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Editor's Desk

Dear Members,

We are happy to present this issue of newsletter - combined with Jan issue due to delays solely attributed to me. My sincere apology.

It has been a great jubilation for all of us as our esteemed President Shri A S Kiran Kumar, Director SAC took over the reigns of ISRO as Chairman ISRO and Secretary DOS. Having moved to Bangalore, he will now be somewhat remote but will continue to shine our path with even more powerful beacon. On behalf of members of ISG, the Newsletter sends warm wishes for his bright tenure.

This issue will continue to be consistent in content with a slight change in cover page as the content list and editorial are brought out right on the first page. Please give your feedback on this layout.

We are featuring three interesting articles and all the usual features by our committed columnists. I am sure you would appreciate the article on e-learning written meticulously by Harish Karnatak et al on the contemporary learning revolution ushered by IIRS. Second article by Dipanwita showcases the work done at SAC on microwave data based Kharif crop estimation. The article on past warming of earth due to geological and solar factors by Prof Verma is featured to broaden your horizons.

On behalf of Editorial Board, I thank all the authors and columnists for their contributions.

I take this opportunity to bid farewell to two board members - Dr Nanda Kumar and Dr Beena Kumari and welcome the incumbents Mrs. Shweta Sharma and Shri Vivek Pandey to ISG Newsletter who are likely to rev up the proceedings from next issue onwards. I acknowledge the painstaking compilation done by Gaurav Jain and editorial support provided by C. P. Singh.

Please keep reading and continue your support.

R. P. Dubey, Editor
(rpdubey@hotmail.com)

Also in this issue:

ISG Executive Council

Editorial Board - ISG Newsletter

ISG Executive Council greets Shri A. S. Kiran Kumar on assuming charge as Chairman ISRO and Secretary DOS.

ISG Executive Council Members greets Shri Tapan Misra on assuming charge as Director SAC

E-learning Based Capacity Building in Geoinformatics

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Introduction

E-learning or electronic learning is an active learning experience for the learners which works on interactivity or "learning by doing" methodologies rather than a passive learning methods in which the learners are sitting in front of the teacher and "learning by telling". E-Learning makes learning exciting, engaging and compelling with full involvements of learner in the subject. Difficult and boring subjects can be made easier, more interesting and appealing and learner centric with e-learning. Learning is a social activity, and e-learning means that powerful and enduring learning experiences can be achieved, not just through content, but through the use of online communities and networks (Jane Knight, 2003). In this mode of learning, the learners are encouraged to communicate, collaborate and share knowledge through Internet or similar network. E-learning includes various types of media like text, audio, images, animation, and streaming video etc. to deliver the contents to the learner. In typical environment the contents are shared either through CDs, DVDs, Tape, Hard disks or by Internet media. In e-learning based learning methodologies many methods are available like synchronous learning, Asynchronous learning, linear learning, Collaborative learning etc. These methods will be discussed in coming sections of this article.

The recent Developments in web and related technologies using Web 2.0 and AJAX has opened new dimension for skill development using new learning methods. The learning methodologies are moved towards self-paced learner centric environment. During last decade the utilization of Internet technology by different user groups in the society is emerged as a technological revaluation which has directly affect the life of human being (Karnatak et al, 2012). The role of internet technology is very important for capacity building in any discipline which can satisfy the needs of maximum users in minimum time (Karnatak et al, 2014). The successful implementations of internet based e-learning methods are already demonstrated for many areas in worldwide (www.creativity-portal.com, www.wanna learn.com, www.howstuff works.com/, www.skilldom.co.in/ etc.). One of the interesting e-learning contents available in Internet for different subjects is from Khan Academy (www.khanacademy.org/) where learning is available in very interactive mode with more involvements of learners in the subject.

The capacity building for geospatial technologies and applications using e-learning based methods are getting popular among user communities. Remote Sensing and geo-information science have become key technology tools for the collection, storage and analysis of spatially referenced data for resource planning and decision making (Karnatak et

al, 2007). Today it is the backbone to many decision-making systems and location-based services emerging in the new information economy. Planners and decision makers' utilize these geo-spatial technologies for variety of applications in agriculture, forestry, mining, market research, environmental analysis as well as the social, utility services and disaster management.

In the recent years, sharing and disseminations of geospatial information via Internet and World Wide Web (WWW) became interesting and most popular among geo-spatial community and general users. The online map and satellite data services like Google Maps, Bing Maps, Openstreet Map, ISRO Bhuvan etc., are some of the success stories. By using these web mapping services the users are able to generate some of the interesting applications using mashup architecture. The internet based GIS are now becoming a platform for further capacity building for geo-spatial technologies and applications. In this article various technical issues and challenges are discussed for Internet based e-learning for Geoinformatics. The Initiatives of Indian Institute of Remote Sensing (IIRS) Dehradun for e-learning based capacity buildings are also presented in this article.

E-learning based education system

E-learning or electronics based learning is the use of electronic media with Information and communication technologies (ICT) in capacity building including training and education. E-learning includes various types of media that deliver text, audio, images, animation, and streaming video, and includes technology applications and processes such as audio or video tape, satellite TV, CD-ROM, and computer-based learning, as well as local intranet and web-based learning (Tavangarian et al, 2004). The e-reading based systems works on downloading the reading contents and read it offline while e-learning is a systematic learning system which guides the learners online with various learning methodologies implemented in LMS. The E-learning contents can be accessed by the students during live classrooms or in out of the classroom. E-learning can be self-paced, asynchronous learning or may be instructor-led, synchronous learning. E-learning is suited to distance education, but it can also be used in conjunction with face-to-face teaching, in which case the term blended learning is commonly used (Wikipedia, accessed 12th Nov. 2014). E-learning based learning methodologies are also known as, technology-enhanced learning (TEL), computer-based instruction (CBI), Computer-based training (CBT), computer-assisted instruction or computer-aided instruction (CAI), internet-based training (IBT), flexible learning, web-based training (WBT), online education, virtual education, virtual learning environments (VLE), digital education, tele-education etc. The learning methodologies in different modes were presented by Nick Van Dam using education model of Charles Merril, 1960 (Mayer, 1960). According to this model the learners through electronic media remembers 10% of what they read (like e-mail, e-documents etc.), 30% of what they see (like online self-study guide, video, ppt etc.), 50% of what they hear and see (like e-course with audio and video), 70% of what they say or write (like live e-class, interactive e-course). The most effective mode of learn-

ing in electronic mode is what learner do (like simulation and gaming) where the learners are actively participating in learning process.

The levels of instructional design are very high in e-learning based system rather than e-reading. The virtualization of classroom through internet media is one of the emerging domain in e-learning environment. Here the term “Virtual" is used to describe a course that not taught in a classroom face-to-face but through a substitute mode that can conceptually be associated "virtually" with classroom teaching. In virtual classroom the student participates from remote places in live classrooms. The e-learning based systems are typically depends on internet and multimedia technologies which are the basic enabler of online learning.

The extent to which e-learning assists or replaces other learning and teaching approaches is variable, ranging on a continuum from none to fully online distance learning (Bates, A. and Poole, G., 2003; OECD, 2005). Further the concept of e -learning can be sub divided in to four major sub categories:

Synchronous e-learning:
Synchronous learning occurs in real-time, with all participants interacting at the same time through some media like face-to-face discussions, live chat (audio, video and text), live lecture delivery, virtual classroom etc. The virtual classroom is one of the most popular technique which is getting very popular among learners.

Asynchronous e-learning:
Asynchronous learning is self-motivated and allows learner to engage in the exchange of ideas or information without the dependency of other participants or involvement of trainer at the same time. Asynchronous learning may use technologies such as email, blogs, wikis, and discussion boards, as well as web-supported textbooks, hypertext documents (HTML, XML etc.), audio, video lectures, and social networking using web 2.0 (Loutchkoet et al, 2002).

Asynchronous learning is very effective for the working professionals or the participants those are not able to participate in lectures or practical in prefix time slot. In asynchronous mode of online courses, the participant proceed at their own pace and convenience. Both the asynchronous and synchronous methods rely heavily on self-motivation, self-discipline, and the ability to communicate in writing effectively.

Linear learning:
Linear learning or e-reading through Computer-Based Learning or Training (CBT) refers to self-paced learning activities delivered on a computer or handheld device such as a tablet or smartphone. Zahm (2000) described computer-based training (CBT) as usually delivered via CD-ROM or as a Web download and that it is usually multimedia-based training. Karon (2000) discussed the convenience factor of well-designed computer-based training by saying that any well-designed computer-based training- whether it’s networked based or delivered via the Internet – is more convenient than traditional instructor-led training or seminars.

Collaborative learning:
Computer-supported collaborative learning (CSCL) uses instructional methods designed to encourage or require students to work together on learning tasks. CSCL is similar in concept to the terminology, "e-learning 2.0" and "networked collaborative learning" (NCL)

(Trentin G., 2010). The utilization of Web 2.0 technology for collaborative learning is very successful by using Blogs, wikis, discussion forum, social networking, live chat, etc.

Technological standards for E-learning

The standards for contents creation and development of Learning Management System are important to achieve interoperability among learning objects in Internet environment. A learning management system (LMS) is software used for delivering, tracking and managing training and education. The first e-learning standards were developed by Aviation Industry CBT Committee (AICC) (www.aicc.org). AICC brings together trainers, courseware developers, software vendors, simulator designers and airframe manufacturers to develop standards, technology recommendations and analysis of best practices (www.coursea venue.com). The most popular AICC standards are AICC documents AGR-006 (File-based CMI Systems) and AGR-010 (Web-based CMI Systems).

Another important e-learning object is Sharable Content Object Reference Model (SCORM) which integrates a set of related technical standards, specifications, and guidelines designed to meet requirements including accessibility, interoperability, durability, and reusability of content and systems. The e-learning contents based on SCORM standard are delivered through SCORM compliant Learning Management System (LMS) like Moodle, Blackboard, A-tutor etc. SCORM is produced by Advance Distributed Learning (ADL), a research group sponsored by the United States Department of Defence. Since its establishment in 1997, ADL has worked with military and government agencies, industry, academia, and professional organizations world-wide to accomplish its mission and realize its vision that learning experiences must be accessible to all online and on demand (www.courseavenue.com).The SCORM version 1.1, 1.2 and 2004 are available for their implementation in LMS. The SCROM 3rd (2005) and 4th edition (2009) are most popular and widely used standards implemented in majority of LMS. The Tin Can API is latest development in e-learning object standards. The first version of Tin Can API is published in April 2013 and had its name changed to "Experience API" (xAPI) and "Next Generation SCORM" (SCORM, 2014). The Tin Can API solves many of the problems inherent with older versions of SCORM (SCORM, 2014).

