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...on a mission for transferring technology through education, research and capacity building

Message from DIRECTOR



Indian Institute of Remote Sensing (IIRS) is a premier institute of Southeast Asia in training, education, and research related to geospatial technology and its applications. In the last six months, IIRS has made a remarkable contribution to training, education, and research. In addition to the regular courses (M.Tech., M.Sc. and P.G.

Diploma), IIRS conducted specially designed courses for IFS officers, Range Forest Officers, project personnel of Department of Biotechnology and Department of Space sponsored projects, personnel involved under Atal Mission for Rejuvenation and Urban Transformation (AMRUT) sub-scheme, and course through the outreach programme. Multi-disciplinary advanced research on a better understanding of the Earth's system processes using EO data and geoinformation science was accomplished by IIRS. Large-scale deforestation, sun-induced fluorescence, glacier retreat and development of glacial lakes, forest fire reporting, simulation of precipitation associated with western disturbance, identification of paddy stubble burnt activities, and urban water distribution modelling were some of the prime research areas during the last six months, involving integration of multi-sensor data and various modelling techniques. The institute also initiated various research related to Earth,

atmosphere, and planetary sciences involving microwave, LiDAR, hyperspectral remote sensing as well as advanced data-integration tools. IIRS also developed an android-based mobile app for forest fire reporting.

The ISPRS TC-V Mid-term Symposium on Education and Outreach with the theme on Geospatial Technology-Pixel to People was organised by IIRS in collaboration with Indian Society of Remote Sensing. The event comprised of mid-term symposium and pre-symposium tutorials. IIRS also conducted ISRO-JAXA seminar on Space Education for Educators within the framework of Asia-Pacific Regional Space Agency Forum (APRSAP) Space Education Working Group (SEWG). I appreciate the research acumen of IIRS fraternity which is contributing equally to the research in advances fields and the areas of societal importance. My best wishes to all the faculty, staff, and students of IIRS to achieve their goals in research and academics.

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Spaceborne Sun-induced Fluorescence: An Advanced Probe to Monitor Forest Seasonality

Sun-induced fluorescence (SIF) is the latest breakthrough in remote sensing of the physiological response of plants. Analysis of spaceborne SIF (OCO-2) and reflectance data (MODIS NDVI & GPP) differs significantly across the wet and dry forest sites of Central India (Fig. 1). SIF explained higher seasonal variations and was also better correlated to rainfall across sites compared to Normalised Difference Vegetation Index (NDVI).

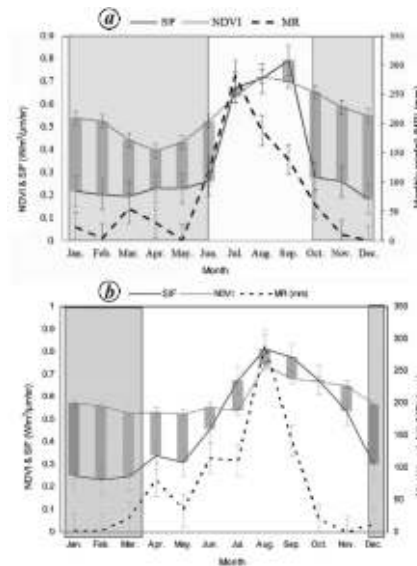


Fig. 1: Intra-annual distribution of SIF, NDVI and rainfall at (a) Dry site and (b) Moist site. Shaded area represents the average SIF value lower than 0.3 W/m²/µm.

Hitendra Padalia & Sanjiv Kumar Sinha

Largescale Deforestation in Lesser Himalayan Elephant Landscape of North East India

The study monitored forest cover depletion in parts of Assam and Arunachal Pradesh over an area of 42,375 km² during 1924-2009 in an elephant landscape falling in the Lesser Himalaya, North East India. The exercise showed continuous high loss of forest cover during the study period (Fig. 1). The total loss in forest cover was estimated to be about 7590 km² from 1924 to 2009. The Cellular Automata Markov Model has predicted a further likely decrease by 2028. More districts of Assam than Arunachal Pradesh and more plains than hills faced deforestation. Increasing human population and subsequent demand on the land for cultivation were identified as the major reasons for forest cover depletion.

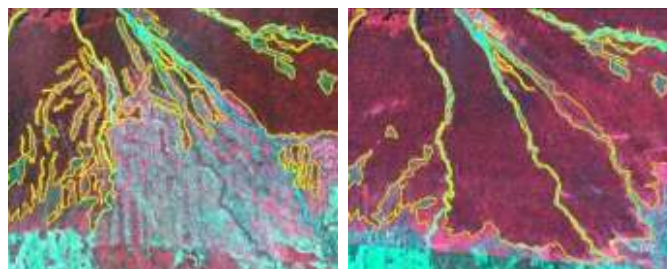


Fig. 1: Largescale deforestation in Charduar Reserve Forest, Assam

Subrata Nandy

Continuous Alarming Retreat of Parbati Glacier and Development of Glacial Lakes, Himachal Himalaya

The Himalayan glaciers are in continuous state of recession in response to climate change and global warming. Apart from glaciers in the Karakoram, the glaciers of Eastern Himalaya, Central Himalaya and Western Himalaya are retreating with varying rates of retreat, depending on the mass balance and the rate of melting at the terminus (Bolch et al. 2012; Paterson, 1981). Parbati is one of the largest glaciers in the Beas basin and one of the important water source for downstream areas of the Himachal Pradesh, India. The glacier has been studied by Kulkarni et al. (2005) between 1990 and 2001 using remote sensing data and reported to be retreating with a remarkable rate of 52m/year during the study period. The present study aimed to extend the study to understand the present status of the glacier since it is the largest glacier of the basin and can represent the basin. In the present study, terminus retreat of the glacier has been derived for the last 23 years from 1994 to 2017 using Landsat 5 and Landsat 8 data, respectively. The analysis of the result indicated that the Parbati Glacier continued to retreat alarmingly. The glacier has vacated about 0.48 sq km of its frontal area from 1994 to 2017. The snout of the glacier has receded by 1 km (approx.) in the last 23 years. The glacier was retreating by a rate of 43m/year from 1994 to 2017. Development of new glacial lakes near the glacier has also been observed over the years. The increased number and size of glacial lakes can be taken as an indicator of the increased melting of the Parbati glacier. The dynamics of the glaciers along with lakes and mass wasting in the Parbati valley has significant impact on Hydro Electric Projects and disaster management in the downstream region. As Indian Institute of Remote Sensing (IIRS), Dehradun has carried out geological investigation in the Parbati valley in 80's employing aerial photographs, the same would be further used to assess the long term impact of climate change on the glacier dynamics in the valley.

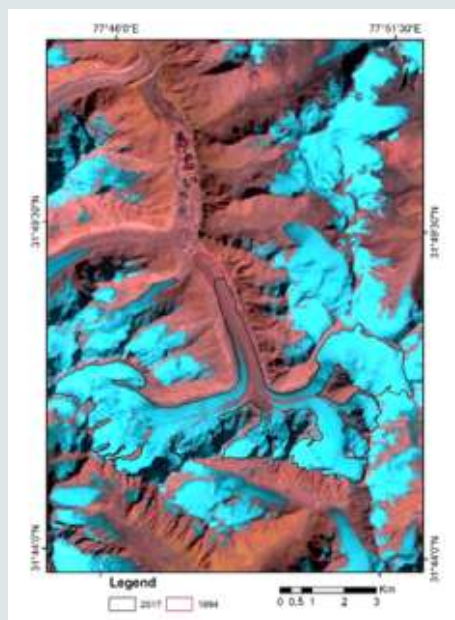


Fig. 1
Map showing retreat of Parbati glacier from 1994 and 2017

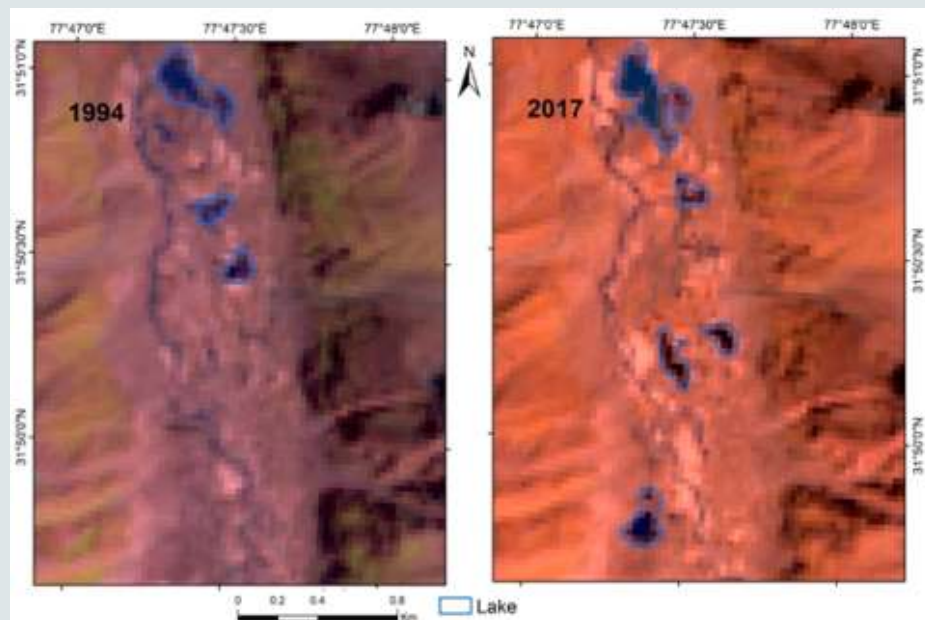


Fig. 2
Change in the area and number of lakes between 1994 and 2017 in the front of Parbati glacier shown on the Landsat imageries

Geospatial Solution for Forest Fire Reporting

IIRS has designed and developed “Geospatial Solution for Forest Fire Reporting” consisting of an Android based mobile App and web based dashboard application for Jammu & Kashmir (J & K) State Forest Department. Mobile App enables through intuitive user interface geotagging of sites along with various details about forest fire event. Mobile App also have functionality of offline storage in case of Internet issues. The submitted details can be visualized in real-time by decision maker over web based dashboard application. The geospatial solution was digitally released by Shri. K. Vjay Kumar, Advisor to Honourable Governor (J & K) on Oct 3, 2018 in Srinagar in presence of Director, IIRS and IIRS.

