



REFLECTIONS



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



From the Director's Desk

Dr. S. P. Aggarwal
Director, NESAC

It gives me immense pleasure to present the latest edition of REFLECTIONS, the NESAC Newsletter, highlighting the Centre's key achievements, initiatives, and activities over the past three months. This quarter was particularly significant as the 13th Annual General Meeting of NESAC Society was held on June 04, 2026 at Shillong, Meghalaya, which was chaired by the Hon'ble Union Minister for Development of North Eastern Region (DoNER), Shri Jyotiraditya M. Scindia. The meeting was attended by the Hon'ble Chief Minister of Meghalaya, Shri Conrad K. Sangma, Hon'ble Minister of State for DoNER, Dr. Sukanta Majumdar; Secretary, Department of Space, Dr. V Narayanan; Secretaries of NE States; along with distinguished members of the Society and invited dignitaries. The deliberations reaffirm the growing recognition of NESAC's role in harnessing space technology for the sustainable development of the North Eastern Region. During this period, NESAC was privileged to have Dr. Jitendra Singh, Hon'ble Union Minister of State (Independent Charge) for Science & Technology and Earth Sciences, and Minister of State for the Prime Minister's Office, Personnel, Public Grievances and Pensions, Atomic Energy and Space. The Hon'ble Minister appreciated the contribution of NESAC in bringing the benefits of space technology closer to the State Governments, departments and communities of the NER.

This edition features important initiatives such as drone-based plantation monitoring and the comparative evaluation of lightning detection networks over North-East India, demonstrating NESAC's continued focus on developing practical, technology-driven solutions to regional challenges. Capacity-building remained a key priority through the successful conduct of the 6th edition of the ISRO Young Scientist Programme (YUVIKA 2026) and specialized training programmes, including AMRUT 2.0, aimed at strengthening geospatial capabilities across diverse sectors.

I sincerely appreciate the dedication and commitment of our scientists/engineers and staff, collaborators, partner organizations, and stakeholders, whose collective efforts continue to advance NESAC's mission. I hope this edition of REFLECTIONS provides valuable insights into our recent activities and inspires greater collaboration as we continue to leverage space technology for sustainable and inclusive development across the North Eastern Region.

HIGHLIGHTS:

- NESAC hold 13th NESAC society meeting
- Union Minister Dr. Jitendra Singh visited NESAC

Drone-Based Monitoring of Plantations Raised Under Namami Gange in West Bengal – Kasba, Panagarh Range

Dhruval Bhavsar, Kasturi Chakraborty, Victor Saikhom, Chirag Gupta, Shashi B Nayak

Plantations under the Namami Gange Programme contribute to riverine ecosystem restoration and carbon sequestration along the Ganga basin. NESAC conducted drone-based monitoring of plantation sites raised during 2017–18 to 2022–23 across West Bengal to assess plantation growth and health. This study presents the results for the Kasba plantation site (Figure a) (10 ha) in Purba Bardhaman district, established in 2019. The site was surveyed in December 2025 using RGB and multispectral sensors at a flying height of 120 m. An RGB orthomosaic was used to estimate tree count and canopy dimensions, while canopy height was derived from the Canopy Height Model (CHM) generated from the DSM and DTM. Vegetation health was assessed from multispectral imagery using NDVI and NDRE. Individual tree crowns were delineated using a marker-controlled watershed segmentation method combining NDVI & CHM. The plantation, dominated by *Acacia auriculiformis* (Akashmoni), contained an estimated 13,439 trees. Tree count and canopy height derived from drone data were validated using field measurements from four 10 m × 10 m sample plots, showing good agreement with field observations ($R^2 = 0.80$ for tree count and $R^2 = 0.67$ for canopy height). The plantation exhibited high NDVI and NDRE values, indicating healthy vegetation. A semi-dense canopy with a well-developed understory of herbs and shrubs suggested active natural regeneration despite limited maintenance.

