

Reflections

Triannual Inhouse Newsletter



Shri Amit Shah Ji, Hon'ble Home Minister of India, Chairman of NEC and President, NESAC Society, being presented with a memento by Dr K Sivan, Secretary, Department of Space, Government of India and Chairman, ISRO and NESAC GC during the 9th NESAC Society meeting held on 23 January, 2021 at Shillong, Meghalaya

From the Director's desk



The deadly virus Corona has once again engulfed the world and more severely our nation. This time, in the 2nd wave of the pandemic, the impact of the virus has been more deadly. We have witnessed unprecedented heart breaking scenes in hospitals and cemeteries. The medical fraternity is doing an excellent humanitarian job to save the world from this pandemic. The other front line workers are also

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A report on 9th Meeting of NESAC Society

The 9th meeting of NESAC Society was held on January 23, 2021 (Saturday) at Conference Room of North Eastern Council (NEC) Secretariat, Shillong under the Chairmanship of Shri Amit Shah, Hon'ble Union Home Minister / Chairman, NEC and President, NESAC Society. The meeting was also attended by Dr Jitendra Singh, Hon'ble Minister of State (Independent Charge) for the Ministry of Development of North Eastern Region (DONER) and Minister of State for Prime Minister's Office; Personnel, Public Grievances and Pensions; Department of Atomic Energy and Department of Space, Dr. K. Sivan, Secretary, DOS / Chairman, NESAC GC and Vice President, NESAC Society, Dr. Inderjit Singh, Secretary, Ministry of DONER, New Delhi, Shri K. Moses Chalai, Secretary, NEC, Chief Secretaries from six NE states, Senior officials from other states, NITI Aayog, and ISRO/DoS.

At the beginning of the meeting, Hon'ble Union Home Minister inaugurated the Outreach



Shri Amit Shah Ji, Hon'ble Union Home Minister is welcomed by Dr K Sivan, Chairman, ISRO

Facility of NESAC by virtual mode and dedicated the facility to the Nation. The Outreach Facility has been created to conduct training, workshops and skill development in the area of space technology applications for NE region. NESAC has been recognized to conduct training programmes for BIMSTEC

(Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation) countries, which was announced by the



Shri Amit Shah Ji, Hon'ble Union Home Minister remotely inaugurating the NESAC outreach facility

Hon'ble Prime Minister of India during the BIMSTEC Summit held in Kathmandu, Nepal.

Dr. K. Sivan, Secretary DOS & Chairman, ISRO, as the Chairman of the NESAC Governing Council (GC) & Vice-President of the NESAC Society welcomed the President and the members of the Society and also briefed about the past NESAC GC meetings.

Dr Jitendra Singh, Hon'ble Minister of State (Independent Charge) for the Ministry of Development of North Eastern Region (DONER) and Minister of State for Prime Minister's Office; Personnel, Public Grievances and Pensions; Department of Atomic Energy and Department of Space lauded the space technology applications in wide range of areas in the country. He emphasized on the real time monitoring using space technology and cited the example of Indian railway, where space technology is being used effectively for tracking of large number of trains in the country. He said that NESAC is a unique centre of the Department of Space providing space technology support to strategically important NE region, which is also known for its rich diversity. Hon'ble Minister highlighted the major achievements of the NESAC such as the

A report on 9th Meeting of NESAC Society

project on Sericulture development, Forest Working Plan preparation, Bamboo resource mapping, Tele-medicine, Tele-education, Flood Early Warning System, Lightning Early Warning, Forest Fire monitoring, etc. He appreciated the effort of NESAC in carrying out more than 120 projects with UAV/Drone based surveys.

Director, NESAC presented activities and



Director, NESAC making presentation to the NESAC Society

achievements of NESAC during 2016-2017 to 2019-2020. He highlighted the major achievements of the centre covering different thematic areas and in the areas of training and capacity building initiatives. He informed the Society that there are 69 ongoing projects, out of which 31 projects are in the area of Remote Sensing & GIS applications, 12 projects in the area of ICT and

Governance, 14 projects in the area of Space & Atmospheric Science, 6 projects in the area of satellite communication and another 6 projects in the area of Disaster Management support. He also presented the minutes of the 12th, 13th, 14th and 15th meeting of NESAC GC for approval and ratification by the Society and briefed about the actions taken based on GC recommendations.

President, NESAC Society requested all members to share their views and suggestions. Shri Naresh Kumar, IAS, Chief Secretary, Arunachal Pradesh suggested that Satellite images should be used for the route alignment of the ongoing Highway construction along the India-China border. He also sought space technology support for feasibility studies for the border fencing along the India-Myanmar international border, expansion of the CHAMAN project in the six districts of Arunachal Pradesh bordering to Assam and promote organic cultivation, identification and monitoring of illegal Poppy cultivation in six districts. Bordering Assam.

Shri M.S. Rao, IAS, Chief Secretary, Meghalaya requested NESAC to undertake Mapping of Shifting/Jhum cultivation areas and also requested to share Project monitoring details with Meghalaya government. Shri Hemen Das,



The NESAC Society meeting is in progress

IAS, Secretary, S&T, Assam, suggested that all satellite data available with NESAC pertaining to Assam should be shared with Assam government without any cost. He also suggested that NESAC should actively collaborate and do handholding with ASTEC and ARSAC. Shri Rajesh Kumar, IAS, Chief Secretary, Manipur requested NESAC to take up Jhum cultivation mapping for entire Manipur, border area monitoring, Horticulture mapping in Manipur, study on Loktak lake conservation, develop flood early warning system to Manipur, support for e-Vidya application in Manipur and to expand the Telemedicine network in entire Manipur.

Several new proposal were approved by the NESAC Society including inclusion of new members in the NESAC Governing Council, NESAC Society, Budget proposals, sanctioning of new posts as per the earlier approval of NESAC Society, etc.

President, NESAC Society appreciated the wide range of activities carried out by NESAC to support the developmental planning of NER with space technology inputs. He reiterated the vision of former Prime Minister, Late Shri Atal Bihari Vajpayee Ji, while establishing the NESAC to augment the development of the region with advanced space technology support.

Hon'ble Home Minister opined that NESAC has considerable repository of data on various aspects/ sectors which should be used for planning and implementation for purposes like degraded unutilized lands, management of forest, restoration of water resources like lakes, check dams and ponds in appropriate locations as means for flood control, irrigation and development of tourism. Space technology available with NESAC can be effectively used given the unique physiography, terrain and

diversity of NER. He said that all the NE States should come up with developmental Plan of Action (PoA) using Space Technology within 6 months. The PoA to have targets to be attained within three years.

President, NESAC Society also emphasized that NEC should organize interactions with Chief Secretaries of NE states once in every three months to review the status of space applications in their respective state. He also suggested that space technology inputs should



Shri Amit Shah Ji, Hon'ble Union Home Minister and President, NESAC Society delivering his concluding remarks

also be effectively used for mineral exploration, improve connectivity and promote industrial development in the region. Mechanism is to be enabled to monitor the implementation of recommendations emerging from the projects completed & submitted to user departments by NESAC.

