



एनआरएससी की जनसम्पर्क और
प्रशिक्षण गतिविधियां
Outreach & Training Programme of NRSC

डॉ राजश्री बोथले, समूह निदेशक, टी ई ओ जी
Dr Rajashree V Bothale

Group Director, Training & Outreach Group, NRSC



राष्ट्रीय सुदूर संवेदन केंद्र (एनआरएससी)
भारतीय अन्तरिक्ष अनुसंधान संगठन (आईएसआरओ)
हैदराबाद

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एनआरएससी जनसम्पर्क सुविधा

Vision

शिक्षा, गैर-सरकारी संगठनों, सार्वजनिक, उद्योगों आदि के लिए एक केंद्रीकृत एनआरएससी आउटरीच सुविधा का होना, जहां पर आउटरीच, प्रशिक्षण, आउटसोर्सिंग, प्रदर्शनी, सूचना प्रसार, वेब सेवा और इंक्यूबेशन से सभी संबंधित गतिविधियों को एकीकृत किया जाएगा।

To be a centralized NRSC Outreach Facility for Academia, NGOs, Public, Industries, etc., integrating all the concerned activities of Outreach, Training, Outsourcing, Exhibition, Information Dissemination, Web Services and Incubation.





एनआरएससी आउटरीच सुविधा – पृष्ठभूमि - Background

- (लगातार बढ़ती जरूरतों और मांगों को ध्यान में रखते हुए) Considering the ever increasing needs and demands of all the stake holders / users, it was proposed to setup a centralized Outreach Facility for NRSC, integrating all the concerned activities of

- प्रशिक्षण Training,
- आउटसोर्सिंग Outsourcing,
- प्रदर्शनी सुविधा Exhibition Facility,
- सूचना कियोस्क Information Kiosks,
- वेब सेवाएँ Web Services and
- इंक्यूबेशन सुविधा Incubation Facility.



Activities @ Jeedimetla

गतिविधि Activity contains :

1. ज्ञान बांटना Knowledge Sharing

- Information / Data Kiosks
- Enquiry / Advisory Cells
- Interaction Meets
- Exhibition Facility
- Web Services



2. प्रशिक्षण Training

- Skill Development
- Training for Schools / College students**
- Project Specific Workshops**
- Calendar based Courses
- Customised Courses for specific users



3. Academia Partnership

- Project Execution
- Joint Experiment Studies
- Data Collection / Analysis
- Student Projects**
- RESPOND



4. उद्योग Industry Collaboration

- Incubation Facility
- Joint Development Programs
- IPR & Technology Transfer
- Outsourcing / Wet Leasing**
- Infrastructure Development

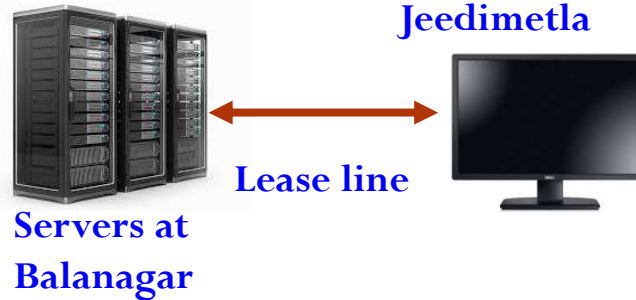




मूलभूत सुविधाएँ Infrastructure

Phase 1

- 1050 sq m area
- Solar (250 KW) 4.5 lakh unit/year
- Thin client system – 300
- 2 x 100 MBPs lease line
- Software –
- Host of satellite data as per demand
- Food court – 100
- Exhibition
- “Space on wheels”



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अमृत महोत्सव





मूलभूत सुविधाएँ Infrastructure

Phase 2

- 5500 sq m
- प्रशिक्षण कक्ष Training class rooms and labs
- Audio-Video halls
- Web GIS services/Bhuvan content
- Skill development facilities
- जनसम्पर्क सुविधा Outreach facility
- प्रदर्शनी Exhibition
- पुस्तकालय Library



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मूलभूत सुविधाएँ Infrastructure



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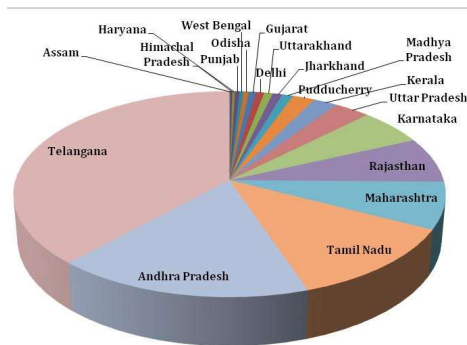


