



**ISRS**

# **SIGNATURES**

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## **Editorial**

*Dear Members,*

*The focus of current issue is on ISRS-AC activities especially International Workshop on "Impact of Climate Change on Agriculture". A technical brief on Moon Mission provides good review to the members. We have made efforts to report the professional recognition/awards of ISRS-AC members. The Editorial Committee wishes prosperous and successful-professional year to all the members.*

*K.R.Manjunath*

## **ISPRS-GEO-ISRS Joint International Workshop on Impact of Climate Change on Agriculture**

ISPRS-AC played an active role in organizing the 'International Workshop on Impact of Climate Change on Agriculture' at Space Applications Centre (ISRO), Ahmedabad during December 17-18, 2009. It was jointly organised by ISPRS (International Society of Photogrammetry and Remote Sensing) Working Group VIII/6 on 'Agriculture, Ecosystem & Biodiversity', GEO (Group on Earth Observations) Task AG-07-03 on 'Global Agricultural Monitoring System of Systems' and Indian Society of Remote Sensing. The workshop was co-hosted by SAC and ISRS-AC. The workshop received an overwhelming participation of about 127 delegates, including 11 international delegates from 9 countries.



The Indian participants were from forty-five organizations including ICAR centers, IMD, IITM, CSIR, IIT, IIIT, ICRISAT, IISc, State Agricultural and General Universities, State Remote Sensing Centres and DOS centers. The Inaugural Session was presided by Dr. R. R. Navalgund, Director, SAC. He briefed about the activities of SAC with special reference to climate change studies. The activities of ISPRS, GEO and ISRS (including ISRS-AC) and GEO AG-07-03 were briefed by Dr. Haruhisa Shimoda, President, ISPRS TC VIII, Dr. Fan Jinlong from GEO Secretariat and Mr. A. S. Kiran Kumar Chairman, ISRS-AC, respectively. Dr. Jai Singh Parihar, Chair, Organizing Committee and Vice-President, ISRS briefed about the workshop. Dr. S. S. Ray, Chair, ISPRS WG VIII/6 proposed the vote of thanks. There were seven technical sessions and three short presentation sessions and invited lectures by renowned experts during the two day period.



# ISRS-AC ACTIVITIES

## National Remote Sensing Day - 2009

ISRS-AC celebrates Dr. Vikram Sarabhai's birthday (August 12) every year as *National Remote Sensing Day* by organizing various programmes for schools and general public. This year NRS day was celebrated at Holy Child School, Kalol, (Dist. Gandhinagar). The celebrations were marked by lecture on '*Remote Sensing & Applications*' in Gujarati by Mr. B.N. Mankad, Scientist, SEDA, SAC. It was followed by Poster Painting Competition on '*Environmental Pollution*' for students of VIII, IX and X classes and Elocution Competition on '*Vikram Sarabhai's Life and his Contribution to Science and Technology*'. Students from 20 schools of Gandhinagar district participated in the programme. Prizes to the winners were given by Mr. Harish Brahmhatt, Managing Trustee, Holy Child School and Mr. N.S. Mehta, Secretary, ISRS-AC.



## Science Exhibition - Pancham 2009

Pancham 2009, a mega Science Exposition was organised by Zenith School, Vadodara during December 10-13, 2009. Dr. Kasturirangan, Member, Planning Commission and former Chairman ISRO inaugurated the exposition. A large number of Schools and research institutes from Gujarat participated in the exposition and demonstrated their science projects. On behalf of SAC (ISRO), ISRS-AC, ISG-AC and VC organised Space exhibition. The models of launch vehicles, and orbiting satellites were star attractions.



## Meeting The Young Brains

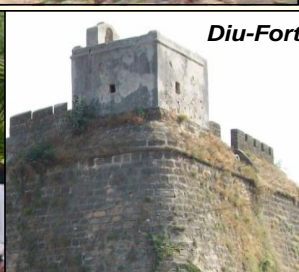
An educative and interesting interaction of students with scientists on Chandrayaan -1 Mission was arranged by ISRS-AC for the children from Vikram Vignan Centre and Shreyas Foundation, Ahmedabad on January 30, 2010.