Director, NESAC & Secretary, NESAC Society offered the vote of thanks. The meeting ended with thanks to the Chair.

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not behind in fighting this pandemic with collective efforts. The department of Space is also heavily affected in this wave with hundreds of COVID positive cases being reported from different ISRO/DoS centers including a significant number of casualties. At NESAC, although we took all measures to contain the spread of COVID as per the protocols laid down by government of India and government of Meghalaya, we could not avoid contacting the virus. Several cases has been

reported at NESAC, however, the good part is none of them required any hospitalization.

During last four months, in terms of our scientific activity, we were functioning almost as in normal situation till end of March, of course maintaining social distancing. We had the major event of hosting the 9th meeting of NESAC Society after a period of four years. This was very special for NESAC, as the meeting was Chaired by Shri Amit Shah Ji, Hon'ble Union Home Minister / Chairman, NEC and President, NESAC Society. The meeting was also attended by Dr Jitendra Singh Ji, Hon'ble Minister of State (Independent Charge) for the Ministry of DONER; Dr. K. Sivan, Secretary, DOS and Vice President, NESAC Society; Dr. Inderjit Singh, Secretary, Ministry of DONER; Shri K. Moses Chalai, Secretary, NEC; Chief Secretaries from six NE states; Senior officials from other states, NITI Aayog, and ISRO/DoS. The meeting remained very fruitful as several new proposals by NESAC was approved including recruitment of human resources.

While Hon'ble Home Minister was extremely happy with the volume of work done by NESAC and excellent database created over last two decades. However, he expressed doubt on its extensive application. He said that all the NE States should come up with developmental Plan of Action (PoA) using Space Technology having targets that can be attained within three years. He asked all states to use these database for planning and implementation for purposes like degraded unutilized lands, management of forest, restoration of water resources, flood control measures, irrigation, and development of tourism. Towards this, he asked NEC and NESAC to have more frequent interaction with the states for better utilization of these database and space technology in general.

NESAC has always been proactive to take the benefits of space technology to the NE states and towards this one focal point from NESAC for each NE states has been identified. This clear cut directive from Hon'ble Home Minister has added new life to our mission. Few NE states acted on this directive immediately and

had one to one meeting with NEC and NESAC. This was followed by a one day workshop with the concerned state line departments to give then one more round of familiarization on the database available at NESAC and on preparation of PoA. I am very happy to share that all NE states have subsequently come up with their PoA and a few states have even started implementing them. I am sure all other NE states will also start implementing the projects identified in PoA soon. NESAC is committed to provide all technical and consultative support for successful implementation of these projects. Chairman, ISRO has also ensured all support to NESAC and the states in this endeavor.

Hon'ble Union Home Minister also inaugurated the Outreach Facility of NESAC by virtual mode and dedicated the facility to the Nation. The Outreach Facility has been created to enhance the training, workshops and skill development activities of NESAC in the area of space technology applications for national and international professionals and students. Even during this pandemic time, we conducted five training courses in online and hybrid mode.

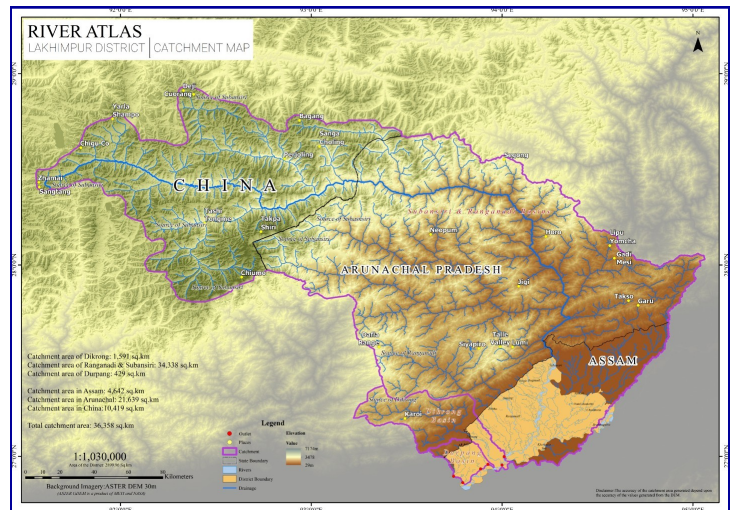
Eleven new projects have been approved during last four months, in addition to more than sixty ongoing projects covering all thematic areas. We signed MoU with two large institutes for capacity building and research. The pre-monsoon season also brings lot of challenges in terms of providing the space based disaster management support. NESAC has been providing forest fire alerts, lightning and severe storm warning for all states in the NE region, etc during the winter and pre-monsoon season. The preparatory work for the Flood Early Warning System (FLEWS) project, which has recently been extended for three more years, has also been done and the project will be made operational from 15 May, 2021. A lot of emphasis has been given on the disaster management support program and the NER-DRR web portal is also being revived to make it more useful and user friendly.

I request all to follow COVID protocol and wish good health and safety for all.

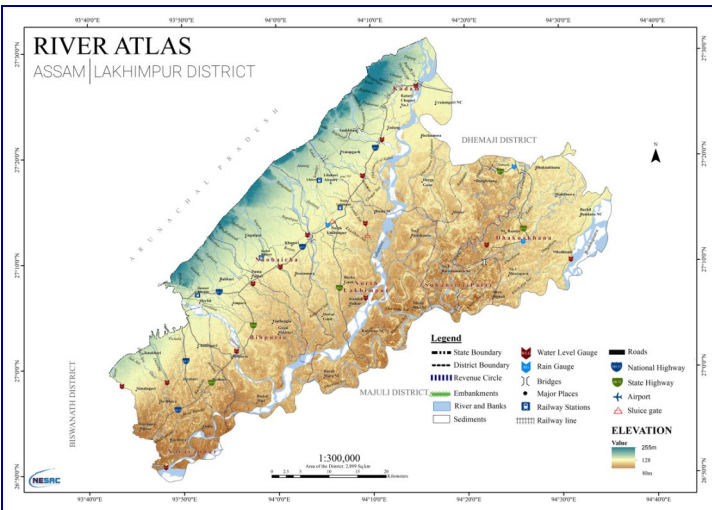
Preparation of River Atlas for Assam

Diganta Barman, Arjun B M, Gokul Anand, and Tapas Kumar Nahak

The Brahmaputra & Barak basins regularly face the problems of flooding & riverbank erosion. Better management of the water resources of this region needs detailed data and information about the river systems and also continuous monitoring of the river bank lines. However, the existing river database is of coarser resolution and lacks the bank information, except only a few major rivers. Also, some of the small non-perennial flashy rivers that cause intense flooding during the peak monsoon are not traced in the present database. Therefore, NESAC in collaboration with Assam Water Resource Management Institute Society (AWRMIS) has taken up a project on preparation of River Atlas for Assam. The atlas was prepared with the



Catchment map showing the source of origin of all the rivers entering the district



Detailed district map showing all the major and minor rivers in Lakhimpur district of Assam

objective of preparing river database at a finer scale with the funding support from Assam State Disaster Management Authority (ASDMA).