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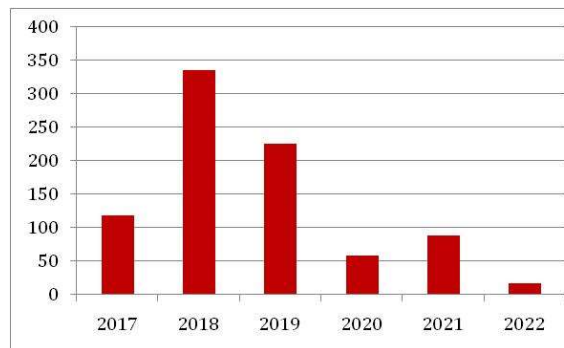


उपलब्धियां Highlights – Academic partnership

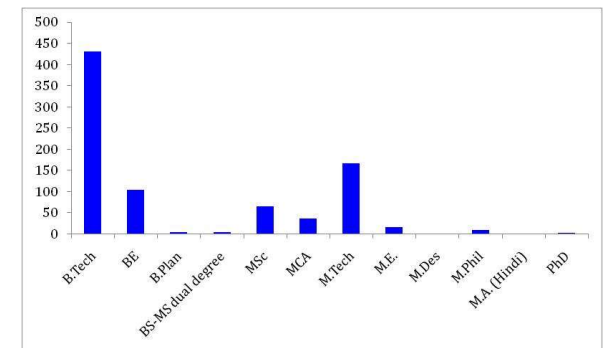
S No	Activity	Numbers reached
1	विद्यार्थी (प्रोजेक्ट) Number of students B Tech/ M Tech / MCA/ PhD projects	855
2	Student technical papers	Published 22 Conference 13
4	BITS, Pilani students project (Pixxel) on Nano satellites	Initial guidance
5	Course introduction at NALSAR, Hyderabad	
6	Outreach talent day- 2018 - 2019 technical presentations	43 papers by students
7	Biennial celebrations	19 posters
8	Technical and general Competitions for schools/colleges	Ideate, quiz, painting, essay



State wise



Year wise



Course wise



Published papers

1. **Pranav V**, E Venkateswarlu, Thara Nair, G P Swamy & B Gopala Krishna (2017). Estimation of NIIRS Incorporating an Automated Relative Edge Response Method. I.J. Image, Graphics and Signal Processing, 2017, 11, 29-38.
2. **Lolith Gopan**, E Venkateswarlu, Thara Nair, G P Swamy & B Gopala Krishna (2017). Scene based Non-uniformity Correction for Optical Remote Sensing Imagery. I.J. Image, Graphics and Signal Processing, 2017, 12, 50-57.
3. **B Battula**, L Paraytiam, T S Prasad et al. (2018). Classifications of High Resolution Optical Images using Supervised Algorithms. 8th International Advance Computing Conference (IACC). <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8692132>.
4. K. Hareef Baba Shaeb, **K. Krishna Rao** & P. Althaf (2019). Seasonal Characteristics of Black Carbon Aerosols over an Urban City in India: Source Analysis Using Concentration Weighted Trajectories. Asia-Pacific Journal of Atmospheric Sciences, <https://doi.org/10.1007/s13143-019-00126-9>.
5. **S.Surya Teja, D.L Sai Teja, Mehanaz Fathima J**, Rajashree Vinod Bothale, D.S Chandra (2019). Mapping of Snow Melt in Chenab Basin using Microwave Remote Sensing. International Journal of Recent Technology and Engineering (IJRTE), ISSN: 2277-3878, Volume-7, Issue-6C2, April 2019, 785 - 789
6. **D.L Sai Teja, S. Surya Teja, Mehanaz Fathima J**, Rajashree Vinod Bothale, D.S Chandra (2019), Multiple Linear Regression for Generation of Gap-Free LST Maps in Parts of Eastern Antarctica International Journal of Recent Technology and Engineering (IJRTE), ISSN: 2277-3878, Volume-7, Issue-6C2, April 2019 780 – 784
7. Thara Nair, **Akshay Singh**, E. Venkateswarlu, G.P. Swamy, Vinod M Bothale and B. Gopala Krishna (2019). Generation of Analysis Ready Data for Indian Resourcesat Sensors and its Implementation in Cloud Platform. I.J. Image, Graphics and Signal Processing, 2019, 6, 9-17.
8. **Kuntala Sai Kiran**, P Manjusree, M viswanatham (2019). Sentinel-1 SAR data preparation for extraction of flood foot prints – A case study. Disaster Advances Vol 12 (12)
9. Rajashree V. Bothale, **Mehanaz Sherif, Himaja Chanumolu** (2019), Scatterometer-derived long-term (2000 to 2017) variability in snowmelt and freeze in river basins of the Indian Himalayas, J. of Applied Remote Sensing, 13(4), 044501 (2019). <https://doi.org/10.1117/1.JRS.13.4.044501>
10. **Battula Balnarasiah**, T.S. Prasad, Laxminarayana Parayitam (2019), “Pixel based SAR Image Classification using Random Forest Classification Algorithm”, International Journal of Innovative Technology and Exploring Engineering (vol. 8, issue 10, pp. 4351 – 4356, Aug. 2019)





