayaraman, Prof. Satish Dhawan Distinguished Professor, ISRO were also invited as guests in this meeting.

Dr. P.S Roy, Director, CSSTEAP briefed on the Centre's current activities and on the future programmes.

The main observations of the Alumni meet are as below:

- The theoretical and practical knowledge acquired by the students from academic programs of CSSTEAP have helped them to enhance their working capability in the area of science and technology in their home institutions. This was also appreciated by senior officials of invited institutions/organisation's representatives.
- Mr. Bharat Tamang Yonzon, Managing Director, Bhutan Power Corporation Ltd. stressed that satellite Remote Sensing and GIS have important role starting from locating hydropower generation sites, monitoring the land use and land cover and environmental impacts and also providing inputs to the snow fed reservoirs on its reservoir capacity. He also reiterated that International funding agencies are making available the high resolution data of IKONOS, Worldview 1 & 2 and Geoeye 1 & 2. These datasets are 3-5 years old and do not reflect current land use and land cover and are difficult in mapping land use and land cover classes. However, they are using it for generating DEM, geological studies and locating the hydropower sites. Efforts should be made to make available Indian High Resolution Earth Observation Satellite data of CARTOSAT and RESOURCESAT LISS IV.

#### Recommendations:

- Alumni mentioned that more opportunity should be provided in offering fellowships to the students from Bhutan for pursuing M.Tech. research work at CSSTEAP as there is a problem in obtaining local expertise and guidance.
- Alumni suggested that Bhutan being a small country, awareness at a decision makers level is essential and requested that CSSTEAP should make efforts to organize a workshop of 2-3 days so that the space technology and applications can be popularized. In such workshops, CSSTEAP alumni can also make presentation of their work using RS&GIS techniques.
- CSSTEAP students should be provided fellowships to work in CSSTEAP for their project work of one year duration.



*CSSTEAP Alumni Meet in progress in Thimpu, Bhutan- chaired by Dr. P.S. Roy*

- CSSTEAP students also highlighted to organize short duration programmes for the important themes for Bhutan like snow melt runoff, glacial lake outburst, landslide hazard zonation, impact on climatic change in Bhutan agriculture, etc.

## INTERNATIONAL COLLABORATION

CSSTEAP has signed a new international collaboration in September 2011 with University of Illinois, Department of Atmospheric Science, Urbana-Champaign campus, Urbana, Illinois, USA for establishing cooperative relationship through mutual assistance in the areas of education and research for an initial period of five years effective from 2011. On behalf of CSSTEAP, the agreement was signed by Dr. P.S Roy, Director, CSSTEAP and Prof. Atul Jain from University of Illinois. CSSTEAP will be greatly benefitted with this collaboration by enhancing turnover of M.Tech. students and by promoting relevant research between the international institutions.

### Scope of the Collaboration:

- Each institution may offer to decrease space other opportunities for activities and programs, such as teaching, research, exchange of faculty and students, and staff development that will foster a collaborative relationship.
- The institutions contemplate implementation of programs or activities such as: (a) joint educational, cultural, and research activities; (b) exchange of faculty members and advanced graduate students for research, lectures, and discussions; (c) participation in seminars and academic meetings; (d) exchange of academic materials, publications, and other information; and (e) special, short-term academic programs.

CSSTEAP has renewed MoU with Third World Academy of Science (TWAS), Trieste, Italy TWAS-UNESCO Associateship Scheme at Centre of Excellence in the South for collaborative research in frontier areas of science & research for further period of 5 years effective from 2011. This includes provision for student fellowships for research in number of research institutions which has been enlarged by joining hands with UNESCO. Under the agreement, TWAS will provide two researchers per year with international air travel support as well as fellowship and CSSTEAP will provide technical support, guidance and necessary research facilities to the researchers.



*Dr. P.S Roy delivering lecture in Thimphu, Bhutan*



A delegation from Israel visited CSSTEAP on September 26<sup>th</sup>, 2011. During the discussion it was suggested that the possibility of collaboration between Israel and India in the field of training programme on Microwave and Hyper-spectral technology and application can be explored.

### BACKGROUND OF CSSTEAP

In response to the UN General Assembly Resolution (45/72 of 11<sup>th</sup> December, 1990) endorsing the recommendations of UNISPACE-82 the United Nations Office for 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 and 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 (CSSTEAP) was established in India in November 1995. Department of Space, Government of India has made available appropriate facilities and expertise to the Centre through the Indian Institute of Remote Sensing (IIRS) Dehradun, Space Applications Centre (SAC) & Physical Research Laboratory (PRL) Ahmedabad. The Centre is an education and training institution that is capable of high attainments in the development and transfer of knowledge in the fields of space science & technology. The emphasis of the Centre is on in-depth education, training and application programmes, linkage to global programmes / databases; execution of pilot projects, continuing education and awareness and appraisal programmes. The Centre offers Post Graduate level and short courses in the fields of (a) Remote Sensing and Geographic Information System, (b) Satellite Communications and GPS, (c) Satellite Meteorology and Global Climate, (d) Space and Atmospheric Science. 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, Visakhapatnam, India for awarding M.Tech. degree (after completion of one year project).



