



# REFLECTIONS

The Quarterly In-House Newsletter of the  
North Eastern Space Applications Centre



## From the Director's Desk

The second quarter of 2025 was an impactful period for NESAC, featuring landmark events and vibrant outreach programs. During this period the use of Terrestrial Laser Scanner (TLS) is successfully experimented at NESAC for improvement of estimation of tree volume. Moreover, in a first-of-its-kind effort, the entire state of Meghalaya has been mapped in remarkable detail at a 1:4000 scale, setting a new benchmark in high-resolution geospatial planning.

The Regional Meet on "Leveraging Space Technology Applications for Viksit Bharat 2047", NESAC, in collaboration with ISRO and the Assam State Space Application Centre (ASSAC), successfully hosted on 24<sup>th</sup> June 2025 in Guwahati Assam. This event served as a crucial preparatory step for the upcoming National Meet 2.0. Hon'ble Minister of Science & Technology, Govt of Assam, Shri Keshab Mahanta, graced the occasion as Chief Guest along with esteemed guests including Shri Som Kamei (NEC Planning Adviser), Shri Pallav Gopal Jha (Secretary, Assam S&T Department), and Dr. J.V. Thomas (ISRO Earth Observation & Disaster Management).

The 5th edition of the ISRO Young Scientist Program for empowering future Scientist, YUVIKA 2025, was conducted from 19th to 30th May, with 45 bright students from five NE states taking part. The program was inaugurated online by Dr. V. Narayanan, Chairman of ISRO. During the course, participants gained insights from eminent scientists from various ISRO centres, igniting young minds towards careers in space science and technology.

NESAC continued its commitment to skill development by conducting two intensive training programs under the AMRUT 2.0 initiative. The first program targeted decision-makers with a week-long workshop, while the second focused on GIS-based master plan formulation over two weeks. These trainings aim to strengthen regional planning and sustainable urban development. In collaboration with CBPO, ISRO HQ, and NEC, NESAC also coordinated the second batch of the NE-SPARKS program, engaging 100 students from the North East. The participants visited key ISRO installations, including ISTRAC and the Indian Deep Space Network (IDSN) at Bialalu, Bengaluru, and had interactive sessions with senior ISRO scientists, enriching their understanding of space science. NESAC also extended its outreach with a specialized training for project officials from Tripura's CRERLAT, focusing on Remote Sensing and GIS applications in forestry and ecology. This program supports the effective use of space technology for natural resource management and environmental conservation. These initiatives highlight NESAC's ongoing dedication to fostering space technology applications and capacity building, propelling the North Eastern Region towards a technologically empowered future.



Dr. S. P. Aggarwal  
Director, NESAC

## HIGHLIGHTS:

- A Regional Meet on "Leveraging Space Technology Applications for Viksit Bharat 2047" for the North Eastern Region as part of preparatory meet for the National Meet 2.0 was organized at Guwahati on 24<sup>th</sup> June 2025.
- NESAC conducted 5<sup>th</sup> edition of ISRO YUVIKA program during 19-30 May, 2025.