About 200 students participated in the programme. A movie on 'Chandryaan', India's first lunar mission was also screened during the programme. Mr. B. Mankad, Scientist, SEDA, SAC delivered a lecture on '*Fundamentals of Remote Sensing and Planetary missions*'.

## Environmental Educational Camp

A two-day *Environmental Educational Camp* to to Diu, Somanath and Gir forest range for members and their family was jointly organized by Indian Society of Geomatics - Ahmedabad chapter, Indian Society of Remote Sensing - Ahmedabad chapter, Indian National Cartographic

Association-Gujarat Branch and Indian Meteorological Society-Ahmedabad chapter during January 9-10, 2010. The places covered included Gir forest, Devalia interpretation zone, Somnath temple, Sea shell museum, Waterfalls, Panikotha Beach, etc. The camp witnessed an enthusiastic participation from more than hundred members with their families.





Popular lecture by Shri A.S. Kiran Kumar, Associate Director, SAC and Chairman, ISRS – AC was organised on September 16, 2009 at Shri UV Patel College of Engineering, Ganpat University, Kherwa, Mehsana, Gujarat on the topic Chandrayaan – 1, India's First Mission to Moon. The inquisitive students had interaction with the speaker on various issues pertaining to India's moon mission.



## ENVIRONMENTAL WATCH

### Carbon Footprint

'Global Warming' is the most pressing environmental issue faced by mankind today. Each one of us contributes to this serious problem through our '**Carbon Footprint**'. Carbon Footprint is the '*measure of the impact of one's activities on the environment in terms of the amount of*

*greenhouse gases produced*'. It includes various daily-life activities viz. transportation, household energy use, waste and recycling etc. It is usually measured as equivalent tons of CO<sub>2</sub> emitted during the time period of a year. For example: Household Energy Use (table below):

Emissions from use of incandescent bulbs / tubelights / fans = number of fixtures * hours of use per day * days in a year * power consumption rating * electricity emission factor
Emissions from use of PC / Laptop / TV / DVD player / washing machine / microwave oven / refrigerator = hours of use per day * days in a year * power consumption rating * electricity emission factor
Emissions from use of air conditioner / air cooler / water heater = hours of use per day * number of months for which used * days in a month * power consumption rating * electricity emission factor
Assumptions-
Power consumption rating in kW of incandescent lamps = 0.06
Power consumption rating in kW of tubelights = 0.05
Power consumption rating in kW of fans = 0.01
Power consumption rating in kW of personal computers = 0.15
Power consumption rating in kW of laptops = 0.08
Power consumption rating in kW of television = 0.24
Power consumption rating in kW of DVD player = 0.1
Power consumption rating in kW of washing machine = 0.25
Power consumption rating in kW of microwave oven = 0.25
Power consumption rating in kW of refrigerator = 0.13
Power consumption rating in kW of water heater = 2
Power consumption rating in kW of air conditioner = 2.36
Power consumption rating in kW of air cooler = 0.17
Electricity emission factor (kg of CO <sub>2</sub> equivalent emitted per unit of power generated) = 0.9



Use the  
calculator  
and check  
your  
carbon  
footprint  
today!

For Indian circumstances, Carbon  
Footprint calculator is available  
free at <http://www.cleanindia.org>.



Join Hands To Keep Our Mother Earth Clean and Green by following few 'Green Tips'



- ✓ Plant trees . Creepers on walls will keep room temp. down.
- ✓ Use organic fertilisers like vermi-compost and cow-dung.
- ✓ Don't waste water. Each drop of water is precious.
- ✓ Don't waste water. Each drop of water is precious.

- ✓ Allow natural light and replace bulbs with CFLs or LEDs.
- ✓ Buy only energy efficient products and unplug if not in use.
- ✓ Drive less and walk, bike or car pool whenever possible.
- ✓ Do not fall victim to the 'use and throw' culture.

