

Vice Chancellor's Profile

1. Name: **Prof (Dr.) Arun Kumar Verma**
2. Designation: **Vice Chancellor, The ICFAI University Nagaland, India**
3. Qualifications:
 - (a) **Ph.D. (Radio Science)**
 - (b) **Electronics Fellow, D.I.A.T. (Erstwhile Institute of Armament Technology), DRDO, Ministry of Defence**
 - (c) **M.Sc. Physics (Radio Physics & Electronics)**
4. Cadre of Scientific Service : Defence Research Development Service (DRDS) (Retd), Defence Research Development Organisation (DRDO), Ministry of Defence
5. Association with International Bodies:
 - (a) *Radio Scientist and Senior Member, International Union of Radio Science (URSI), Ghent University, Belgium*
 - (b) *Member, International Society of Photogrammetry and Remote Sensing (ISPRS), Germany*
 - (c) *Member, Institution of Geo-Spatial and Remote Sensing Malaysia (IGRSM), Malaysia*
 - (d) *Member, Italian Society of Electromagnetism (SIE), Rome*
6. Association with National Bodies
 - (a) *Life Member : Indian Society of Remote Sensing (ISRS), India*
 - (b) *Life Member : Indian Radio Science Society (InRaSS), India*



7. International Exposure as Member in International Conference

- (a) *“Chairman, Technical Session-9: GIS and Spatial Data Analysis”*, 41st Asian Conference of Remote Sensing (ACRS2020), 9-11 November 2020, held at Deqing, China by Asian Association of Remote Sensing, Japan

- (b) International Exposure of presenting research paper on Space-borne SAR Sensors and Radio Communication System
 - (i) 38th Asian Conference of Remote Sensing (ACRS2017) organized by Asian Association of Remote Sensing (AARS), Japan in association with Indian Space Research Organisation (ISRO), 2017

 - (ii) 39th Asian Conference of Remote Sensing (ACRS2018) by Malaysian Remote Sensing Agency, Kuala Lumpur, Malaysia, 2018

 - (iii) 41st Asian Conference of Remote Sensing (ACRS2020) by Chinese National Space Research Agency, China, 2020

 - (iv) IEEE-Asia Pacific Conference on Antenna and Propagation, South Korea, 2019

 - (v) 2019 International Symposium of Remote Sensing (ISRS2019), Taipei, Taiwan, 17-19 April 2019 organised by Center for Space and Remote Sensing Research (CSRSR), National Central University, Taiwan

 - (vi) ISPRS (International Society of Photogrammetry and Remote Sensing) - GEOGLAM-ISRS-International Workshop on “Earth Observation for Agriculture Monitoring”, February 18-20, 2019, India

 - (vii) URSI (International Union of Radio Science)- Asia Pacific Radio Science Conference (APRSC)-2019, New Delhi, India, 09-15 March 2019

 - (viii) URSI-RCRS 2020 (International Union of Radio Science- Regional Conference on Radio Science 2020), IIT (BHU), India, 12-14 February 2020

 - (ix) URSI-GASS 2020, 29 August – 5 September, 2020, in Sapienza University Campus, Rome, Italy

(c) National Exposure of organizing conferences and presenting research papers/ delivering talks (IEEE; URSI; InRaSS; ISRO; DRDO; MICT, ICAR) in Remote Sensing, Radio Science, Information Technology, Space-borne Disaster Management System, Digital Healthcare, Space Technology, ICT, Nano-Technology.

8. Former Members of Task Force/ Working Group/ Committee at National Level from 1997 to 2007 constituted by Central Ministry/ Planning Commission.

(i) Member of National Level Committee constituted by Government of India (GOI)

(a) *Invited Member: Working Group: "Science and Technology for Department of Space (DOS)/ Indian Space Research Organisation (ISRO) for 10th Five Year Plan" Constituted by Planning Commission, Government of India, 2002*

(b) *Invited Member: National Disaster Management Authority: Invited by Member, North Eastern Council, DONER and Member, NDMA for working out framework for NER at initial stage (2005 to 2008)*

(c) *Invited Member by Shri P.P.Srivastav, Member, North Eastern Council, DONER, Shillong, Meghalaya, by the approval of Hon'ble Defence Minister, GOI: 11th Five Year Plan Document for Science & Technology, North Eastern Council, DONER*