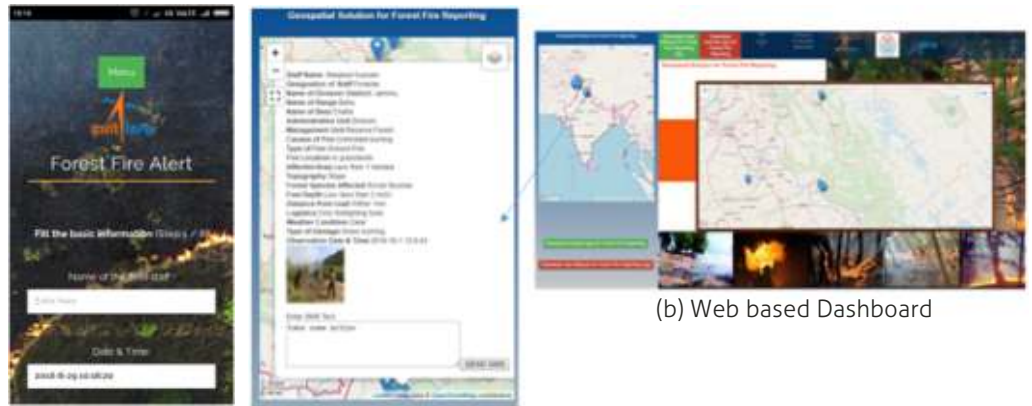


Fig.1
(a) Android mobile App for forest fire reporting



Fig. 2
Solution released by Mr K. Vijay Kumar, Advisor to Hon. Governor (J & K)

Simulation of Precipitation Associated with Western Disturbance over North Western Himalaya using WRF

(Presented in TROPMET 2018 held in Banaras Hindu University, 24th to 27th Oct, 2018)

Northern parts of India receive rainfall in the winter season (December to March) mainly due to the Western Disturbances (WD). WD are low tropospheric cyclonic vortices moving eastward in the mid latitudes from Mediterranean Sea or the mid-Atlantic ocean. The extent and magnitude of these disturbances are determined by upper tropospheric troughs in the zonal westerlies and are predominant during the northern hemisphere winter. WDs are associated with heavy precipitation in North Western Himalayas (NWH) usually in the form of snow which triggers landslides and avalanches. Therefore accurate prognosis of WD is vital for the Himalayan region. In the present study, one month simulation from 1st to 31st of March 2017 was carried out using the Weather Research and Forecasting (WRF) model to assess its capability to simulate WD over the North Western Himalayas. The results show that temporal evolution of WD pattern for NWH region during one month are nicely captured by the model simulation. The first WD (7 - 11 March) extended from western Jammu and Kashmir (JK) to Uttarakhand, covering most of Himachal Pradesh (HP) and further moved eastward towards Nepal and eventually dissipated. The second WD (21-22 March) was observed over North Pakistan, western JK along with some parts of HP and the third WD (28-31 March) occurred over JK only. This corroborates spatially as well as temporally with the IMD reports. Validation of daily accumulated rainfall from the model is also carried out using high resolution GPM IMERG satellite dataset. The Hit Rate for the three WDs was 0.94, 0.69 and 0.67 respectively, suggesting the decreasing accuracy of the model with time. The amount of rainfall in higher Himalayan region accompanying the WDs is over estimated but was able to capture the spatial structure fairly well. The study therefore reveals that high resolution mesoscale model can simulate the weather associated with WD with reasonable accuracy well in advance.

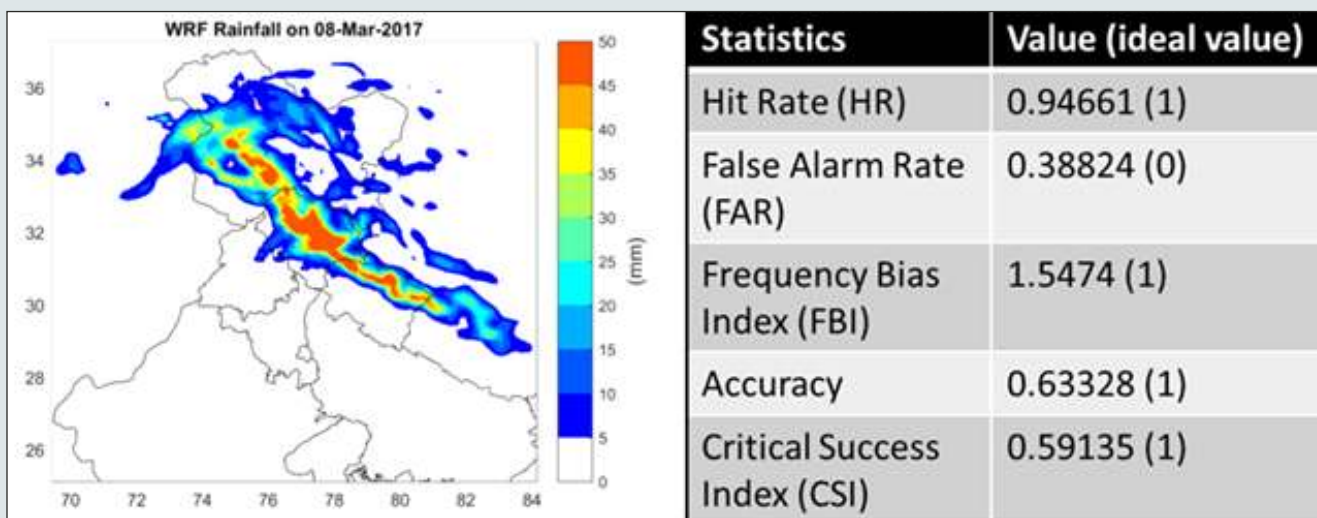
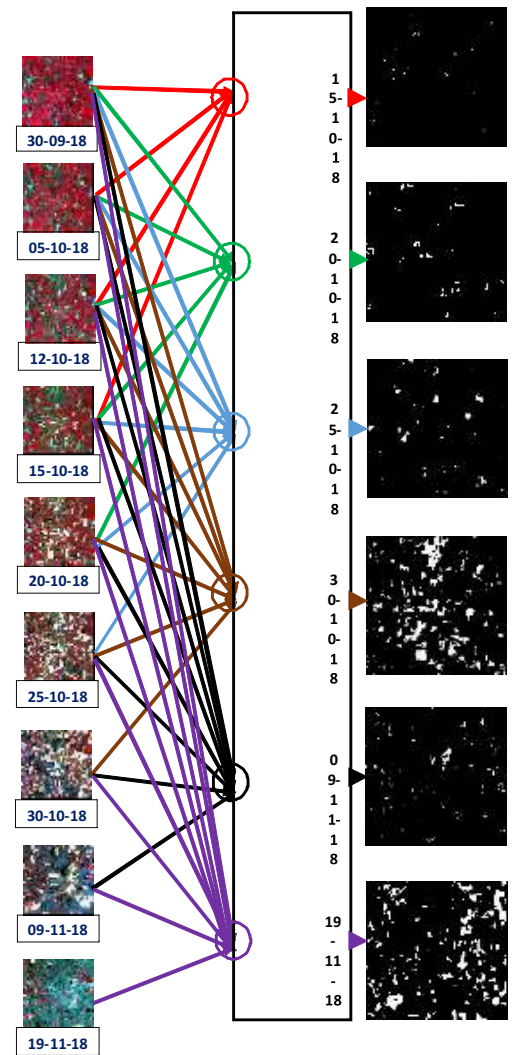


Fig. 1:
The Western Disturbance simulated by WRF on 8th March 2017 over Jammu and Kashmir, Himachal Pradesh and Uttarakhand and the table specifies the categorical statistics associated with the event.

*Ashish Navale, Sachin Budakoti,
Charu Singh & Sanjeev Kumar Singh*

Identification of Paddy Stubble Burnt Activities @ few days Interval using Temporal Remote Sensing Images

burning is practiced in many countries and has been proven to be a significant source of emissions during the harvest season. Especially in India, Haryana and Punjab are dominating states for paddy stubble burnt activities, being easy way to dispose of paddy straw. Indian government has tried to monitor paddy stubble burnt activities, to have some control. Availability of temporal remote sensing data, of 5 days temporal resolution, it is possible to monitor paddy stubble burnt field activities in different pockets of Haryana and Punjab states. While identifying paddy stubble burnt field's using temporal remote sensing data, specific classification algorithm has to be applied which can identify paddy stubble burnt field, while incorporating temporal information of paddy stubble burnt field. Possibilistic fuzzy based classifier is capable to extract only single class of interest like; paddy stubble burnt field every five days interval while reducing spectral dimensionality of temporal remote sensing data, using class based sensor independent indices approach. From fuzzy based temporal data processing approach, at 5 days interval paddy stubble burnt fields have been identified in Patiala, Punjab area as a case study.