Published papers

12. R. V. Bothale, **M. Fathima** and M. P. Kumar (2020), "The Potential for Estimating Snow Density Using SCATSAT-1 Scatterometer," in *IEEE Geoscience and Remote Sensing Letters*, doi: 10.1109/LGRS.2020.3004586.
13. **Mehanaz Fathima**, Rajashree V. Bothale and P Jagadeeswara Rao (2020), Analysis of Melt and Freeze in Shyok Sub-Basin, Indus Basin of Indian Himalaya using Ku Band Scatterometer SCATSAT-1, **International Journal of Advanced Remote Sensing and GIS**, [S.l.], v. 9, n. 1, p. pp. 3312-3320, may 2020. ISSN 2320-0243.
14. Rani, K., Guha, A., **Kumar, K.V.** *et al.* Potential Use of Airborne Hyperspectral AVIRIS-NG Data for Mapping Proterozoic Metasediments in Banswara, India. *J Geol Soc India* **95**, 152–158 (2020). <https://doi.org/10.1007/s12594-020-1404-5>.
15. Gupta, S., **Dharmaraj, T.**, Reddy, K.M. T. Ravisankar (2020). Spatial-Temporal Analysis and Visualization of Rural Development Works Implemented under World's Largest Social Safety Programme in India-a Case Study. *Journal of Geovisualization and Spatial Analysis*, 4(2): 1-14. Springer.
16. Stutee Gupta, Shikha Anand, **Vishesh Mathur**, K. M. Reddy , T Ravishankar (2020). Mapping spatial relationship of Van Panchayats and Forest Fire of 2019 in Almora district, Uttarakhand. *Current Science* (00113891), 118(10).
17. Hareef Baba Shaeb Kannemadugu, Manish Verma, Dibyendu Dutta, **Lianne Rachel Johnson**, Srinivasa Rao, Seshasai MVR. Comparison of temperature and humidity profiles retrieved from INSAT-3DR sounder with high resolution radiosonde measurements[J]. *AIMS Geosciences*, 2021, 7(2): 180-193. doi: 10.3934/geosci.2021011
18. **Battula Balnarasiah**, T.S. Prasad, Laxminarayana Parayitam (2021), Classification of Synthetic Aperture Radar-Ground Range Detected Image using Advanced Convolution Neural Networks, *Remote Sensing in Earth Systems Science*, Jan.
19. **Vijay Prakash, K., Vimala, G.**, Preethi Latha, T., Jayaram, C., Nagamani, P. V., & Laxmi, C. N. (2021). Assessment of Water Quality Along the Southeast Coast of India During COVID-19 Lockdown. *Frontiers in Marine Science*, 8, 338.
20. **Vijay Prakash, K., Geetha Vimala, C.S.**, Nagamani, P.V. *et al.* (2021) Role of physical oceanography parameters in ocean's biological response with the passage of cyclone *Titli* in the Bay of Bengal. *J Earth Syst Sci* **130**, 123 (2021). <https://doi.org/10.1007/s12040-021-01625-y>.
21. Mahesh Pathakoti, Muppalla, A., **Sayan Hazra**, D. Venkata, M., A. Lakshmi, K., K. Sagar, V., Shekhar, R., Jella, S., M. V. Rama, S. S., and Vijayasundaram, U. (2021) "Measurement report: An assessment of the impact of a nationwide lockdown on air pollution – a remote sensing perspective over India", *Atmos. Chem. Phys.*, 21, 9047–9064, <https://doi.org/10.5194/acp-21-9047-2021>, 2021.
22. Thara Nair, E.Venkateswarlu, Vinod M Bothale , **Tejoram.V**, Shadow Detection and Restoration in VHR Satellite Imagery, Under review in ISRS Journal