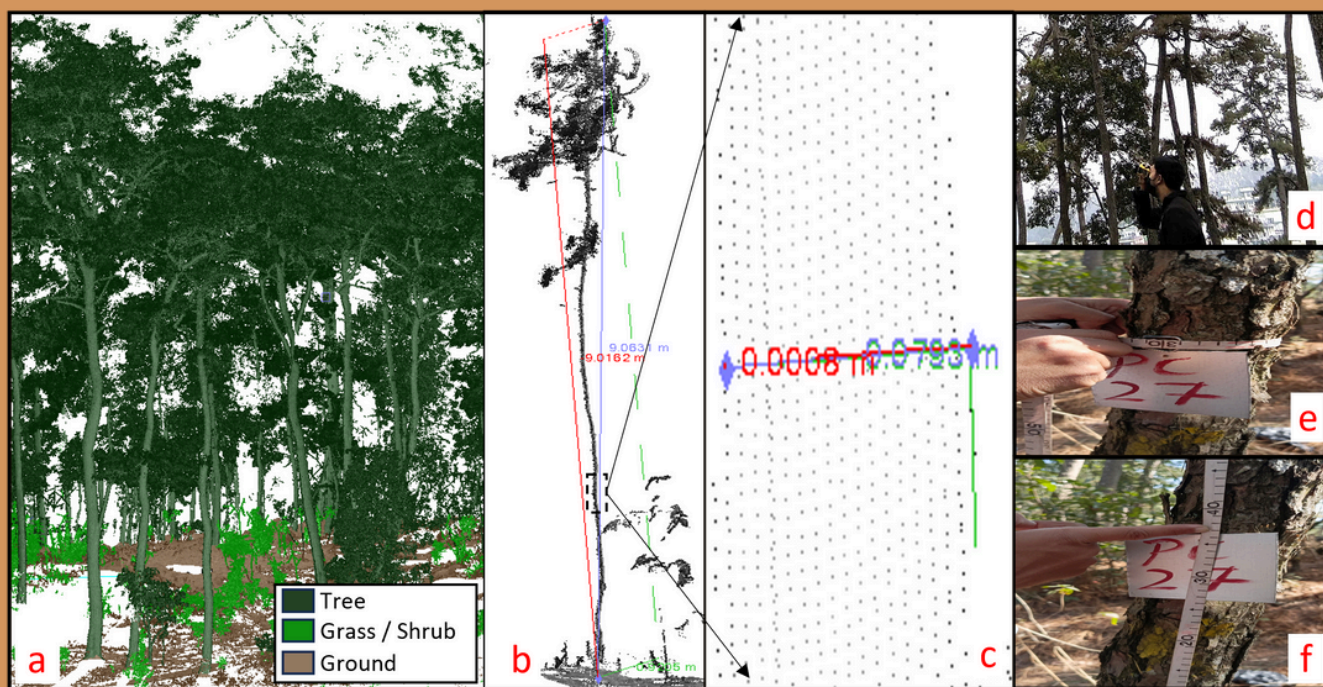
## Use of Terrestrial Laser Scanning (TLS) for Improved Tree Volume Estimation

*Dr. Dhruval Bhavsar, Pritom Pran Dutta and Thejas M.*

Sustainable forest management depends on precise tree volume measurements to evaluate biomass, carbon storage and ensure responsible timber harvesting. Traditional methods, such as using measuring tape and laser rangefinders, often face limitations due to human error and restricted range, which compromise the accuracy needed for reliable forest inventory data. To address this, the study analysed 22 *Pinus kesiya* trees, categorised into two girth classes: PB (11–20 cm) and PC (21–30 cm), comparing manual measurements with data derived from Terrestrial Laser Scanning (TLS).

The point clouds were classified into different classes, and then tree measurements were taken (Figure). Manual girth measurements ranged between 18 and 29.4 cm, while TLS recorded a broader range of 15.79 to 33.28 cm. Similarly, manual tree height measurements varied from 4 to 9.1 meters, whereas TLS measurements spanned 4.6 to 10.2 meters. Volume estimations using the Forest Survey of India's formula revealed an average of  $358.54 \pm 122.31 \text{ cm}^3$  for manual methods, in contrast to  $422.93 \pm 138.10 \text{ cm}^3$  for TLS, highlighting TLS's ability to capture greater variations. Within the PB girth class, the manual volume averaged  $216.46 \pm 16.99 \text{ cm}^3$ , compared to  $274.93 \pm 60.33 \text{ cm}^3$  using TLS.

TLS offers considerable advantages with high-resolution 3D models, reduced errors, and enhanced precision, crucial for biomass and carbon assessments. Upon completing a survey of approximately 400 tree samples, the volume equation will be updated for refined and robust results.



**Figure 1. a) Classified of point clouds data, b) Height measurement of the tree from point clouds, c) Girth measurement of the tree from point clouds, d) Taking the height of trees using Nikon Forestry Pro rangefinder, e) Girth measurement using measure tape, f) Height at which girth of the tree is measured i.e. 1.37m.**

## Meghalaya at 1:4000 – A New Era in Village-Level Land Use Mapping

Sumanth BC & Dr Jenita M. Nongkynrih

In a first-of-its-kind effort, the entire state of Meghalaya has been mapped in remarkable detail at a 1:4000 scale, setting a new benchmark in high-resolution geospatial planning. Prior to this, land use and land cover (LULC) data for the region was available only at coarser scales such as 1:50,000 (for the years 2005–06, 2011–12, and 2015–16) at 1:25,000 and 1:10,000 (under programs like SIS-DP and NUIS). By utilizing the GIS, remote sensing, and GPS technologies, this initiative has produced a comprehensive geodatabase in alignment with AMRUT 1.0 Guidelines, customized to the specific conditions of the state. Over 51 major classes and over 364 sub-classes, capturing a rich spectrum of land use, settlement patterns, infrastructure, and natural resources. Notably, the mapping includes 42,896 km of road network and land use/land cover approximately 12 lakh polygons. This massive data volume will significantly enhance the decision-making capabilities of local governance for better planning and rural service delivery. To make this valuable data easily accessible to communities, planners and stakeholders, supporting transparent, informed, and inclusive growth, an interactive geoportal and mobile application have also been developed in-house. This milestone development paves the way for sustainable development and effective village-level governance across Meghalaya's diverse and often remote landscape.