The Hyper Text Mark-up Language (HTML) is most common language for development of online learning system in conjunction with JavaScript, XML and other server side programming languages like Java, PHP, C#, VB.net etc. using web 2.0 and AJAX. The XML provides an easier way to read and exchange information, allowing the reusability of the information presented in the files in order to present it in different formats and to different audiences without the necessity of reprogramming (Bray et al, 2004).

E-learning for Geoinformatics

The e-learning based online education is offered by different universities and Institutions across the globe in the field of Remote Sensing and Geoinformatics. A brief summary of popular programmes are given below:

Penn State University USA under the banner of COURSERA offers UG and PG course on Remote Sensing Image Analysis and Applications. Graduate Certificate in Geospatial Intelligence, Master of Professional Studies in Homeland Security - Geospatial Intelligence Option, Certificate of Geographic Information Systems and Master of Geographic Information Systems. COURSERA has also conducted online course on Maps and the Geospatial Revolution with video lectures and demonstration (https://www.coursera.org).

UNIGIS International offers online distance learning education across the world with different course structure for various countries. In UK, with collaboration of two universities viz Manchester Metropolitan University and the University of Salford offering certificate, PG diploma and M.Sc. degree through online e-learning based education system (www.unigis.org).

ITC university of Twente, Netherland offers several distance education based certificate and diploma programmes in modular structure with limited availability of seats. The contents of their online education programmes are e-reading based rather e-learning. The six -week Distance courses (5 credits) have a weekly study load of 20 to 24 hours (www.itc.nl).

In India, the e-learning based online education programme is in emerging stage. The Open universities like IGNOU and Sikkim Manipal University (SMU) are offering various distance education programme (very limited for Geo-spatial technologies) but the interactive contents for e-learning are very limited. Status of major programme areas under:

The National Institute of Disaster Management (NIDM) under the Ministry of Home Affairs, Government of India is offering e-Learning courses on Disaster Risk Management. The Interactive contents are developed for Comprehensive Disaster Risk Management Framework and various thematic courses. The contents for NIDM course are based recorded videos and e-reading materials available for downloads.

Sikkim Manipal University offering distance education programmewith Master's Degree in Geoinformatics. They provide access through online Learning Management System (LMS) and e-reading contents for its regular distance education students.

All the courses mentioned above are based on recorded videos and demonstrations where the learners has to play these contents as their own convenience and pace. It looks like an extension of classroom teaching where learning is based on "learning by telling". The interactive multi-media contents where the learners are involved in learning process are still very limited. The availability of teachers for live interaction is also very limited. But these efforts encouraging and exciting for learners.

IIRS Initiatives in e-learning for Geoinformatics

The initial focus of IIRS was to use EDUSAT/INSAT 4CR satellite for distance learning but extended the scope to use broadband internet so that access to large number of institutions/universities /individuals with little cost the user (Krishna Murthy et al, 2014). IIRS distance learning program initiated in 2007 and successfully conducted 14 programs in the last eight years. The first

course was attended from twelve universities and the number of institutions / universities increased manifold. The fourteenth course is in progress with more than 222 institutions /universities / departments with more than 4000 number of participants attending the program live and interactive. IIRS program is unique and interactive and demand is increasing not only universities but among research institutions, user departments and individuals. In this mode of online education the teachers are available for live classroom during 16:00 hrs to 17:30 hrs on daily basis during the course. The practical exercises are being conducted as live demonstration with open source and COTS packages. The live classes are being conducted using A-VIEW system developed by Amrita University funded by Ministry of Human Resources Development (MHRD), Government of India.

Further to enhance the outreach of geo-spatial science and technology, IIRS has developed e-learning contents and LMS for different certificate courses in Remote Sensing and geo-spatial technology. The e-learning courses are self-paced and learner centric courses. The syllabus of the courses are as per latest developments and trends in geo-spatial science and technologies with specific focus on Indian case studies for geo-spatial applications. The learning is made available through interactive 2D and 3D animations, audio, video for practical demonstrations, software operations with free data applications. The learning methods are implemented to make it more interactive and learner centric application with practical examples of real world problems.

The e-learning contents are created as interactive multimedia application and integrated with customized LMS based on Moodle. The user registration and admission module is developed outside Moodle LMS for proper user management and linking the participants with IIRS EDUSAT programme. The adopted e-learning objet standard and other technical details are shown in Table 2.

The hardware infrastructure is setup for 1000 concurrent learners with 100 Mbps Internet connectivity from NKN which is fully scalable to satisfy more number of participants. Open source software and data sets for practical exercises are also available to the participants. In future it is planned to give access to IIRS laboratory for practical exercises through private cloud.

IIRS e-learning courses are flexible for anytime, anywhere learning keeping in mind the demands of geographically dis-

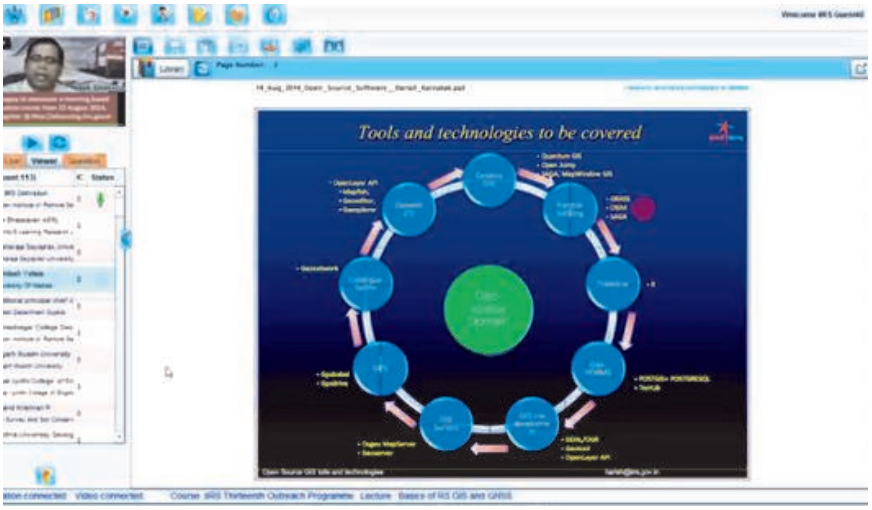

Figure 1- Online Delivery of lectures in IIRS Outreach programme

Table 1: Distribution of e-learning hours for available courses under IIRS e-learning programme

Subject	E-learning Hours	
	Theory	Practical
Image Statistics	3	2
Basic Remote Sensing	19	3
Photogrammetry and Cartography	12	2
Digital Image Processing	14	7
Geographical Information System	19	7
Global Navigation Satellite System	4	2
Customization of Geospatial Tools	3	5
Applications of Geospatial Technologies-Theory	4	-

persed audience and their requirements. Program is comprehensive with variety of online delivery modes with interactive, easy to learn and having a proper blend of concepts and practical to elicit students' full potential.

Following e-courses are currently available:

- Comprehensive certificate course on Remote Sensing and Geo-information Science - 4 Months duration.
- One month fundamental certificate courses on
  - Basics of Remote Sensing;
  - Photogrammetry and Cartography;
  - Geographical Information System and Global Navigation Satellite System
  - Digital Image Processing.

Conclusions

Electronic mode of learning is becoming an important tool for

Table 2: Technologies and standards

Component	Technology / Standard
Operating System	Linux
Database Server	MySQL
Application Development	PHP, Javascript and HTML, Flash
LMS	Moodle
Web Server	Apache
Object standard	SCORM 2004, 4th edition
Online classes	Apache OpenMeeting
URL	http://elearning.iirs.gov.in

capacity building in geo-spatial technologies and applications. The e-learning systems are based on self-paced, learner centric methodologies which focusses on "learning by doing" where learners are involved in learning process. The e-reading based systems works on downloading the reading contents and read it offline while e-learning is a systematic learning system which guides the learners online with various learning methodologies implemented through LearningManagement Systems (LMS). E-learning based education and training is one of emerging mode of learning by harnessing the power of ICT and educational tools in the area of Geoinformatics. The utilization of Internet and multimedia technology for capacity is very effective for remote sensing and geo-spatial technologies. Various e-learning object standards are providing an interoperable solution for online learning contents. The role of open source/freeware Learning Management System (LMS) is very important for wider uses and application of this technology. Moodle LMS is one of the ma-

Figure 3: LMS and contents delivery (Theory and Practical) in IIRS e-learning courses

ture software product which provide excellent platform to run e-learning based online courses. The e-learning concept is very new in education system where sometimes the students are confused in e-reading and e-learning. The validity of e-learning certificates and degree is still in discussion stage while for learners it is a successful platform. In geo-spatial domain e-learning based capacity building is good for theory and practical but the fields survey exercises are again depend on self-motivation of the participants. In future some virtual simulations for field exercises can be attempted for understanding the geographical features.●

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Figure 3: LMS and contents delivery (Theory and Practical) in IIRS e-learning courses

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URLS:

http://elearning.iirs.gov.in

http://www.creativity-portal.com

www.wannalearn.com

http://www.howstuffworks.com/

Operational remote sensing of rice crop monitoring in India

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Rice area monitoring is of particular significance in India, as the crop is grown in the rainy season (hence SAR acquisitions are preferred), and occupies the largest share of the food grains. Use of C band SAR data for rice area estimation started as early as 1995 in India has been demonstrated (Patel et al., 1995). Multi-temporal data is more suitable for crop monitoring and condition assessment as changes and variations in crop growth can be observed and information on crop growth and condition can be extracted. Preliminary analysis of ERS-1 SAR data for crops grown in India showed good results for rice crop identification (Premlatha and Rao, 1994, Patel et. al. 1995). Similar results have been reported for other rice growing areas of the world (Kuroso et. al. 1993, ESA, 1995, Le Toan et. al. 1997). The results indicated that all wetland systems show a typical and unique temporal signature of radar backscatter, which can be used to identify the rice fields (Chakraborty et al., 1997). It indicated that data acquisition at critical crop growth stages is an essential requirement to obtain desired classification accuracy. Based on this, an experimental project was taken up to estimate rice acreage using sample segment approach for state / district level during 1996-97 season for the states of Assam, West Bengal and Orissa using multi date ERS SAR data. The results confirmed that rice in all these regions showed a unique temporal backscatter.