Conference papers

- Hareef Baba Shaeb, K., **K. Krishna Rao, P. Lavanya Devi** (2017), P.Althaf , D.Dutta, M.V.R.Sesha Sai , Y.V.N.Krishnamurthy, Seasonal Characteristics of Aerosol Black Carbon pollution over Nagpur in Central India, P.191-198, ISBN: 978-93-86819-50-5 (Hardback), BS Publications.
- **S Surya Teja, Mehanaz Fathima J** & Rajashree V Bothale (2018), Utilisation of Active and passive microwave data from SCATSAT-I & AMSR2 towards detection of melt and freeze in Indian Himalayas, NDC User Conference-2019.
- **Battula Balnarsaiah**, T.S. Prasad, Chandrasekhar Patibandla and Laxminarayana Parayitam (2018), Classifications of High Resolution SAR and Optical Images using Supervised Algorithms, presented at International Conference on Computational Intelligence in Pattern Recognition (CIPR - 2019). (<https://link.springer.com/article/10.1007/s41976-020-00042-x>).
- **Anjaly Unnikrishnan** & C. Sudhakar Reddy (2018), Analysing hotspots of forest degradation in Myanmar using geospatial techniques. Presented at 2nd International Workshop on Biodiversity and Climate Change, 24-27 February 2018. IIT, Kharagpur.
- **V.S. Faseela** & C. Sudhakar Reddy (2018), Geospatial assessment of ecosystem level threat and its implications on biodiversity conservation in Bangladesh. Presented at 2nd International Workshop on Biodiversity and Climate Change, 24-27 February 2018. IIT, Kharagpur.
- **J. Sebastian** & C. Sudhakar Reddy (2018), Assessment and monitoring of long-term changes in Mangroves of Sundarbans using remote sensing data and GIS. Presented at 2nd International Workshop on Biodiversity and Climate Change, 24-27 February 2018. IIT, Kharagpur.
- **S. Sreelakshmi**, C. Sudhakar Reddy, T. Mayamanikandan & R. Jaishanker (2018). Characterization of spatio-temporal patterns of forest fires in South Asia. Presented at 2nd International Workshop on Biodiversity and Climate Change, 24-27 February 2018. IIT, Kharagpur.
- Mahesh P, **Vishnu A, Rohit Reddy G**, Aarathi M, Biswadip G and Sesha Sai M.V.R (2019). Urban Air Pollution monitoring using IoT based Technology, 5th International SKYNET Workshop, 13-15 February, 2019, MoES, New Delhi.
- S. Gupta, **Ramraj Pendkar**, K.M. Reddy, T. Ravisankar. (2021) Efficacy of Soil and Water conservation measures in Maharashtra: An empirical analysis using GIS International Virtual Conference on Innovative Trends in Hydrological and Environmental Systems (ITHES-2021). NIT Warangal





उपलब्धियां Highlights - Outreach Activities

S No	Activity	Numbers reached
1	Number of students visited during industrial visits, event celebrations (Children Science Congress, Water day, Science day, Forest Day, World Environment day, etc), viz., AKAM, Vigyan Sarvatra Pujiyate	> 1 lakh
2	Awareness days	
3	Remote Sensing day, Remote Sensing Fortnight	
4	Delivering lectures, conducting competitions etc.	
5	जनसम्पर्क दिन Outreach day (IISF)	5000
6	National Science day – 2019 (30 colleges)	1440
7	Coordinating visit of armed forces/ foreigners/ workshop participants/CGO	
7	विक्रम साराभाई शताब्दी कार्यक्रम Vikram Sarabhai Centenary Programme	2.78 lakhs
8	ISRO Cyberspace Competition – 2020 (evaluation of)	5386 entries
9	International Space Conference and Exhibition – 2020 & 2021	NRSC Stall 239, 474 visitors





उद्योगों के साथ संवाद Interaction with industries

ISRO & AGI desire to collaborate with each other

- Information sharing and solutions/applications development for ISRO's Earth Observation Systems and platforms like Bhuvan.
- IRNSS services for navigation applications.
- Skill-building for Geospatial services work to support national development programs.
- Incubation support for Start-ups.
- Smart Cities, AMRUT, Digital India, Natural Resources, Weather related products and services, etc.