## NEWS & SNIPPETS

### New Journals of Remote Sensing and GIS

**Remote Sensing:** A peer-reviewed free open access online journal, ISSN 2072-4292,  
<http://www.mdpi.com/journal/remotesensing>

**The Open Remote Sensing Journal:** a peer-reviewed free open access online journal. It publishes original research and review articles in all areas of remote sensing. Special attention is given to current advances in remote sensing, product validation and scaling issues, and the application of remote sensing products. ISSN: 1875-4139,  
<http://www.bentham.org/open/tormsj>.

**International Journal of Applied Geospatial Research (IJAGR):** A quarterly, peer-reviewed journal specializing in studies from applied geography that interface with geographic information science and technology. The journal includes both regular and special themed issues with high-quality articles exemplifying various application domains within applied geospatial research. ISSN: 1947-9654, for details, <http://www.igi-global.com/IJAGR>

# FREE DATASETS AVAILABLE

## INDIAN



**MOSDAC** site provides satellite data for meteorological and oceanographic applications. Free data download is available after registration. Different products like AOD, CMV, NDVI, OLR, QPE, Rain, SST, UTH, WV etc. are available at different temporal (hourly, daily and weekly) resolutions. For details visit <http://mosdac.gov.in>

## NATIONAL NATURAL RESOURCES MANAGEMENT SYSTEM (NNRMS)

**NNRMS** site provides GIS data under major themes of administrative boundaries, landuse, settlement, transportation, terrain, desertification, water resources, soil resources, wetlands etc. at different spatial resolutions. You need to get registered for downloading the free data. <http://www.nnrms.gov.in>

