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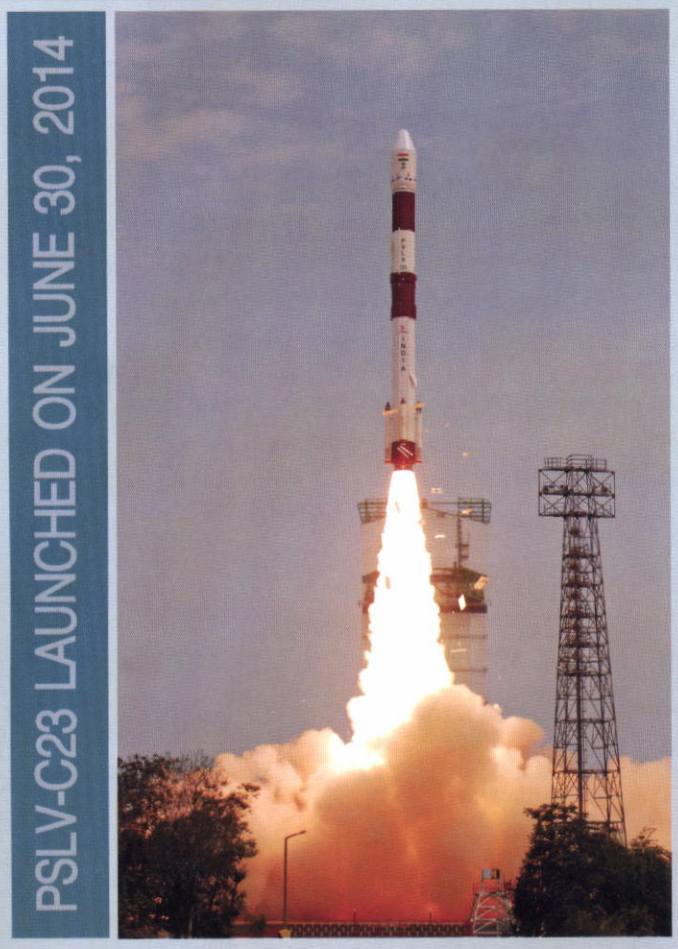
CSSTEAP Newsletter

July, 2014

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.

PSLV-C23 LAUNCHED ON JUNE 30, 2014



Polar Satellite Launch Vehicle - C23 (PSLV-C23) successfully launched French Earth Observation Satellite-SPOT 7 and four other co-passenger satellites from Satish Dhawan Space Centre SHAR, Sriharikota on June 30, 2014. The main payload comprised of the French Earth Observation Satellite SPOT-7 weighing 714 kg. It also launched AISAT of Germany weighing 14 kg, NLS7.1 (CAN-X4) & NLS7.2 (CAN-X5) of Canada each weighing 15 kg and VELOX-1 of Singapore weighing 7 kg. These five satellites were launched under commercial arrangements that ANTRIX Corporation had entered with the respective foreign agencies.

Honb'le Prime Minister of India, Mr. Narendra Modi, also witnessed the successful launch of the PSLV-C23 from Sriharikota. In his congratulatory address at the Mission Control Centre after the landmark launch, the Prime Minister called upon the space community to proactively engage with all stakeholders to maximize the use of space science in governance and development. India must fully harness this expertise in space technology in the developmental process for social change, economic development and resource conservation, he added.

Inside this issue .....

Mr. Narendra Modi, Hon'ble Prime Minister of India visiting SHAR before launch of PSLV-23

PSLV-C23 Heat-shield closed with five satellites integrated to the Launch Vehicle

Speaking of India's age-old ethos of the whole world being one family, the Prime Minister said India's space programme is driven by a vision of service to humanity, not a desire of power. He said India has a rich heritage of science and technology, including space. Mr. Modi said the works of our ancestors, who included visionaries like Bhaskaracharya and Aryabhata, still continue to inspire generations of scientists. He added that India must share the fruits of its advancement in space technology with the developing world, and neighbours in particular. He called upon the space community to take up the challenge of developing a SAARC satellite that can be dedicated to our neighbourhood as a gift from India.