As part of this project, different maps are prepared such as, district wise river map, Land use/Land cover maps, and catchment maps. District river map contains all the major and minor rivers at a scale of 1:5000 in the district. This map also contains the details of river banks, names of rivers, sand

deposits, embankments, sluice gates, locations of hydro-meteorological observatories, major locations, roads, railway networks, railway stations, bridges, administrative boundaries, etc. In addition to this, the district map also has the detailed description of the major river flowing in the district and information related to the origin of those rivers. These maps also have the details of the length of all the rivers, length of embankments along the river, river level charts showing warning levels and danger levels.

The land use land cover (LULC) maps are prepared with a defined buffer of one kilometre on either side of major and minor rivers. These maps are prepared using merged satellite products. In this map, the LULC is divided into



Interim review of the project by Shri Sarbananda Sonowal, Hon'ble Chief Minister of Assam

Preparation of River Atlas for Assam

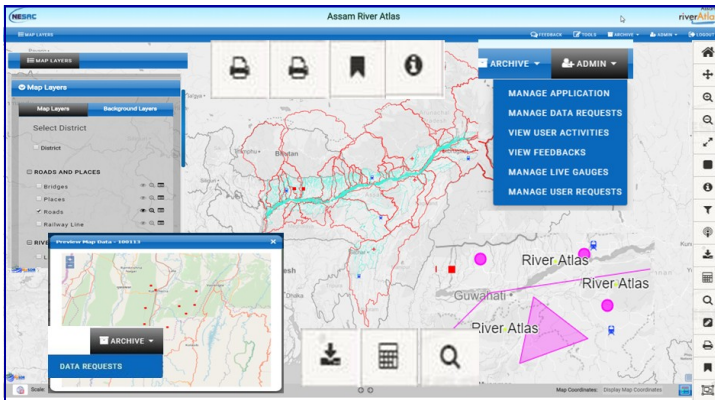
four different classes such as water, agricultural land, forest and built-up. The area corresponding to different classes in the respective district are attributed. In addition to this, the map also contains the details of revenue circles, bridges, major places, railway

stations, railway lines, roads, etc. whose names are not available, the name of the parent channel has been provided.

To utilize the generated layers to the maximum extent, a user-friendly web portal is developed incorporating all the layers generated under this project. The geoportal can be accessed by the public for various purposes with different levels of access profiles using the link <https://riveratlas.nesdr.gov.in/>.

In an interim review of this project during January, 2018, Hon'ble Chief Minister, Assam, expressed satisfaction and optimism on the usefulness of this exercise in river planning & development in Assam in future.

As part of Assam River Atlas, a detailed technical report comprising of district wise river maps has been prepared, and the same along with River Atlas Geoportal was formally released by Shri Jishnu Barua, Honourable Chief Secretary, Government of Assam on 23 March 2021. Several Additional Chief Secretaries, Principal Secretaries, and Senior Secretaries, officials of different departments of Government of Assam and CEO of ASDMA were present during the release event. A live demonstration of the portal including a detail technical presentation was made during the program by NESAC Scientists in presence of Director, NESAC.



River Atlas Geoportal

stations, railway lines, roads, etc.

Catchments maps are prepared to show the origin of all the rivers entering the respective district of Assam. These maps are prepared using auto-catchment delineation technique. These auto delineated catchments are further verified manually for correctness. For auto-delineation of river networks, CartoDEM v3 is used for those catchments lying inside Indian Territory. For catchments outside the country,

A S T E R / SRTM DEM was used. This catchment map has the information of the area of catchments in different states and countries, the source of origin of all the rivers, the name of rivers, etc. For those rivers outside district



Release of the River Atlas by Shri Jishnu Barua, Chief Secretary, Government of Assam

Development of Analysis Ready EO Data Cubes - an initiative under NeSDR

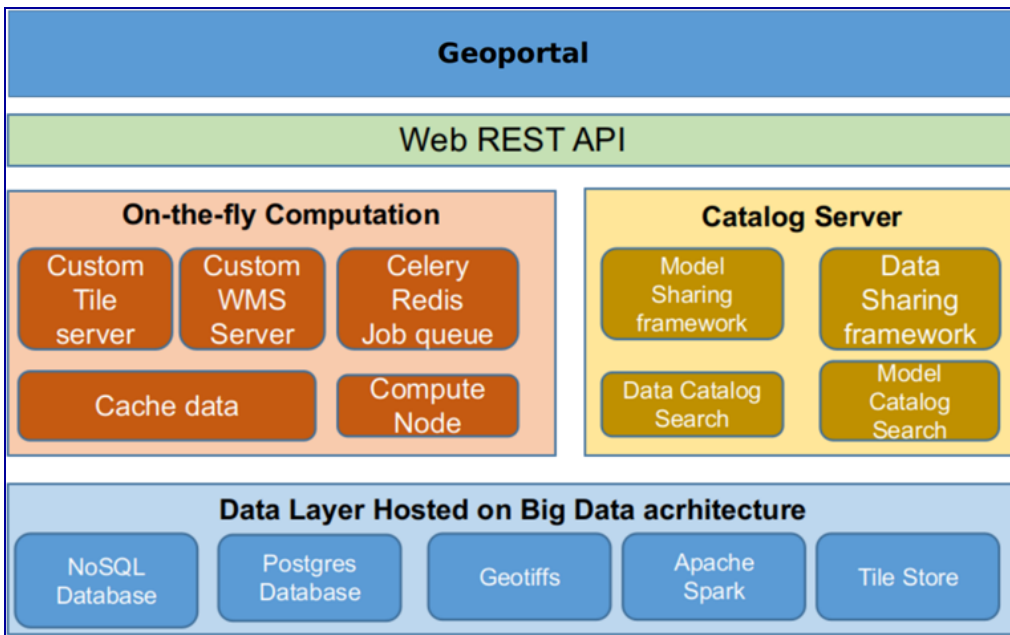
Nilay Nishant, S Roy, S K Ojah, A Chouhan, S Bhuyan, P S Singh, V Saikhom, R Anilkumar, and D Chutia

Earth observation satellites generate a large amount of data globally on a daily basis, which provides vital information in understanding the ecosystem. It is virtually impossible to manually download and organize these files at a national level. Open data cube (ODC) is an

EO datasets using a simple and easy to use GUI platform.