*CSSTEAP Hqrs. at Dehradun*

### Forthcoming symposia/workshops in area of Space Science & Technology

| S.No | Theme   | Duration                    | Location               | Web address   |
|------|---|-----------------------------|------------------------|---|
| 1.   | 2012 3 <sup>rd</sup> International Conference on Environmental Science and Development (ICESD 2012)             | January 5-7, 2012           | Hong Kong, China       | <a href="http://www.icesd.org/">http://www.icesd.org/</a>   |
| 2.   | International conference on Spatial technologies for rural development  | January 5-7, 2012           | Hyderabad, India       | <a href="http://www.apgeos.org">www.apgeos.org</a>  |
| 3.   | National conference on Environmental surveillance for natural resource management (ESNRM - 2012)                | January 9-10, 2012          | Jalgon, india          | <a href="http://www.nmu.ac.in/circulars/Events/NCESNRM%20Jan%202012.pdf">http://www.nmu.ac.in/circulars/Events/NCESNRM%20Jan%202012.pdf</a>                             |
| 4.   | International Workshop of the Coastal and Shelf Seas Task Team  | January 10-12, 2012         | Miami, USA             | <a href="http://www.godae-oceanview.org/outreach/meetings-workshops/coss-tt-workshop/">http://www.godae-oceanview.org/outreach/meetings-workshops/coss-tt-workshop/</a> |
| 5.   | National Conference on Agricultural and Food Mechanization (NCAFM) 2012   | January 10-12, 2012         | Sarawak, Malaysia      | <a href="http://ncafm2012.mardi.gov.my/">http://ncafm2012.mardi.gov.my/</a>   |
| 6.   | International Computational Modeling Validation Conference  | January 14-15, 2012         | Sydney, Australia      | <a href="http://doncomputing.com/sydney-conference/">http://doncomputing.com/sydney-conference/</a>   |
| 7.   | Alaska Marine Science Symposium   | January 16-20, 2012         | Alaska                 | <a href="http://www.alaskamarinescience.org/">http://www.alaskamarinescience.org/</a>   |
| 8.   | Multidisciplinary Approches in Applied Geology (MAAG 2012)  | January 20-21, 2012         | Kolhapur, india        | <a href="http://gkgcollege.co.in/pdf/GKGBt.pdf">http://gkgcollege.co.in/pdf/GKGBt.pdf</a>   |
| 9.   | Internationals LiDAR mapping forum  | January 23-25, 2012         | Denver, USA            | <a href="http://www.lidarmap.org">www.lidarmap.org</a>  |
| 10.  | National Conference on Forest, Environment and Climate Change: Issues and Challenges                            | January 30-31, 2012         | Bilaspur, India        | <a href="http://ggu.ac.in/download/national_conference_forestry_2012.pdf">http://ggu.ac.in/download/national_conference_forestry_2012.pdf</a>                           |
| 11.  | 4 <sup>th</sup> International Conference on Advanced Geographic Information Systems, Applications, and Services | January 30-February 4, 2012 | Valencia, Spain        | <a href="http://www.eamnet.eu/cms/?q=node/98">http://www.eamnet.eu/cms/?q=node/98</a>   |
| 12.  | 4 <sup>th</sup> eHealth and Environment Conference  | January 30-February 2, 2012 | Dubai, UAE             | <a href="http://congress.hbmcu.ac.ac/">http://congress.hbmcu.ac.ac/</a>   |
| 13.  | 3 <sup>rd</sup> International conference on Climate Change and Sustainable Management of Natural Resources      | February 5-7, 2012          | Gwalior, India         | <a href="http://www.itmuniversity.ac.in/TIMS/">http://www.itmuniversity.ac.in/TIMS/</a>   |
| 14.  | International Symposium on Water and Wetlands in the Mediterranean  | February 6-8, 2012          | Agadir, Morocco        | <a href="http://agadir2012.medwct.org/">http://agadir2012.medwct.org/</a>   |
| 15.  | First International Conference on Environmental Challenges in Arid Regions                                      | February 6-8, 2012          | Jeddah, Saudi Arabia   | <a href="http://ecar.kau.edu.sa/Default.aspx?SiteID=188020&amp;lng=EN">http://ecar.kau.edu.sa/Default.aspx?SiteID=188020&amp;lng=EN</a>                                 |
| 16.  | International Conference on Advanced Information System, E-Education and Development                            | February 7-8, 2012          | Kuala Lumpur, Malaysia | <a href="http://www.icaised.com">http://www.icaised.com</a>   |
| 17.  | Conference on Computer Science & Computational Mathematics  | February 9-10, 2012         | Melaka, WP, Malaysia   | <a href="http://www.cccm.net">http://www.cccm.net</a>   |
| 18.  | International Conference on Computational Techniques and Artificial Intelligence (ICCTAI'2011)                  | February 11-12, 2012        | Penang, Malaysia       | <a href="http://parcentre.org/listing.php?subcid=43&amp;mode=detail">http://parcentre.org/listing.php?subcid=43&amp;mode=detail</a>                                     |
| 19.  | 17 <sup>th</sup> National Space Science Symposium   | February 14-17, 2012        | Tirupati, India        | <a href="http://www.nsss2012.com/">www.nsss2012.com/</a>  |
| 20.  | The 1st International Congress on Dust Haze and Combating it's Adverse Effects                                  | February 15-17, 2012        | Khuzestan, Iran        | <a href="http://en.icodh.ir/">http://en.icodh.ir/</a>   |
| 21.  | AGU Chapman Conference on Remote Sensing of the Terrestrial Water Cycle   | February 19-22, 2012        | Kona, Hawaii, USA      | <a href="http://www.agu.org/meetings/chapman/2012/acall/">http://www.agu.org/meetings/chapman/2012/acall/</a>   |
| 22.  | Ocean Sciences Meeting  | February 20-24, 2012        | Utah, USA              | <a href="http://www.sgmnet.com/osm2012/">http://www.sgmnet.com/osm2012/</a>   |