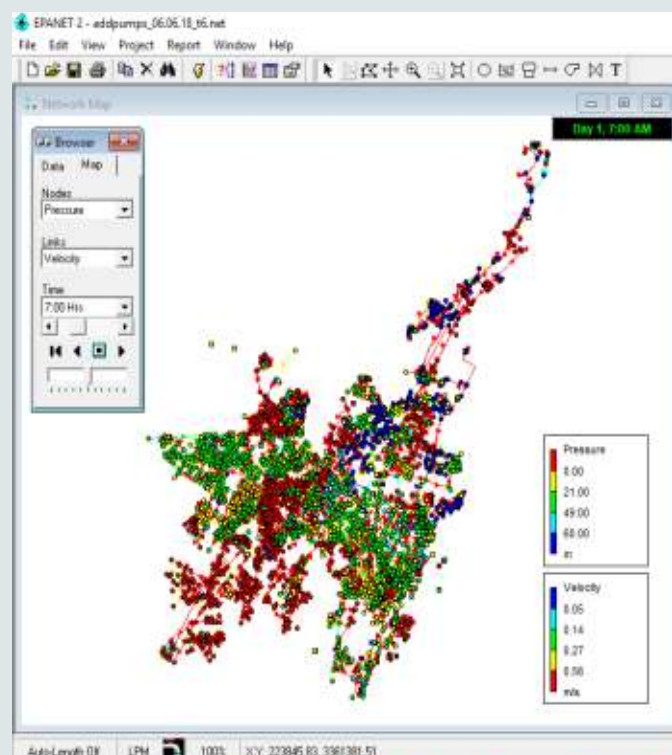
Paddy straw open-field

-Abhishek Singh & Anil Kumar

Urban Water Distribution Modelling using Geospatial Techniques

Water utilities form the core part of any urban infrastructure. However, in developing countries, the existing Water Distribution System (WDS) has many deficiencies such as smaller pipe diameter for water distribution mains, lack of storage tanks, and uneven distribution of water supply. To overcome all these deficiencies, the urban development authorities can use hydraulic modelling tools like Environmental Protection Agency Network (EPANET) along with geospatial data as inputs for efficient planning of WDS in cities. As a case study, the spatial database of WDS for Dehradun city has been created with inputs from satellite images, scanned maps, Computer Aided Design (CAD) files, Ground Penetrating Radar (GPR), etc. The existing as well as future water demand has been estimated using various methods of population projections considering the growth potential of different wards in the city. Further, water supply-demand gap analysis has been done using this geospatial database. The mapping of existing 564 km distribution network revealed that more than three-fourth of system has Polyvinyl Chloride (PVC) and Asbestos Cement (AC) pipes. An accuracy of 93% was obtained upon validation by GPR and updation of pipe diameter in the database. According to supply-demand gap analysis, Dehradun is a water surplus city yet it suffers from water scarcity mainly due to unsatisfactory condition of existing WDS. Twenty-seven percent of existing pipes are smaller than the prescribed standards, and there is an undesirable practice of direct pumping of water from tube wells into the network and storage tanks are required for at least 29 locations in the network. Extended period simulation over the network for 24 hours in EPANET 2.0 helped to identify the crisis localities where water supply experienced very low or negative pressures. Through model simulation, it is observed that total supply-demand gap will become

negative in the year 2041, if current scenario continues and adequate steps are not taken to conserve water and whole city will face huge water crisis. The upgraded WDS of Rajender Nagar area of city was also checked for its current and future feasibility in EPANET and it was found to be adequate for meeting the future water demands. The model outputs showed that negative pressure exist even in morning peak hours when total demand reached up to 25,000 LPM. Thus, it can be concluded that a GIS based water utility mapping and asset management is the need of the hour for our civic authorities to efficiently manage and conserve water as precious resource for future.



EPANET Simulation results

Kerala Flood Mapping and Monitoring

The detailed hydrological study has been carried at Water Resources Department (WRD) of Indian Institute of Remote Sensing (IIRS), ISRO Dehradun on various hydrological aspects of this flood disaster. The study is done using various geospatial tools and data in combination with hydrological/hydrodynamic/topographical models, to simulate the flood flows arising due to the heavy rainfall in all major river basins of Kerala (Figure 1). All 12 major flood affected river basins are studied for detailed basin wise DEM based hydro data processing and virgin hydrological simulations using Hydrological Modelling System (HMS). IMD-GPM gridded daily data used as input meteorological data, SCS method for initial loss estimation, and SCS unit hydrograph as runoff transformation, Muskingum-Cunge as channel routing method & constant monthly as base flow, in all basins simulations. The simulated discharge was validated at limited sites from the India WRIS and CWC observed data. SAR and cloud free optical data was also used for mapping the flood inundation areas. The 1-D hydrodynamic (HD) modelling is also done to simulate the impact of opening the major dam gates such as Idukki, which caused extensive flood in the downstream areas.

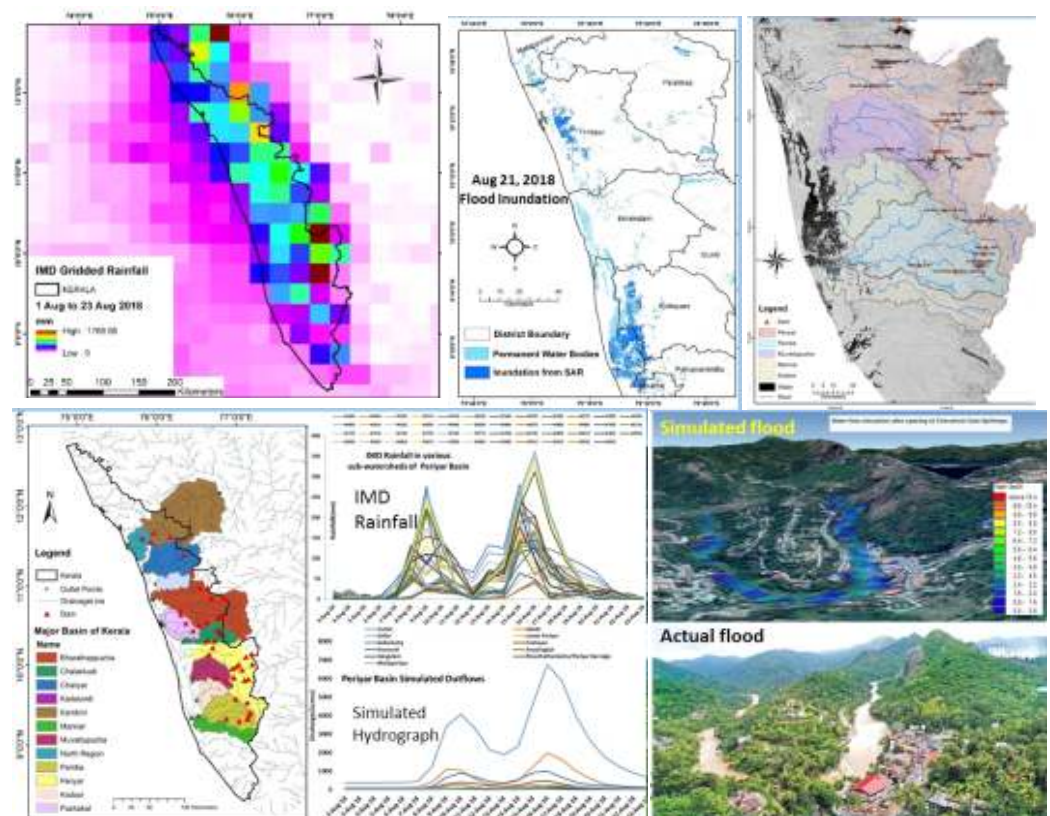


Fig. 1: The heavy rainfall of 1-23 Aug 2018 over Kerala, and subsequent flooded area as seen and mapped by satellite images. The hydrological simulated basins, hydrographs and Idukki dam all gate opening flood scenario simulated as well as actual field picture

Pankaj R. Dhote & Praveen K. Thakur

ISPRS Technical Commission V on Education and Outreach Mid-Term Symposium during Nov 20-23, 2018 at IIRS Dehradun, India

The ISPRS TC V Mid-term symposium on Education and Outreach with Theme on Geospatial Technology Pixel to People was jointly organised by the Indian Society of Remote Sensing (ISRS) in collaboration with the Indian Institute of Remote Sensing (IIRS). The event comprises the Mid-term Symposium, organised during November 20-23, 2018 and pre-symposium tutorial during November 17-19, 2018 at IIRS, Dehradun, India. There were overall 14 technical themes comprising 8 working groups and 6 special themes under ISPRS TC V. Around 450 participants attended the symposium. There were 4 plenary session, 3 special sessions and 26 Technical Sessions. Total 213 research papers were presented in the symposium, which was published in ISPRS Archives and Annals. Around 50 delegates from ISRO Centres participated in the symposium namely NRSC (31), SAC (10), ADRIN (3) and ISRO HQ (5). The entire ISPRS Council members participated the symposium along with few ISPRS TC Presidents. Overall, there were 37 international participants from 17 countries. Dr. A. S Kiran Kumar (Chief Guest) and Dr. Shailesh Nayak (Guest of honor) attended the inaugural ceremony.



**Dr. Sameer Saran, Organizing Secretary,
Mid term symposium of ISPRS TC-V**

ISPRS Technical Commission V Mid-Term Symposium on Education and Outreach, Nov. 20-23, 2018, IIRS, Dehradun



Inaugural ceremony



Dignitaries at the dais



Address by Director, IIRS



Address by Shri. A.S. Kiran Kumar, Former Chairman, ISRO



Release of proceedings of ISPRS TC V mid-term symposium



Release of book "Remote Sensing of Northwest Himalayan Ecosystems"

ISPRS Technical Commission V Mid-Term Symposium on Education and Outreach, Nov. 20-23, 2018, IIRS, Dehradun



Release of atlas "Ocean's Colour from Space"



Release of atlas "Decadal Forest Cover Changes in India from Indian EO Data"



Felicitation of Shri. A.S. Kiran Kumar by Director, IIRS



Group photograph of ISPRS TC V mid-term symposium



Inauguration of the exhibition at ISPRS TC V mid-term symposium



Dignitaries visiting the exhibition stalls

Refresher Course on Advances in RS, GIS and GNSS Applications in Forestry for Senior Indian Forest Service Officers

On the behest of MoEFCC, Govt. of India, IIRS every year organizes a refresher course for senior IFS officers from the forest departments of state/union territories to appraise them with the latest development in the field of geospatial technologies so that its more effective use can be insured in forest management in the country. This special course was organized by the Forestry and Ecology Department of IIRS during 27-31 August 2018 for 16 IFS Officers representing 10 states, viz., Assam, Chhattisgarh, Gujarat, Jammu and Kashmir, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Uttar Pradesh, and Uttarakhand. The course comprised of lectures, hands-on and field visit. The major topics covered in lectures were: Advances in RS, GIS and GNSS in forestry: An overview; Forest working plan preparation using RS & GIS inputs; Indian earth observation programme; Mapping vegetation cover, biomass & carbon stocks; Integration of geoinformatics in wildlife research and management; Geoinformatics for bioresources databases & citizen science; Forest fire assessment and monitoring; Forest aboveground biomass estimation using SAR with NISAR perspective; Geospatial applications for governance and development; Issues in creation of spatial database of forest boundaries; ISRO Geoportals products and services. Hands-on exercises were carried out on familiarisation to optical, SAR and LiDAR datasets; forest classification, change and terrain analysis; modelling potential distribution of target species and multi-criteria analysis for decision support. Demo on DGPS for forest surveying, and ecosystem services modelling were also conducted. One-day field visit was carried out in Mussoorie forest division.