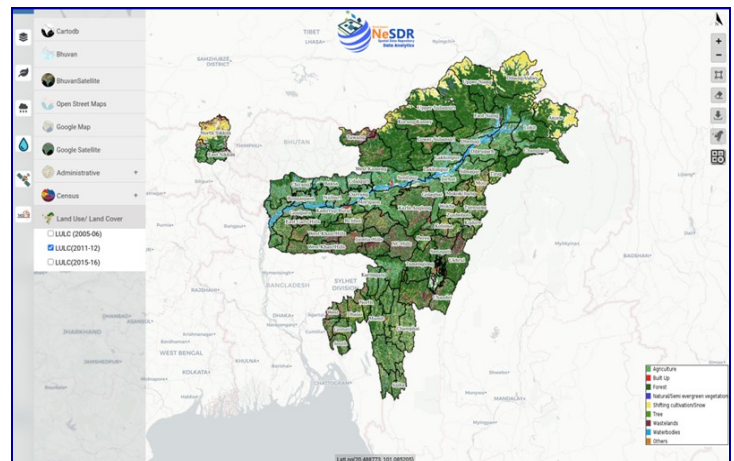
Under North Eastern Spatial Data Repository (NeSDR at <https://www.nesdr.gov.in>), an innovative web browser based solution has been developed for geospatial analytics on the ingested data by combining the OGC WMS standard visualisation with cloud computing capabilities. The team has also implemented a wide range of analytical tools like long term analytics, point data analysis, clustering and many more on top of the available data. This way, the platform provides an online platform for performing various analytical operations on raster data without having the need to obtain powerful computing facility at the user's end. Further, the application is designed to

catalogue large number of multi source raster data, analyse these satellite images on-the-fly and produce the result as OGC compliant WMS map for portraying on the web browser. The user would select an operation; request triggers the fetching of data or processing



High level architecture of the NeSDR Analytics Platform

emerging technology which governs how the user interacts with the huge volume of spatio-temporal Earth Observation (EO) data. The data is indexed and organized ensuring faster retrieval and processing of the ingested datasets. Some of the major implementations of open data cubes are the Swiss Data Cube (SDC) and the Australian Data Cube (ADC) which deliver nationwide information using remotely sensed time series Earth Observations. However, ODC requires skilled python programmers for its installation and use. In contrast, solutions such as Google Earth Engine (GEE) provides a cloud environment with multi-petabyte archive of geo-referenced datasets that includes Earth Observation satellites and airborne sensors, weather and climate datasets, as well as digital elevation models. Unfortunately, there are very few platforms across the globe that allows the users to exploit the space time paradigm of the



User interface of the analytics platform

algorithm. The response is in the form of a WMS, which is one or more JPEG/PNG images displayed in a browser application.

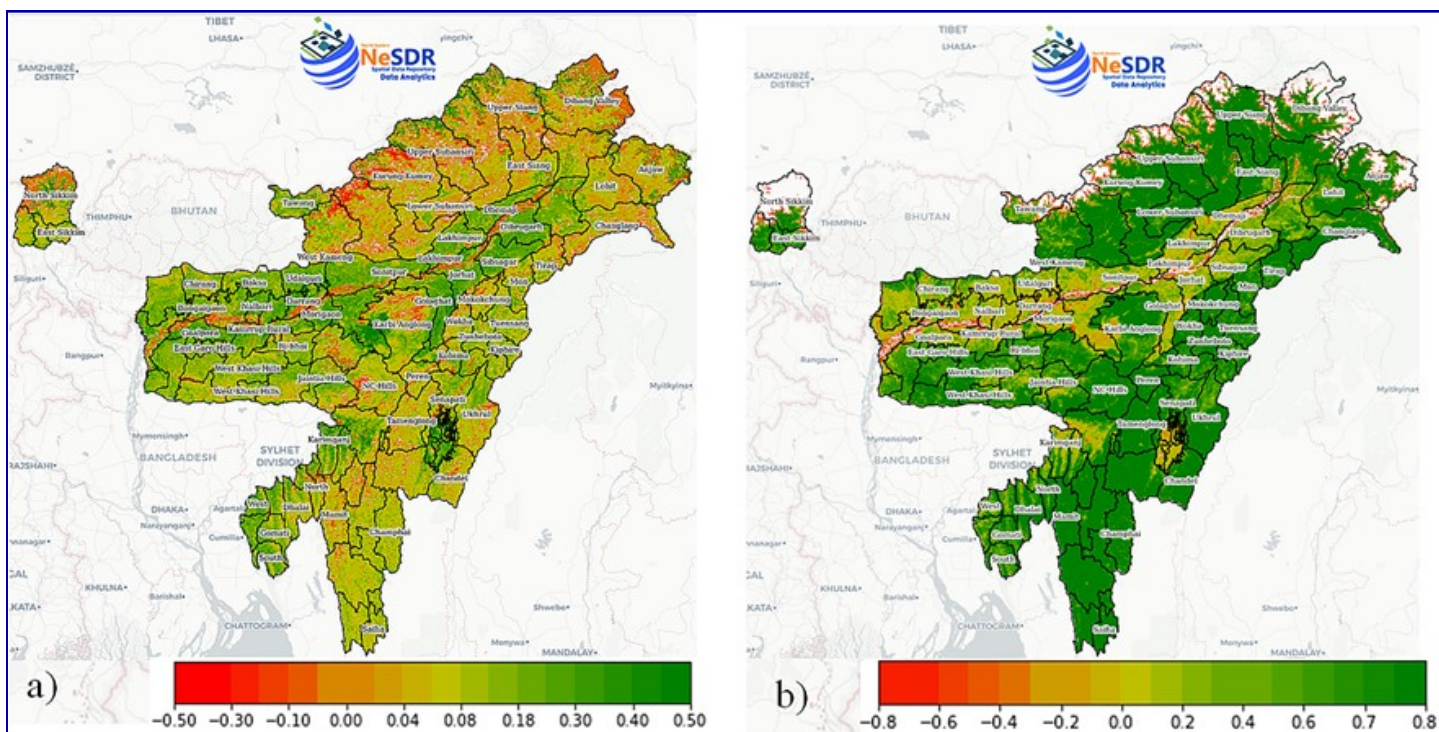
The data catalogue: Analysis Ready Data is time-series imagery that is ready for analysis without having to pre-process the imagery by the users. These stacks of data are made available by United States Geological Survey (USGS) and European Space Agency (ESA) via their data sharing platforms which are geometrically rectified and corrected for atmospheric effects, making it ideal for immediate use for vegetation and land use studies. However, it comes with limitations such as latency in receiving the data and also computational resources to manage and process such a huge volume of data. The NeSDR analytics platform is catalogued with a collection of widely used geospatial datasets. The bulk of the catalogue is made up of Earth-observing remote sensing imagery, including the archive of MODIS and INSAT datasets pertaining to NE region of India along with certain cloud free data scenes of LANDSAT and Sentinel-2. It also includes weather forecasts,

land cover data and many other environmental, geophysical and socio-economic datasets. The catalogue is continuously updated with geospatial data from active missions.

System Architecture: Analytics platform is built on collection of open-source stack and enabling technologies that are widely used within geospatial domain. A simplified system architecture of the platform is shown in figure. That platform consists of 3 major components.