NRSC – AGI workshop

First – Bhuvan Overview

Application workshop



**Meeting of India OGC
(Open Geospatial
Consortium)**



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आउटसोर्सिंग Outsourcing

- Facility for outsourcing
- AMRUT project presently going on
- Two shift operation

Ceinsys



Tricade Design



Trans Globel



Pan India



RSI



Enfragy





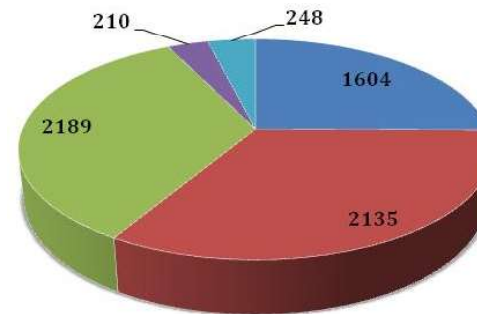
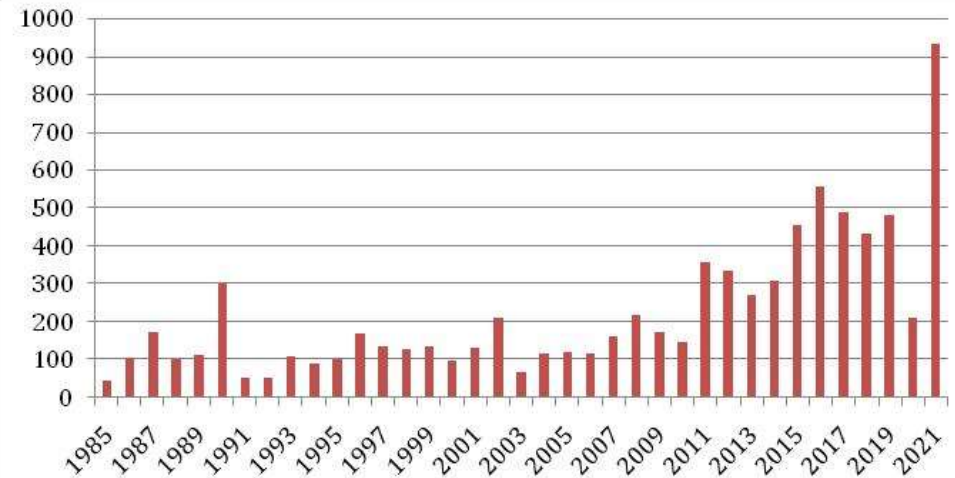
Training & Education

No of participants trained (8066)

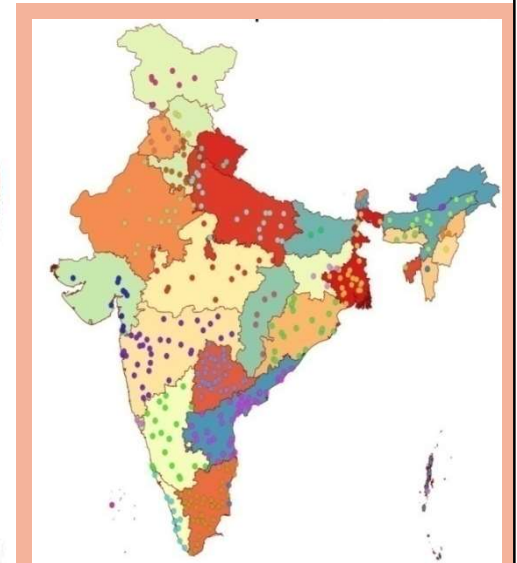
Training courses offered

Duration – three days to three months

- Introduction to RS, Photogrammetry & GIS
- Remote Sensing & GIS Technologies
- Bhuvan overview
- Open Source GIS
- Hyperspectral Remote Sensing
- Microwave Remote Sensing Applications
- Disaster Management
- Photogrammetry and LiDAR & LIDAR Data Processing
- RS & GIS Applications in Water Resources, Water Resources Assessment, Surface Runoff Modelling, Irrigated Command Area Inventory and Performance Evaluation, etc
- Remote Sensing in Geological Applications
- Large Scale Mapping for City/Urban Planning and Panchayat Raj Applications
- Remote Sensing Applications for Land Resources Management
- Geospatial Technologies for Climate Studies
- & customised courses



- Regular
- Customised
- Special
- Internal (NRSC)
- ISRO STP



Spatial distribution of participants



Onsite training at Delhi



पुरस्कार और प्रशंसा Awards & Appreciation

- आधिकारिक भाषा के सर्वश्रेष्ठ कार्यान्वयन के लिए प्रथम पुरस्कार - 2017-18, 18-19 & 19 – 20 & 20-21 Outreach Facility was awarded first prize for the best implementation of official language for the year 2017-18, 18-19, 19 – 20 & 20-21
- Certificate of Appreciation from DGDE in recognition of training organised by TEOG from Hon Defence Minister





कुछ छाया चित्र



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