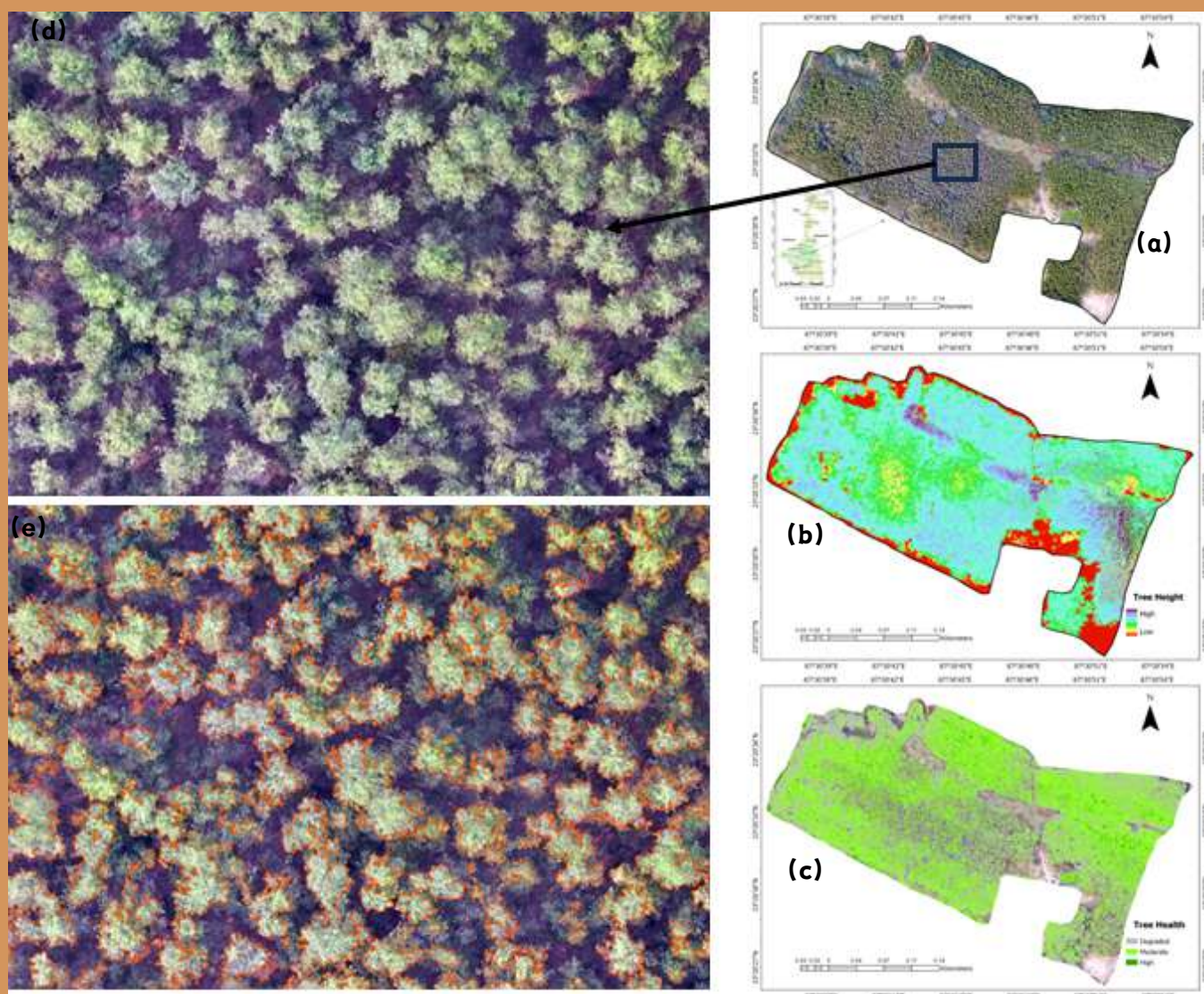


Figure: (a) Orthomosaic RGB image (b) Tree Height Map (c) Tree Health of plantation site (d) Zoomed area of RGB image showing (e) Tree segmentation