The experience has led to the operational programme "National Rice Crop Monitoring" that uses multi-date RISAT-SAR presently and earlier Radarsat SAR (C-band, 5.3 GHz and HH polarization) data to estimate rice area early in the season in the country (Chakraborty and Panigrahy, 2000). Vertically-polarized microwaves couple with the predominant vertical structure of most vegetation and as a result, penetration of the signal through the canopy is reduced. Hence Agricultural surface remote sensing entails horizontal transmit and receive polarizations. In 2012 institutionalization of the technology was done by setting up a centre under the Ministry of Agriculture termed Mahalanobis National crop forecast Centre. This centre is responsible for carrying out the inventories of all major crops in kharif and rabi seaon. Rice monitoring forms an integral part of the crop inventory system in both the season. In addition to the inventory of acreage, rice yield by using SAR data through rice biomass modelling is done at SAC. Other ministry funded projects like monitoring and assessing the impact of improvement schemes for boosting productivity are also addressed. Such example under Bringing Green Revolution in Eastern India (BGREI) is illustrated in Haldar et al., 2014. Currently all such operations are carried out using our RISAT-1 data in systematic passes in 14 states in kharif season and 4 states in rabi season in India. The general specifications are listed in table 1.

Data pre-processing and dataset preparation includes the

Table1: Specifications of RISAT data

SN	RISAT-1 data features	Specifications
1.	Beam mode and position	MRS descending
2.	Beam position combinations Incidence angle (degree)	87-97 (central incidence angle around 37)
3.	Frequency (GHz) and wavelength (in cm)	C-band @ 5.35 GHz; 5.65 cm
4.	Polarization	HH/HV
5.	Incidence angle (degree)	33 - 41
6.	Pixel spacing (m)	18 × 18
7.	Swath width (Nominal ground coverage in km.)	115 ×115
8.	Resolution (m)	24 × 18.71
9.	Satellite orbit	Sun synchronous, descending orbit
10.	Number of looks (Range ´ Azimuth)	2 × 1
11.	Repeat cycle	25 days
12.	Altitude	542 km

steps of data downloading, data inspection, speckle suppression using a predefined adaptive low-pass filter, conversion of pixel digital numbers to back-scatter values, image geo-referencing (i.e. develop image -to-map transformation model) and multi-date image dataset.

Data calibration is an important processing step in SAR data. Here, the area covered by a pixel is implicitly assumed to be horizontal in orientation. This is not true in undulating terrain, however, for agricultural areas, this assumption is quite appropriate. Using this computed incidence angle, the backscattering co-efficient σ° for the j^{th} pixel in a scan line is computed using equation:

$$\sigma^0{}_j = 20 \times \log_{10}\left[\left(DN_j{}^2 + A_0\right)\right] - cf$$

Where, DN_j is the digital number, *cf* is calibration factor, and A_0 is zero in this case. Calibration factor is different for both HH and HV polarization. The thus computed is then linearly scaled back to 8-bit (0-255) and written in the same image channel for convenience of less storage and faster analysis of data. In this process, the range of backscatter values stored was –26.05 to –0.46 dB with quantization error of ±0.05 dB, which contains all information required for agriculture and land cover classes (from very calm water or smooth surfaces to dense forest), except dense urban areas show saturation. The individual date level 2 (L-2) geotiff images after calibration needs to be stacked or co-registered for a multi-date analysis. The subsequent date data are co-registered to the first-date data, using an image-to-image registration procedure. The calibrated data is finally put in 8-bit format after truncating the redundant data beyond -25 and above 0 dB as the crop range generally lies between -5 to -18 dB. The dB thus recoded can be read out from 8-bit coded DN as below:

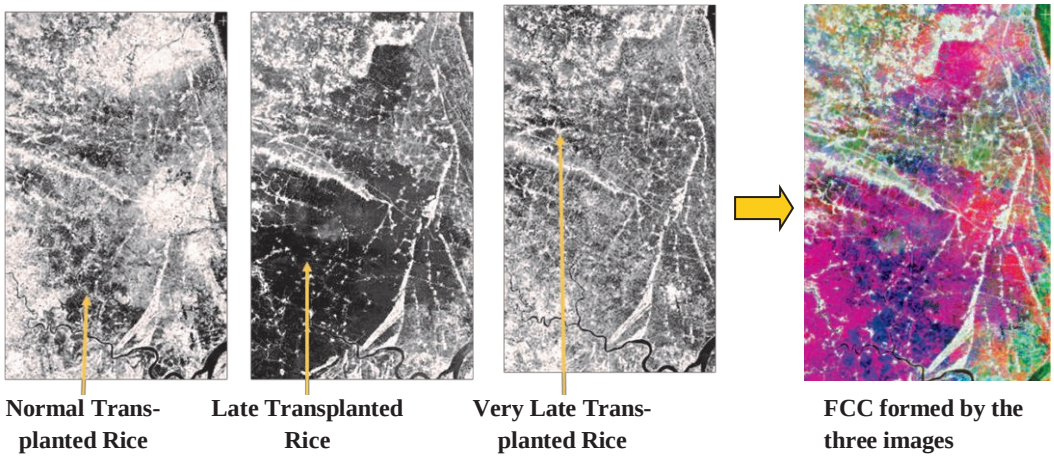

Figure 1: Multitemporal RISAT SAR data of 15th July, 9th August and 3rd September 2014 and the FCC taking first date as red channel, second date as green and third date as blue channel

$$DN_j = (dB \times 10) + 255$$

From the DN value of the pixel, the dB can be obtained as given below:

$$dB = \left(\frac{DN}{10}\right) - 25.5$$

Analysis of SAR data

Clusters of rice growing areas are observed in the multi-date SAR image. Hierarchical knowledge based decision rule classifier is used to classify the rice and non-rice areas. Here, the knowledge can be heuristic, i.e. based on experience and reasoning. It uses logical (near constant temporal backscatter of water, urban, forest; canopy backscatter based on soil contribution as well as volume scattering) and a mathematical approach. This approach is applied pixel by pixel to produce a label for each pixel dependent on the multi-temporal class signatures and ancillary data. The user on the current data uses expert knowledge, accumulated, in the classification process.

Rice signature extraction and area estimation

A decision-rule classifier has been developed based on a Radiative Transfer (RT) model and calibrated using large number of rice sites in India and controlled field experiments. This procedure accounts for change in backscatter as a result of transplanting of rice and crop (biomass) growth in multi -date data to classify rice areas. Classes of rice crops and other features are shown in figure 1. A knowledge based decision tree designed, which used the information provided by each pixel in each image with its typical temporal behavior (i.e. crop phenology and flood condition of rice field); the resulting dominant interaction mechanisms (SAR signal-vegetation-water) and the corresponding backscattering coefficient (the RT model). The classifier structure designed based on the analysis of the temporal SAR backscatter values of all the land cover classes for each image, whereas homesteads, forest and water bodies have almost constant signature. This observation has been used to develop decision rules for separating rice and non-rice areas as described below for rice class:

If (-17 dB <D1> -14 dB,
-14 dB <D2> -10 dB, -10 dB <D3> -5 dB
) (normal sown)

If (-10 dB <D1> -5 dB, -17 dB <D2> -12 dB, -12 dB <D3> -5 dB) (late sown)

As and when such rules are satisfied the pixels are classified as rice. In case of rice, the range of backscatter is large and dynamic, ranging from -18.5 to -5.5 dB (i.e., from transplanting to pre-harvest stage of the crop). The lowest backscatter value (i.e., freshly transplanted plant) ~ -18.5 dB and upper backscatter value (i.e., pre-harvest stage) ~ -5.5 dB). Hence, as an example, the decision rules developed for classification of rice subclass areas based on the date of sowing and pre-sowing conditions.

It can so happen that rice is transplanted after the first pass of the satellite or after the second pass of the satellite. In such cases for traditional rice areas and for the segments that are to be used during the analysis, the ground information is collected. Any delay in crop transplanting, crop vigour or fallow area is taken into account and the same is used during the generation of decision rules for the current season, with respect to the pass of the satellite.

On getting the rice pixels classified crop proportion is computed in the scene and then aggregated to get the district wise figures and national figures of crop acreage. Such forecasts are carried out thrice in a year during end August, end September and end January. The last forecast includes the results for Tamil Nadu and the rest for all major rice growing states of India. ●

Acknowledgements

Authors are thankful to Shri. A.S. Kiran Kumar, Chaiman, ISRO and Dr. P.K .Pal, Deputy Director, EPSA, SAC for encouraging and guiding the team during the course of the study. The support provided by MNCFC, New Delhi and all the states remote sensing Centres is highly acknowledged.

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Solar cum Geo-Genic Driven Climate Change

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"*Travelling a well-defined roller-coaster temperature path cycle on solar intensity variations*," the Earth is gigantic, effects thereon tiny and human appearance nano in time-frame. Over past 16,000 years its temperature is ascending with high variability and intermittent pause. Earth's primary natural heat drivers and dispersal too, are: a) solar plus arrested back terrestrial radiations, b) near earth's surface radioactivity, c) volcanism-igneous activity, d) frictional heat on seismicity, e) ozone-hole passaged ultraviolet ray's penetration into Earth's atmosphere, and f) El Nino re-surfacing ocean heat.

The earth has essentially the following three cyclical movements (Milankovitch, 1941) design the non – linear multi-factorial interactive space-time scale complex spectra, strongly pointing that the Sun is the biggest Climate Changer of the Earth. A great correlation is observed between solar intensity and earth`s temperature.

- eccentricity from circular to elliptical, periodicity approximately one lakh year;
- obliquity: around 41,000 years periodic cycling Earth`s axis tilt: ~ 22.1º to 24.5 º and back again, and
- orbital precision led changes in solar radiations

Considerable warming is caused on large scale active sunspot (recording commenced in 1755) occurrences when magnetic field rip through Sun`s surface releasing vast amount of thermal energy. An 11-year or thereabout (Bhattacharya 2013) periodic solar cycle of sun-spot activity develop when magnetic field fluctuations occur as dark spots on the solar surface. When highest in number, termed solar maxima magnetic field reversal's initiation, polar north becomes south and south becomes north, flipping linked to plasma flow motion within the sun which re-organises itself by breaking sun's electrically charged hot interior material setting in motion turning the magnetic field upside down, a process referred to as solar dynamo mechanism. High cosmic ray influx recording indicates solar magnetic field to flip shortly. Its diminishing lowers the temperature, as experienced in Europe during the period from 7650 and 18th century when the Thames was frozen. The Sun has been active for over past 30-40 years now, which generally lasts for 50 to 100 years transmitting high heat energy. Over a decade, 40% temperature decline is estimated. This is likely to enhance cloud formation and restrict ultra-violet terrestrial surface radiation heat but permits day and night light causing landing to cut across pulling down the global temperature by approximately 0.20 C. Less high cloud-coverage in tropics on warming planet may allow more heat to escape into space before reaching terrestrial surface countering temperature rise postulation (Lundzen, 2012). The ongoing 25-30 year warming/cooling cycle matches well with solar irradiance cycle (Easterbrook, 2009). Current temperature chart is consistent with changes during the recorded human history (Mann et al., 1999).