- Custom Web Map Server/ Tile Map server for on-the-fly computation
- Catalogue server for cataloguing geospatial datasets
- Model catalogues for geospatial data processing

The web processing component is implemented using python programming language (Django framework). The processing framework consists of a library of large number of functions, which range in complexity, from



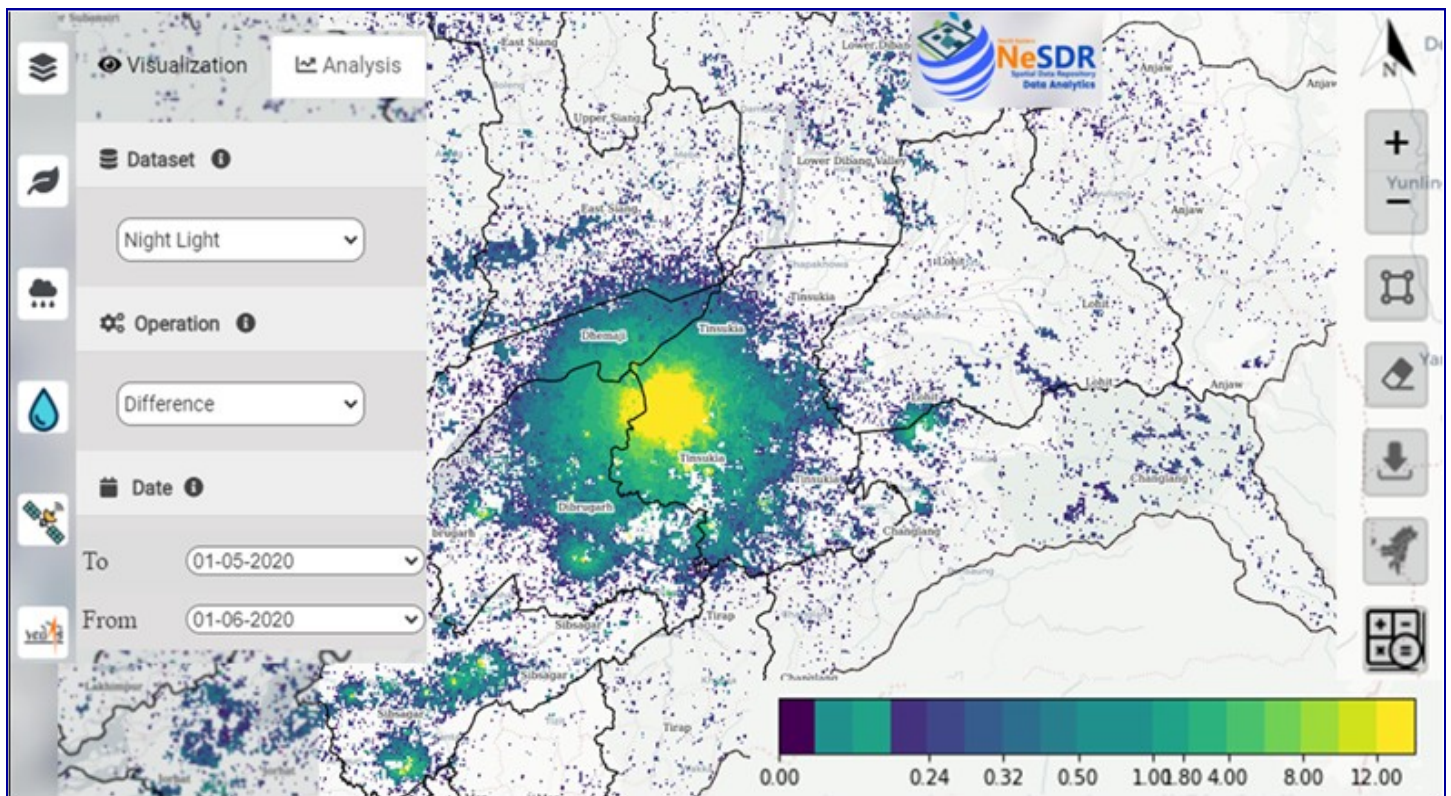
Vegetation analysis at regional scale: a) Difference of vegetation index between 01-01-2020 and 02-02-2021 using MODIS NDVI products. b) Long vegetation stability map showing the anomaly in the vegetation over the period from 2000 to 2020. Red colour indicates the disturbance in the vegetation while green or dark green colour indicates the increase of vegetation.

simple mathematical operations to powerful geo-statistical, machine learning, and image processing operations. The user interface to access the different algorithms and geospatial datasets is shown here. Analytics platform is also enabled with tools to compute statistics on the computed results along with the capability to download the computed results. Web based raster calculator is also implemented and made accessible via a simple and easy to use user interface, to enable users to perform custom band math operations.

Applications: The platform has various modules for disseminating output of research and applications for various thematic areas like; vegetation monitoring system to monitor

areas using Near Real Time flood inundation rasters by performing spatio-temporal analysis on the catalogued images such as temporal statistical analysis and band math operations along with thresholding operations. Some of the operations that can be done are depicted in figures here.

The article demonstrates capabilities of an additional software layer in geoprocessing that combines the interoperability of the state of the art OGC WMS standard with the new possibilities offered by the HTML5 to present data in a way that everybody can explore and understand without any need of programming skills. In addition, it demonstrates a promising multidimensional array based time series



Visualization of Baghjan oil well fire: Spreading of oil well fire in the Baghjan oil well of Tinsukia district of Assam is visualized in the portal using the difference of night-time light remote sensing images of 01-05-2020 and 01-06-2020.

vegetation change and disturbances using long term vegetation index datasets, Monitoring Air quality using AOD products from Satellite images, Assimilating rainfall from INSAT satellite data, Forest fire analytics using night light images, identifying the flood-affected

analytics that the current system will extend in the future. Experiments are ongoing in the integration of integration of online scripting platform and deep learning techniques.

Inauguration of Space Corner at DBCIC, Shillong

Bijoy Krishna Handique

NESAC has established a 'Space Corner' at Don Bosco Centre for Indigenous Cultures (DBCIC), Shillong. The main objective of the 'Space Corner' is to create awareness and popularize space science, technology and applications in the NE region. The 'Space corner' consists of display panels depicting growth and development of Indian space technology, Indian launch vehicles & satellites, ISRO's interplanetary missions, science missions, Gaganayan mission, future of Indian Space Programme and applications of space technology, particularly for the north



Chairman, ISRO taking a tour inside the Space Corner

Srivastava, Vice Chancellor, NEHU, Shri M. Maheshwar Rao, Jt. Secretary & Financial Adviser, DOS, Ms G. Jayanti, Jt. Secretary (Finance), DOS, Dr. Raj Kumar, Director, National Remote Sensing Centre, Hyderabad, Shri P.L.N. Raju, Director, NESAC, Shri Vivek Singh, Asst. Scientific Secretary, DOS, Shri Shasikant Sharma, Group Director, Space Applications Centre, Ahmedabad, Mr. Sylvester Kurbah, Village Headman, Fr. Philip Barjo, Rector, Sacred Heart Theological College and Fr. Alister Marwein, Principal, Sacred Heart Boys HS School.