Subrata Nandy and Hitendra Padalia

Orientation Course on Applications of RS and GIS in Forestry for Range Forest Officers

A Range Forest Officer (RFO) is a front line officer in the state forest departments in India. RFO's primary function is to safeguard the forest resources as well as executive welfare schemes for forest-dependent communities. The aim of this special course was to sensitize the RFOs about the utility of RS, GIS and GNSS in effective protection and management of forests and wildlife areas. It was organized by the Forestry and Ecology Department from 30 July to 3 August 2018 for 30 RFOs of Forest Training Institute and Ranger's College, Sundernagar, Himachal Pradesh. The course comprised of lectures, hands-on and field visit. The major topics covered were: introduction to RS, GIS and GNSS technologies; forest type and density information retrieval from aerial photographs and satellite remote sensing data; forest growing stock and biomass estimation; forest fire monitoring, wildlife habitat suitability assessment; land evaluation for afforestation programmes, use of spatial product and services from Indian Bioresource Information Network and ISRO Bhuvan portals, besides a special lecture on use of geospatial technologies for enhancing governance and development.



Subrata Nandy and Hitendra Padalia

Training Course on RS, GIS and GNSS Applications in Biodiversity Characterisation

A nationwide biodiversity characterization at landscape level was carried out by IIRS, ISRO in the past. However, one of the recommendations of National Space Meet-2015 was high-resolution mapping of biodiversity. Moreover, this kind of information is lacking in the country. In view of that, biodiversity characterization at the community level was realized and a national level project was formulated. At the same time, Indian Bioresource Information Network (IBIN) project was designed to serve relevant information on bioresources of the country to the professionals involved in bio-prospecting, marketing, protecting bio-piracy and the conservation of bioresources. The aim of the course was, therefore, to familiarize the project personnel of both the projects with RS, GIS and GNSS technologies so that they can effectively utilize this technology in their respective projects. This special course was organized during 10-14 December 2018 by the Forestry and Ecology Department of IIRS for 15 participants which included 2 project principal investigators and 13 researchers of Department of Biotechnology and Department of Space funded projects - Biodiversity Characterisation at Community Level and IBIN. The participants were from French Institute of Pondicherry, Kerala Forest Research Institute, M.S. University of Baroda, Andhra University and IIRS.

The course comprised of lectures, hands-on and field visit. The broad topics covered in lectures were: Basics of RS, GIS and GNSS; Forest type and density mapping using various methods; Applications of geospatial techniques in biodiversity research and conservation. Hands-on exercises were carried out on vegetation classification, terrain analysis, and spatial analysis. One field visit was carried out in Mussoorie forest division.



Subrata Nandy and Hitendra Padalia

Geospatial Inputs for Enabling Master Plan Formulation under AMRUT Sub-scheme

The Govt. of India has launched Atal Mission for Rejuvenation and Urban Transformation (AMRUT) which has a sub-scheme on 'Formulation of GIS Based Master Plan for AMRUT cities'. Initially, 500 towns are selected for the project. IIRS along with Town & Country Planning Organisation (TCPO), Ministry of Housing and Urban Affairs (MoHUA), GoI has developed the course contents for country-wide training and capacity building of personnel involved in sub-scheme at three levels (Tier-1: Decision Makers, Tier-2: Middle-level and Tier-3: Junior-level Officers). The course contents are designed to build capacity among urban planning professionals for utilising geospatial data for Master Plan Formulation and for Utility Management.

IIRS has organised a series of face-to-face training programmes and one Outreach Programme under AMRUT Sub-scheme. So far, 174 participants from 15 states have benefitted from five training programmes. The course contents include lecture/ demo/ practical related to geospatial data and techniques for enabling Master Plan Formulation, utility management, etc. During the programmes, Dr. Prakash Chauhan, Director, IIRS enlightened the participants on "ISRO's EO Sensors for Large Scale Applications: Current and Future". In one of the programme, Dr. Shailesh Nayak, Director, NIAS and former Secretary, MoES delivered a lecture on "Future Earth: The Indian Perspective". Dr. S.K. Srivastav, Dean (A), IIRS delivered a lecture on "Role of Geology/Geomorphology in Urban Suitability Analysis"; Sh. S. Surendra and Dr. Pawan Kumar from TCPO delivered lectures on "AMRUT Cities: Mission Guidelines and the Formulation of GIS-Based Master Plans" and Dr. K. Venugopal Rao, NRSC on "Design and Standards for Geospatial Data Creation and Enabling Master Plan Formulation under AMRUT". The participants were exposed to ground control points (GCPs), field data and utility data collection using Mobile GPS, DGPS and Total Station devices. The participants have rated the courses to be extremely useful and the quality of course content to be excellent. A panel discussion moderated by Dr. Sudhir Krishna, former Secretary, MoHUA; Director, IIRS and TCPO officials was organised on September 14, 2018 wherein senior officials from 14 states through virtual network participated and deliberated on geospatial data needs for AMRUT sub-scheme. IIRS has conducted an Outreach Programme on AMRUT attended by more than 1700 participants from 187 Institutes in the country.

IIRS along with TCPO has also developed a Mobile App with web-enabled GIS dashboard as per AMRUT Design and Standards guidelines. It facilitates smart field data collection for LULC, building footprints, base map mapping, etc. It also helps in attribute coding for urban utilities such as water supply, sanitation, transport, solid waste management, etc. The App shall be helpful in accelerating training and capacity building activity under AMRUT Sub-scheme.



-Team Members, IIRS & TCPO (MoHUA, GoI)

Pre-Symposium Tutorial on Big Geospatial Data Analytics

Geoinformatics Department of IIRS organized the one day pre-symposium tutorial entitled 'Big Geospatial Data Analytics' on November 19, 2018 as part of the Mid Term Symposium of International Society for Photogrammetry and Remote Sensing (ISPRS) Technical Commission V on Education and Outreach with theme "Geospatial Technology - Pixel to People" which was scheduled from November 20-23, 2018. The pre-symposium tutorial covers through a series of hands-on sessions, the fundamentals of storing, handling, analysing and retrieving hidden information and patterns from big geospatial data. Four hands-on sessions were covered in this tutorial namely:



- Big Data Analysis using Cloudera Distribution of Hadoop (CDH)
- Exploratory Spatial Data Analysis using GeoDa Software
- Introduction to Big Geospatial Data Analytics using Google Earth Engine
- R for BigGIS Data Analysis

The tutorial was attended by 10 participants; Seven were from India, two from Tajikistan and one from Bangladesh. Participants were also provided the reading material consisting of hands-on exercise as step-by-step manual as well as extra reading material in form of Journal articles on big geospatial data for their ready reference.

Group photograph of one day tutorial on "Big Geospatial Data Analytics"

Sameer Saran

Advanced Geospatial Modeling Tools and Techniques

The online workshop was held during August 06-10, 2018 through distance learning mode to address domain expert requirements to construct custom mathematical models in the area of geospatial modelling. The workshop was conducted by IIRS under outreach program where 1232 participants from 189 universities/institutions participated. It was helpful for the people who wanted to know the different mathematical and statistical tools to build the different models based on the understanding of area of expertise. It's content was based on implementation of theoretical process models. The participants was informed about how to categorise data, data filtering, fitting to the mathematical or statistical models. They were also made aware of techniques available for model evaluation. The course content was provided to cater many applications like interpolation of point data pattern analysis, multi geospatial data integration, Agents based modeling, Land Use/Cover prediction modelling, health GIS etc. Participants were given data and material for hands on geospatial data in R, use these data to build mathematical and statistical models and carry out the evaluation of these models. The topic covered in the workshop were : Understanding Spatial Data, Deterministic & Stochastics Modelling techniques, Spatial temporal Modelling, Spatial Markov Modelling, Agent Based Modelling, Point pattern Modelling, Geostatistical Modelling, Ensemble Modelling, Model Validation, Quantifying Model Performance. The major target audience were, Geospatial professional, Remote Sensing and allied Departments / Training Academies, Central/State/Private Universities & Academic Institutions, Central & State Government Departments, Research Institutes, Geospatial Industries, Environmentalists, Health department, Forester. Overall the workshop was highly useful to all the participants.

Sameer Saran

ISRO-JAXA Seminar on Seminar on Space Education for Educators

Two days seminar on space education for educators was jointly organized by Indian Space Research Organization (ISRO) and Japan Aerospace Exploration Agency (JAXA) during November 15-16, 2018 at Indian Institute of Remote Sensing (IIRS) Dehradun. The seminar was conducted within the framework of Asia-Pacific Regional Space Agency Forum (APRSAF)/Space Education Working Group (SEWG). The seminar was targeted to School Teachers (Class - IX to XII), Educators from planetarium and science museum. The Seminar aims at building a working knowledge of teaching tools and methods to impart space education with a scope to include in schools curricula and extra-curricular activities for future generations. The major objective of the seminar was to exchange lessons learned from previous experiences in teaching space science and technology and share ideas to let space education inspire new generation.