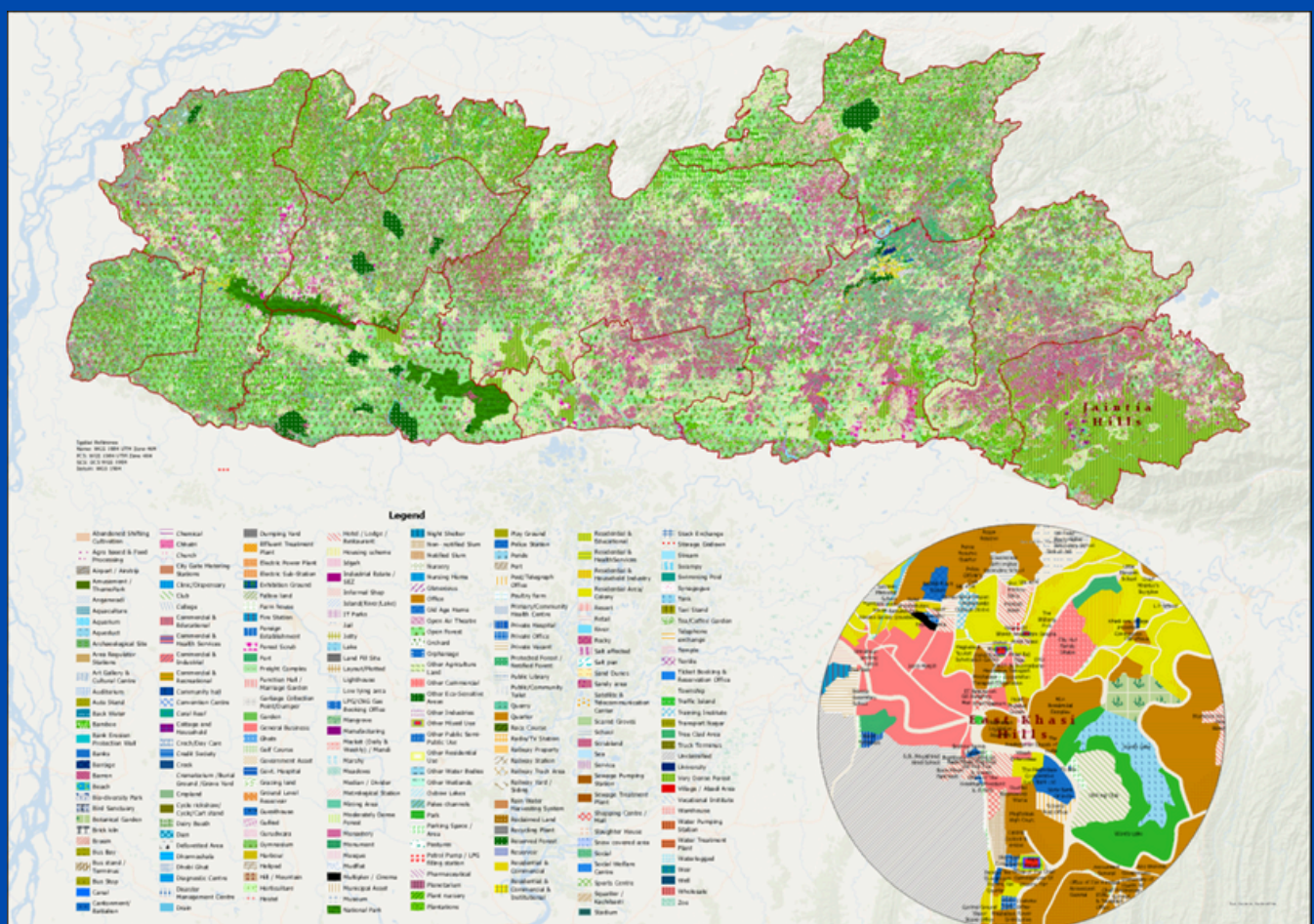


Figure 2. Land use and land cover map of Meghalaya with a legend and a detailed inset at 1:4000