He said we can be proud of the Indian space programme, which is fully indigenous, developed in the face of great international pressure and hurdles. He described it as a domain where "we have pushed beyond mediocrity to achieve excellence."

Referring to the benefits of space technology for the common man, the Prime Minister said it drives modern communication, empowers children in remote villages with quality education, and ensures quality healthcare to all, through telemedicine. He said it has a critical role in realizing the vision of a *Digital India* the power of 125 crore connected Indians.

The Prime Minister said continued progress in space must remain a mission of high priority. He called for developing more advanced satellites and expanding our satellite footprint. He said India has the potential to be the launch service provider of the world and must work towards this goal.

He commended Dr. K. Radhakrishnan for his leadership, and said India's space programme is the best example of his vision of scale, speed and skill. He wished the team of scientists the best as they prepare to insert our spacecraft into the orbit of Mars in a few months. Towards the end he remarked that he had met four generations of scientists during his visit to ISRO, which is an ideal example of one family.

Governor of Andhra Pradesh Mr. E.S.L. Narasimhan, Chief Minister Andhra Pradesh, Mr. Chandrababu Naidu, Minister of Parliamentary Affairs Mr. M. Venkaiah Naidu, MoS, PMO Dr. Jitendra Singh, Secretary, Department of Space Dr. K. Radhakrishnan, and eminent scientists for former Chairmen Prof U.R. Rao, Dr. K. Kasturirangan and other dignitaries were also present on the occasion.

Source: adopted from pmindia.gov.in & www.isro.gov.in

PSLV-C24 SUCCESSFULLY LAUNCHES INDIA'S SECOND DEDICATED NAVIGATION SATELLITE IRNSS-1B

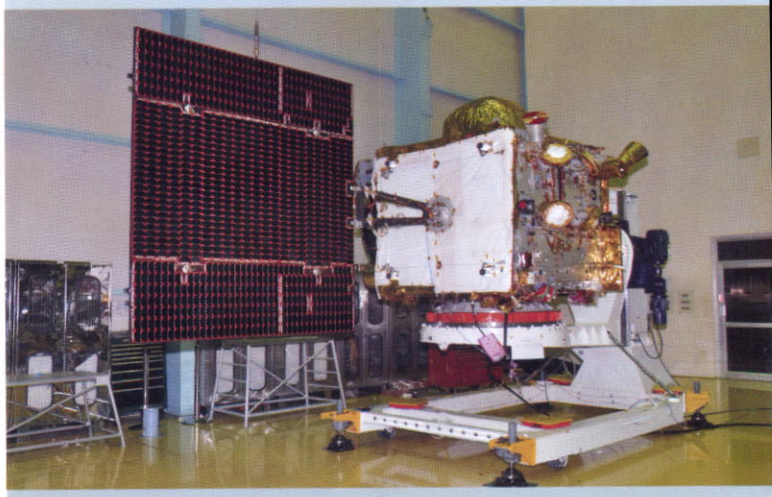
ISRO's Polar Satellite Launch Vehicle, PSLV-C24, successfully launched IRNSS-1B, the second satellite in the series of Indian Regional Navigation Satellite System (IRNSS), on April 04, 2014 at 1715 hours IST from Satish Dhawan Space Centre SHAR, Sriharikota. This was the 25th consecutively successful mission of PSLV. The 'XL' configuration of PSLV was used for this mission. Previously, the same configuration of the vehicle was used five times to launch Chandrayaan-1, GSAT-12, RISAT-1, IRNSS-1A and Mars orbiter spacecraft.