The seminar was inaugurated by Prof. Y.V.N. Krishnamurthy, senior professor and registrar, Indian Institute of Space Science and Technology Thiruvananthapuram, India and Dr.NozomuSakuraba, Director JAXA Space education centre, Japan. Total 80 participants from 16 states of Indian and Nepal has participated in the seminar. The technical sessions with hands on practical demonstrations were conducted on various aspects of space science and technology and its applications. The session on space science and technology - introductory and overview was conducted by JAXA team where the major space programmes of various space faring nations were presented to the participants. The space applications oriented technical session on "Applications of Earth Observation Data for Societal Development" was delivered by Prof. Y.V.N. Krishnamurthy. Dr. Krishnamurthy has presented the use of space technology in various flagship programmes of government of India. The session on space education in classroom was conducted by JAXA team. The hand on experiment on water rocket to understand the principles of rockery was conducted by ISRO and JAXA team. The participants were briefed about the various stages of water rocket building with its principles of launching. During the water rocket event the participants has launched their own rocket by applying required pressure and angle to hit a defined target. The participants were very excited to build their own rocket and launch it by applying basic principles of physics. The water rocket event was very successful where all the teachers has shown their keen interest to conduct similar water rocket event and competition in their school to encourage young minds to build the interest towards rockery science. The water rocket event was also witnessed by Shi R. Uma Maheswaran, scientific secretary ISRO. During the seminar a special astronomy session on celestial observation technique was conducted by Shri Sachin Bahmba, SPACE group of companies, India. During the session three telescopes were installed for celestial night observation by the participants. The participants were very much excited to know about the different planets and their observations through telescope.

The first technical session of the second day was conducted by Dr. Anil Bhardwaj, Director Physical Research Laboratory (PRL) Ahmedabad. Dr. Bhardwaj has delivered a talk on "Learning about our solar system and beyond". The participants were very



much excited to know about the solar system and they made the session very interactive by asking many interesting questions to the speaker. The science teachers from various schools has shown their special interest toward interplanetary explorations. The second session of the day was on innovative astronomy education where various online learning contents and instrumentation to study astronomy was presented to the participants. The next session was hands-on vacuum experiment which was conducted by JAXA team. The vacuum experiment was very excited activity for the participants where they understand the behaviour of different objects in vacuum environment. The vacuum chamber was created by the participants to understand the system practically. The session on "Active learning platforms for space education" was conducted by team IIRS where various e-learning contents on space education were presented to the participants. The IIRS-ISRO initiative on online learning and outreach activities were presented during the session. The online satellite data repositories with various simulated case studies were presented for earth observation applications. The 3D visualization of Himalayan terrain with high resolution satellite imageries of Cartosat 2E overlaid on Cartosat DEM was most exciting outcome for the participants to geo-visualize the geographical features specially Himalayas. The session on Indian space programme, current and future perspectives was delivered by Shi R. Uma Maheswaran, scientific secretary ISRO. Shri Uma Maheswaran has presented the major space programmes in Indian with its applications in various sectors. He has also briefed about the future space programmes of ISRO including Chandrayan-2 and Human Space Flight i.e. GAGANYAN. The participants were very much excited to know about ISRO's mission and its achievements and raised many innovative questions during the session. Space Application Centre (SAC) has also setup space exhibition at IIRS campus during the seminar. All the participants has visited the space exhibition and raised many interesting questions on space technology and its applications.