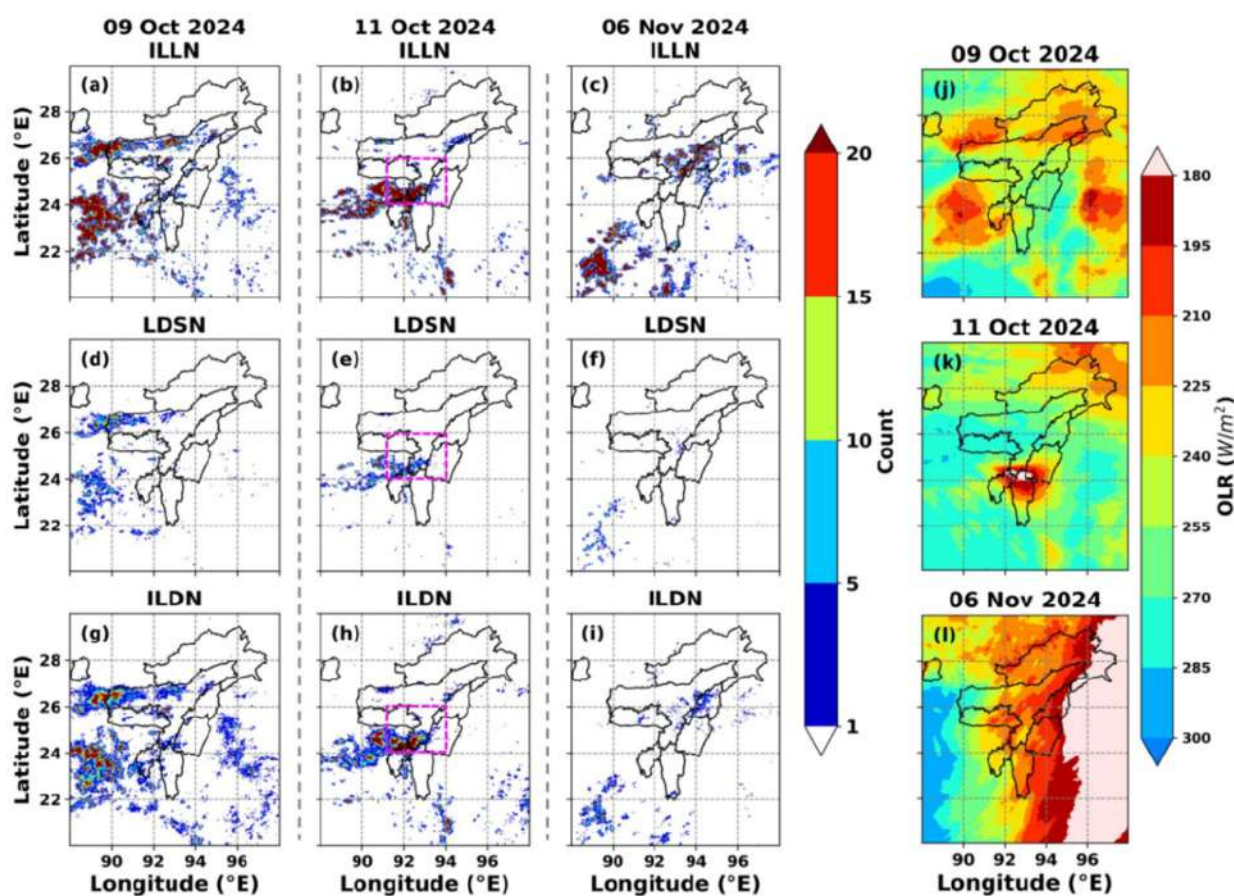
Comparitive Evaluation of Lightning Detection Networks Over North-East India

Arundhati Kundu et.al

A recent study published in Atmospheric Research presents the first comprehensive comparison of India's three operational lightning detection networks over the North-Eastern Region, one of the world's most lightning-prone areas. The study evaluates the Indian Lightning Location Network (ILLN), Lightning Detection Sensor Network (LDSN), and Indian Lightning Detection Network (ILDN) using lightning detection efficiency, spatial distribution, temporal consistency, and peak current characteristics. The results show that although all three networks capture similar thunderstorm patterns, ILLN consistently detects the largest number of lightning events throughout the lifecycle of convective storms. LDSN performs well for mid-range lightning currents (5–35 kA), while ILDN demonstrates the closest spatial and temporal agreement with ILLN, with nearly 89% of shared events occurring within a 5 ms time window. The study highlights that no single network can completely capture lightning activity across India. Integrating data from multiple networks would provide a more comprehensive representation of lightning occurrence, improving severe weather monitoring, nowcasting, and disaster preparedness.