IRNSS-1B is the second of the seven satellites constituting the space segment of the Indian Regional Navigation Satellite System. IRNSS-1A, the first satellite of the constellation, was successfully launched by PSLV on July 02, 2013. IRNSS-1A is functioning satisfactorily from its designated geosynchronous orbital position

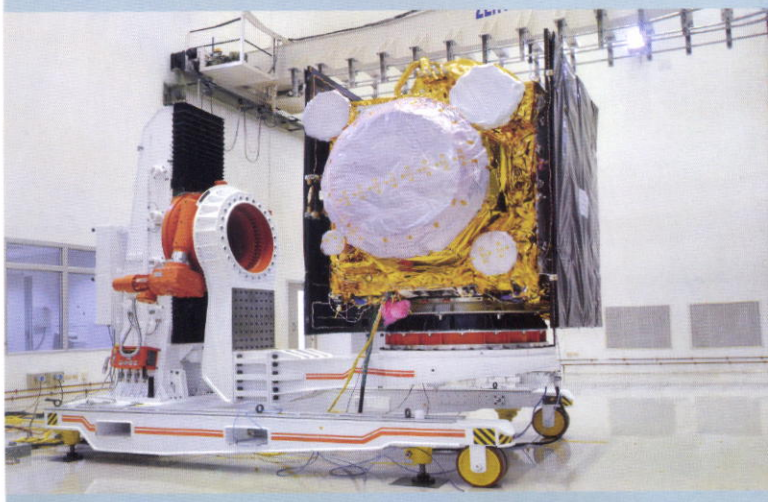
Two more satellites of this constellation, namely, IRNSS-1C and IRNSS-1D, are planned to be launched in the second half of 2014. The entire IRNSS constellation of seven satellites is planned to be completed by 2015-16. IRNSS is an independent regional navigation satellite system being developed by India. It is designed to provide accurate position information service to users in India as well as the region extending up to 1500 km from its boundary, which is its primary service area. The *'Extended Service Area'* lies between *'Primary Service Area'* and area enclosed by the rectangle from Latitude 30° South to 50° North and Longitude 30° East to 130° East.

It will provide two types of services, namely, Standard Positioning Service (SPS) which is provided to all the users and Restricted Service (RS), which is an encrypted service provided only to the authorised users. The IRNSS System is expected to provide a position accuracy of better than 20 m in the primary service area. It comprises of a space segment and a ground segment. The IRNSS space segment consists of seven satellites, with three satellites in geostationary orbit and four satellites in inclined geosynchronous orbit. IRNSS-1A, the first satellite of the IRNSS constellation, has already started functioning from its designated orbital slot.

Source: www.isro.gov.in



IRNSS-1B at clean room with one of its Solar Panels Deployed



IRNSS-1B satellite in clean room

Director, CSSTEAP in UN-OOSA, Vienna

Meeting with Directors of Regional CSSTEAP in UN-OOSA, Vienna Austria

MEETING WITH DIRECTORS OF REGIONAL CENTRES FOR SPACE SCIENCE AND TECHNOLOGY EDUCATION IN UN-OOSA, VIENNA, AUSTRIA DURING JUNE 10-14, 2014

Director CSSTEAP, Dr. Y.V.N. Krishna Murthy attended meeting of Directors of Regional Centres for Space Science and Technology Education at Vienna, Austria on an invitation from UN-OOSA during June 10-14, 2014. Mr. H.N Madhusudana, Director BEA, ISRO Hqrs. has also accompanied and participated in the meeting.

On June 11, 2014 he met with Dr. Takao Doi, UN Expert on Space Applications and briefed on the activities of CSSTEAP, planned programs and role of ISRO in support as host country. Later on June 12, 2014 he had an informal meeting with the Director/ Director General of other Regional Centres and discussed about the activities of the Centre and on new initiatives.

On June 13, 2014 he also interacted with Ms. Simonetta Di Pippo, Director UN-OOSA. She was briefed on CSSTEAP academic activities, future initiatives and role of Director UN-OOSA as chairperson of Advisory Committee and as a member of Governing Board meeting of CSSTEAP.