India, a large country endowed with most varied landscapes system in the world is geographically, meteorologically and hydrologically a homogenous region with heterogeneous environment sensitivity under the influence of : i) snow-clad towering the Himalaya, to its north; ii) warm equatorial Indian Ocean waters, washing the Peninsular south; iii) arid, the Thar desert often show-casing beautiful ripple garmented majestic dunes, to its west; and iv) riverine deltas at the standing marine waters confluences, eastwards , further aggravate the complexities. Worrisome are:

a) shrinking of Himalayan glaciers on ice cover melting

b) structural dismembering of snow-pack avalanches on enhanced gravitational processes induced thermodynamic inequilibrium (Verma, 2008) triggered by : i) 5-10 ^{o} C diurnal temperature variations , ii) increased wind velocity, iii) snow accumulation steepening slope, iv) seismicity and v) slope-soil characteristic change on river's land rise (Uttarakhand tragedy 2013, an instance)

c) high altitude behavioural changes causing glacier tides wherein probably ice is pulled by celestial masses, just as any other physical body (Verma, 1985)

d) alpine treeline shifting uphill the Himalaya northward (Singh et al, 2012)

e) sea- level and temperature rise (no such sea–level rise is reported during the driest Triassics)

f) abundant fossil fuels utilization blowing higher CO_2 emission and methane level injections into the atmosphere

g) CFCs puncturing ozone (derived from the Greek word ozien a poisonous unstable gaseous form of oxygen) layer above the earth surface in the stratosphere above tropopause facilitating ultra-violet rays earthward free- fall.

Antarctic and Greenland ice sheets constitute nearly 99.5% of the world`s total glacier ice which on complete melting is capable of raising sea-level to the order of 63 meters. Detected by Lovelock (1971), the CFCs break off the chlorine atom under solar radiation destroying several thousand ozone molecules depleting the ozone layer, an argument triggered conceptualisation of the process termed global warming introduced by S. Arrehnius (Lonnie and Thompson 2007). The perception that an anthropogenically erected umbrella sheltering GHG including CO_2 and other gases produced due to many fold increase in aerial flights and refrigeration devices and abundant fossil fuels use (industrial and vehicular) growth trapping earth`s thermal release, further aided to the process of global warming i.e. areal widespread-global in dimension, and rise over generally prevalent temperature, humidity/ moisture depleted dry arid conditions.

A 20% increase in CO_2, the largest radiative-contributor force concentration and it's doubling over since 18th century Industrial Revolution is sensed through its phenomenal rise from 318 ppm (in 1950) to 370 ppm (in 2000), to now 392.6 ppm (in 2013). The latter is unprecedented in last 800,000 years. The earth, through 12,000 years interglacial period is thus construed to be rapidly warming, a generalization upheld by 1,000 computer based models involving 9,200 scientific studies reviewed by 10,890 experts from

55 countries estimates, rising though non-uniformly century-end temperature by 40C and rainfall upto 20% over most of the sub-continent.

The moisture-laden warm equatorial air is lifted from the circulating Earth around the Sun develops Coriolis force, an atmospheric pattern: ascent of warm air near equator and descent of cold air near polar region. Thus the elevated upper equatorial air develops pressure which pulls its movement down equator-ward. It is deflected by what is called the Coriolis force.

Sub-aerial volcanism surfaced at the expanse of sub-marine volcanism after a major tectonic episode 2.5 billion years ago during Archaean-Proterzoic transition (Kump 2007; Kump and Barley 2007). For the past over a decade or so an increase in feeble volcanism, VEI ranging between 0 and 1 on 8 point scale, also contributes to temperature rise slow down (Girlis, 2012; Rao, 2013) on aerosol widespread into the atmosphere. These particulate matters particularly the coarser ones could hardly stay up in the atmosphere for long time for sustainable impact over the climate besides it's (or anthropogenicllly widespreading to control temperature rise) sulphurous content causing other damages like pollution and acid rains. P/T and K/T boundaries on gigantic scale CO_2 release (Singh, 2007) caused mass extinction on oxygen deficiency is no match and incompatible to fossil fuels use CO_2 release.

Polar wandering is limited to 10/ million years. Plate tectonics is however rather more active. The Indian plate, (Fig 1) probably thinner-about half the other plates and possibly still sutured down below with the Australian plate of which it was part 50-55 millions before as Gondwanaland, severed in late Cretaceous around 90 million years ago from Madagaskar moved much faster @ 20 cm/year, subducted on collision with relatively slow (@2cm/year) moving Asian plate in Eocene epoch causing the birth and rise of the orogenic belt, now standing as the lofty roof of the World, the Great Himalaya, virtually considered as a third pole. Since then the plate dynamics has substantially slowed down to 4 to 5 cm/ year northwards (a

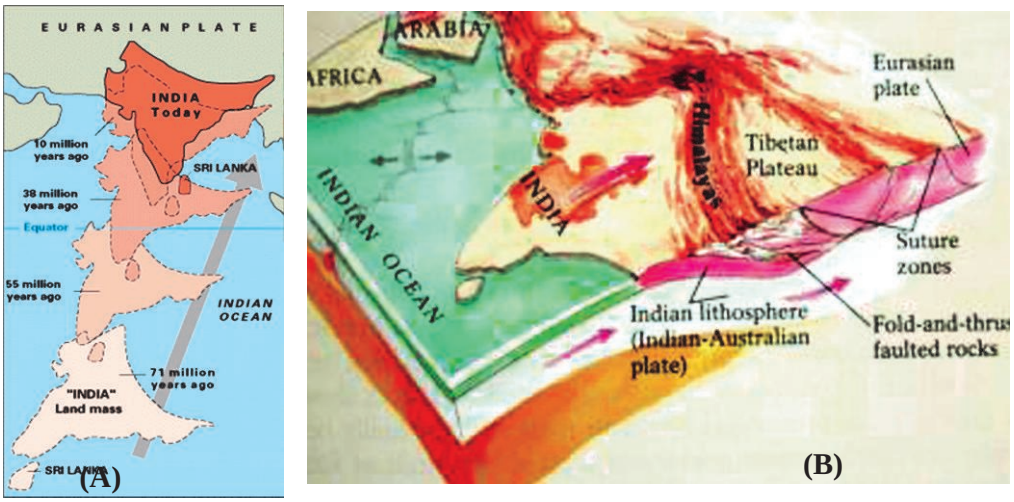

Figure 1: Movement of Indian Plate: (A) India through Geologic Past ; and (B) Indian plate subducting under Asian Plate

little east to the absolute north) and the Himalaya uplift @ 5 to 10 cm/year. Hypothetically computing rise of the Himalaya @ 5mm/year for say 10,000 years, the effective uplift would be

5 mm x 10,000 = 50,000 mm or 500cm or 50m

In the earth history of 4.57Ga years obviously 10,000 years is a matter of only yesterday. India with time- a horizontal shift besides vertical uplift discussed above) and the humans witnessed the wall-like rise of the Great Himalaya. In spite of the continued erosion, it has now assumed majestic status. It arrests, a) monsoon pushing off and b) India-ward Siberian chilling air blowing in across, the sub-continent. Also northward moving Indian plate displaces low pressure Sindhu-Ganga (Indo-Gangetic) plate and modifies monsoon spells differently:

- intermittent short duration frequent heavy downpour and often humid sultry days;
- longer moderate summer-winter-summer spreads with few harsh and extreme temperature events;
- moderate events decrease over peninsular parts particularly Central India leading to floods and droughts directly impacting on climate. The Indian and Chinese monsoons together largely control the global hydrologic cycle scenario (Ganjoo, 2012)

There is marked increase in seismic intensity and frequency. Many times seismicity is closely associated with radon gas emission. A limited, less than 9 meters radius quasi-circular path around the poles called Polar Motion is also affected by unpredictable geophysical stresses due to Earth's interior mass movement. It is here that it finally returns to earthquakes. Seismicity on heavy oversize mass displacement and redistribution on modifying tensor of inertia may eventually deviate on rotation, the Earth's figure axis from magnetic N-S alignment (axis) and speed causing slight wobbling and climate in equilibrium imparting instability, but shock waves did not knock off the Earth.

Figure 2 shows, some relationship between seismicity and

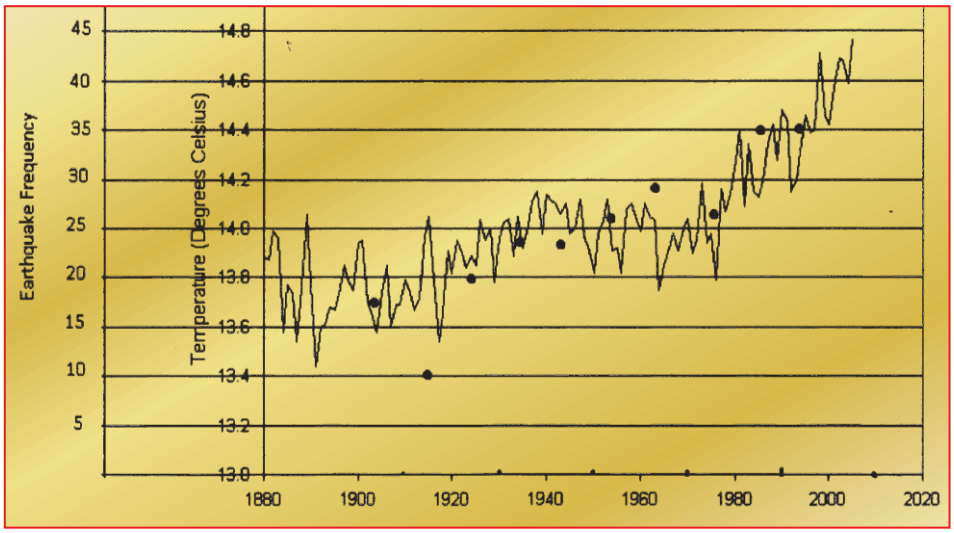

Figure 2: Average global temperature, 1880- 2005 with decadal earthquake frequency

temperature fluctuations. Seismicity strength can be estimated by 7.7 magnitude spread earthquake on 24th September, 2013, Epicentre 16 km deep underwater near Awaran district, Baluchistan (Pakistan) sprang a portion of seabed measuring 120m × 300m, ~20 m (60-70 ft) above sea level, 2 km off Gwadas coastline in Arabian Sea. Spreading @ 5cm/year originating in 2001 from Carlberg rift about 1000 km away in Indian Ocean not only caused earthquake at Saurashtra plate edges, but also reached its other end in the Himalaya. This and 2004 Indian Ocean Tsunami impacting across almost half the hemisphere away to east coast of Africa attest global areal widespread. Laced with translation of motion, endogenic processes like seismicity and volcanism up-push subterranean thermal energy surfacewards spewing methane gas at several points.

Ocean floor basalt spreading, a possible heat supplier at depth, as noted say at 2300 to 6600ft depth below, not in contact with atmosphere, could raise sea-level and temperature.