Bhaskar Nikam and S.K. Srivastav



Group Photograph
of the participants



Water Rocket Launching
by the participants



Briefing on building
Water Rocket



Vacuum experiment
by the participants

TRAINING CALENDAR 2019

Last updated on 14 .12.2018

S. No.	Course Code	Specialization	Intermediate/ Pre-University	Essential Qualifications
POST-GRADUATE DIPLOMA IN REMOTE SENSING AND GIS WITH SPECIALIZATION IN FOLLOWING DISCIPLINES				
1.	D-AS	Agriculture & Soils	Science stream (with at least any two subjects out of Physics/ Chemistry/ Maths/ Statistics/ Biology/ Comp. Science)	M.Sc. (Soil Sci./Agromet./Entomology/Pathology/Agron./Plant Physiol./Hort./Agric. Botany/Soil Conservation & Water Management/Climate Change Adaptation)/ Env. Sci. (OR) B.E./B.Tech. (Agril. Engg./Agri. Informatics/Agri. & Food Engg.) (OR) B.Sc. Agriculture/Horticulture/ Sericulture (4-years degree) (OR) Master's in Geography
2.	D-FE	Forest Resources & Ecosystem Analysis	Science stream (with at least any two subjects out of Physics/ Chemistry/ Maths/ Statistics/ Biology/ Comp. Science)	M.Sc. (Forestry/Ecology/Botany/Wildlife Sci./Biosci./Zoology/Env. Sci./Env. Mgmt./Natural Resources Management/Life Sci./Plant Sci.) (OR) 4 years B.Sc. (Forestry/Biotech./Forest Biotech./Bioinformatics) (OR) B.E./B.Tech. (Biotech./Forest Biotech./ Bioinformatics/ Environmental Engg.) (OR) Master's in Geography
3.	D-GG	Geosciences	Science stream (with at least any two subjects out of Physics/ Chemistry/ Maths/ Statistics/ Biology/ Comp. Science)	M.Sc./M.Sc.(Tech.)/M.Tech. (Geol./Appl. Geol./Geophy./Earth Sci./Geoexplor./Petrol. Engg./Geo-Engg./Mining Engg./Geography) (OR) B.Tech./B.E. (Civil Engg./Geosci./Petrol. Engg./Mining Engg./ Mineral Processing)
4.	D-NHDM	Natural Hazards & Disaster Risk Management	Science stream (with at least any two subjects out of Physics/ Chemistry/ Maths/ Statistics/ Biology/ Comp. Science)	Master's (Disaster Mgmt./Natural Resource Mgmt./ Env. Mgmt./Meteorology) (OR) M.Sc. (Phy./Maths/ Chem./Botany/Zool./Geol./Earth Sci./Env. Sci./Marine Sci./Atm. Sci./Agri./ Forestry) (OR) B.Arch./B.Plan./M.Plan. (OR) B.E./B.Tech. (Civil Engg./Env. Engg./Geosci./ Geoexplor./Geo Engg./Earthquake Engg./IT/Comp. Sci.) (OR) B.Sc. (Forestry/ Agric., 4 years deg.) (OR) Master's in Geography
5.	D-UR	Urban & Regional Studies	Science stream (with at least any two subjects out of Physics/ Chemistry/ Maths/ Statistics/ Biology/ Comp. Science)	Master's (Plan./Arch./Civil/Comp. Sci./Geoinformatics/Env. Sci. or equivalent) (OR) B.Plan./B.Arch. or equivalent (OR) B.E./B.Tech. (Civil/Comp. Sci./Geoinformatics or equivalent) (OR) Master's in Geography
6.	D-MS	Marine & Atmospheric Sciences	Science stream (with at least any two subjects out of Physics/ Chemistry/ Maths/ Statistics/ Biology/ Comp. Science)	M.Sc. (Marine Sci./Earth Sci./Phy./Oceanog./Meteor./Atm. Sci./Env. Sci./Maths) (OR) Master's in Geography
7.	D-PR	Satellite Image Analysis & Photogrammetry	Science stream (with at least any two subjects out of Physics/ Chemistry/ Maths/ Statistics/ Biology/ Comp. Science)	M.Sc./M.Tech. (Phy./Appl. Phy./Maths/Chem./Stat./Appl. Maths/Comp. Sci./IT/Geoinform./ Geomatics/ Remote Sensing/Civil Engg. or equivalent) (OR) B.E./B.Tech./B.Sc. Engg. (Civil/ Electronics/Electrical/ ECE/Comp. Sci./IT/Geomatics/Geoinform./Remote Sensing or equivalent) (OR) M.Sc. in Geography
8.	D-WR	Water Resources	Science stream (with at least any two subjects out of Physics/ Chemistry/ Maths/ Statistics/ Biology/ Comp. Science)	Master's (Geol./Env. Sci.) (OR) B.E./B.Tech. (Civil Engg./Agril. Engg./Water Res. Engg./ Structural Engg.)
9.	D-SDS	Spatial Data Science	Science stream (with at least any two subjects out of Physics/ Chemistry/ Maths/ Statistics/ Biology/ Comp. Science)	B.E./B.Tech./B.Sc. (Engg.) (four year degree) (Comp. Sci./Comp. Engg./IT or equivalent) (OR) M.Sc./M.Tech. in Computer Science (OR) M.Sc. (Physics/Maths/Statistics) with minimum six months Certificate course in Computer Programming from a recognised UGC/AICTE university/institute or govt. organisation
<ul style="list-style-type: none"> • Seats in P.G. Diploma (including all specializations mentioned at Sl. No. 1-9): 48 • Start date: 16.07.2019 and Completion date: 26.06.2020 • Last date to Apply: 15.04.2019 [17:30 hrs] (Only Online Applications will be considered) • Fee: Govt.-Sponsored candidate = Nil; Self-financed (Indian) candidate = Rs. 60,000; Foreign candidate = USD 6,000 • Selection for admission to P.G. Diploma course is generally based on merit considering the academic record. However, institute may also decide conducting interviews of eligible/short-listed candidates for selection. 				
M.TECH. IN RS & GIS WITH SPECIALIZATION IN FOLLOWING DISCIPLINES				
10.	M-RG	Specialization: (i) Agriculture and Soils, (ii) Forest Resources & Ecosystem Analysis, (iii) Geosciences, (iv) Marine & Atmospheric Sciences, (v) Urban & Regional Studies, (vi) Water Resources, (vii) Satellite Image Analysis & Photogrammetry and (viii) Geoinformatics		<ul style="list-style-type: none"> • For specializations from Sl. No. 1 to 7: corresponding qualifications as mentioned for Post-Graduate Diploma courses are applicable. Candidate should have Science subjects at graduation level. • Entrance Requirement for Geoinformatics Specialization: M.Sc./M.Tech. (Physics/Appl. Physics/ Electronics/Maths/ Appl. Maths/Stat. /IT/Comp. Sci./ Comp. Applications/Geo-Engg.) (OR) M.Sc. (Remote Sensing/Geoinform./Geomatics or equivalent) (OR) Master's in Geography (OR) B.E./B.Tech./B.Sc. (Engg.) (four year degree) in Civil/ECE/ Electronics/Electrical/Comp. Sci./IT/Remote Sensing/ Geoinform./Agri. Inform./Forest Informatics <i>*with graduation in Science</i>
<ul style="list-style-type: none"> • Seats in M.Tech. (including all specializations): 40 • Start date: 15.07.2019 and Completion date: June, 2021 • Last Date to Apply: 29.03.2019 [17:30 hrs] (Only Online Applications will be considered) • Fee: Govt. - Sponsored candidate = University Registration fee only (currently, Rs. 20,000); Self-financed (Indian) candidate = Rs. 1,44,000 (IIRS fee) + University Registration fee (currently, Rs. 20,000); Foreign candidate = USD 14,400 (IIRS Fee) + University Registration fee (currently, Rs. 20,000) • M.Tech. degree is presently awarded by the Andhra University, Visakhapatnam (India). • Selection for admission for M.Tech. course is based on entrance test and interview. Govt.-sponsored candidates are exempted from written test and they have to appear only for interview. Foreign nationals are also exempted from written test and they have to appear only for interview through online platforms. Other candidates need to appear for Entrance Test followed by Interview. Entrance test & interview are likely to be held at Ahmedabad, Bangalore, Dehradun, Delhi, Guwahati, Kolkata, Nagpur, Raipur, Varanasi and Thiruvananthapuram during May 4-6, 2019. <p>Note (for M.Tech. and P.G. Diploma Courses):</p> <ul style="list-style-type: none"> • Candidate should have secured a minimum of 55% marks (or equivalent CGPA) in the qualifying degree. Further, candidate holding Master's degree in any of the subjects/disciplines mentioned above as the required qualification for any course/specialization (Sl. No. 1-10) should have Bachelor's degree in Science [B.Sc./B.S.] with the subjects from the following areas: Earth, Atmosphere, Ocean & Planetary Sciences/ Physical Sciences/ Life Sciences/ Mathematical Sciences/ Chemical Sciences/ Engineering Sciences/ Geography/ Env. Science/Computer Science (OR) Bachelor's degree in Engineering [B.E./B.Tech./ B.Sc.(Engg.)]. • Candidates in the final semester/year of the qualifying degree can also apply under the 'Result Awaited' category. For details, please read the 'Instructions for Appearing Candidates' in the 'Important Information' Section given at the end of this Academic Calendar. • Age limit for admission to above P.G. Diploma & M.Tech. courses (Sl. No. 1-10): 45 yrs. • Govt.-sponsored candidates are given preference for admission and the Institute may consider relaxation in qualification/age for them. • Specialization, once allotted upon selection, cannot be changed during the course. 				
IIRS-ITC JOINT EDUCATION PROGRAMME (JEP)				
11.	D-GI*	Post-Graduate Diploma* in Geoinformation Science & Earth Observation with specialization in Geoinformatics	Science stream (with at least any two subjects out of Physics/ Chemistry/ Maths/ Statistics/ Biology/ Comp. Sci.)	M.Sc./M.Tech. (Phy./Appl. Phy./Electron./Maths/Appl. Maths/Stat./IT/Comp. Sci./Geology/ Geophysics/ Geo-Engg./Agriculture/ Forestry/Env. Sci.) (OR) B.E./B.Tech./B.Sc. (Engg.)/B.Sc. (with 4 years deg. course) in Civil/ECE/Electron./Comp. Sci./IT/Electrical/Geoinformatics/ Geomatics/Agri. Engg./ Geosci./ Petrol. Engg./Mining Engg./Agri. Inform./Forest Inform./ Agriculture/Forestry or equivalent (OR) B.Arch./B.Plan./M.Arch./M.Plan. (OR) Master's in Geography (OR) Govt. officials having B.Sc. degree
<ul style="list-style-type: none"> • Seats: 10 • Start date: 16.09.2019 and Completion date: August, 2020 • Last Date to Apply: 30.04.2019 [17:30 hrs] (Only Online Applications will be considered) • Fee: Shall be announced soon. • Age limit: 45 yrs. • Candidate should have secured a minimum of 55% marks (or equivalent CGPA) in the qualifying degree. Further, candidate holding Master's degree in any of the subjects/disciplines mentioned above as the required qualification for D-GI course (Sl. No. 11) should have Bachelor's degree in Science [B.Sc./B.S.] with the subjects from the following areas: Earth, Atmosphere, Ocean & Planetary Sciences/ Physical Sciences/ Life Sciences/ Mathematical Sciences/ Chemical Sciences/ Engineering Sciences/ Geography/ Env. Science/Computer Science (OR) Bachelor's degree in Engineering [B.E./B.Tech./ B.Sc.(Engg.)]. • Candidates in the final semester/year of the qualifying degree can also apply under the Result Awaited category. For details, please read the 'Instructions for Appearing Candidates' in the Important Information Section given at the end of this Academic Calendar. • M.Sc. degree is awarded by University of Twente, The Netherlands. • Post-Graduate Diploma in Geoinformatics (D-GI) is awarded jointly by IIRS and ITC/University of Twente, The Netherlands. • Selection for admission for P.G. Diploma Course is generally based on merit considering the academic record. Institute may also decide conducting interviews of eligible/ short-listed candidates for selection. • Government-sponsored candidates are given preference for admission and the Institute may consider relaxation in qualification/age for them. <p><i>*Subject to continuity of JEP with Faculty of Geoinformation Science & Earth Observation (ITC)/University of Twente, The Netherlands.</i></p>				
12.	M-GI*	M.Sc*. in Geo-information Science & Earth Observation with specialization in Geoinformatics	As mentioned under Sl. No. 11.	
<ul style="list-style-type: none"> • Seats: 10 • Start date: 16.09.2019 and Completion date: July, 2021 • Last Date to Apply: 29.03.2019 [17:30 hrs] (Only Online Applications will be considered) • Fee: Shall be announced soon. • Age limit: 45 yrs. • Candidate should have secured a minimum of 60% marks (or equivalent CGPA) in the qualifying degree. Further, candidate holding Master's degree in any of the subjects/disciplines mentioned above as the required qualification for D-GI course (Sl. No. 11) should have Bachelor's degree in Science [B.Sc./B.S.] with the subjects from the following areas: Earth, Atmosphere, Ocean & Planetary Sciences/ Physical Sciences/ Life Sciences/ Mathematical Sciences/ Chemical Sciences/ Engineering Sciences/ Geography/ Env. Science/Computer Science (OR) Bachelor's degree in Engineering [B.E./B.Tech./ B.Sc.(Engg.)]. • Candidates in the final semester/year of the qualifying degree can also apply under the Result Awaited category. For details, please read the 'Instructions for Appearing Candidates' in the Important Information Section given at the end of this Academic Calendar. • M.Sc. degree is awarded by University of Twente, The Netherlands. • Selection for admission for M.Sc. course is based on entrance test, interview and academic record. Govt.-sponsored candidates are exempted from written test and they have to appear only for interview. Foreign nationals are also exempted from written test and they have to appear only for interview through online platforms. Other candidates need to appear for Entrance Examination followed by Interview. Entrance test & interview are likely to be held at Ahmedabad, Bangalore, Dehradun, Delhi, Guwahati, Kolkata, Nagpur, Raipur, Varanasi and Thiruvananthapuram during May 4-6, 2019. • Government-sponsored candidates are given preference for admission and the Institute may consider relaxation in qualification/age for them. <p><i>*Subject to continuity of JEP with Faculty of Geoinformation Science & Earth Observation (ITC)/University of Twente, The Netherlands.</i></p>				