Chairman, ISRO addressed the gathering having the DBCIC staff and invited guests. He stressed on the commitment of ISRO for supporting the development process of NE region of India. About 20 selected students from nearby schools were invited to witness the program and to have interaction with Chairman, ISRO.



Dr K Sivan, Chairman, ISRO inaugurating the Space Corner

eastern region of India. Nine physical models of launch vehicles, satellites, Cryogenic engine and Vikash engine, along with a satellite view of NER are displayed for the visitors.

The 'Space Corner' was inaugurated by Dr. K. Sivan, Secretary, Department of Space (DOS) and Chairman, ISRO on 23rd January, 2021 in the presence of Fr. Paul Olphindro Lyngkot, the Provincial of the Salesians, John D. Sohshang SDB, Assistant Director, DBCIC, Prof. S.K.



The group of students with the dignitaries present during the inauguration program

Chairman, ISRO visited NESAC and reviewed the projects

Dr K Sivan, Secretary, DoS and Chairman, ISRO and NESAC GC visited NESAC on 23 January, 2021 while he came to Shillong to attend the 9th meeting of NESAC Society. He visited the new facilities of NESAC, witnessed tethered balloon launching, UAV systems and NESAC and the outreach facility. He was given guard of honor on his arrival at NESAC.



Chairman, ISRO with NESAC staff

He reviewed the preparations for hosting the NESAC Society meet under the Chairmanship of Shri Amit Shah Ji, Hon'ble Home Minister of India. He also reviewed the ongoing projects and new proposals. He asked NESAC to focus more on application projects based on the needs and requirements of the States and requested NESAC to visit the states and have more interaction with the state governments.

Secretary, DONER visited NESAC

Shri Inder Jit Singh, IAS, Secretary to Ministry of DoNER, Govt. of India visited NESAC on January 22, 2021 and reviewed the projects sponsored by Ministry of DoNER and North Eastern Council (NEC). He expressed satisfaction on the quality and diversity of activities of NESAC. He requested NESAC to adopt new technologies to find innovative solutions to the problems faced by the NE region of India.

NESAC signed MoU with Assam Survey and Settlement Training Centre (ASSTC)

NESAC signed an MoU (Memorandum of Understanding) with Assam Survey and

Settlement Training Centre (ASSTC), Government of Assam on 1st February 2021 at ASSTC, Guwahati in presence of Sri Jogen Mohan, Hon'ble Minister of State (Independent charge), Revenue & Disaster Management Department, Government of Assam, for carrying out joint outreach and capacity building programmes. Sri Manivannan, IAS, Commissioner & Secretary to the Govt. of Assam, Revenue & Disaster Management Department and Sri P L N Raju, Director, NESAC addressed the gathering as Guest of Honors. The signatories of the MoU were Sri Pankaj Chakravarty, Principal, ASSTC and Sri P L N Raju, Director, NESAC. Other dignitaries present during the occasion were, Nazrul Islam, Retired IAS officer and Mentor of ASSTC, Smt Gitanjali Bhattacharyya, Additional Secretary, Revenue & Disaster Management Department, and senior Scientists/Engineers from NESAC.



The signing of MoU between NESAC and ASSTC

NESAC signed MoU with AAU, Jorhat

North Eastern Space Applications Centre signed an MoU with Assam Agriculture University (AAU), Jorhat, on 20 April, 2021 at AAU Jorhat in presence of Hon'ble Vice Chancellor, AAU, recognizing the importance of research and development in the areas of Remote Sensing and Geoinformatics, Atmospheric Sciences and any other relevant areas with space technology based inputs; joint/collaborative research projects/activities between NESAC & AAU as per mutual agreeable terms. The signatories were by Dr. A.

Bhattacharyya, Director of Research (Agri.), AAU and Shri P L N Raju, Director, NESAC.



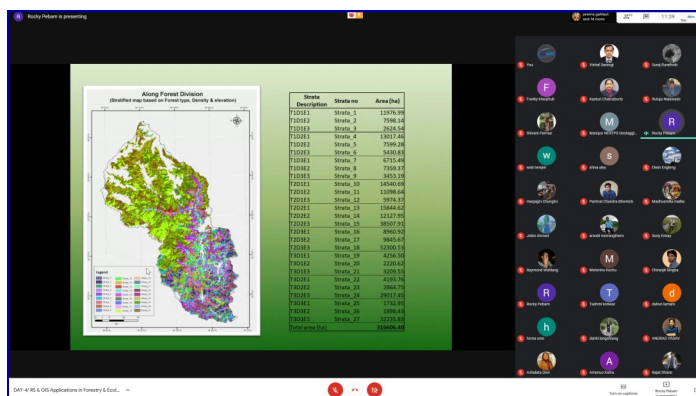
The signing of MoU between NESAC and AAU in presence of Hon'ble VC, AAU

While addressing the house, Dr. B.C. Deka, Hon'ble VC, AAU, Jorhat mentioned about the scope and opportunities of the application of the Space technology for development of flood affected and silt deposited areas of Assam. He opined that the use of Space technology in the studies of soil properties has edged over the destructive methods. He also emphasized on the need of application of remote sensing tools in studying insect-pest dynamics, disease management and in precision agriculture. He urged upon the Scientists to take necessary action for development of technology that will give early sign of hail storm and lightening using Space technology. Following the signing of the MoU, a Brainstorming session was held to discuss about the potential areas for future collaborations.

NESAC conducted one week training course on RS and GIS applications in Forestry & Ecology

An online one week course on 'Remote Sensing and GIS applications in Forestry & Ecology' was conducted by NESAC during February 1 to 5, 2021. The course covered geospatial technology with introductory concepts of remote sensing, GIS and GPS, visual and digital satellite data interpretation techniques, accuracy assessment, forest type and density mapping along with growing stock assessment. The course also covered important theoretical

concepts on wildlife habitat evaluation, forest change detection, hyperspectral, microwave and forest fire monitoring. Familiarization with QGIS software and demonstration of basics of information extraction from satellite data for information extraction was also arranged. A special lecture on 'Indian space program' was presented by Sri P.L.N. Raju, Director, NESAC. A total of 56 number of participants joined the course from different parts of India, with maximum participants from North East India. Resource persons for the course were Dr. K K Sarma, Smt. H Suchitra Devi, Dr. Kasturi Chakraborty, Dr. B K Handique, Dr. Pebam Rocky, Sri Victor Saikom, Dr. Arjun BM, Sri Nilay Nishant and Ms Ritu Anil Kumar, all Scientists/Engineers from NESAC. Dr. Kasturi Chakraborty was the course coordinator while Dr. Pebam Rocky was the course officer for the course.