The above discussed abiotic drivers based solar and geogenic, as of now, are generally not preventable and predictable.●

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ISPRS TC VIII Mid-Term Symposium (Draft Resolutions)

Operational RS Applications: Opportunities, Progress, and Challenges
Hyderabad, India, December 9-12, 2014.

N. S. Mehta, Secretary, ISG (Email: nsmehta55@gmail.com)

Recognizing

Efforts made by the International, Scientific Advisory, The National and the Local Organizing Committees for successful conduct of the event is highly rewarding. This was ably supported by the Government and Private Agencies, while the symposium had a large number of technical submissions by the research community that was systematically handled by Copernicus organization. All these are duly acknowledged for the successful completion of the event.

Noting

the importance of the accessibility of satellite based information for development and realizing the myriad of applications of remote sensing, and existence of gaps in real life usage, the institutionalization and capacity building is of paramount importance for wider use of technology by all stakeholders data policies on sharing, access and outreach, international collaboration, including with GEO tasks and other select international programmes on the Earth observation applications, will be of great utility.

Recognizing

the spectrum of remote sensing applications, including natural resources management, information support for disaster risk reduction, space based inputs for health services, studies on environmental pollution, improved geophysical products for climate change / variability studies and various, Earth science applications such as crop monitoring for growth and stress for sustainable agriculture, land use / cover dynamics, water resources, biodiversity, desertification and drought, bio -geo-chemical cycles, physical and biological oceanographic parameters and assimilation in coupled models, geophysical products for Cryospheric studies and so on.

Recommends

- Realizing the synergy of collection and utilization of Earth observations from multiple platforms and providing sustained value-added services;
- Developing information support for disaster and risk reduction: Early warning systems, short-term and long term impact assessment, near real-time monitoring, resilience and so on;
- Space based inputs for health services: Disease epidemiology, predictive modelling and decision support systems;
- Environmental pollution: Protocols for assessment and quantified impacts;
- Improvements in space based geo-physical products: Radiative forcing, weather forecasting and climate change analyses
- Hydrological modelling: Improved parameterization, scaling from river basin to micro-watershed, water and energy cycle, including interactions
- Integration of remotely sensed inputs on Geology, Geomorphology and Pedology with the Earth Science Applications
- Multi-scale crop monitoring

for growth and stress for sustainable agricultural production and Conservation agriculture;

- Integration of spatio-temporal satellite data products for analyses of global data sets for climate change / variation;
- Global and regional dynamics of land use / land cover, bio-diversity, nexus of degradation, desertification and drought, bio-geo-chemical cycles;
- Carbon fluxes in soils, vegetation and inland, coastal and ocean waters;
- Physical and biological oceanographic parameters and assimilation in coupled models.
- Geophysical products for Cryospheric studies: Status, response and trends Data Policies on sharing, access and outreach;
- Capacity building upto the grass root level, involving stakeholders and deploying e-learning techniques and virtual classrooms;
- Exploring crowd sourcing and location based services for different thematic applications;
- Improved access to geospatial data through geo-portals such as Bhuvan;
- Collaborate with GEO, CEO to enhance remote observing capabilities and tasks.●

Opening Session of ISPRS TC VIII Mid-term Symposium, India,

ISPRS TC VIII Mid-Term Symposium: Photo Gallery

Dignitaries at ISPRS TC VIII Mid term Symposium Inaugural Session

Shri A. S. Kiran Kumar, Dr. Shailesh Nayak and Dr. V. K. Dadhwal at the Symposium

Dr. V. K. Dadhwal, Shri Vinod Bothale and Dr. Shailesh Nayak at the Exhibition

Dr. A. S. Rajawat, Shri N. S. Mehta and Shri K. P. Bharuch at the Symposium

Delegates participating in the Symposium

Prof. (Mrs.) Parvatham Venkatachalam receiving ISG Fellowship

Dr. Baldev Sahai receiving National Geomatics Award for Excellence

Prof. Anjana Vyas receiving National Geomatics Award (Applications)

Dr. P. G. Diwakar receiving National Geomatics Award (Technology)

Dr. Sarvesh Palria receiving President's Appreciation Medal for Contribution to the ISG

Dr Dipanwita Halder receiving Prof. K. Nageswara Rao Endowment Young Achiever Award - 2014

ISG
Indian Society of Geomatics

Annual Report: 2014

It gives me great pleasure to present the 19th Annual Report of ISG for the period January - December, 2014. During this period, various activities were planned and executed to realize the objectives of Indian Society of Geomatics. The details are as follows:

1. MEMBERSHIP

This Year 93 Life Members and 3 Annual members have been enrolled. The total membership of ISG is now 1710. The details of membership are given bellow:

Membership Type	December 2013	December 2014
Life	1580	1673
Patron	34	34
Annual/Student	Nil	03
Grand Total	1614	1710

In addition, current number of ISG Fellows is 10.

2. REGIONAL CONFERENCE AT SHILLONG

Indian Society of Geomatics (ISG) organised a Regional Conference on "Geoinformatics for Early Warning of Disasters with Special Emphasis on NE Region", at Shillong during Sept 18-19, 2014. The conference was hosted jointly by Indian Society of Geomatics-Shillong Chapter, North Eastern Space Applications Centre (NESAC), and North-Eastern Hill University (NEHU). The conference was preceded by a Pre-Conference Tutorial on Early Warning System for Floods organised at NESAC on Sept 17, 2014. About 50 participants, mostly research scholars participated in the pre-conference tutorial.

The Symposium was inaugurated by Hon'ble Governor of Meghalaya Dr. K.K. Paul and during his inaugural address, he highlighted the importance

of geoinformatics in disaster management. He also stressed on improving the accuracy of early warning of disasters.

During the two days of the conference about 90 research papers were presented under seven Technical Sessions covering a wide range of themes. In all around 200 delegates mostly from various organisations in NE Region and rest of the country participated in the conference.

An industrial exhibition was organised during the Conference with various government and private organizations such as: National Remote Sensing Centre (NRSC), North Eastern Space Applications Centre (NESAC), Madhya Pradesh Council of Science & Technology (MPCST), Assam State Disaster Management Authority and Total IT Solutions Pvt. Limited, showcasing their products and services for the benefit of the participants and visitors.

The conference was co-sponsored by Oil India Limited, M.P. Council of Science & Technology, Indian Space Research Organisation, Department of Science & Technology, Ministry of Earth Sciences, National Disaster Management Authority, Assam State Disaster Management Authority, North Eastern Space Applications Centre, Survey of India and Indian Council Social Science Research - NER, National Remote Sensing Centre and Antrix Corporation Ltd.

ISG appreciates efforts put in by organisers and sponsorers for their support in successful organisation of the conference.

3. ANNUAL CONVENTION AND NATIONAL SYMPOSIUM

ISG Annual Convention – 2014 is being held along with ISPRS TC VIII International Symposium on “Operational Remote Sensing Applications : Opportunities, Progress and Challenges" during December 09 – 12, 2014 at Hyderabad, India. The Symposium is being organized jointly by ISPRS TC VIII, Indian Society of Geomatics (ISG) and Indian Society of Remote Sensing (ISRS), and hosted by National Remote Sensing Centre (ISRO), Dept. of Space, Govt. of India, Hyderabad.

GEOMATICS AWARDS

The awards for the year 2014 were conferred to the following eminent personalities for carrying out significant work in the field of Geomatics and innovative applications. The recipients are as under:

ISG Fellowship : Prof. (Mrs.) Parvatham Venkatachalam, Prof. & Head, CSRE, IITB, Mumbai.

National Geomatics Award for Excellence: On the occasion of completing 20 Years of ISG, a life time achievement award called “National Geomatics Award for Excellence” is instituted by ISG and inaugural award is conferred to Dr. Baldev Sahai, Former Dy. Director, RSA, SAC, Ahmedabad.

National Geomatics Award (Applications): Prof. Anjana Vyas, Professor & Acting Dean, Faculty of Technology,CEPT University, Ahmedabad.

National Geomatics Award (Technology): Dr. P. G. Diwakar, Dy. Director, RSA, NRSC, Hyderabad.

President's Appreciation Medal for Contribution to the ISG: Dr. Sarvesh Palria, Professor and Head, Department of Remote Sensing and Geoinformatics, M.D.S, University, Ajmer.

The Best Chapter award : Visakhapatnam Chapter, for organizing ISG - ISRS National Symposium – 2013 and various activities towards the promotion of Geomatics technology in the region.

Prof. K. Nageswara Rao Endowment Young Achiever Award - 2014: Dr (Smt.). Dipanwita Halder, Scientist, SAC, Ahmedabad.

MILLENNIUM LECTURE SERIES

10th lecture under this series is planned to be delivered by Dr. V.K. Dadhwal, Director, National Remote Sensing Center (ISRO), Hyderabad on "Unlocking the Potentials of Geomatics for Disaster Management in India" on December 10, 2014 at Hyderabad during ISPRS - ISRS - ISG International Symposium - 2014.

4. CHAPTERS

a) Chapters & Activities

ISG has sixteen active Chapters located at Ahmedabad, Ajmer, Bhagalpur, Bhopal, Chennai, Dehradun, Delhi, Hyderabad, Mangalore, Mumbai, Mysore, Pune, Trichi, Srinagar, Vadodara and Visakapattnam.

Three new chapters i.e. Shillong, Jaipur and Vallabh Vidyanagar opened during this period raising chapter's strength to nineteen.

Opening up of ISG – Trivendrum Chapter is at advanced stage. Nine members from Trivendrum met on November 26, 2016 at IIST and had a discussion regarding opening of the chapter. They also had a lecture by Dr. John Mathew from M.G. University, to mark the GIS day.

ISG has given guidelines to all chapters to conduct following mandatory activities during the year.

Activity	Date
i) Science-Day	28-February
ii) Technology-Day	11-May
iii) GIS Day	Can be decided by Chapter (Normally, 3rd Sunday of November)

Ahmedabad Chapter

i) Hands-on-Training on Microwave Remote Sensing and Data Processing Indian Society of Geomatics-Ahmedabad Chapter in association with Civil Engineering Department , Institute of Technology, Nirma University and IEEE Gujarat Section GRSS-Chapter organized one week hands on training programme during June 16 – 21, 2014 at Nirma University.

The training programme was a huge success and was attended by more than 50 participants from various Universities and academic institutes from all over Gujarat.

ii) Regional workshop on, "Introduction to Geomatics: Techniques, Applications and Opportunities"

Organized jointly by Botany Department, M.G. Science Institute, Ahmedabad & Indian Society of Geomatics, Ahmedabad Chapter on August 09, 2014 at M.G. Science Institute. The Workshop was attended by more than 200 students from various colleges in and around Ahmedabad.