S. No.	Course Code	Specialization	Intermediate/ Pre-University	Essential Qualifications
COURSE FOR DECISION MAKERS				
13.	O-DM	Remote Sensing-An Overview for Decision Makers		Officers of All India Services having 5 years of experience in service (OR) Senior Officials/Functionaries working in Govt. Organizations/ Academic Institutes/ Research Institutes/ Geospatial Industry having 15 years of experience in service.
<ul style="list-style-type: none"> • Seats: 15 • Start date: 11.06.2019 and Completion date: 14.06.2019 • Last date for receiving the Application: 10.05.2019 • Fee: Rs. 10,000 (includes boarding + lodging charges) • Candidates nominated by the govt. organizations will be given preference for admission. 				
INTERNATIONAL PROGRAMMES (ONLY FOR FOREIGN NATIONALS FROM ITEC/SCAAP PARTNER COUNTRIES)				
14.	S-GI	Short Course on Geoinformatics (ITEC-Sponsored)		P.G. Deg./ Grad. Deg./ Diploma in Phy./Chem./Maths/Botany/Forestry/Zool./Wildlife Sci./Env. Sci./Life Sci./Agri. Sci./Meteorology (Agro/ Hydro)/Geog. (with B.Sc. at Grad. level) or any other Sci./any discipline of Engg. with sufficient knowledge of Maths/Stat. at high school level/middle level resource managers and professionals from Govt./NGOs/Universities with 2-year work experience.
<ul style="list-style-type: none"> • Seats: 20 (Only for Foreign Nationals from ITEC Partner Countries) • Start date: 16.09.2019 and Completion date: 08.11.2019 • Age limit: 45 yrs. 				
14.	S-RS	Short Course on Remote Sensing with special emphasis on Digital Image Proc. (ITEC-Sponsored)		P.G. Deg./ U.G. Deg./ Diploma in Phy./Chem./Maths/Botany/Forestry/Zool./Wildlife Sci./Env. Sci./Life Sci./Agri. Sci./Meteorology (Agro/Hydro)/Geog. (with B.Sc. at U.G. level) or any other Sci./Engg. Discipline with sufficient knowledge of Maths/Statistics at high school level/ middle-level resource managers and professionals from Govt./NGOs/Universities with 2-years of work experience
<ul style="list-style-type: none"> • 20 (Only for Foreign Nationals from ITEC Partner Countries) • Start date: 06.01.2020 and Completion date: 28.02.2020 • Age limit: 45 yrs. NOTE: For S-GI and S-RS courses (Sl. No. 14, 15), candidates should Apply through Ministry of External Affairs, Govt. of India (www.itecgoi.in). 				
CERTIFICATE COURSE				
16.	C-RS	Short Course on Remote Sensing and Image Analysis		Bachelor's degree in Sci./Engg. (OR) Government officials with Bachelor's degree in any discipline
<ul style="list-style-type: none"> • Seats: 20 (all seats are for Indian nationals only) • Start date: 06.01.2020 and Completion date: 28.02.2020 • Start Date to Apply: 01.08.2019; Last date to Apply: 15.11.2019 [17:30 hrs] (Only Online Applications will be considered) • Fee: Rs. 20,000 (Rs. 12,000 course fee + Rs. 8,000 towards registration & other charges) • Candidates nominated by the govt. organizations will be given preference for admission. 				
NNRMS-ISRO SPONSORED CERTIFICATE COURSES FOR FACULTY/ SCIENTIST*/ENGINEER*				
17.	N-GI	GIS Technology & Advances		P.G. Deg. in Sci./Engg./Geog./MCA
18.	N-WR	RS & GIS Applications in Water Resources		P.G. Deg. in Civil/Agri. Engg.
19.	N-FE	RS & GIS Applications in Forest Resources & Ecosystem Analysis		P.G. Deg. in Bot./Ecol./For./Env. Sci./Zool./Wildlife Sci./LifeSci./Biosci.
20.	N-UR	RS & GIS Applications in Urban & Regional Studies		P.G. Deg. in Plann./Civil Engg./Arch./Geog./Geoinformatics or equivalent
21.	N-SIP	Satellite Image Analysis & Photogrammetry		P.G. Deg. in Sci./Engg./Geog.
22.	N-GS	RS & GIS Applications in Geosciences		P.G. Deg. in Geol./Appl. Geol./Geophy./Earth Sci./Geoexplor./Petrol. Engg./Geo-Engg./Mining Engg./Civil Engg./ Geog.
23.	N-AS	RS & GIS Applications in Agriculture & Soils		P.G. Deg. in Agri./Geog./Env. Sci./Agric. Engg./Soil Cons.
24.	N-CO	RS & GIS Applications in Coastal & Ocean Sciences		P.G. Deg. in Marine Sci./Geol./Oceanog./Appl. Geol./Env. Sci.
25.	N-GVV	Geocomputation and Visualization in Web Platforms		P.G. Deg. in Sci./
<ul style="list-style-type: none"> • Seats (including all disciplines): 64 • Start date: 13.05.2019 & Completion date: 05.07.2019 • Last Date to Apply: 18.03.2019 [17:30 hrs] (Only Online Applications will be considered) • Fee: Govt.-sponsored candidate# = Nil; Self-financed (Indian) candidate = Rs. 12,000 • Age limit: 50 years. 				

#Regular/Permanent faculty members (teachers) of UGC/AICTE approved universities & their affiliated colleges nominated by Vice Chancellor/ Principal/ Registrar/ Dean and Regular/Permanent Faculty/Scientists/Engineers/Officers nominated by the competent authority of the Central/State Govt. organisations/institutions will be considered as Govt.-sponsored candidates. Such candidates will be eligible for payment of TA (2nd AC train fare) and nominal living expenses by IIRS as per the provision available under this programme. For details, refer course brochure available in IIRS website.

*Preference will be given to Govt.-sponsored University/College Faculty.

26.	C-SC	Usefulness of Remote Sensing & GIS for Environmental Study		Class IX - XII students
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• Seats: 50 • Start date: 24.06.2019 & Completion date: 28.06.2019 • Last Date to Apply: 03.05.2019 • Fee: Nil Note: No accommodation will be provided to the participants of this course (C-SC).

Important information for Candidates

- **Only Online Applications will be considered**, except for the O-DM course (Sl. No. 13) and C-SC course (Sl. No. 26).
 - **Application fee for courses at Sl. No. 1 to 12, 16:** For Indian nationals - Rs. 1,000; For Foreign nationals - USD 100.
 - Fee should be paid online.
 - Candidates applying for M.Tech. course (Sl. No. 10) may choose maximum two specializations (wherever eligible) at the time of submitting the application, without any extra application fee (i.e. total application fee for two specializations is Rs. 1,000 only for Indian nationals and USD 100 for foreign nationals). However, they will have to finally opt only one specialization out of the two chosen specializations at the time of entrance test, since entrance test will be conducted for one specialization only for a candidate.
 - Candidates applying for P.G. Diploma course in Remote Sensing & GIS (Sl. No. 1 to 9) may choose maximum four specializations (wherever eligible) in order of their preference. However, application fee of Rs. 1,000 for Indian nationals and USD 100 for foreign nationals will be applicable for choosing up to two specialisations; if a candidate chooses three or four specializations, the application fee will be Rs. 2,000 for Indian nationals and USD 200 for foreign nationals.
 - **Instructions for Appearing Candidates:**
 - Candidates in the final semester/year of the qualifying degree can also apply for the P.G. Diploma, M.Tech. and M.Sc. courses (mentioned above at Sl. No. 1 to 12) under the "Result Awaited" category. However, such candidates must submit the proof of marks/grades (cumulative marks/CGPA) till the pre-final semester/year at the time of submitting the application, without which the application will be treated as incomplete and will be rejected.
 - In case of candidates applying for M.Tech/M.Sc. courses (S.No. 10 and 12), they must bring a certificate in original from the Competent Authority of their Institute at the time of interview stating that: (i) by 30th June, 2019, he/she will have appeared for examination in all subjects required for obtaining his/her qualifying degree; and (ii) he/she has obtained requisite marks [i.e. 55% or equivalent upto pre-final semester/year in case of candidates applying for M.Tech. course, and 60% or equivalent in case of candidates applying for M.Sc. course]. However, admission of such candidates, if selected, will be provisional and they will have to submit the marksheets/certificates of final semester/year on the date of registration (during admission) or before the last date as announced/decided by IIRS. Non-fulfilment of this condition will automatically result in the cancellation of the provisional admission.
 - The candidates applying for P.G. Diploma course (S. No. 1 to 9, 11) should submit the marksheets/certificates of final semester/year on the date of registration (during admission). In case these documents are not available, then they must bring a certificate in original from the Competent Authority of their Institute at the time of registration (during admission) stating that: (i) he/she has appeared for examination in all subjects required for obtaining his/her qualifying degree; and (ii) he/she has obtained requisite marks [i.e. 55% or equivalent upto pre-final semester/year]. However, admission of such candidates will be provisional and they will have to submit the marksheets/certificates of final semester/year on or before the last date as announced/decided by the IIRS. Non-fulfilment of this condition will automatically result in the cancellation of the provisional admission.
 - **Instructions for Govt.-sponsored Candidates:**
 - Govt.-sponsored candidate means only the Permanent Employee nominated by a Govt. organization in India (Central or State Government Ministries/Departments or Autonomous Institutions and State or Central Govt.-funded Universities). Nominating organizations are required to meet all expenses viz., travelling allowance, daily allowance, contingent expenses, medical expenses, etc. for their candidates. Courses at Sl. Nos. 13, 14, 15 & 16 are paid courses for all, including candidates nominated by the Govt. organizations. In case of NNRMS-ISRO sponsored courses (S. No. 17 to 25), nominated candidates from universities/colleges/ Govt. organizations are paid TA, living expenses etc. as per provision available under this programme and as per rules.
 - **Govt.-sponsored candidates must submit the Nomination Form from the Competent Authority of their parent organisation/institute at the time of submitting the online application.** The template of the Nomination Form can be downloaded from <https://admissions.iirs.gov.in>.
 - Course fee and other expenditure are likely to change as per IIRS and collaborating University/Institute's policy.
 - **Security deposit:** Self-financed candidates, if selected, have to pay security deposit prior to the commencement of the course (i.e. on or before the last date mentioned in the admission letter) @Rs. 4,000/- in respect of Certificate courses, @ Rs. 6,000/- in respect of P.G. Diploma courses, and @ Rs. 10,000/- in respect of M.Sc./M.Tech. courses, failing which seats would be offered to the wait-listed candidates. The security deposit will be adjusted in the course fee.
 - Boarding and lodging charges in IIRS Hostel are currently Rs. 4,500 per month (approx.). Local candidates will be considered for hostel accommodation, only if available.
 - Increase and decrease in number of seats and age/qualification relaxation for candidates nominated by the govt. organizations will be at the discretion of the institute. In the event of number of applications being large, institute may adopt short-listing criteria based on academic record, relevant experience, etc. Government-sponsored candidates will be given preference for admission.
 - If the date of course commencement falls on a holiday, course will start from next working day.
 - The medium of instructions in the courses is English.
- To apply online, please visit <https://admissions.iirs.gov.in>. For any further details, please contact: Group Head, Programme Planning & Evaluation Group, Indian Institute of Remote Sensing, ISRO, 4 Kalidas Road, Dehradun-248001, Uttarakhand, India. Tel: +91-135-2524105, 2524106, 2524107, Fax: +91-135-2741987, 2748041; E-mail: admissions@iirs.gov.in. Kindly visit www.iirs.gov.in for other details. Correspondence will generally be done through e-mail. Therefore, all candidates are advised to regularly check their email and visit IIRS website frequently for regular updates.

Awards



Dr. Hitendra Padalia received P.R. Pisharoty Memorial Award-2018 by ISRS, Dehradun



Dr. Harish Karnatak received National Geomatics Award - 2018 by ISG, Ahmedabad.