Key Findings :-

- First comparative assessment of North East India three lightning detection networks.
- ILLN recorded the highest number of lightning events.
- ILDN showed the closest agreement with ILLN.
- Multi-network integration can significantly improve lightning monitoring and early warning systems.



Comparison of lightning observations from ILLN, LDSN, ILDN with INSAT-3DR OLR

13th Meeting of NESAC Society conducted in Shillong

The 13th Annual General Meeting of the North Eastern Space Applications Centre (NESAC) Society was held on 4th June 2026 at Shillong, Meghalaya. The meeting was Chaired by the Hon'ble Union Minister for Development of North Eastern Region (DoNER), Shri Jyotiraditya M. Scindia. The meeting was attended by the Hon'ble Minister of State for DoNER, Dr. Sukanta Majumdar; the Hon'ble Chief Minister of Meghalaya, Shri Conrad K. Sangma; the Secretaries of the Department of Space; Ministry of DoNER; North Eastern Council; Chief Secretaries of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Sikkim; along with distinguished members of the Society and invited dignitaries.



Fig. Glimpses of 13th Meeting of NESAC Society

The meeting commenced with a welcome address by Dr. V. Narayanan, Secretary, Department of Space, Chairman, ISRO, Vice-President of the NESAC Society, and Chairman of the NESAC Governing Council. He welcomed the Chairperson, members of the Society, and invited guests, and briefed the gathering on the major achievements of NESAC and ISRO over the past one and a half years. He highlighted that the Vision and Roadmap Document prepared under the guidance of the Hon'ble President of the NESAC Society would serve as a strategic framework for NESAC's future activities and contributes significantly towards the vision of a developed North Eastern Region by 2047. He further assured the continued support of ISRO and the Department of Space in leveraging space technology for governance, planning, and sustainable development across the region.

This was followed by a comprehensive presentation by Dr. S. P. Aggarwal, Director, NESAC and Secretary of the Society, who presented the key achievements and scientific activities undertaken by NESAC since the previous Society meeting.

Dr. Aggarwal also outlined the Centre's short, medium, and long term plans as envisaged in the Vision and Roadmap Document, highlighting several strategic initiatives aimed at strengthening space technology applications for the socio-economic development of the North Eastern Region.



Fig. Dr Aggarwal delivered summary of activities of NESAC

Addressing the Society, the Hon'ble Union Minister for DoNER and Chairperson of the meeting lauded NESAC for its diverse and impactful contributions over the past twenty-five years. He noted that NESAC's work has played a significant role in accelerating the development trajectory of the North Eastern Region through the effective utilization of space technology. He appreciated NESAC's contributions across a wide range of sectors, including natural resource management, livelihood enhancement, governance support, weather and climate research, drone and satellite communication technologies, disaster risk reduction, and capacity building. He urged all State Governments and departments to make optimum use of the geospatial data, services, and technical expertise available through NESAC.

The Hon'ble Minister also shared his vision for developing a unified digital clearance platform to facilitate faster processing of government infrastructure projects. He further highlighted five transformative initiatives proposed by the Hon'ble Union Home Minister and President of the NESAC Society, Shri Amit Shah, aimed at strengthening high-resolution geospatial mapping, enhancing disaster risk reduction capabilities, promoting the green economy of the NE Region, supporting space based start-up ecosystems, and enabling frequent monitoring of natural resources and developmental activities through advanced space technologies.

The Chief Secretaries and senior officials from the NE States appreciated NESAC's continued support to various user departments through State Space Application and Remote Sensing Centres. They acknowledged the Centre's valuable contributions to governance and development planning and proposed several new initiatives requiring technical support from NESAC. The State representatives expressed their keen interest in further strengthening partnerships with NESAC for the holistic development of their respective states and the NE Region as a whole.