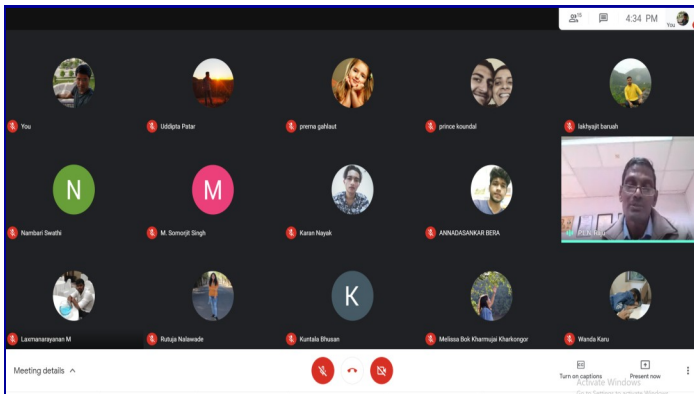


A online lecture is in progress

NESAC conducted training course on Disaster Risk Mitigation

NESAC conducted a two days training program on "Applications of Geographic Information System in Disaster Risk Mitigation for officials working in the field of disaster Management during 25-26 February, 2021. The programme was sponsored by National Disaster Management Authority (NDMA) in an online mode through google meet platform. A total of 43 nominations were received from different State and Central government departments, out of which 35 nominations were accepted for the training course.

NESAC conducted one week training course on Applications of RS and GIS in Geosciences



A online lecture is in progress

NESAC organized a one week online training course on 'Applications of Remote Sensing & Geographic Information System in Geosciences' during 8 to 12 February, 2021. The program was inaugurated by Shri PLN Raju, Director, NESAC. A total of 19 participants from various academic organizations and industries participated in the training program. Shri M Somorjit Singh Sci/Engr. 'SF' was the course coordinator and Dr. Gopal Sharma Sci/Engr. 'SD' was the course officer of the training program. The course was conducted through google meet platform. The course consisted of a series of lectures followed by hands-on/practical on the relevant topics. The course was designed with a view to provide participants an understanding of the scientific concepts associated with remote sensing and its applications to various areas of Geosciences. During the concluding session a number of good feedbacks were received. Most of the participants suggested to have more number of hands-on using different software, orientation to live dashboards, geoportals, and modeling exercises etc.

The National Science Day-2021 was celebrated at NESAC

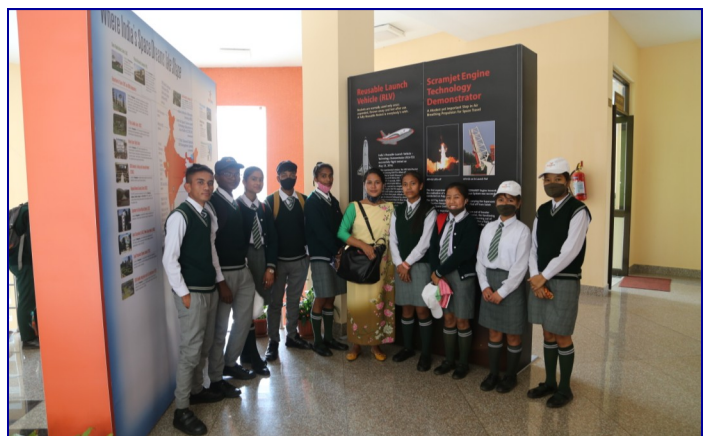
NESAC organized a major program to celebrate the National Science Day on March 01, 2021 (28th Feb, being Sunday). The programme was organized under the aegis of Indian Society of Geomatics (ISG) - Shillong

Chapter. As part of the programme, essay writing and painting competitions among school students were conducted.



Students at NESAC outreach conference hall for the National Science Day program

Shri Paritosh Choudhary from Christ School (International), Nongsder bagged the first prize in essay writing competition, while Ms Laa Ila, Kendriya Vidyalaya, North Eastern Police Academy bagged the second prize and Ms Bithika Baruah from Army Public School, Umroi bagged the third prize. In Painting Competition, first prize went to Ms Anamika Kharkang from Kendriya Vidyalaya, North Eastern Police Academy. The second prize was shared by Shri Aditya Paul from Army Public School, Umroi and Ms Brenila Marak from Kendriya Vidyalaya, North Eastern Police Academy while third prize was bagged by Ms N. Pragati, Army Public School, Umroi. Around 60 students from 9th to 12th standard attended the popular science talk on "Glory of Indian Science: From Zero to Quantum Computing",



Students at the exhibition organized by NESAC

delivered by Prof. Arup Kumar Misra from Assam Engineering College & former Director of Assam Science, Technology & Environment Council (ASTECC), Guwahati during the National Science Day Celebration. Exhibition on different aspects of Space technology and its applications was also organized to mark the occasion.

Training Program on Emotional Intelligence held at NESAC

One day online training programme on Emotional Intelligence for achieving better work life balance was organised at NESAC by



The online lecture is in progress

NESAC HRD committee on 19th March, 2021. The programme was organised for Scientists and Researchers of NESAC and all other permanent staff. The training aimed at providing the employees with higher emotional intelligence so as to have better work life balance. The programme was inaugurated by lighting of holy lamp and welcome addressed by Director, NESAC followed by introduction about the Centre for Organization Development (COD) by Dr. B.K. Handique, Chairman, NESAC HRD Committee. Faculties from COD, Hyderabad had delivered lectures covering the following topics:

- Developing Emotional Intelligence
- Achieving Balance through Self Management
- Achieving Balance through Relationship Management

The day long training program ended with the concluding remarks of Director, NESAC

followed by Vote of thanks offered by Dr. Kuntala Bhusan, Scientist, NESAC.

NESAC conducted two-weeks joint program on RS & GIS with ASSTC



Director, NESAC with the participants

NESAC in collaboration with Assam Survey and Settlement Centre (ASSTC), Government of Assam had successfully conducted the two-week training course on “Basics of Remote Sensing and Geographic Information System” during 15-26 March, 2021. The course was carried out both at ASSTC and NESAC in offline mode. A total 28 participants from different parts of Assam attended the course. Experts from IIT-Guwahati, IRRI, Mangaldoi College, Climate Change Cell, Assam including NESAC and ASSTC were invited as resource persons.

Inauguration of new Staff Quarters at NESAC Residential Campus



Director, NESAC inaugurating the NESAC Phase-II quarters

Phase-II of NESAC staff quarters consisting of 14 quarters (2 E-type, 8 D-type, and 4 C-type) were completed during December, 2021. The new staff quarters were inaugurated by Director, NESAC on 1st January 2021. The quarters have been built with all modern facilities and fittings. Almost all quarters have been occupied by NESAC staff after the inauguration of the quarters.