The agenda for meeting of Directors of Regional Centres on June 14, 2014 was to focus on the exchange of status of activities of the Programme on Space Applications of regional centres, the status of development of education curricula, the future of space science and education and challenges in the activities of regional centres. He highlighted the academic and research programmes of CSSTEAP, new initiatives, role of CSSTEAP GB in providing focus to the centre in making it 'Centre for Excellence' and role of Department of Space, Government of India and host institutions of ISRO in providing funding, infrastructure and expert faculty. Dr. Murthy also mentioned about CSSTEAP GB member's suggestion to organize PG course in Navigation and Satellite Positioning System and to enhance short courses in thematic areas. UN-OOSA suggested introducing a short course on Space Law may also be considered.

Availing the opportunity, Director CSSTEAP also participated in the 57th Session of Committee on the Peaceful Uses of Outer Space (COPUOS). During proceedings, Ambassador from Republic of Venezuela appreciated IIRS/ISRO for providing support in capacity building to Venezuela professionals in the area of space applications.

EIGHTEENTH POST GRADUATE COURSE ON REMOTE SENSING & GIS

The 18th Post-Graduate Course on "Remote Sensing and Geographic Information System (RS&GIS)" of CSSTEAP was conducted at Indian Institute of Remote Sensing (IIRS), Dehradun during July 1, 2013 to March 31, 2014. Total 20 participants from 11 countries of Asia-Pacific Region viz. Bangaldesh-1; China-1; India-2; Kazakhstan-2; Kyrgyzstan-1; Maldives-1; Mongolia-2; Nepal-1; Tajikstan-2; Uzbekistan-3 and Vietnam-4 attended this course.

The entire course was divided into two semesters. Semester-I (4 months) consisted of basics and recent trends of RS, GIS and GPS for environmental analyses. The major components of the course syllabus were covered by the faculty of IIRS; and additional guest lectures by National and International Guest faculty on specialized topics were also arranged. The guest lecturers from various Indian Organizations/Institutes/ Universities were Mr. Rajesh Kumar, Forest Survey of India, Dehradun; Dr. Sanjay K Jain, National Institute of Hydrology, Roorkee; Dr. Gopal Prasad Juyal, Centre Soil and Water Conservation Research and Training Institute, Dehradun; Mr. Nitin Joshi, Survey of India, Dehradun; Mr. P.S Uttarwar, Delhi Development Authority, New Delhi; Dr. Rahul Dev Garg, Indian Institute of Technology, Roorkee; Mr. Amit Bhargava, National Informatics Centre, New Delhi; Dr. P.S Archarya, Department of Science and Technology, New Delhi; Mr. C.M Adhikari, ESRI, New Delhi; Dr. Manish Naja, Aryabhatta Research Institute of Observational Sciences, Nainital., etc.

In semester-II, the course participants chose one of the eight electives by considering his/her academic qualification, professional experience, and technical requirement of their parent organization.

The academic activities like theory, guest lectures, practical, etc. were organized in smart-class rooms. Multi-media self-learning packages, field excursion, seminars, etc. were also organized. All the participants learnt operationalization of software for digital satellite image processing for mapping natural resources for management and planning during computer-based practical exercises. Local field visit were effective in understanding different ecosystems, phenomenon, and earth surface features using RS data. They Academic performance of the course participants was evaluated in each semester through periodic internal and external examinations,

Participants during their practical excercises at IIRS, Dehradun

Course participants with faculty at Andhra University Visakhapatnam

class test, tutorials, seminar etc. The participants were given opportunity to visit technical facilities at NRSC Hyderabad and participate in the technical symposium at Andhra University, Visakhapatnam.

Four participants of the PG course & one participant of M.Tech participated in the IIRS Interaction Meet 2014 held during February 20-21, 2014 at IIRS Dehradun. On the social front, the participants had glimpses of Indian festivities by their active participation in various festivals such as Dussehra, Holi, Diwali, Id-ul-Fitr, Christmas, New year, etc.