# Capacity Building

## NESAC Conducts 5th Edition of ISRO Young Scientist Program (YUVIKA 2025)

NESAC successfully conducted the 5<sup>th</sup> Edition of ISRO Young Scientist Program (YUva VigyaniKaryakram) YUVIKA 2025 during May 19-30, 2025. Forty five students from the five NE states viz., Arunachal Pradesh, Manipur, Meghalaya, Mizoram and Nagaland took part in the residential program of two weeks' duration. The program was inaugurated by Dr. V. Narayanan, Chairman, ISRO/Secretary, DoS on 19<sup>th</sup> May, 2025 through online mode. The program consist of both theoretical lectures & Space Science based activities, educational visits and comprehensive evaluation based on project activity and quiz competition. Eminent resource persons from other ISRO Centres also delivered lectures during the course. A total of four online sessions were organized for the YUVIKA students, viz., telecast of sounding rocket(RH-200) launching from TERLS, interaction with scientists from ISRO's station at Antarctica, interaction with India's designated astronaut for upcoming GAGANYAAN mission Group Captain Angad Prathap and a session on Drone technology & Applications (Live from NESAC). The students also visited Guwahati Regional Science Centre & Guwahati Planetarium on 23<sup>rd</sup> May, Air Force Museum and Don Bosco Centre for Indigenous Cultures in Shillong on 28<sup>th</sup> May. The students attended a total of 24 lectures and 8 practical sessions. The program was concluded on 30<sup>th</sup> May with distribution of certificates, mementoes and prizes for different competitions. During the valedictory function, Chairman, ISRO/Secretary, DoS addressed the students via online mode and appreciated for their keen participation and wished them bright futures ahead.



## Customised training for project officials of the Tripura CREFLAT on RS & GIS in forestry & ecology applications

The two-week course for the Indo German Development Cooperation funded project “Climate Resilience of Forest Ecosystems, Biodiversity & Adaptive Capacities of Forest Dependent Communities in Tripura” (CREFLAT) supported by the Tripura Forest Department was organized during 21<sup>st</sup> April 2025 to 02<sup>nd</sup> May 2025 by the Forestry & Ecology Division for twelve officials.





# Capacity Building

## **NESAC conducts One Week Training Program for Decisions Makers under AMRUT 2.0 Sub-scheme on Formulation of GIS based Master Plans**

NESAC successfully organized a one week training program for twenty Tier-1 officials under the AMRUT 2.0 sub-scheme on Formulation of GIS-Based Master Plans during May 5 – 9, 2025. Participants were from state town planning departments, urban local bodies and development authorities across Nagaland, Mizoram, Kerala, Manipur, Chhattisgarh and Uttar Pradesh. Shri N.K. Dhiran, Chief Town Planner of TCPO, New Delhi, graced the event as the chief guest.



## **NESAC organizes a two-weeks training program on Formulation of GIS-Based Master Plans under AMRUT 2.0**

NESAC in collaboration with the Town and Country Planning Organization (TCPO), Ministry of Housing and Urban Affairs (MoHUA), Government of India, organized a two-week training program titled “Formulation of GIS-Based Master Plans (Tier-II) under AMRUT 2.0 Capacity Building Sub-Scheme” during June 2–13, 2025, at the NESAC Outreach Facility for 18 participants representing planning departments from Rajasthan, Assam, Madhya Pradesh, and Maharashtra.



## **NESAC conducted second edition of NE-SPARKS during June 26–27, 2025 in joint collaboration with CBPO, ISRO HQ. & NEC**

Eight hundred students from eight NER States attended the second edition of NE-SPARKS program, jointly coordinated by NESAC, CBPO, ISRO HQ. & NEC during June 26 & 27, 2025. Students visited various ISTRAC facilities and interacted with senior ISRO Scientists including Director, CBPO, ISRO HQ, Associate Director, ISTRAC and Division Head, HRLD. They also visited the Indian Deep Space Network (IDSN), located at Byalalu, Bengaluru South.

Later, students toured the U R Rao Satellite Centre (URSC) in Bengaluru where they explored the space exhibition and Jawaharlal Nehru Planetarium (JNP), located in Bengaluru. They also witness a planetarium show.