(d) *Member: Working Group " Convergence and E-Governance for 10th Five Year Plan" Constituted by Planning Commission, Government of India*

(e) *Invited Member : Working Group " Digital Telemedicine System standardization and Network for India" Constituted by Ministry of Information and Communication Technology, Government of India*

(f) *Member : Task Force " Setting up Earthquake Risk Evaluation Centre for Northern India" Constituted by Ministry of Science and Technology, Government of India*

(g) *Member : Working Committee " Study of changes of River Courses of Bharamputra River using Remote Sensing Technology " Constituted by Department of Space, Indian Space Research Organisation (ISRO), Bangalore*

- (h) *Member “Project Assessment and Monitoring Committee on Earth Science” Constituted by Ministry of Science and Technology, Department of Science and Technology (DST), Government of India*
 - (i) *Member : Committee for “North Eastern Border Area Development for Electronics and IT Applications” Constituted by Planning Commission, Government of India*
 - (j) *Member : Standing Committee of NNRMS (National Natural Resource Management System): Agriculture (constituted by Planning Commission), GOI*
 - (k) *Member Secretary: ISRO-NEC Core Committee and Coordination Committee for Disaster Management System: Constituted jointly by Indian Space Research Organisation (ISRO) and North Eastern Council, DONER, GOI*
 - (l) *Member Secretary: Working Group of IT Development, E-Governance and Science &Technology for NER (10thFive Year Plan), DONER, GOI*
- (ii) Formerly Member of Governing Board/ Research Council/ Executive Committee in National Level Institutions, Government of India: (1997-2003).
- (a) *Founder Member, Executive Council, North Eastern Space Application Centre (Joint Institution of ISRO and NEC), Shillong, Meghalaya*
 - (b) *Member, Executive Council: Regional Institute of Medical Science(NEC Institution), DONER, GOI, Imphal, Manipur*
 - (c) *Member, Executive Council : Regional Institute of Water and Land Management (NEC Institution), DONER, GOI, Tezpur, Assam*
 - (d) *Member, Executive Council : B Barua Cancer Institute (NEC Institution), DONER, GOI, Guwahati, Assam*
 - (e) *Member, Executive Council : Regional Institute of Pharmacy and Nursing Science (NEC Institution), DONER, GOI, Aizwal, Mizoram*

- (f) *Founder Member, Executive Council* : LGB Regional Institute of Mental Health (LGBRIMH) (*NEC Institution*), DONER, GOI, Tezpur, Assam
- (g) *Member (Rep: Secretary, GOI) : Governing Board* : Indian Institute of Technology (IIT), MHRD, GOI, Guwahati, Assam
- (h) *Member : Research Council* : Regional Research Lab (CSIR Lab), Government of India, Jorhat, Assam
- (i) *Member: Governing Board:* North Eastern Regional Institute of Science and Technology (NERIST), Ministry of HRD, GOI, Itanagar
- (j) *Member, Executive Council,* Indian Institute of Entrepreneurship, Ministry of Industry, GOI, Guwahati

9. Positions held in DRDO, Ministry of Defence ; Ministry of Home Affairs/ Department for Development of North Eastern Region (DONER) and other institutions:

- (a) Scientist (different levels): Period: 1986 to 2007 : Defence Electronics Applications Laboratory (DEAL), DRDO, Ministry of Defence, Dehradun,
- (b) Electronics Fellow : 1985-86 : Defence Institute of Advanced Technology (DIAT) (Erstwhile Institute of Armament Technology (IAT)), DRDO, Girinagar, Pune
- (c) Director (Science & Technology) : 1997 to 2003: On deputation to North Eastern Council (NEC), Ministry of Home Affairs/ Department for Development of North Eastern Region (DONER), GOI, Shillong, Meghalaya ; Additional Responsibility: Adviser (Technical Education)
- (d) Chief Technology Adviser : 2007 to 2010 : Technology Development, Genesis Futuristic Technology Ltd (GFTL), Noida
- (e) Director: 2010 to 2020: Vidyadaan Institute of Technology & Management (VITM), Approved by AICTE, Aryabhata Knowledge University (AKU), Bihar