The course participants learnt a great deal with respect to practical and technical aspects of RS & GIS technologies and their applications during the three months of pilot project carried out in Module-III. This module is basically designed to carry out pilot project work by the course participants. Course participants developed and finalized pilot project in consultation with organization in their home country and supervisors of IIRS.

The valedictory function was organized on March 24, 2014. Dr. V. Jayaraman, Satish Dhawan Professor, ISRO was the Chief Guest of the Valedictory function. On the occasion, Memoirs comprising of messages from GB, AC members, eminent persons, course report and pilot project abstracts of students was released by the Chief Guest. Dr. V. Jayaraman delivered the valedictory address and awarded the Post Graduate Diploma certificates to all the successful participants.

Eight participants passed with Distinction, eleven in First class and one passed out as Pass. Three meritorious participants, Ms. V.N.V Swathi Lakshmi from India, Ms. Mahmuda Khatun from Bangladesh and Mr. Mahendra Singh Thapa from Nepal were awarded merit certificates for 1st, 2nd and 3rd positions respectively. CSSTEAP Excellence medals alongwith certificates were awarded by the Chief Guest.

Dr. V Jayaraman Distinguish Professor ISRO distributing diploma certificates to the participants

Course participants with dignitaries during the valedictory function conducted at IIRS, Dehradun

Dr. Sarnam Singh
Course Director

Dr. Yogesh Kant
Course Coordinator

NINTH POST GRADUATE DIPLOMA COURSE IN SATELLITE COMMUNICATIONS (SATCOM-9)

The 9th Post Graduate Diploma Course in Satellite Communications (SATCOM-9) of CSSTEAP commenced on August 01, 2013 and concluded on April 30, 2014 at SAC Ahmedabad. Sixteen participants from six countries of Asia Pacific region, namely Bangladesh-1, India-5, Mongolia-4, Nepal-4, Uzbekistan-1 and Vietnam-1 attended this course.

The Valedictory function was held on April 28, 2014 at Bopal Campus, SAC. Shri K.S. Parikh, DD, SNAA welcomed the participants and guests. Director, CSSTEAP, Dr Y.V.N. Krishna Murthy in his address to participants highlighted the activities of CSSTEAP and in particular brought out the opportunities and fellowships available for doing M.Tech. Shri A.S. Kiran Kumar, Director, SAC, in his talk emphasized the role of SAC in satellite communications in ISRO. The Chief Guests of the function Dr. P.S. Goel, Prof M.G.K. Menon DRDO Chair, addressed the audience and stressed the role of satellite communications in defense applications.

Dr. Raghunadh K. Bhattar, Course Director, SATCOM presented the course report. At the end, two participants from the SATCOM course gave their feedback and said that the nine month course was very useful and enhanced their knowledge and skills in satellite communications. Further they expressed their gratitude towards SAC and CSSTEAP for organizing and giving them an excellent opportunity. The chief guest gave away the certificates to all participants. Rank certificates were also distributed to rank holders. The function was concluded with the vote of thanks from Shri V.N.Parekh, Course Coordinator, SATCOM.

Dr. Raghunath K. Bhattar
Course Director

Mr. V.N. Parekh
Course Coordinator

Participants of SATCOM-9 Course during educational tour

Participants of SATCOM-9 Course with dignitaries during Valedictory ceremony conducted at SAC, Ahmedabad

INTERNATIONAL SHORT COURSE ON MICROWAVE REMOTE SENSING (SAR) AND ITS APPLICATION

The course commenced on May 05, 2014 with 20 participants from 7 countries including Bangladesh-1, India-8, Khazakhstan-3, Sri Lanka-2, Thailand-1, Uzbekistan-1 and Vietnam-4. The overall objective of this training course was to provide awareness about the concept of Microwave Remote Sensing, aspects of data processing, microwave data complimenting optical data and potential of microwave data applications through various case studies. The course was designed in a modular structure and provided a blend of theory, and practical experience consisting of two modules:

Module-1 organized during initial two week covered topics like Microwave Remote Sensing fundamental, RADAR Target Interaction, Microwave Sensors, RADAR image interpretation, SAR image processing and analysis, RISAT 1 data processing, feature extraction introduction to SAR interferometry, differential Interferometry, SAR Polarimetry fundamentals and data processing, Radargrammetry. While module 2 organized during last two week of the course covered applications of Microwave remote sensing in Agriculture & Soils, Forestry, Urban & Land use mapping, Hydrology & Oceanography, Atmosphere and Geology and participants carried out a small case study in the area of their interest and presented their results.