Three Research Scholars of Forestry and Ecology Department of IIRS, Mr. Sanjay Babu, Ms. Ritika Srinet and Ms. Srishti Gwal, won the 1st Runner up trophy in the Inter-Departmental Nature Quiz Competition organized by the Forest Department of Uttarakhand on 6 October 2018.

Hitendra Padalia & Subrata Nandy

Publications



IIRS released an atlas on Decadal Forest Cover Changes in India from Indian earth Observation Data on November 20, 2018 during the inaugural function of ISPRS TC-V symposium at Dehradun. This atlas showcases the capability of long-term satellite data from Indian Remote Sensing Satellite (IRS) and Resourcesat satellite series in monitoring forest loss and gain patterns in different parts of India. An attempt has been made to portray the forest cover changes, both negative and positive, occurred due to a variety of reasons such as clearing of forests for agriculture, subsidence agriculture, submergence of forests due to hydroelectric power projects, loss of forests due to coastal erosion and natural disasters such as Tsunami and increase in forest cover due to protection and conservations measures in the past two decades. The loss of forest has serious implications for the native biodiversity, wildlife habitats and environment, therefore, it is expected that this collation of temporal satellite images of key hotspots of forest change would help in awareness generation and sensitization of the policymakers, and the public at large.

Hitendra Padalia

Major Visits/Activities

- Parliamentary Standing Committee (PSC) visit to IIRS on June 02, 2018
 - Study visit of the Department related Parliamentary Standing Committee (PSC) on Science & Technology, Environment & Forest to Dehradun and Jim Corbett National Park (Uttarakhand) to Dehradun took place in Indian Institute of Remote Sensing, Dehradun on June 02, 2018.
 - The Honourable Committee was headed by Shri Anand Sharma, Chairman of the Committee and accompanied by Members Dr. Raghu Sharma, Shri NinongEring, and Shri VikramUsendi visited IIRS. They were accompanied by officials of the Rajya Sabha Secretariat viz., Shri T.N. Pandey, Director; Shri Rajiv Saxena, Under Secretary; Shri Bhim Singh, Sr. Secretariat Assistant; and Shri Gautam Kapoor, PS to Chairman.
 - Meeting began with brief presentation on activities of ISRO by Scientific Secretary, ISRO followed by a detailed presentation on activities of IIRS by Director, IIRS. Field instruments used by IIRS faculty and students were also demonstrated before the Honourable Members.
 - Committee generally expressed immense satisfaction on activities of IIRS & made some suggestions on deliberations. Detailed minutes of meeting are sent to ISRO Hqs for clearances.
- All Group Heads, Head of Departments and Officers in Admin Account Purchase participated in the workshop titled 'Right to Information' on July 20, 2018 at IIRS, Dehradun.
- Based on the ISRO HQ Office Order dated 13-04-2018, the Skill-test for the shortlisted candidates was conducted at IIRS, Dehradun on July 7, 2018.
- Dr. Shailesh Nayak, Director, NIAS Bengaluru delivered a lecture on 'Future Earth: The Indian Perspective' on July 17, 2018 and reviewed EOAM Projects activities. He also was interacted with the course participants of AMRUT programme.
- Dr. George Joseph (Honorary Distinguished Professor, ISRO and Former Director, SAC and Director, CSSTEAP) delivered Guest Lecture on July 17, 2018 on "Science of Remote Sensing" to 23rd RS&GIS course participants.
- Director, IIRS reviewed the pre-budget proposals during July 24-30, 2018 for the centre & projects activities (RE:2018-19 & BE:2019-20) and suggested revisions in budget/ programmatic requirements.
- Addition of GB Member: Currently CSSTEAP has 16 GB Members and 2 observers. Based on GB recommendation, Mr. Shamsuddin Ahmed, Director, Bangladesh Meteorological Department, Bangladesh has joined as member from Bangladesh in CSSTEAP Governing Board by signing an agreement on August 02, 2018. After this addition now CSSTEAP has 17 GB members and 2 observers.
- 72th Independence Day was celebrated at IIRS and Director, IIRS unfurled the National Flag. Various programmes were arranged on the occasion for staff, students and family members.
- Dr A.S. Kiran Kumar, Member, Space Commission and Former Chairman, ISRO visited IIRS on August 05, 2018 and reviewed R&D Projects activities.
- राजभाषा हिंदी के प्रति जागरूकता एवं उसके प्रयोग में गति लाने के उद्देश्य से प्रत्येक वर्ष की भांति इस वर्ष संस्थान में 14-28 सितम्बर के दौरान 'हिंदी पखवाड़ा' का आयोजन किया गया जिसके अंतर्गत संस्थान के कार्मिकों/उनके परिवार के सदस्यों के लिए विभिन्न प्रतियोगिताओं का आयोजन हुआ।
- Director, IIRS alongwith five Scientist/ Engineers from IIRS and Director CSSTEAP participated in the '6th Bengaluru Space Exhibition (BSX) 2018' at BIEC, Bengaluru During Sept 6-8, 2018.
- Director, IIRS chaired a session and three Scientist/ Engineers from IIRS presented 'Technical papers' in Technical Hindi seminar at DOS Branch Secretariat, New Delhi on 28th Sept, 2018.
- The BOS meeting for SATCOM & GNSS courses of CSSTEAP was held on October 8, 2018 and submitted its recommendations
- IIRS Student's Recreation club, IIRS Recreation club and Ladies club jointly organised 'Durga Puja and Dandiya night' in the campus on 13 October, 2018
- Director, IIRS distributed the certificates to the winners of various events in the closing ceremony of हिन्दी पखवाड़ा (Hindi fortnight) on October 1, 2018 which was celebrated during September 14-28, 2018 in IIRS.
- ISRO-Academia meet was organized by CBPO, ISRO Hqs at IIRS, Dehradun on Nov. 13, 2018. About 140 participants from IITS, NITs, other universities and ISRO officials participated in the event. On this day, presentations were made

by senior Scientists of different ISRO centres on possible research areas for collaboration between ISRO and Academia.

- Advisory committee meeting of CSSTEAP was organized at IIRS on November 30, 2018 with participation of officials from ISRO, Andhra University and other important dignitaries.
- IIRS hosted and successfully organized the Mid-Term Symposium of 'International Society for Photogrammetry and Remote Sensing (ISPRS) Technical Commission V' on "Education & Outreach - Geospatial technology Pixel to People" during Nov 20 - 23, 2018. including Pre-Symposium Tutorial on "Big Geospatial Data Analytics" was conducted on Nov 19, 2018.
- A Seminar on 'Space Education for Educators' was organised jointly by ISRO and JAXA at IIRS campus, Dehradun during November 15-16, 2018 within the framework of Asia-Pacific Regional Space Agency Forum (APRSAF) - Space Education Working Group (SEWG). As a part of this Seminar, a half-day session on "Water Rocket" at the premises of Survey of India Stadium, Dehradun was conducted on November 15, 2018 for all the registered participants of Seminar.
- IIRS also hosted "Space Exhibition" during 16-17 November 2018 and 19-21 November 2018 jointly organized by Vikram Sarabhai Space Exhibition (VSSE), SAC, Ahmedabad. The exhibition was an attempt to showcase the evolution of Indian Space Program and applications for Societal Development through working models, live panels, static displays and interactive multimedia presentations.
- Chairman ISRO & Secretary DOS inaugurated through Video conference (VC) from ISRO HQ the 'Central Dining Facility at IIRS' on Dec. 20, 2018.
- CSSTEAP General Body Meeting was held at DOS Branch Secretariat N. Delhi on Dec. 10, 2018 with participation of officials from ISRO, GB-Member countries and other important dignitaries.
- The skill test for light vehicle driver (LVD) recruitment was conducted at IIRS, Dehradun on December 7, 2018.

हिन्दी पखवाड़ा

भारतीय सुदूर संवेदन संस्थान में हिंदी पखवाड़ा दिनांक 14.09.2018 से दिनांक 28.09.2018 तक आयोजित किया गया। हिंदी पखवाड़े में भारतीय सुदूर संवेदन संस्थान के कार्मिक एवं उनके पारिवारिक सदस्यों ने बढ़-चढ़कर हिस्सा लिया। पखवाड़े के दौरान प्रतियोगिताओं का आयोजन किया गया, जैसे कि श्रुतलेखन, टंकलेखन, निबंधलेखन, आशुलेखन, हिंदी-गीत आदि। प्रतियोगिताओं के विजेताओं को पुरस्कार राशि एवं प्रमाणपत्र देकर सम्मानित किया गया।



New Appointment



E.C. No.: GI03049
Dr. Ishwari Datt Rai
Sci/Engr - SD
03.10.2018



E.C. No.: GI03048
Dr. Taibanganba Watham
Sci/Engr - SD
Date: 27.09.2018

Transfers



E.C. No.: HQ04183
Naveen Kumar
Assistant
29.11.2018
ISRO, HQ, Banglore to IIRS



E.C. No.: IS05569
Ajay Malik
Sr. Assistant
24.09.2018
URSC, Banglore to IIRS



E.C. No.: S05424
Javed Akram
Sr. Assistant
10.09.2018
URSC, Banglore to IIRS

Superannuated



E.C. No.: GI00290
Smt. Asha Arora
Senior Project Assistan
30.09.2018



E.C. No.: Gi00864
Shri Ashok Kumar
Senior Project Attendant
31.10.2018



E.C. No.: GI00902
Smt. Madhulata
Senior Project Attendant
31.10.2018



E.C. No. GI00473
Shri G.S. Verma
Senior Project Assistant
30.11.2018

ISRO Academia Meet

ISRO Academia Meet was organized by CBPO, ISRO Headquarters at IIRS, Dehradun on Nov. 13, 2018. About 140 participants from IITs, NITs, other universities, and ISRO officials participated in the event. On this day, presentations were made by senior scientists of different ISRO centres on possible research areas for collaboration between ISRO and academia.



Group photograph of ISRO Academia Meet



Address by Dr. K. Sivan, Chairman, ISRO

Kindly write to us at newsletter@iirs.gov.in for suggestions/feedback.

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