10. Expertise/ Domain : More than 35 years experience in the following domains

- (a) Research and Technology Developments in (i) Information & Communication: Microwave and mm wave communications link design for terrestrial (wireless) and satellite (Earth to Space) system including mm wave broadband wireless system (ii) Remote Sensing Technology & Applications: Space-based Synthetic Aperture Radar (SAR) Interferometry & Remote Sensing Applications (iii) Health-Care : Telemedicine Technology & Digital Health Care System (iv) Covid-19 Geo-Spatial Big Data Analysis & Predictive Modeling: Global Perspectives
- (b) Technology Policy and Planning in Science & Technology; Information & Communication Technology Applications for Development of North Eastern Region, Implementation multi-projects and plans; Collaboration with multi-ministries and multi-organisations/ institutions for working out collaborative plans
- (c) Management & Administration of functioning of government institutions under the umbrella of North Eastern Council, DONER, GOI
- (d) Establishing North Eastern Space Applications Center (Shillong) in collaboration between North Eastern Council (NEC) and Department of Space (DOS).

11. Recent Research Achievement on Covid-19 Pandemic:

- (a) *Appreciation by Dr. Vinod K Paul, Hon'ble Member (Health), NITI Aayog, Government of India, looking after Covid-19 pandemic issue, on the research outcome: Technical Report : " Covid-19 Spatial Big Data Predictive Analysis: With respect to India and Predictive Model for Coronavirus Trend dated 02.06.2020 " for its usefulness.*
- (b) *Research paper entitled "Covid-19 Geo-Spatial Big Data Analysis for the impact of latitude on population mortality for countries situated at latitudes between 64°N and 35°S", presented during "41st Asian Conference on Remote Sensing (ACRS2020) held at China during 09 -14 November 2020 organized by Asian Association of Remote Sensing (AARS), Japan" has been selected by International Editorial Team for publication in "Coordinates: A monthly magazine on positioning, navigation and beyond" (www.mycoordinates.org) to reach the larger audience of more than 35,000 professionals all across the world during January 2021.*

12. Major Achievements in Research & Development/ Academic / Technology Planning & Management:

(a) Research & Development Domain: Terrestrial & Space Communication ; Remote Sensing Applications; Climate Modelling; Disaster Management; Covid-19 Geo-Spatial Big Data Predictive Analysis

- (i) *Trans-horizon Radio Wave Propagation Theory* based on formation of thermal lenses in troposphere for radio/ radar communication system design.
- (ii) *Rain-Drop Size Distribution Model* and (Horizontal and Vertical) Rain Structure for Indian Tropical Climate (*Lower Atmosphere Rain Modeling* for Indian Climate)
- (iii) *Specific Rain Attenuation Model* for Indian Tropical Climate for mm wave *Broadband Communication System Design* based on 5km LOS Radio Link and Radiometric Data measurement at 20/ 30 GHz System ; (*Next Generation Broadband Mobile Communication and development of Smart City Infrastructure*)
- (iv) *Applications of Space-Based SAR (Synthetic Aperture Radar) Sensors* for disaster management and agriculture crop growth analysis.
- (v) *Space-Based 3-D-SAR Interferometry for Earth Imaging / DTM / DEM generation* (Adopted by NASA / JPL (Jet Propulsion Lab), California, USA for Earth Imaging Mission by Prof R.A. Rosen, Mission Director and NISAR (NASA-ISRO-SAR) Mission Director)
- (vi) Covid-19 Geo-Spatial Big Data Predictive Analysis and Modeling for countries situated at latitudes below 64 degree north.

(b) Technology Planning and Management:

- (i) Establishing *North Eastern Space Application Centre (NE-SAC)* in collaboration between North Eastern Council and Department of Space, at Shillong, Meghalaya
- (ii) Developing *Information Technology Education Infrastructure for NER* covering more than 1200 institutions during 9th/ 10th FYP : Accreditations: IT

Excellence Awards from Hon'ble President for more than 10 institutions during 9th FYP

(c) Academic Activities

- (i) Research/ Technology Planning Activities : Published as Chapter in Books by different authors: 02

(a) “ *Information Technology for Masses: Key factors for Development of NER*”, Mr Gopal Mishra, Senior Journalist, Concept Publishing Company, New Delhi, 2005 (*Chapter-7 and Chapter-8: Activities of Dr A.K. Verma as Director (Science & Technology)*)

(b) “*Recent Advances in Microwave Technology*”; Prof B S Rawat, Prof Bharti Bhatt and Prof R S Gupta : IIT, Delhi; Chapter-B7; Wiley & Sons