The meeting concluded with a vote of thanks delivered by Dr. S. P. Aggarwal, Director, NESAC, who expressed his gratitude to the Chairperson, members of the Society, distinguished guests, and all participants for their valuable guidance, support, and contributions towards the successful conduct of the meeting.

Capacity Building and Outreach

NESAC successfully conducts 6th Edition of ISRO Young Scientist Program (YUVIKA 2026)



NESAC successfully conducted the 6th Edition of ISRO Young Scientist Program (YUva Vigyani KARYakram) YUVIKA 2026 during May 11-22, 2026. Fifty two students from the four NE states viz. Manipur, Meghalaya, Mizoram and Nagaland took part in the two weeks' residential capacity building program. This program envisages to provide young students an exposure to India's space program, in terms of technology & applications along with current and upcoming ISRO missions.

The program was inaugurated by Dr. V. Narayanan, Chairman, ISRO/Secretary, DoS and consisted of both theoretical lectures & applied science based activities, exposure visits to science centres, space science themed project activities, quiz and comprehensive evaluation. Students got a rare opportunity to interact with India's designated astronaut for upcoming GAGANYAAN mission Group Captain Shri Subhanshu Shukla also.

The students attended a total of 24 Lectures and 8 Practical Sessions. The program was concluded on 22nd May with distribution of certificates, mementoes and prizes for different competitions. Dr. Jonali Goswami, Chairman of the Centre Level Organizing Committee (CLOC), coordinated the program while Shri Anjan Debnath served as the convenor of the CLOC with Dr. Aniket Chakraborty as the co-convenor.

NESAC conducts training for Officials of Department of Agriculture, Meghalaya



NESAC conducted a two-days curated training programme on "Remote Sensing and GIS in Agriculture" for 24 officials from the Department of Agriculture during 10-11 June 2026. The programme was sponsored by the Meghalaya Agricultural Management and Extension Training Institute (MAMETI), Shillong. The inaugural session on 10th June was graced by Smt. T. M. R. Marak, Director, MAMETI, as the Chief Guest. The training provided the participants with an overview of the principles and applications of Remote Sensing and GIS in agriculture as well as hands-on demonstrations and exposure to geospatial tools and ongoing agricultural applications at NESAC. Smt. Pratibha Thakuria Das, Scientist/Engineer-SF, served as the Course Director of the training, while Dr. Francis Dutta, Scientist/Engineer-SD, served as the Course Officer.

Capacity Building and Outreach

NESAC conducts AMRUT 2.0 Trainings on GIS-Based Master Plan preparation



NESAC in collaboration with the Town and Country Planning Organisation (TCPO) under the Ministry of Housing and Urban Affairs (MoHUA), successfully organised a one-week and a two-week training programs on Formulation of GIS-Based Master Plan for Tier-I & Tier -II Officials under the Capacity Building component of the AMRUT-2.0. The programs were conducted during May 4-8 & June 8 - 19, 2026, at the NESAC Outreach Facility, Umiam, Meghalaya. Nominated planning officials from various states participated in the programs.

The curriculum was meticulously designed to blend theoretical foundations with practical, hands-on applications. Key modules included: Geospatial Fundamentals: Principles of Remote Sensing (RS) and Geographic Information Systems (GIS); Data Acquisition & Analysis: Satellite image interpretation, Urban sprawl analysis, growth modeling, creation of geodatabases, and the systematic preparation of GIS-based master plans.

NEWS & EVENTS

NESAC & IIFM sign MoU



North Eastern Space Applications Centre (NESAC) and Indian Institute of Forest Management (IIFM) signed an MOU on April 24, 2026 during an event held at IIFM, Bhopal. It was signed by Director NESAC and Director IIFM. The MoU looks to strengthen research collaboration in forestry, Environment and Climate Change for five years. Both NESAC and IIFM shall provide their respective R&D facilities in order to promote academic and research interaction.