NESAC participated in Brahmaputra Aamantran Abhiyaan program

The Brahmaputra Aamantran Abhiyaan programme sponsored by Ministry of Jal Shakti, Govt. of India was organized by Brahmaputra Board. The theme of the Brahmaputra Aamantran Abhiyaan is “Live with the River”. Brahmaputra is one of the mighty rivers in the world and has enormous water resources potential. But due to excessive pressure on its catchment areas coupled with the effect of climate changes, the river is causing problems like floods and bank erosion. The abhiyaan aimed at understanding different aspects of the river Brahmaputra and creation of awareness among people to live with river with sustainable development. A team of NESAC staff led by Shri P L N Raju, Director,



The Hon'ble Chief Minister of Assam Shri Sarbananda Sonowal inaugurating the Brahmaputra Aamantran Abhiyan program at Majuli, Assam

NESAC participated in the program and acquired UAV images for selected locations to understand river configurations and the status of embankments. NESAC scientists also made presentations on flood early warning system developed for different rivers and tributaries in Assam.

Community toilet inauguration in Shillong as CSR activity of Antrix corporation

A community toilet was inaugurated near Additional Secretariat in Shillong on 15th January 2021 at 11 AM by Ms Iaswanda Laloo, Deputy Commissioner of East Khasi Hills District, Meghalaya in presence of Meghalaya state government officials as well as officials from Sulabh International, and Director and other senior officials of NESAC. The toilet was constructed by NESAC with funding support from M/s Antrix Corporation, Bengaluru as part of their Corporate Social Responsibility. Similar effort in other part of Meghalay and NE region has also been taken up by NESAC and Antrix Corporation.



Inauguration of Community Toilet at Shilling by Ms I. Laloo, D.C., East Khasi Hills Dist, Meghalaya

Celebration of 72nd Republic Day at NESAC

72nd Republic Day of the nation was celebrated at NESAC on 26th January 2021 with a colorful program. Dr. K. K. Sarma, Sr. Scientist, NESAC hoisted the tricolor amidst singing of national anthem by the staff of NESAC. The



NESAC staff after the flag hoisting

CISF unit of NESAC offered a guard of honor to Dr. K. K. Sarma and performed Republic Day parade. Dr. Sarma addressed the staff of the centre with an informative speech. This was followed by the distribution of sweets and snacks to the gathering by NESAC Canteen.

NESAC celebrated the World Hindi Week

NESAC celebrated World Hindi Week during 10 to 15 January, 2021 to promote the usage of Hindi language at NESAC. The program was inaugurated by Shri P L N Raju, Director, NESAC by lighting of the lamp. A Hindi workshop was organized on the topic “Samanya Hindi Gyan, Tippani Lekhan aur Prashashanik Shabdawali” at NESAC on 14 January, 2021. Various Hindi competitions viz. Painting competition, Hindi poem recitation competition, Quiz competition, etc were organized as part of the program. On 15 January, 2021 valedictory program was organized in which Director NESAC inaugurated the first issue of Hindi magazine of NESAC “ISHAAN”. It was followed by the distribution of certificates to the winners of the competition by Director, NESAC.

Fire safety mock drill was conducted at NESAC



Shri. Merimee Rymbai giving a hands on demo on use of Fire Extinguishers to staff of NESAC

NESAC along with its CISF Unit had organised an awareness class and rescue drill on fire accident on 22 March 2021 at NESAC main campus as a part of preparation for any emergency related to fire incident that may arise in the campus. Shri. Merimee Rymbai,

AFPO-1, F & ES, Shillong Headquarters delivered a lecture on “Fire incident and preventive measures” at NESAC auditorium. The lecture was followed by mock drill exercise on use of fire extinguisher, where NESAC staffs and CISF personnel were demonstrated and trained on the procedures to use different fire extinguisher in different categories of fire incidents. Shri. Ramadas M, Assistant Commandant, CISF NESAC unit and Dr. Gopal Sharma, Alternate Safety officer NESAC had coordinated the programme. The mock drill exercises was followed by exercise on rescue operations where CISF and home guards were demonstrated on the procedure to carry out rescue in the event of fire incidents. Large number of people participated in the programme that include NESAC Scientists, staffs and researchers, CISF personnel’s and their family members. Special attention were given to officers and staffs involved in safety management and work execution related to fire incidents such as CISF personnel’s, safety officers, administrative staffs, electricians, etc.

Brigadier TS Hothi from Umroi Army Cantonment visited NESAC

Brigadier TS Hothi from Umroi Army Cantonment visited NESAC on 11 February, 2021. He interacted with the staff of NESAC and visited various facilities at NESAC office campus. He also visited the ‘Space on wheels’ bus and a live demonstration of UAV flight was given to him by the UAV team of NESAC. He congratulated NESAC on its wonderful array of activities and achievements.



A demonstration of UAV to Brigadier TS Hothi by NESAC team

Introducing new colleagues at NESAC



Shri Himangshu Jyoti Das

He joined the SATCOM area of NESAC on 23 March, 2021 as Sci/Engr - SC. Hailing from the small town Rangia in Assam, he completed his M. Tech degree in Electronics Design & Technology from Tezpur University.



Dr. Dhruval Bhavsar

He did M.Sc. in forestry and Ph D in Forest Management from Forest Research Institute, Dehradun, Uttarakhand. He joined the Forestry and Ecology area at NESAC on 25 March, 2021 as Sci/Engr - SC. He is from Dungarpur, Rajasthan



Shri Shanbor Kurbah

A permanent resident of Bhoirybong, Meghalaya, Shri S Kurbah joined NESAC on 31 March, 2021 as Sci/Engr - SC. An M. Tech in Hydrology from IIT Roorkee, he will be supporting the Flood forecasting and other water resource related projects at NESAC



Shri Siddhartha Bhuyan

He joined NESAC on 31 March, 2021 as Sci/Engr - SC. With a M. Tech degree in Computer Science Engineering from Vellore Institute of Technology, Vellore, he joined the Geoinformatics/IT area at NESAC. He is a permanent resident of Tezpur, Assam.



Shri Sumanth B C

He is an Urban Planner from Bengaluru, Karnataka and joined NESAC on 31 March, 2021 as Sci/Engr - SC at the Urban and Regional planning area of NESAC. HE has a Master's degree in Urban and Regional Planning and also a PG Diploma in RS and GIS.



Shri Darji Harish Kumar

He joined the Construction and Maintenance Division at NESAC as Technical Assistant-Electrical on 2 December, 2020. He holds a Diploma and B. Tech degree in Electrical and Electronics Engineering. He is a permanent resident of Ananthpur, Andhra Pradesh.



Shri Shashi Bhusan Nayek

He joined NESAC as Technical Assistant under Satcom Area on 1 February, 2021. Hailing from Srirampur in Kendrapara district of Odisha, he holds a diploma and B Tech degree in Electronics and Telecommunication Engineering .



Team Reflections Welcomes and Congratulates all new colleagues!!

Editorial Board

Dr Shyam S Kundu
Dr Pebam Rocky
Shri Anjan Debnath
Dr Gopal Sharma
Dr Aniket Chakravorty

Published by

North Eastern Space Applications Centre
Department of Space, Government of India
Umiam-793103, Shillong, Meghalaya
Ph: +91 364 2570141/2570140
Fax: +91 364 2570139
Web: www.nesac.gov.in

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