Shri Sumanth B C and Himangshu Jyothi Das, Scientists from NESAC and Shri Chandan Jena from NEC coordinated the program.





# Capacity Building

## NESAC conducts two weeks short course on “Applications of Remote Sensing and GIS in Geoscience”

Two weeks short course on “Applications of Remote Sensing and GIS in Geoscience” was conducted by Geoscience Division (GSD), NESAC during June 23 - July 04, 2025. A total of 13 participants from different parts of the country attended the course, which includes students, officers from state government departments in NER, research scholars and post graduate students. The course consists of a series of lectures followed by hands-on/practical and Geological Field work/ Survey. A one-day Geological Field study was also included under guidance of Guest Faculty Dr. Ningthoujam Surdas Singh (Director Geology, GSI, Shillong).



## NEWS & EVENTS



### NESAC signs MOU with NIT-Meghalaya for academic and research collaboration

A Memorandum of Understanding (MoU) was signed between NESAC and National Institute of Technology (NIT) Meghalaya on 21st May, 2025 in presence of Dr. S.P. Aggarwal, Director of NESAC, Prof. Pinakeswar Mahanta, Director, NIT Meghalaya. The MoU signing ceremony was attended by senior staff from NIT-M & NESAC.

### NESAC conducts quarterly workshop on Official Language Implementation

As per the Official Language Policy of the Government of India, Hindi workshop was organized at NESAC on 30<sup>th</sup> May, 2025 on the topic “Official Language Implementation, Compliance and Official Language Policy-Rules in the Office”. Shri M G Somshekaran Nair, Joint Director (Official Language), Department of Space, Headquarters, Bengaluru conducted the Hindi workshop where staff of NESAC took active participation.



**NESAC & ISRO jointly organizes regional Meet on “Leveraging Space Technology Applications for Viksit Bharat 2047” for the North Eastern Region in collaboration with Assam State Space Applications Centre, Govt of Assam**





A Regional Meet on “Leveraging Space Technology Applications for Viksit Bharat 2047” for the North Eastern Region (Group RT-NE) as part of preparatory meet for the National Meet 2.0 was organized at Guwahati on 24<sup>th</sup> June 2025. The program was jointly organized by ISRO and NESAC in collaboration with Assam State Space Application Centre (ASSAC). Hon’ble Minister of Science & Technology (S&T), Revenue, Disaster Management (DM) and IT, Govt. of Assam Shri Keshab Mahanta graced the program as the Chief Guest. Shri Som Kamei, Planning Adviser of North Eastern Council (NEC), Shri Pallav Gopal Jha, Secretary to Govt. of Assam, S&T Dept. and Dr. J.V. Thomas, Director, Earth Observation and Disaster Management Support Program Office (EDPO), ISRO were Guest of Honours. Around 190 delegates representing 39 line departments of NE states, scientists from NESAC and state space application centers attended the program.

In his inaugural speech, Hon’ble Minister Shri Mahanta praised and highlighted the role of NESAC in utilizing space technology for sustainable development of NER as well as in Assam. He emphasized that the deliberations of the meet will lead to identification of cutting edge space technology applications for Viksit-NER and Viksit Bharat-2047.



There were a total of three technical sessions which saw lectures on India’s Space Exploration Journey & future missions, demonstrations on various portals developed by ISRO for giving services to Government sector, presentations from representatives of all eight NER states & representatives from NGEs on space applications in their respective regions and way forward.



# NEWS & EVENTS

## Student Visits to NESAC

## Upcoming Events



Participants of the training course on "Forest Fire Prevention & Mitigation Strategies" conducted by CASFOS, Burnihat, visited NESAC on 29th May 2025 as part of their training programme.

NESAC will celebrate National Remote Sensing Day in collaboration with Indian Society of Remote sensing (ISRS) on 08<sup>th</sup> August, 2025 at Shillong.



NESAC will celebrate various events for National Space Day 2025 for eight NER States & west Bengal and organize the Regional Event on 14<sup>th</sup> August, 2025.



A group comprising personnel from NDRF 12 BN and faculty members of CASFOS, Burnihat (totalling 54 individuals) visited NESAC as part of their training programme on 17th June 2025.



31 participants along with one faculty member including various forest officials undergoing "Forest Fire Management" training conducted by the Assam Forest School visited NESAC on 20th June 2025.

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