- (ii) Research work referred in Books

(a) “*Ground Based Radiometry and Remote Sensing: Methods and Application*”, Author: Prof P.K. Karmakar, Institute of Radio Physics and Electronics, Calcutta University; CRC Press, Taylor and Francis Group (London), 2014

(b) “*Microwave Propagation in Remote Sensing: Atmospheric influences with models and applications*” , Author: Prof P.K. Karmakar, Institute of Radio Physics and Electronics, Calcutta University; CRC Press, Taylor and Francis Group (London), 2011

- (iii) Research work referred for Ph.D. Thesis

(a) Ph.D. Thesis “ Studies on Tropical Rain with specific reference to RDSD and integral rain parameters using ground based and satellite measurement” Dr R Harikumar, Atmospheric Science Group, Centre for Earth Science Studies, Cochin University, 2009 , India

(b) Ph.D. Thesis “ A Novel Empirical model of the K-factor for radio-wave propagation for South Africa for Communication Planning”, Prof A.J. Palmer, University of Pretoria, 2004, South Africa

- (c) Ph.D. Thesis “ Long-term Surface Deformation Mapping using small base line Interferogram, Dr Tom-Rume –Lauknes, University of Tromso, Norway, 2004
- (d) Ph.D. Thesis “ A Semi-empirical model for determination of rain attenuation on terrestrial radio links”, Prof O.M. Olubunmi, University of Kwazulu-Natal, Department of Electronics Engineering, South Africa, 2010
- (e) Ph.D. Thesis “ Point Target Interferometry as applied to characterization of localized deformation features” Deepak Manjunath, University of Missouri-Columbia, 2008
- (f) Ph.D. Thesis “ Analisis Observationalde radar meteorologic” Chapter-2, Dr Jorai Beach, University of Barcelona

13. Recent Research and Technology Papers (2017-20): Published in International Conference and International Journal

Research Domain:

Spaced Based Microwave Remote Sensing Applications:
Geo-Spatial Data Analysis (Covid-19) / Real-Time Space-borne Flood Disaster Management System/ Knowledge Classifier Agriculture Crop Forecasting

- (a) Arun Kumar Verma, Anjul Verma, Aditi Verma “ Covid-19 Spatial Big Data Analysis for Predicting Models of the Spread and Severity of the Spectrum of Outbreak in the Southeast Asian Region”, **5th World Congress on Disaster Management 2021 (WCDM2021), 24-27 November 2021**, IIT, Delhi, India
- (b) Arun Kumar Verma, Anjul Verma, Aditi Verma “ Coronavirus Spatial Big Data Analysis of Population Mortality and its Variability of 48 Countries Situated at Latitudes between 64°N and 35°S for Determining Factor as the Severity of the Outbreak”, **5th World Congress on Disaster Management 2021 (WCDM2021), 24-27 November 2021**, IIT, Delhi, India
- (c) Arun Kumar Verma, Anjul Verma, Aditi Verma “ Spatial Big Data Predictive Analysis of Coronavirus (Covid-19) Spectrum and Population Mortality for the Southeast Asian Region”, **5th World Congress on Disaster Management 2021 (WCDM2021), 24-27 November 2021**, IIT, Delhi, India
- (d) Arun Kumar Verma, Ranbir Nandan and Aditi Verma, “Spatial Big Data Predictive Analysis of Covid-19 Spectrum and Population Mortality from beginning of the