| S.No | Theme   | Duration             | Location                   | Web address   |
|------|---|----------------------|----------------------------|---|
| 23.  | 16 <sup>th</sup> Annual International symposium on Sustainability of Space Activities: International issues and Potential Solutions | February 21-23, 2012 | Strasbourg                 | <a href="mailto:symposium16@isu.isunet.edu">symposium16@isu.isunet.edu</a>  |
| 24.  | International Conference on Environmentally Sustainable Urban Ecosystems (ENSURE 12)  | February 24-26, 2012 | Guwahati, India            | <a href="http://www.iitg.ernet.in/coeitg/ensure.html">http://www.iitg.ernet.in/coeitg/ensure.html</a>   |
| 25.  | 2012 International Conference on Climate Change and Humanity (ICCCH 2012)   | February 26-28, 2012 | Singapore                  | <a href="http://www.iccch.org/">http://www.iccch.org/</a>   |
| 26.  | International Conference on Sustainable Architecture and Urban Design 2012  | March 3-5, 2012      | Penang, Malaysia           | <a href="http://icsaud2012.hbp.uam.my/">http://icsaud2012.hbp.uam.my/</a>   |
| 27.  | International Seminar on Marine Science and Aquaculture   | March 13-15, 2012    | Sabah, Malaysia            | <a href="http://www.ums.edu.my/fipmb/isomsa/isomsa/">http://www.ums.edu.my/fipmb/isomsa/isomsa/</a>   |
| 28.  | The 1 <sup>st</sup> International Conference on Decision Modeling (ICDeM2012)   | March 13-16, 2012    | Kedah, Malaysia            | <a href="http://www.icdem.uum.edu.my">http://www.icdem.uum.edu.my</a>   |
| 29.  | International conference on marine ecosystem 2012 (INCOMES 2012)  | March 13-15, 2012    | Johor, Malaysia            | <a href="http://www.ukm.my/incomes2012/">http://www.ukm.my/incomes2012/</a>   |
| 30.  | 6 <sup>th</sup> International Symposium on Advances in Science and Technology (6thSASTech)  | March 24, 2012       | Kuala Lumpur, Malaysia     | <a href="http://6thSASTech.khi.ac.it">http://6thSASTech.khi.ac.it</a>   |
| 31.  | International IGBP Global Change conference   | March 26-29, 2012    | London, UK                 | <a href="http://www.camnet.eu/cms/?q=node/98">http://www.camnet.eu/cms/?q=node/98</a>   |
| 32.  | 2012 International Conference on Computer Networks and Communication Systems - CNCS 2012  | April 7-8, 2012      | Kuala Lumpur, Malaysia     | <a href="http://www.sic-edu.sg/cnca/index.htm">http://www.sic-edu.sg/cnca/index.htm</a>   |
| 33.  | 2012 4 <sup>th</sup> International Conference on Digital Image Processing (ICDIP 2012)  | April 7-8, 2012      | Kuala Lumpur, Malaysia     | <a href="http://www.icdip.org/">http://www.icdip.org/</a>   |
| 34.  | 30 <sup>th</sup> Conference on Hurricanes and Tropical Meteorology  | April 15-20, 2012    | Florida, USA               | <a href="http://www.ametsoc.org/mee/fainst/201230hurricane.html">http://www.ametsoc.org/mee/fainst/201230hurricane.html</a>   |
| 35.  | First International Conference on Architecture and Urban Design (1-ICAUD)   | April 19-21, 2012    | Tirana, Albania            | <a href="http://www.icaud.epoka.edu.al/">http://www.icaud.epoka.edu.al/</a>   |
| 36.  | 10 <sup>th</sup> International conference on southern hemisphere Meteorology and Oceanography                                       | April 23-27, 2012    | Nouméa, New Caledonia, USA | <a href="http://www.colloque.ird.fr/icaumo-2012/">http://www.colloque.ird.fr/icaumo-2012/</a>   |