## GLOBAL

Category	Dataset name	Coverage	Parameters	Comment	Data source
Integrated Environment Assessment	United Nations Environmental Programme (UNEP) – GEO Data	National, sub-regional, regional and global	Online database holds more than 450 different variables, covering themes like Freshwater, Population, Forests, Emissions, Climate, Disasters, Health and GDP.	Statistical/ Geospatial data sets (maps), graphs, data tables in different formats	<a href="http://geodata.grid.unep.ch/">http://geodata.grid.unep.ch/</a>
Digital Elevation Model	ASTER Global DEM	Global	High resolution 30m GDEM in GeoTIFF format , WGS84/EGM96 geoid.	Easy-to-use, highly accurate , overing all the land on earth	<a href="http://free-gis-data.blogspot.com/2009/04/aster-global-digital-elevation-model.html">http://free-gis-data.blogspot.com/2009/04/aster-global-digital-elevation-model.html</a>
Climate	High Resolution Gridded Datasets	Global	Mean precipitation, mean temperature, wet days, relative humidity, 10m wind speed, sunshine hours, elevation	10' resolution (~18km)	<a href="http://www.cru.uea.ac.uk/cru/data/">http://www.cru.uea.ac.uk/cru/data/</a>
Demographic data	Global Gridded Population Maps and data version 3	Global	Distribution of human population across the globe. , including both rural and global population.	Developed between 2003 and 2005	<a href="http://free-gis-data.blogspot.com/2009/04/global-gridded-population-maps-and-data.html">http://free-gis-data.blogspot.com/2009/04/global-gridded-population-maps-and-data.html</a>
General Map Data	Global Map	Global	Boundaries, Drainage, Transportation, Population Centers, Elevatic, Land Cover, Land Use, and Vegetation	Raster and Vector data	<a href="http://www.iscgm.org/cgi-bin/fswiki/wiki.cgi">http://www.iscgm.org/cgi-bin/fswiki/wiki.cgi</a>
Soils	Soil Map of the World and Derived Soil Properties	Global	Soil data and derived properties	Original scale 1 : 5 000 000	<a href="http://www.fao.org/ag/agl/agll/dsmw.htm">http://www.fao.org/ag/agl/agll/dsmw.htm</a>
Land Cover & Vegetation	Global Resources Assessment (FRA 2000)	Global	State and conditions of forest resources for the year 2000, and their changes over the last 20 years	Global Land Cover Characteristics (GLCC) Database	<a href="http://edcsns17.cr.usgs.gov/glcc/fao/index.html">http://edcsns17.cr.usgs.gov/glcc/fao/index.html</a>
Land Cover & Vegetation	Satellite imagery, products	Global & regional	Landuse / cover	Products from divers sensors, e.g Landsat, MODIS, ASTER, Quickbird, AVHRR	<a href="http://glcf.umiacs.umd.edu/data/">http://glcf.umiacs.umd.edu/data/</a>
Water Resources	The Global River Discharge Database (RivDIS)	Global	Yearly time series with monthly data of discharge (m³/s) for about 1000 sites.	textual information, tabular data, and graphs	<a href="http://www.rivdis.sr.unh.edu">http://www.rivdis.sr.unh.edu</a>
Topographicaly derived geographic database	HYDRO 1k elevation derivative dataset	Global	Hydrologically correct dem, aspect, drainage basins, slope, flow direction, streams, compound topographic index	Dataset is derived from USGS 30arc sec. global dem	<a href="http://free-gis-data.blogspot.com/2009/04/hydro-1k/elevation-derivative-free.html">http://free-gis-data.blogspot.com/2009/04/hydro-1k/elevation-derivative-free.html</a>
Protected Areas & Biodiversity	Global Biodiversity Information	Global	Biological diversity		<a href="http://www.biodiv.org/default.shtml">http://www.biodiv.org/default.shtml</a>
GHG emissions	Matthew's GSFC Global Wetlands and Methane Emission	Global	High resolution data base of animal population densities and associated methane (CH <sub>4</sub> ) emissions	1-Degree resolution	<a href="http://dss.ucar.edu/ds866.0">http://dss.ucar.edu/ds866.0</a>
Surface	NCEP ADP Operational Global Surface Observations	Global		February 1975 - February 2007	<a href="http://dss.ucar.edu/ds464.0">http://dss.ucar.edu/ds464.0</a>
Irrigated Area	Global Irrigated Area Mapping Data Portal	Global	National, Continental, Global Irrigated areas, Rainfed cropland areas	Global irrigated area map (GIAM) and statistics	<a href="http://free-gis-data.blogspot.com/2009/01/global-irrigated-area-mapping-data.html">http://free-gis-data.blogspot.com/2009/01/global-irrigated-area-mapping-data.html</a>
Human Health	Global Health Atlas	Global, regional, country	World Health Organization's (WHO) Communicable Disease Global Atlas data and statistics for infectious diseases.		<a href="http://free-gis-data.blogspot.com/2009/04/global-health-atlas.html">http://free-gis-data.blogspot.com/2009/04/global-health-atlas.html</a>

Chandrayaan-1 has been India's first planetary mission to moon, involving the state-of-art technology and carrying 11 sensors onboard. One of the sensors is a panchromatic camera - the Terrain Mapping Camera (TMC) possessing high spatial resolution of 5 m and multi-viewing capability, enabling three dimensional view of the Lunar surface. The TMC camera images the Lunar surface in the panchromatic band 0.5 - 0.85  $\mu\text{m}$  with a spatial/ ground resolution of 5m, 10 bit quantization and swath coverage of 20 km. The camera has been configured for imaging in fore, nadir and aft views (along track).. The strength of this camera lies in its high resolution and 3D imaging capabilities providing unique opportunity to study the Lunar terrain in unprecedented way. The primary aim of TMC is to capture high resolution and three dimensional morphological layout of the moon surface in both near and far side of the Moon, carry out morphometric analysis enabling unprecedented direct measurements of depths, heights and lateral extent of various surface features. The digital elevation model available from TMC along with the Lunar Laser Ranging Instrument (LLRI) on Chandrayaan-1 will also improve the Moon gravity model. Parts of the near and far side of the Moon has been covered in strip (swath of 20kms) mode and some of these strips have been processed and interpreted for identification of various features on the Moon, especially the morphological features, faults, grabens, lava-flows, crater types etc. 3D view of some of the lunar features like faulted rim (Fig 1) & crater are given below (Fig 2)