NESAC conducts Official language workshop



A Hindi Workshop was organized at NESAC on June 19, 2026, for this quarter April-June, 2026. Shri Ajay Kumar Prasad, Assistant General Manager (Official Language), Reserve Bank of India, Shillong, conducted the workshop as the Chief Guest. The theme of the workshop was "Updated Information on Various Tools for Official Language Typing on Computers." The workshop witnessed active participation from 20 personnel, comprising 16 officers and 4 staff members.

NEWS & EVENTS

NESAC conducts joint Mock Drill on emergency evacuation



A joint Mock Drill was conducted at NESAC on 25th June, 2026 by CISF Unit of NESAC in collaboration with NDRF 1st Battalion, Guwahati, SDRF, Meghalaya Fire & Emergency Services, Umiam, and Meghalaya Police. The Mock Drill was on Emergency Response & Evacuation to demonstrate and train NESAC Staff regarding procedures & functional modalities. Participating agencies exhibited evacuation techniques, basic firefighting & life saving techniques (use of Fire Extinguisher, Use of CPR).



NESAC & IIPH Shillong sign MoU

NESAC and IIPH Shillong signed an Memorandum of Understanding (MoU) on 1st July, 2026 to collaborate in Geospatial Intelligence and Public Health Science. The MoU was signed by Dr. S. P. Aggarwal, Director, NESAC, and Prof. Sandra Albert, Director, IIPH Shillong.



NESAC inaugurates implementation of e-Office

e-Office was formally inaugurated at NESAC on July 3, 2026. Director, NESAC inaugurated the e-Office and demonstrated first use of e-Office for official works. Hand-on training was provided to all NESAC staff prior to this by designated Master trainers on operation of e-Office on June 30th & July 1st.

Union Minister Dr. Jitendra Singh visits NESAC



Dr. Jitendra Singh, Union Minister of State (Independent Charge) for Science and Technology and Earth Sciences and Minister of State for the Prime Minister's Office, Personnel, Public Grievances and Pensions, Atomic Energy and Space, visited the North Eastern Space Applications Centre (NESAC), Umiam, on 14 July 2026.

Dr. SP Aggarwal, Director, NESAC received the Hon'ble Union Minister at Shillong airport before formal welcome at NESAC premises. Director, NESAC, made a comprehensive presentation highlighting the Centre's major activities, achievements and ongoing programmes in the application of space technology for the development of the North Eastern Region (NER).

The Hon'ble Minister also advised NESAC to collaborate with the North East Cane and Bamboo Development Centre (NECBDC) and the concerned State agencies to share the findings of ongoing bamboo mapping related activities for enhancing the bamboo value chain in the region.

Important Visits to NESAC



23 school students and 3 teachers from Asian Institute of Management and Technology,, Assam visited NESAC as a study tour on 9th June. Md. Abu Sahin coordinated the visit.



59 B.Tech students (4th Sem) of Assam Engineering College, Guwahati from the ETE & CSE departments visited NESAC on 9th June, coordinated by Siddhartha Bhuyan.



A senior delegation from the Water Resources Department, Government of Himachal Pradesh, accompanied by officials from the Hydrology and Information Unit, WRD, Government of Assam, visited NESAC, Umiam, on 15 July 2026. The interaction was chaired by Dr. Diganta Barman, Head, WRD, NESAC. Dr. Barman and Shri Ranjit Das, Senior Scientist, WRD, shared their experience in flood-hazard mapping, hydrological and hydraulic modelling, flood forecasting, disaster management, watershed management etc. The meeting also explored opportunities for technical collaboration for improved water resource management and resilience.

Upcoming Events

National Space Day 2026

NESAC will be conducting and coordinating events for celebration of 3rd National Space Day during first part of August, 2026. Nine events will be conducted in 8 NE States & West Bengal for this purpose. The country celebrates 23rd August as National Space Day to commemorate the historic Moon Landing of Chandrayaan-3 on 23rd August, 2023.



80 students (12th Science & Humanity) and 3 teachers of Jawahar Navodaya Vidyalaya (JNV), Mawphlang visited NESAC on 27th July, for an exposure study coordinated by Rosly B Lyngdoh.

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