Pune Chapter

GEOVISION - 2014: ISG-Pune chapter conducts GEOVISION series of workshops every year. This year GEOVISION 2014 was organised on October 11, 2014 on ''Spatial Technologies in Disaster Management' at Symbiosis Institute of Geoinformatics, Pune. The workshop was attended by professionals and college and school students. The Pune Chapter also instituted an "Best Project Award" for research scholars.

Ajmer Chapter

Science Day was celebrated on 28-29 Feb 2014, on this occasion lectures were organized on "Basics of Remote Sensing, GIS and GPS" in collaboration with Department of Remote Sensing and Geoinformatics of the MDS University, ISG and ISRS Ajmer Chapters. Practical demonstration was given on Global Positioning System (GPS) and Differential Global Positioning System(DGPS). Dr. D.N. Pant from IIRS, Dehradun and Dr. R.P Dubey from Chairman, ISG-Ahmedabad Chapter, Ahmedabad were invited as guest speakers in the inauguration. The Programme was presided by Shri R.L. Meena, Div. Comm. and Hon'ble Vice Chancellor of the University. Lecture on Bhuvan was organized through video conferencing by Dr. Vinod Bothale from NRSC, Hyderabad. More than 300 Lecturers/students from the various colleges/ University attended the programme.

Ajmer Chapters of ISG & ISRS in association with Rolta India Pvt. Ltd. organised e-Training Programme on "Geomatica" software from March 23-25, 2014 at MDS University Ajmer. About 45 students participated in the training programme and were awarded certificate of participation.

ISG Ajmer Chapter and M.D.S. University, Ajmer jointly celebrated GIS day followed by exhi-

bition on “Indian Space Programmes” on August 12, 2014. The programme was inaugurated by Prof Kailash Sodani, Hon’ble Vice Chancellor, MDS University, Ajmer.

The programme was attended by more than 500 students from various Secondary / Higher Secondary Schools in and around Ajmer.

Visakhapatnam Chapter

ISG-Visakhapatnam Chapter had a AGM on March 27, 2014 and elected new executive council for the term 2014-17, and decided to organise series of programmes to promote field of geomatics in the region.

Jaipur Chapter

Organised Special Lectures on Space Science & Applications of Geoinformatics jointly with Poornima Foundation at Arbuda Convention Center, PIET, Jaipur on October 18, 2014. Speakers were invited from SAC, Ahmedabad and BITS, Jaipur. Around 300 engineering students from various colleges from Jaipur participated in the programme.

Vallabh Vidyanagar Chapter

ISTAR and ISG-VV Nagar Chapter jointly started a course on RS, GIS & GPS Technologies. Faculty invited from IIRS, ISRO, Dehradun for online teaching and assessment. 20 students participated in this course.

ISG Vallabh Vidyanagar also celebrated GIS day on November 29, 2014 by organising a popular lecture on "Wireless Sensor Network & Societal Applications" by Dr.Prabhat Ranjan, Executive Director, TIFAC, New Delhi.

Hyderabad Chapter

The ISG - Hyderabad Chapter was revived by calling AGM on November 12, 2014 and electing New EC under the Chairmanship of Dr. K.M. Reddy, Shri K.P.R. Menon elected as Secretary of the Chapter.

The Chapter celebrated GIS day on November 19, 2014 by organising a lecture on “g-Governance towards Digital India” by Dr. K.S. Rajan, Associate Professor at IIIT, Hyderabad at NRSC. The lecture was attended by ISG members and Scientists at NRSC, Hyderabad.

b) Support to Chapters

Once in a year, the ISG provides funding support to organize the mandatory activities such as Science day, GIS day and Technology day to the Chapters. This year on request, Society has funded Pune Chapter for conducting “Geovision – 2014” Workshop.

5. JOURNAL OF GEOMATICS

ISG is bringing out bi-annual peer-reviewed journal named "Journal of Geomatics". The 13th and 14th issues of JOG Volume 8. No 1&.2. were brought out during April and October, 2014 respectively. The Journal is also available to viewers online through society's website and attracting good number of papers from out side India.

6. ISG NEWSLETTER

ISG regularly brings out a Newsletter (ISSN: 0972-642X) for circulation to its members. During this period two issues namely Volume 20, No. 1 June, 2014 and Volume 20, No. 2, September, 2014; Special issue on "Early Warning of Disasters"were published. Print copies of Vol. 20, No.2 were distributed to the delegates of Regional Conference held at Shillong during September 18 – 19, 2014.

7. PROFESSIONAL CONSULTANCY BY ISG MEMBERS

Over its two decades of existence, ISG has managed to grow and retain its relevance. However, this is not in keeping with the exponential growth of geomatics technology in various spheres of life. The need for trained manpower at various levels is increasing while supply of trained manpower is seriously constrained particularly at working level. ISG took up this responsibility in improving the situation and training of students on larger scale. Since this activity requires a involvement of ISG members as experts to deliver lectures and also honorarium, the following committee was constituted to prepare a proposal to carry out professional consultancy by ISG Members:

Dr. Ajai	Chairman
Dr. S. M. Ramasamy	Member
Shri R. P. Dubey	Member
Shri I. C. Matieda	Member
Prof. Shakil A. Romshoo	Member
Shri N. S. Mehta	Member
Dr. A. S. Rajawat	Convener

The committee submitted it's report and was deliberated during last two EC meetings and is at advanced stage of finalization.

8. EC MEETINGS

The Executive Council of ISG met four times (March 11, April 11, July 30 and December 08) during the year 2014 to formulate various policies and guidelines to conduct different activities of the ISG.

9. ISG WEBSITE

The Society is maintaining its website i.e. www.isgindia.org/. It is updated regularly as and when required.

10. ISG ACCOUNTS AND AUDITS

The audited accounts for the Year ending on 31-March-2014 is circulated and is being presented by the Treasurer. Trial balance for the period from April-December, 2014 and budget estimates for the year 2015 – 16 has been prepared and same are also presented by the Treasurer.

11. ACKNOWLEDGEMENTS

The Executive Council of ISG would like to place on record its appreciation to its members and various organizations for their kind support and co-operation to carry out various activities of the Society.

Officials from NESAC, NEHU and members of Indian Society of Geomatics - Shillong Chapter deserves a special appreciation for excellent organization of Regional Conference at Shillong. We are thankful to Director, SAC for providing all necessary support and facilities to the society from time to time. Thanks are also due to members of ISG-EC for providing whole hearted support in organizing various events.

December 10, 2014 (N.S. Mehta)
Hyderabad Secretary, ISG

ISG Regional Conference, Shillong - A Brief Report

Shri K. P. Bharucha, Scientist, Space Applications Centre (ISRO), Ahmedabad
Email: kpbharucha@sac.isro.gov.in

Indian Society of Geomatics (ISG) organised a Regional Conference on Geoinformatics for Early Warning of Disasters with Special Emphasis on NE Region at Shillong during Sept 18-19, 2014. The conference was hosted jointly by Indian Society of Geomatics, Shillong Chapter, North Eastern Space Applications Centre (NESAC), and North-Eastern Hill University (NEHU). The inauguration programme of the conference was began with singing of national anthem followed by lighting of lamp by the dignitaries. Dr. K.K. Paul, Hon'ble Governor of Meghalaya and the Chief Guest inaugurated conference.

Dr S. Sudhakar, Director, NESAC and the Organising Secretary of the conference welcomed all the dignitaries and the participates to the conference. He also briefed about the conference and the pre-conference tutorial. Dr A.S. Rajawat, Vice President, ISG delivered the presidential address on behalf of Sri A.S. Kiran Kumar, Director, SAC, Ahmedabad and the President, ISG. He mentioned about the activities of ISG. He appreciated the efforts of NESAC, NEHU and newly formed ISG-Shillong Chapter for their sincere effort for successful organisation of the conference.

Prof. P. Shukla, Vice Chancellor, NEHU and the Guest of Honour appreciated efforts of ISG and offered his gratitude for choosing NEHU as the venue for the conference. Hon'ble Governor in his speech highlighted the import role of geoinformatics in disaster management. He also stressed on improving the accuracy of early warning of disasters. Inauguration programme ended with singing of national anthem. During the inauguration function, Conference Souvenir was released the Hon'ble Governor, while Special issues of ISG Newsletter and NESAC Newsletter were released by Vice Chancellor, NEHU and Vice President, ISG respectively. The Inaugural function ended with offering of vote of thanks by Prof. B.S. Mipun, Jt. Organising Secretary of the Conference.

The Inaugural Function was followed by a Plenary Session, in which four eminent speakers delivered invited talks on various disaster with special emphasis on NER. These are as follows::

1. Historical Events of Earthquake in NER and Role of Early Warning for DRR: By Dr. S. Baruah, Head, Geo Sciences Division, North East Institute of Science & Technology, Jorhat.
2. North Eastern Regional Node for Disaster Risk Reduction (NER-DRR)-A model to address disaster in NE Region: by Dr. S Sudhakar, Director, NESAC, Shillong.
3. Initiative of Assam State Disaster Management Authority for Disaster Risk reduction by Smt. Nandita Hazarika, SPO, ASDMA, Guwahati.
4. Role of Space Technology in Early Warning and Disaster Management: by Dr A.S. Rajawat, Head, Geoscience Division, SAC, Ahmedabad.

An industrial exhibition was organised during the Conference with various governmental and private organizations such as National Remote Sensing Centre (NRSC), North Eastern Space

Applications Centre, Madhya Pradesh Council of Science & Technology (MPCOST), Assam State Disaster Management Authority and Total IT Solutions Pvt. Limited showcasing their products and services for the benefit of the participants and visitors. The industry and space exhibition was inaugurated by Dr. S. Sudhakar, Director, NESAC and the Organising Secretary just before lunch. A cultural programme was organized on first day of the conference prior to the Welcome dinner.

During the two days about 180 research papers were presented under Seven Technical Sessions covering a wide range of themes as given below:

- Earth Observation Missions for Early Warning of Disasters
- Role of Communications and navigational satellites in disaster management
- Disaster Management in North-East India - Issues and Challenges
- Early Warning and Flood Management in NE Region
- Earthquake Precursors
- Landslides hazard zonation and Early Warning
- Cyclone, Drought, Forest-Fire, Land degradation
- Development of early warning systems for various hazards
- Urban/Regional Planning vis-à-vis Natural Disasters
- Village Information System & infrastructure
- Disaster Risk Reduction & Rehabilitation
- Climate change and Hazards/Disasters
- Preparedness to address the natural hazards to the NE segment of India
- Biodiversity and Early Detection of Endangered Species
- Technological Trends in Geomatics
- Geoinformatics for Industries and Business

An exclusive session (Session VII) for Industry presentations was arranged on 19th Sept, 2014. A cultural programme was organized on first day of the conference prior to the Welcome dinner. At the end of the Technical Sessions on the second day Panel discussions was held, which was chaired by Dr. Sudhakar, Director, NESAC. Important resolutions were passed for onward transmission to various users particularly those concerned with disaster management activities. The programme ended with presentation of awards for three Best papers presented during the conference. The Awardees are Ms Roopjyoti Hazarika of NEHU, Shri Pranab Kaushik of NESAC and Sri Kapil Ghosh of Tripura University as 1st, 2nd and 3rd respectively.