Experienced faculty from IIRS, Space Applications Centre, Ahembdabad, NRSC, IIT Roorkee, IIT Karagpur and Defence Electronics Application Laboratory Dehradun delivered lectures on all issues related to microwave data processing and its applications. The participants were exposed to the various commercial and open source software used for microwave data processing and the training material are provided on CD. The participants carried a group project and presented the results in various application areas including DEM generation using SAR data, INSAR for Glacialogical Studies, Microwave RS for Montioring and Mapping Rice, RISAT data processing for identification of Basmati and non-basmati Rice, Modelling surface roughness using Multi polarized data, Land use land cover mapping and change detection, Polarimetric data decomposition, analyzing various Land cover signatures, etc. Trainees also carried out the analysis using data from Indian region as well some worked on the data from their respective countries.

The course concluded on May 30, 2014. Hon'ble chief guest of the valedictory function was Dr. Anmol Kumar, IFS, Director General Forest Survey of India, Dehradun, who distributed certificate to all the participants.

Course participants of Microwave RS (SAR) and its Applications at IIRS, Dehradun

Dr. Sarnam Singh
Course Director

Mrs. Shefali Agarwal
Course Coordinator

INTERNATIONAL TRAINING COURSE ON NAVIGATION AND SATELLITE POSITIONING SYSTEMS (NAVSAT)

The 3rd international short traning course on Navigation and Satellite Positioning System of CSSTEAP commenced on June 16, 2014 at SAC Ahmedabad. Nineteen participants from eight countries of Asia Pacific region, namely Bangladesh-1, India-2, Indonesia-3, Kyrgyzstan-2, Mongolia-5, Myanmar-1, Nepal-2, and Vietnam-3 attended this course. Mr. K.S. Parikh, Dy. Director, SNAA welcomed the participants and guests. Mr. A.S. Kiran Kumar, Director SAC, inaugurated the course. Director, SAC highlighted the various programmes of ISRO and in particular the contributions made by SAC. He also outlined the India's efforts to establish its own regional navigation system, namely IRNSS. Other dignitaries also emphasized the need for navigation, GAGAN systems, and applications of navigation in remote sensing and other areas. Mr. V.S. Palsule Director, DECU; Dr. J.S. Parihar, DD, EPSA; Mr. A.P. Shukla, were the focal persons for conducting the course from SAC. On the occasion Dr. Y.V.N. Krishnamurthy, briefed about CSSTEAP and its activities. Other dignitaries from SAC, PRL and DECU were also invited and present during inaugural function.

The course conducted for four weeks covered vaired topics covering ring Satellite navigation fundamentals to applications covering wide range of topics. The course-faculty were drawn from experienced retired ISRO Scientists apart from scientists of SAC/Ahmedabad. Invited lectures were also delivered by Scientists/Engineers working at different ISRO Centres, experts from Indian Navigation system industries and Communications and aviation experts of Govt. of India. The course incorporated topics like Introduction to GNSS in which overview of GPS, Gallelio, compass, IRNSS with Introduction to MATLAB, orbital dynamics of GPS-orbit, Satellite & User position algorithms, concept of Fourier transformations, error source, new modulation schemes for navigation, antennas, DGPS, GPS augmentation, GPS receivers, etc. were covered.

The course will be concluding on July 11, 2014 at SAC Ahmedabad.