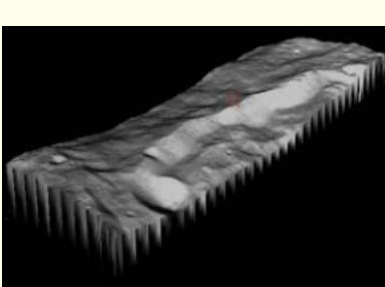


Fig 1. 3D view of part of step faulted-rim of Moretus Crater (see arrow) Near-side , 15 Nov 2008, TMC Image)

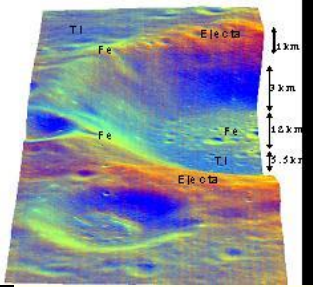


Fig 2. TMC+HySI image showing surface composition (Fe, Ti & Ejecta) in 3D view

HySI, the hyperspectral sensor onboard Chandryaan-1 provides high quality data in 64 spectral bands with 80 m spatial resolution, to map the surface compositions and mineral abundances on the Moon. The TMC DEM is also very useful as the 'rider-data' for other Chandryaan-1 sensors to understand the three dimensional spatial distribution of the mineral assemblages, and their relative proportions, in and around a crater ( Fig 2).

The HySI data, has also been used for mineralogical mapping and reflectance calibration for sites on the Moon whose mineralogy is known accurately from the return samples of past landing missions e.g. Apollo-17 landing site (Fig 3). TMC data is being used to study the morphology of lunar surface, the types of craters and their dimensions, structures on lunar surface, the process of volcanism, lava-flows, types of Rilles etc. The detailed studies of the crater& number, density, size and their spatial distributions as well as surface composition will provide important information on the processes of the evolution of the Moon.

Knowing the dimensions of the craters, its age as well as surface composition in and around crater, one can find out the amount of kinetic energy with which the extra-terrestrial object would have hit the Moon surface. This information will further help to understand the origin and evolution of Moon.

TMC stereo data along with the HySI data are being analyzed to identify the suitable sites for the future landings and human settlement on the Moon. One such sites, suitable for the future settlements could be non-collapsed lava tubes with sufficiently large diameter and length

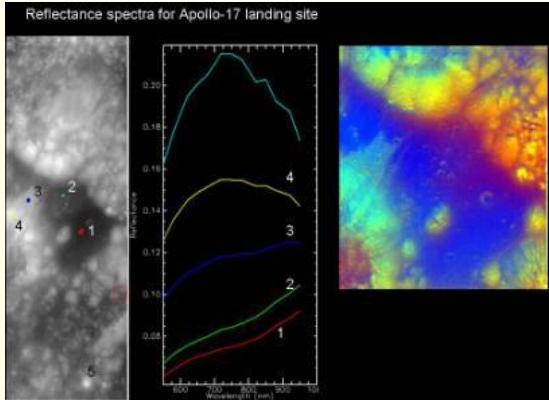


Fig 3. Spectral signatures of various minerals from Apollo-17 landing site used for calibration and mineral mapping.

Authors: Ajai, A.S. Arya & Prakash Chauhan, Marine & Earth Sciences Group, Space Applications Centre, Ahmedabad

### Forthcoming Events

#### BENGALURU SPACE EXPO – 2010

A showcase of India's major strides in Space Research, Development and its application for the socio-economic upliftment.