- outbreak to 31 December 2020 for the Southeast Asian Region”, **URSI (International Union of Radio Science, Belgium) –GASS (General Assembly & Scientific Symposium)- 2021**, Sapienza Faculty of Engineering, Rome, Italy, 28 August- 4 September 2021
- (e) Arun Kumar Verma, Anjul Verma, Ranbir Nandan, Aditi Verma “Spatial Big Data Analysis of Covid-19 for Determining Severity of the outbreak in the Southeast Asian Region”, **41st Asian Conference on Remote Sensing (ACRS2020), 9-11 November 2020, Deqing, China, Organised by Asian Association of Remote Sensing (AARS), Japan**
- (f) Arun Kumar Verma, Anjul Verma, Ranbir Nandan, Aditi Verma, “ Coronavirus Spatial Big Data Analysis for Developing Spectrum Models of Different Stages of the Outbreak to Predict the Trends of the Spectrum”, **41st Asian Conference on Remote Sensing (ACRS2020), 9-11 November 2020, Deqing, China, Organised by Asian Association of Remote Sensing (AARS), Japan**
- (g) Arun Kumar Verma, Anjul Verma, Aditi Verma, “ Covid-19 Geo-Spatial Big Data Analysis for the Impact of Latitude on Population Mortality for Countries Situated at Latitudes between 64°N AND 35°S”, **41st Asian Conference on Remote Sensing (ACRS2020), 9-11 November 2020, Deqing, China, Organised by Asian Association of Remote Sensing (AARS), Japan**
- (h) Arun Kumar Verma, Anjul Verma, Aditi Verma, “ Coronavirus Spatial Big Data Predictive Analysis for Southeast Asian Region”, **Defence S & T Technical Bulletin, Science & Technology Research Institute for Defence (STRIDE), Ministry of Defence, Malaysia, Vol-13, No-2, PP-344-366, 2000**
- (i) Verma Arun Kumar, Nandan Ranbir, Verma Aditi, “ Space-borne Synthetic Aperture Radar (SAR) Sensors in Low Earth Orbit for Real-Time Detection and Monitoring of Floods”, **Defence S&T Technical Bulletin, Science & Technology Research Institute for Defence (STRIDE), Ministry of Defence, Malaysia, Vol.12, No.01, PP 39-50, 2019**
- (j) Verma Arun Kumar, Nandan Ranbir, Verma Aditi, “ Knowledge Based Classifier based on Backscattering Coefficient for Monitoring the Crop Growth Analysis using Multi-Temporal Images of Space-Borne Synthetic Aperture Radar (SAR) Sensors, **ISPRS-WG III/10 GEOGLAM ISRS Joint International Workshop on “ Earth Observations for Agriculture Monitoring”, February 18-20, 2019, IARI, New Delhi, India**

- (k) Verma Arun Kumar, Nandan Ranbir, Verma Aditi, “ Knowledge Based System for Classification and Monitoring the Crop Growth based on Time Series Analysis of Backscattering Coefficients of Images of Space-borne Synthetic Aperture Radar” **2019 International Symposium on Remote Sensing, Organised by CSPRS (Taiwan) ,KSRS (Korea), RSSJ (Japan), NCU(Taipei) and CSRSR (Taipei), 17- 19 April 2019, Taipei, Taiwan**
- (l) Verma Arun Kumar, Nandan Ranbir, Verma Aditi, “ Space-Borne Synthetic Aperture Radar (SAR) Sensors in Low Earth Orbit for Real-Time Detection, Monitoring of Floods and Disaster Management”, **39th Asian Conference on Remote Sensing (Organised by Malaysian Remote Sensing Agency, Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC), Kuala Lumpur, Malaysia and the Asian Association on Remote Sensing, Japan) held at Renaissance Hotel, Kuala Lumpur, Malaysia, 15-19 October 2018.**
- (m) Verma Arun Kumar, Nandan Ranbir, Verma Aditi, “ Space-borne Synthetic Aperture Radar (SAR) System for Real Time Surveillances of Earth Surface for Detection and Management of Flood Disaster in Indian Sub-continent”, **Journal of Applied Mathematics and Computation (JAMC),USA, 2(5), 166-177, 2018.**
- (n) Verma Arun Kumar, Nandan Ranbir, Verma Aditi, “ Space-borne Synthetic Aperture Radar (SAR) System for Real Time Surveillances of Earth Surface for Detection and Management of Flood Disaster in Indian Sub-continent”, **38th Asian Conference on Remote Sensing organized by Indian Space Research Organisation (ISRO) in association with Asian Association of Remote Sensing (Japan) held at New Delhi during 21-25 October 2017, India**
- (o) Arun Kumar Verma, Ranbir Nandan and Aditi Verma , “ Applications of Synthetic Aperture Radar (SAR) Imaging Technology for monitoring the characteristic flow of River Ganga and Flood Management”, **International Conference on Incessant Ganga; Feb 25-26, 2017; PP 47; Hotel Maurya, Patna;** Organised by Water Resource Department (WALMI), Government of Bihar
- (p) Arun Kumar Verma, Ranbir Nandan, Aditi Verma and S K Singh “ Space-borne Synthetic Aperture Radar (SAR) System for Near Real Time Detection and Monitoring of Flood in Eastern Region of India”, **International Seminar on “Floods and Water Resource Management in the Eastern Region of Indian Sub- Continent”;** Organised by Indian Engineers Association (IEA), Abhiyanta Bhawan, 28 May 2017, PP-40-52