| 37.  | EuSAR 2012: 9 <sup>th</sup> conference on Synthetic Aperture Radar  | April 24-26, 2012    | Nuernberg, Germany         | <a href="http://conference.vde.com/eusar/EUSAR2012/Pages/default.aspx">http://conference.vde.com/eusar/EUSAR2012/Pages/default.aspx</a>                             |
| 38.  | ACSEE 2012 - The Second Asian Conference on Sustainability, Energy and the Environment  | May 3-6, 2012        | Osaka, Japan               | <a href="http://www.conferencealerts.com/seeconf.mv?q=ca1shaam">http://www.conferencealerts.com/seeconf.mv?q=ca1shaam</a>   |
| 39.  | 44 <sup>th</sup> International Liege Colloquium on Ocean Dynamics   | May 7-11, 2012       | Liege, Belgium             | <a href="http://modb.oce.ulg.ac.be/colloquium/">http://modb.oce.ulg.ac.be/colloquium/</a>   |
| 40.  | SOLAS Open Science Conference   | May 7-10, 2012       | Cle Elum, WA, USA          | <a href="https://www.confmanager.com/main.cfm?cid=2445">https://www.confmanager.com/main.cfm?cid=2445</a>   |
| 41.  | 12 <sup>th</sup> International Circumpolar Remote Sensing Symposium   | May 14-18, 2012      | Levi, Finland              | <a href="http://alaska.usgs.gov/science/geography/CRSS2012/dates.pbp">http://alaska.usgs.gov/science/geography/CRSS2012/dates.pbp</a>                               |
| 42.  | Effects of Climate Change on the World's Oceans   | May 15-19, 2012      | Yeosu, Korea               | <a href="http://www.picos.int/meetings/international_symposia/2012/Yeosu/scope.aspx">http://www.picos.int/meetings/international_symposia/2012/Yeosu/scope.aspx</a> |
| 43.  | 2 <sup>nd</sup> International Symposium, Effects of Climate Change on the World's Oceans  | May 21-24, 2012      | Yeosu, Korea Republic      | <a href="http://www.oceans12mtsieeeyeosu.org/index.cfm">http://www.oceans12mtsieeeyeosu.org/index.cfm</a>   |
| 44.  | Urban Environmental Pollution   | June 17-20, 2012     | Amsterdam, The Netherlands | <a href="http://www.uepconference.com">http://www.uepconference.com</a>   |



## Ongoing Courses

- Sixteenth Post Graduate course in RS & GIS at IIRS, Dehradun from July 1, 2011 to March 31, 2012.
- Eighth Post Graduate Course In Satellite Communications at SAC Ahmedabad from August 1, 2011 to April 30, 2012.

## Future Courses

- Short course on "Application of Space Technology for Disaster Risk Reduction" during April 9 - May 4, 2012 at Dehradun
- Seventeenth Post Graduate course in RS & GIS at IIRS, Dehradun from July 1, 2012 to March 31, 2013.
- Short course on 'Navigation and Satellite Positioning System' at SAC, Ahmedabad during June 18-July 13, 2012.
- Short course on 'Overview of Small Satellite Mission Planning' at IIRS Dehradun and ISAC, Bengaluru during October 29-November 9, 2012.
- Eighth Post Graduate Course in Satellite Meteorology & Global Climate at SAC, Ahmedabad from August 1, 2012 to April 30, 2013
- Eighth Post Graduate Course in Space and Atmospheric Science at PRL, Ahmedabad from August 1, 2012 to April 30, 2013.

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CSSTEAP welcomes views and opinions of the readers on 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.

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