**August 25-28, 2010**

Venue: Bangalore International Exhibition Center (BIEC), Bengaluru, Karnataka

Organized by CII

In association with

Antrix Corporation Limited

Indian Space Research Organization

### XXX INCA INTERNATIONAL CONGRESS ON CARTOGRAPHY FOR SUSTAINABLE ENVIRONMENT

**November 10-12, 2010, Dehradun, Uttarakhand**

#### Important Deadlines

Submission of abstracts : July 31, 2010.  
Submission of Full papers : Sep 30, 2010  
Registration and requests :Oct 31, 2010



# CONGRATULATIONS

## ISRS-AC Members - Awards/Recognitions

Dr. R. R. Navalgund, Director, SAC was conferred with *Distinguished Alumnus Award of Tata Institute of Fundamental Research Alumni Association (TAA)* on the occasion of Birth Centenary Celebrations of Homi Bhabha. Dr. R.R. Navalgund is elected as Fellow of Indian Academy of Science, Bangalore. He is also the Chair – Disasters Management/Natural Hazards Working Group of International Academy of Astronautics .



Mr. A. S. Kiran Kumar, Distinguished Scientist, Associate Director, SAC, was conferred with Membership of International Academy of Astronautics



Mr. S. S. Rana, Outstanding Scientist, Deputy Director MRSA, was conferred with *Spacecraft and Related Technology Award* by Astronautical Society of India for the year 2006.

Dr. J. S. Parihar, Deputy Director, RESA, SAC is the Co-Chair of User Interface Committee of Group on Earth Observations (GEO).



Dr. P. K. Srivastava, DD, SIPA, SAC was conferred with ISG –*National Geomatics Award for Technology -2009* in recognition of his outstanding contributions in the field of stereoscopic remote sensing, satellite photogrammetry and specific contributions made to IRS-1C/1D, TES, Cartosat-1-2 , Resourcesat-1 and Chandrayan-1 data products.

Mr. Tej Pal Singh, Director, BISAG was conferred with ISG - *National Geomatics Award for Innovative Applications – 2009* in recognition of his outstanding contributions in the field of developing RS and GIS based methodologies for natural resources management, setting up of comm. network, PRAGATI GIS package and strengthening e-governance in Gujarat.



Dr. S. K. Pathan, Head, GIDD, SAC, was conferred with ISG - *National Geomatics Award for Innovative Applications – 2009* in recognition of his outstanding contributions in promoting urban planning and infrastructure development, defining standards for information system, creating information systems, national urban query shells and application showcases.

Dr. Tapan Misra, Group Director, MSIG, SAC, was conferred with Membership of International Academy of Astronautics



Mr. R. J Bhandari, Scientist, SAC was awarded Indian National Geospatial Award–2009 in recognition of his significant contribution in the field of applications of geospatial technology for urban planning and natural resources management

Smt. Jolly Dhar, Scientist, SAC was awarded 'Best Woman Scientist' Award by Astronautical Society of India for the year 2006 for *significant contribution towards development of Microwave Remote Sensing Sensors*.



Dr. M. R. Pandya, Scientist, SAC was conferred with ISRO Young Scientist Merit Award for the year 2008 in appreciation of his contribution to the *Indian Space Programme in optical remote sensing satellite payloads area*.

Dr. Sujay Dutta, Scientist, SAC was awarded P.R. Pisharoty Memorial Award for the year 2008 in recognition of his research contributions in the area of operational multiple crop production forecasts and crop pest and disease monitoring using remote sensing.

## Superannuation



Dr. Abhijit Sarkar, Scientist, MOG/SAC and ISRS life member superannuated on Feb 28, 2010. He is currently working as 'Dr. Bramha Prakash Scientist'



Dr. P. C. Joshi, Scientist, MOG/SAC and ISRS life member superannuated on Jan 31, 2010. He is currently working as 'Dr. Bramha Prakash Scientist'



Mr. S. S. Rana, Outstanding Scientist, DD, MRSA and former Chairman, ISRS-AC superannuating on March 31, 2010 after illustrious contribution in the development of Microwave Remote Sensors.

## KUDOS

*ISRS-AC continues to be the largest chapter of ISRS with a total strength of 409 members.*