Dr. Raghunath K. Bhattar
Course Director

Mr. V.N. Parekh
Course Coordinator

BOARD OF STUDIES MEETING ON THE SPACE AND ATMOSPHERIC SCIENCES

To review the course content Board of Studies for the Space and Atmospheric Sciences Course met on 27th June, 2014 at the CSSTEAP office at Bopal Campus of SAC, Ahmedabad. The committee consisted of subject experts of different

Course participants of NAVSAT Programme at Space Application Centre (SAC), Ahmedabad

Valedictory ceremony of the NAVSAT course

Director IIRS unfurling the flag on Republic Day.

2nd IUIM at IIRS during 20-21 February 2014.

topics coved in Space and Atmospheric Sciences prgramme. The feedback given by the participants of the previous batches was considered for discussion. Specifically, for the recent batch a survey was conducted wherein inputs were sought from each participant on the level of understanding / level of difficulty in a particular subject. This information was brought to the attention of all the committee members and the discussions that followed factored in the inputs by the participants in addition to the individual opinion of the subject experts. Detailed discussion on the course structure took place to modify the topics in order to keep up with the recent developments in the field. Further, it was also decided to modify the course work so as to comply with the guidelines set by the University Grant Commission (UGC) on the minimum requirement for pursing an M.Tech. degree. As the minimum requirements set forth by the UGC would have been met in the UN course on Space and Atmospheric Sciences, the modified syllabus of this course will then enable easy transition of the CSSTEAP participants who are desirous of pursuing further studies towards the M.Tech degree that will be given by Andhra University, Visa Khapatram.

LIST OF ACTIVITIES WITH PARTICIPATION OF CSSTEAP STUDENTS

- CSSTEAP participants actively participated in campus republic Day celebrating at IIRS on January 26th 2014. They also participate in cultures programmes.
- CSSTEAP participants participated in Second IIRS User Interaction Meet (IUIM-2014) was held during February 20-21, 2014 at IIRS. CSSTEAP were benefitted from the deliberatioins.
- Dr. V. Jayaraman, Senior Advisor (Space Applications) and Satish Dhawan Professor, ISRO delivered lecture titled 'Technology Innovations & Societal Perceptions' on March 24, 2014 in IIRS auditorium and CSSTEAP trainee participants attended the event.
- CSSTEAP trainees participated in the tree plantation organized in the campus on 'World Forestry Day' on March 21, 2014.

FORTH COMING ACTIVITIES

CSSTEAP-GB and AC

The 19th meeting of Governing Board of CSSTEAP is slated to be organised in the last quarter of 2014. The meeting will be attended by the Governing Board members and special invitees. The meeting will be preceeded by an Advisory Committee meeting; one day before GB meeting; wherein all Course Directors will be making the a detailed presentation of past three year's of academic activities, syllabus and further suggestions for improvement in programmes.

BACKGROUND OF CSSTEAP

In response to the UN General Assembly Resolution (45/72 of 11th 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 centre, 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 and ISRO Satellite Centre (ISAC), Bengaluru. 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 as well as 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 (e) Small Satellite Missions, 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 recognized by Andhra University, Visakhapatnam, India for awarding M.Tech. degree (after completion of one year project).

CSSTEAP Hqrs. at Dehradun

Future Courses

- "SAARC Regional Traning Programme on GIS and Remote Sensing Technology in Disaster Risk and Emergency Management in South Asia" at IIRS, Dehradun/during July,2014.
- 19th Post Graduate course in Remote Sensing & Geographic Information System at IIRS, Dehradun from July 1, 2014 to March 31, 2015.
- 9th Post Graduate course in Satellite Meteorology & Global Climate at SAC, Ahmedabad from August 1, 2014 to April 30, 2015.
- 9th Post Graduate course in Space & Atmospheric Science at PRL, Ahmedabad from August 1, 2014 to April 30, 2015.
- SSM short course form November 10 to 21st, 2014 at IIRS, Dehradun and ISAC Bangalore.

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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.