The conference was preceded by a Pre-Conference Tutorial on Early Warning System for Floods organised at NESAC on Sept 17, 2014. About 50 participnats, mostly research scholars participated in the pre-conference Tutorial. The Tutorial was inaugurated by Shri P. P. Srivasatava, Former Member, North Eastern Council (NEC), Shillong. Prof. M. Perumal, Head , Department of Hydrology. IIT, Roorkee was the chief speaker for the Tutorial. Dr D. Barman, Scientist, NESAC coordinated the Tutorial, which includes hands on training for the participants. At the end of the Tutorial, Dr. S. Sudhakar and the Organising Secretary of the Conference distributed certificates to the participants.

The conference was co-sponsored by Oil India Limited, M.P. Council of Science & Technology, Indian Space Research Organisation, Department of Science & Technology, Ministry of Earth Sciences, National Disaster Management Authority, Assam State Disaster Management Authority, North Eastern Space Applications Centre, Survey of India and Indian Council of Social Science Research-NER, National Remote Sensing Centre and Antrix Corporation Ltd.●

One Day Workshop on GIS Technology & Applications—A Brief Report

Dr P. M. Udani, EC Member, ISG and Director ISTAR.
Email: prafuludani@yahoo.co.in

One Day State Level Workshop on GIS Technology & Applications was jointly organized by Institute of Science & Technology for Advanced Studies & Research (ISTAR) and Indian Society of Geomantic (ISG) V.V. Nagar Chapter on 22nd Jan. 2015 at ISTAR College, V.V. Nagar, Gujarat.

Dr. J. D. Patel, I/C Secretary, Charutar Vidya Mandal presided as president of the function and in his presidential remarks appreciated the efforts of team ISTAR and support provided by ISG and ISRO. Dr Ajai , ISRO and Chief Guest of function delivered a keynote address on "NRDB Project of ISRO & IGiS Software". Shri R. P. Dubey talked about "Remote Sensing inputs for GIS". Shri N. S. Mehta explained information about ISG and activities carried out by Chapter. Dr. P. M. Udani, Director, ISTAR delivered a talk on importance of GIS Technology & Applications, Geoinformatics facilities established at ISTAR and activities carried out by ISG V V Nagar Chapter.

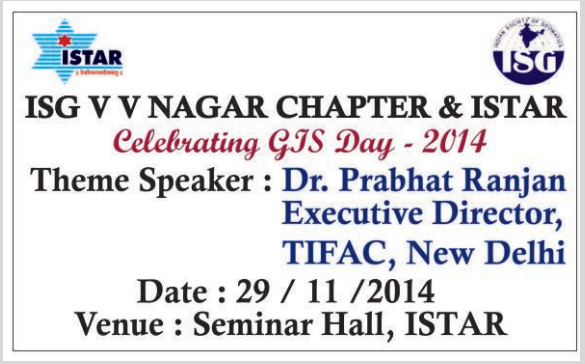
participants and faculty members from 15 Institutes (AAU, NVPASS, VP Science, Takshshila college, MB Patel, SPEC, ISTAR, SICART, GCET, MBICT, RK Parikh Petlad, Shivam Valasan, CUG Gandhinagar, Town Planning) attended this workshop.

One Day State Level Workshop on GIS Technology & Applications on 22nd January 2015

Guests interacting with participants during hands on Training during Lab Session

ISG V V Nagar Chapter and ISTAR jointly organized GIS DAY Celebration on 29-11-2014.

A popular lecture on Wireless Sensor Network & Societal Applications was delivered by Dr Prabhat Ranjan, Executive Director, TIFAC, DST, New Delhi. 150 participants including faculty members from Science & Engineering College participated.



Indian Society of Geomatics

Minutes of 19th ISG Annual General Body Meeting

The 19th ISG Annual General Body Meeting was held on December 10, 2014 at 1830 hrs at Hotel Park, 22, Rajbhawan Road, Somajiguda, Hyderabad. The following agenda items were discussed.

Agenda Item 1: Welcome and Opening remarks by the President, ISG

On behalf of President, Dr. A.S. Rajawat, Vice – President, ISG welcomed all members to the 19th ISG annual general body meeting. He appraised the house about the activities conducted by ISG, Millennium lectures & Awards, status of ISG Journal/News letter, support to ISG chapters for the conduction of mandatory events of the society. He thanked Dr. S. Sudhakar, Director, NESAC and his team for sucessesfully organised the regional conference jointly with NEHU at Shillong and also mentioned that, so far no society has organised any conference in NE Region. He appreciated the organisation of the ISPRS - ISRS - ISG International Symposium - 2014 jointly and hosted by NRSC, Hyderabad. He also appreciated the activities conducted by various chapters for the dissemination of Geomatics technology across the country.

Agenda Item 2: Approval of Minutes of the 18th ISG AGM.

Minutes of the 18th ISG AGM were circulated to all members earlier and also along with Annual Report - 2014. The same were approved after discussions on the actions identified with a voice vote.

Agenda Item 3: Annual Report by Secretary

Shri N.S. Mehta, Secretary, ISG circulated copies of the annual report for the period January – December, 2014, and made a detailed presentation on the activities conducted during the year. He highlighted the increase in life membership of the society, regional conference organised at Shillong, support given to the chapters for conducting mandatory activities of ISG, activities related to Journal of Geomatics and ISG News letter, declaration and presentation of various Geomatics Awards, Annual Conventions and Joint ISPRS -

ISRS & ISG International Symposium – 2014, conduct of Executive Council meetings etc. He also mentioned regarding institution of new award this year called "**National Geomatics Award for Excellence**" and formation of a committee to prepare a proposal to carry out professional consultancy by ISG Members. The report was discussed and the same was approved subject to incorporating following suggestions by members.

- Report of professional consultancy committee should be kept on website after approval from ISG – EC.
- Members suggested to show last year's figures of income – expenditure along with current year's data in the audited report.

(Action: Treasurer, ISG)

Agenda Item 4: Presentation of Accounts by Treasurer

The audited report for the year ending March 31, 2014 was circulated and presented by Shri K.P. Bharucha, Treasurer, ISG and the same was approved with a voice vote.

The trial balance for the period from April 2014 to December 2014 and activity wise budget for the year 2015 - 16 was also presented, and same was approved by voice vote.

Agenda Item 5 : Appointment of Auditor for the financial year 2014-2015

Shri Kamal C. Mehta has been approved as auditor of the Society for the FY 2015 - 16.

Agenda Item 6 : Any other matter with permission of Chair

A number of matters in relation to i) Email address of all members, ii) Journal of Geomatics in soft copy, iii) ISG Web site, iv) Revival of inactive Chapters, and v) Office Space for ISG were discussed with the permission of chair and the decisions are as follows :

Secretary informed all members that, ISG Secretariat has sent a request to all members and ISG Chapter's Chairman/ secretary to update and send the correct email and addresses of all ISG members of their respective chapters. The response is very poor and member's database is updated with whatever feedback is received. The secretariat is sending e-mails in smaller groups for efficient delivery. The Secretary requested once again all Chapter's Chairman/ secretary to send updated database of their respective members to ISG Secretariat.

(Action: Chapter's Chairman/ secretary & Secretary, ISG)

- Concerns were raised about activating inactive ISG Regional Chapters. Dr. Ajai suggested to write letters to such chapters for holding the elections along with national body and carry out at least mandatory activities. He also requested Dr. Rabi N. Sahoo, Senior Scientist, IARI, New Delhi to revive ISG Delhi Chapter. Dr. Sahoo agreed to the suggestion and requested Secretary,

ISG to send list of members from ISG Delhi Chapter. Shri D.R.M. Samudriah, Dr. Brahmprakash Professor, ISRO suggested that, Senior members of the society should visit inactive chapters and encourage them for carrying out mandatory activities.

(Action: Dr. Rabi N. Sahoo & Secretary, ISG)

- Many suggestions came from members regarding encouraging students to become member of ISG. Dr. Anjana Vyas suggested that, ISG and ISRS jointly should declare scheme to provide student life membership at concessional rate. She also suggested ISG to participate in ISPRS activities. Shri D.R.M. Samudriah suggested to provide Tutorial lecture notes to students on CD on request basis. Dr. Prakash Chauhan and Shri K.R. Manjunath suggested to organise national level compitition related to activities on geoinformatics / S/W apps. on mobile, for students and award them during annual convention.

The meeting ended with vote of thanks to the Chair.

These minutes has the approval of President, ISG.

December 26, 2014

(N.S. Mehta)
Secretary, ISG

Interesting Web-resources Related to Geoinformatics

Mrs. Pushpalata B. Shah, Scientist, Space Applications Centre (ISRO), Ahmedabad
Email: pushpa@sac.isro.gov.in

https://www.youtube.com/watch?v=nLZnnX3AM7Y
Nobody cares about Geomatics - Think about Geomatics in a different manner.

http://mosdac.gov.in/tools/MOSDACApp.apk
Android based App for location based weather forecast

http://www.gisci.org/?gclid=CNH9t9uomMQCFVcOjgodrYsAwg
GIS Certification Institute

http://www.uav-g-2015.ca/
International Conference on Unmanned Aerial Vehicles in Geomatics UAV-g 2015

http://digitalearth2015.ca/
9th Symposium of the International Society for Digital Earth (ISDE) Halifax Nova Scotia Canada, October 5 - 9, 2015

http://www.isprs.org/society/awards/Awards_Brochure_2014.pdf
ISPRS Society Awards Brochure

http://122.252.237.243:8084/rainfall_forecast_prev/
Half hourly Nowcast on Cloud burst and or Heavy rain over Uttarakhand and Himachal Pradesh .

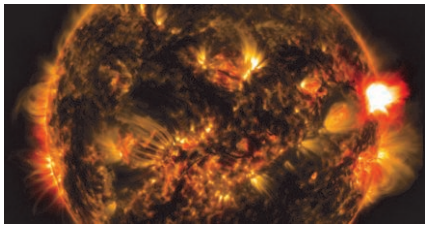
http://www.mmt2015.org/
The 9th International Symposium on Mobile Mapping Technology, MMT2015, 9-11 December 2015, Sydney, Australia ●

Remote Sensing and GIS News

Shri C. P. Singh, Scientist, Space Applications Centre (ISRO), Ahmedabad
Email: cpsingh@sac.isro.gov.in

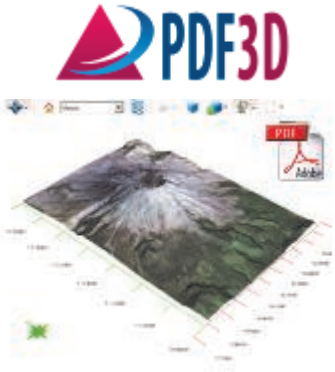
Satellite to save Earth's infrastructure

NOAA's Deep Space Climate Observatory satellite, or DSCOVR planned in 1999 was launched finally on February 11, 2015 having capability of monitoring real-time solar wind. This is going to enhance the accuracy of space weather alerts and forecasts. The space weather events like the geomagnetic storms caused by changes in solar wind (coronal mass ejection) have the potential to disrupt or harm earth's infrastructure like power grids, satellite telecommunications, aviation and GPS. The DSCOVR is going to be placed at 14,99,909 Km away from Earth where the gravity between the sun and Earth is perfectly balanced known as Lagrange 1. The Lagrange 1 lies outside Earth's magnetic environment, a perfect place to measure the constant stream of particles from the sun.●

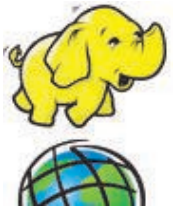


Sharing 3D visualisation

PDF3D ReportGen software (Version 2.11.0) has come which is an stand-alone end-user desktop application generating 3D PDF documents. It operates as a converter to 3D PDF from various model formats. As part of the PDF3D family of publishing solutions for the Visual Enterprise, the 3D interactive documents created are viewable by the free Adobe Reader. It converts 3D models from 70+ 3D file formats. Geomatics community can share scientific & engineering data visualization from various Earth Science, geophysical and geological modelling, CAD drawings, 3D animations, movie clips. The compression and password protection features also there. "Those working with 3D terrain, point cloud data and scans will find various new formats and functions, including the addition of GeoTIFF 16 and 32 -bit Raster Elevation Data & IMAGINE Raster Data Format for multi-channel imagery and elevations.●



GIS Tools for Hadoop



Big Data is emerging as a new frontier for analysis. GIS Tools for Hadoop by ESRI is an open source toolkit intended for Big Spatial Data Analytics which has libraries like, 1. Geometry API for Java: used to extend Hadoop core with vector geometry types and operations, 2. Spatial Framework for Hadoop: to enable Hive Query Language users to leverage a set of analytical functions and geometry types, and 3. Geoprocessing Tools for Hadoop: Contains a set of ready to use Geoprocessing tools. Developers can download the source code of the tools and customize it; they can also create new tools and contribute it to the open source project.●

ISRO Mars Orbiter Mission (MOM) Team Wins Space Pioneer Award

ISRO's Mars Mission team has won the prestigious 2015 Space Pioneer Award in the science and engineering category in recognition of achieving the rare feat in its very first attempt. The prestigious award given by the National Space Society would be presented to the ISRO's Mars Orbiter Programme Team during the National Space Society's 2015 International Space Development Conference to be held in Toronto from May 20-24.●

ISRO Awarded Gandhi Peace Prize 2014

The prestigious Gandhi Peace Prize for the year 2014 was awarded to Indian Space Research Organisation (ISRO).

The jury comprised Prime Minister Narendra Modi, Chief Justice of India Justice H. L. Dattu, Mallikarjun Kharge, Leader of the single largest opposition party in Lok Sabha, L. K. Advani, and Gopalkrishna Gandhi. The official statement released by the Government states that 'the ISRO has upheld its mission of bringing space to the common man and in the service of the nation. In the process it has become one of the six largest space agencies of the world.●

ISRO team wins Indian of the Year 2014 Lifetime Achievement Award

The Indian Space Research Organisation team won Indian of the Year 2014 Lifetime Achievement Award for Mars Orbiter Mission. ISRO achieved which no space agency in world including the USA's National Aeronautics and Space Administration (NASA) managed to do in their first attempt.

With this stupendous achievement, ISRO has become only the fourth space agency which has successfully launched a Mars mission. Former ISRO chairman Dr K Radhakrishnan personally led the team of 14 top space scientists in this mission and worked on it for 15 months.

More than 200 space scientists were in the control room monitoring even the minutest details of the Mars Mission's final phase. The Rs 450 crore mission is one of the cheapest one and costs even less than Hollywood sci-fi film 'Gravity'.●

ISRO to launch Google's Sky Box Imaging satellite for GPS maps

ISRO will launch Google's Sky Box Imaging satellite for GPS maps from its spaceport at Sriharikota.

Skybox Imaging was brought

by Google last year after the company signed a contract with Antrix Corporation of ISRO to launch the 120-kg satellite. Google is planning to launch 180 micro satellites in orbits, which will help improve internet access throughout the world. Google is keen on using high resolution pictures from Skybox Imaging satellites for earth imaging.●

Sources and sinks of CO_2 with high precision and resolution can be estimated now

NASA has launched on July 2, 2014 Orbiting Carbon Observatory-2 satellite (OCO-2) devoted to monitoring atmospheric carbon dioxide. The satellite will measure carbon dioxide levels in Earth's atmosphere 24 times every second, revealing in great detail where the gas is being produced and where it is being pulled out of the air -CO_2 sources and sinks. Decision-makers and scientists will get a much better idea of the role of carbon dioxide in climate change. Sample data files for OCO-2 public products are now available.●

Interested in work / study in Canada?

A new resource guide has been developed for geospatial professionals and students who are interested in coming to Canada to work in geomatics, remote sensing, GIS, etc. This e-book provides information and resources on the Canadian geomatics sector, how to find jobs in Canada, strategies for writing resume and cover letters, and much more.

Members interested in this may please visit GoGeomatics Canada website for more details (http://www.gogeomatics.ca/magazine/international employment-guide) and contact Sandra Baranek, Marketing and Communications
communications@gogeomatics.ca

Dr. Ajai and Shri R. P. Dubey with Shri. A. S. Kiran Kumar, Chairman ISRO and Secretary DOS.

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Geoinformatics Education & Career

Dr P. M. Udani, EC Member, ISG. Email: prafuludani@yahoo.co.in

Geospatial Analytics using information from various sources is new emerging trend and academic institutions need to think beyond measurement, mapping, visualization and spatial analysis and it is required to include data management and data analytics tools of main stream IT in geoinformatics syllabus to enable more efficient governance and business analytics by embedding location information. It is required to popularize and introduce geoinformatics courses at UG level to prepare required GEO-ICT professionals after 12th standard. At present, only few institutes are offering geoinformatics course at UG level.●

Institution / University offering Geoinformatics course at Under Graduate Level

Institute / University	Geo-informatics Course
Andhra University College of Engineering, Vishakhapatnam, Andhra Pradesh	B. Tech. (Geo-Informatics)
S. R.M. University, S. R. M. Nagar, Kanchipuram, Tamil Nadu	B. Tech. (Geo-Informatics)
University of Petroleum and Energy Studies, Dehradun, Uttarakhand	B. Tech. (Geo-Informatics)
Sathyabama University, Chennai, Tamil Nadu	B. Tech. (Geo-Informatics)
Institute of Remote Sensing, Chennai, Tamil Nadu	B. E. (Geo-Informatics)
Watershed Surveillance & Research Institute, Moolji Jaitha College, Jalgaon	B. Sc. (Geo-Informatics)
North Maharashtra University, Jalgaon	B. Sc. Geo-informatics
Vinayaka Missions University , Ariyanoor Salem, Tamil Nadu	B. Sc. Geo-informatics (Distance Education)
University of Madras	B.Sc. Geo-informatics
National College info@nationalcollege.in	B.Sc. Geo-informatics

Note: List is Not Exhaustive.

Recent GIS Job Postings (February 2015)

GIS Application Developer
(4 to 10 yrs experience), Joining Location: Bangalore Gurgaon Kolkata (Sponsored by hirist.com)

GIS Engineer
(2 years experience in GIS) , Vs Geospatial Technologies – Delhi

Sr. Data Analyst
(Good understanding of GIS Concepts : Projection Systems, Topology issues), EXZEO, Delhi

Arc GIS Engineer,
Krish Consultant – Delhi

GIS Expert
(ESRI Arc-GIS, Arcmap, Geomedia, Gtech, Arcinfo, Autocad, Adobe Photoshop; Exp: 1-3 years; BSC or IT Graduate), TCS, Delhi.

GIS Engineer,
Podium Infotech Pvt. Ltd. Delhi.

GIS Developer
Designing and developing applications - Customization & Development using Arc Objects. - ArcSDE Database), NEX G Exuberant Solutions – Delhi

GIS Manager
(Developing GIS and other spatial analysis tools and services for government, corporate multi and bilateral clients), Development Alternatives, Delhi

Lead GIS Engineer
(GIS Mobile, Desktop & GIS Server) Exalt Consulting Placement Services Pvt. Ltd. - Delhi

JRF
Jamia Millia Islamia, Delhi

GIS Expert
(GIS Project Management, GIS Application; GIS a planning tool for Panchayats. Coordinate with NIC in translating the GIS requirements), Success Partner Consultants – Delhi

GIS Trainee
(Database Handling, Data Formatting, Data Geometry Verification; Exp: 0-1 years), MapMyIndia, Delhi

Geospatial Analyst -Risk Management
(GIS and associated extensions. Familiarity with open source GIS platforms such as GRASS GIS) , Risk Management Solutions, Inc. - Delhi●

ISG Chapters - Photo Gallery

ISG Chapter Activities: Hyderabad Chapter

Indian Society of Geomatics

C/o. Secretary
Indian Society of Geomatics
Room No. 4022,
Space Applications Centre,
ISRO, Jodhpur Tekra,
Ahmedabad - 380015,
Gujarat.

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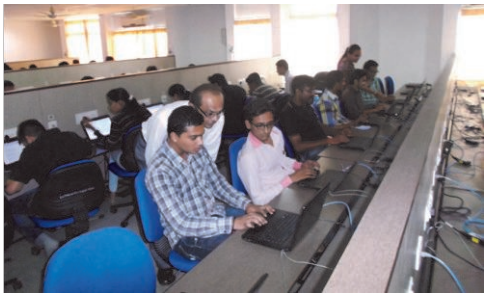
Send your contributions/comments to the Editor -ISG Newsletter at
rpdubey@hotmail.com

ISG V.V. Nagar Chapter & ISTAR Arranged on-line RS-GIS-GPS Training conducted by IIRS (ISRO)



Hands on Training on Microwave Remote Sensing and Image Processing at NIRMA University, Ahmedabad

Workshop on Geoinformatics at MG Science College, Ahmedabad

ISG Chapter Activities: Jaipur Chapter