Research Domain:

Radio-wave Propagation and Radio Link Planning for Earth to Space & Terrestrial Communication at mm-wave frequencies (above 10 GHz), Climatology

- (q) Arun Kumar Verma, Ranbir Nandan and Aditi Verma, “ Rain Attenuation Model due to Non-uniform Horizontal Rain Structure for 30 GHz LOS Radio Link in Indian Tropical Climate”, **URSI (International Union of Radio Science, Belgium) – GASS (General Assembly & Scientific Symposium)- 2021**, Sapienza Faculty of Engineering, Rome, Italy, 28 August- 4 September 2021
- (r) Verma Aditi and Verma A.K., “Variability of Rain Structure and Effective Radio Path Length for 20 and 30 GHz LOS Radio Link in Indian Tropical Climate”, **URSI (International Union of Radio Science, Belgium) –GASS (General Assembly & Scientific Symposium)- 2021**, Sapienza Faculty of Engineering, Rome, Italy, 28 August- 4 September 2021
- (s) Arun Kumar Verma, Ranbir Nandan and Aditi Verma “ Cross-Polarisation Discrimination (XPD) Model due to rain for 20 GHz and 30GHz LOS link for Indian Tropical Climate” **URSI-RCRS 2020 (International Union of Radio Science- Regional Conference on Radio Science 2020)** , IIT (BHU), Varanasi, India, 12-14 February 2020
- (t) Arun Kumar Verma, Ranbir Nandan and Aditi Verma “ Cross-Polarisation Discrimination (XPD) Model for 30GHz (VP/HP) radio signals due to rain for Indian Tropical Climate” **2019 IEEE-Indian Conference on Antenna and Propagation (InCAP2019), 17-21 December 2019**, Ahmedabad, India
- (u) Verma A.K., Nandan Ranbir, Verma Aditi, “Rain-Drop Size Distribution and Variability of Specific Rain Attenuation for Indian Climate”, **URSI (International Union of Radio Science:)- Asia Pacific Radio Science Conference (APRSC)-2019**, New Delhi, India, 09-15 March 2019
- (v) Verma A.K., Nandan Ranbir, Verma Aditi, “Modelling of Rain Drop Size Distribution and its effect on Specific Attenuation at mm Wave for Asia Pacific Climate”, **IEEE: 8th Asia Pacific Conference on Antennas and Propagation, August 4-7, 2019, Incheon, South Korea**

(w) Verma A.K., Nandan Ranbir, Verma Aditi, “Measurement of XPD for 30GHz Radio-link due to rain for Indian Climate”, **IEEE: 8th Asia Pacific Conference on Antennas and Propagation, August 4-7, 2019, Incheon, South Korea**

(x) Verma A.K., Nandan Ranbir, Verma Aditi, “ Regional Variability of Specific rain attenuation in mm wave region for Indian Sub-tropical climate”, **IEEE- Indian Conference on Antenna and Propagation (InCAP)** (Indian Chapter of APS in association with IEEE APS), **December 16-19, 2018, Hyderabad, India**

(y) Verma A.K. and Verma Aditi “ The role of mm wave bands cellular communication network in the development of Smart City” , **India International Science Festival 2016; December 07-11, 2016; CSIR-National Physical Laboratory, New Delhi: Young Scientists Conclave 08-11 December 2016: Digital India: DIGI-45,pp-51**

14. Research-Publication-DRDO-NEC

Research Publication / Conference / Invited Talks/ Citations

Publications: International

Sr No	Authors	Topic	International Name of Journal/ Conference
1	A K Verma , K K Jha	“The effect of tropospheric thermal lenses on radar propagation”	<i>IEEE (Institution of Electrical & Electronics Engineers, USA) -Antenna and Propagation Symposium-APS (USA) 1993, 28 June – 2 July 1993, P 1093-96, Vol-2</i>
2	B S Jassal, G D Gupta, AK Verma	“20/30 GHz Radiometric propagation measurements in India”	<i>IEEE (Institution of Electrical & Electronics Engineers, USA) - Antenna and Propagation Symposium-APS (USA), PP 1340-43, 1994</i>
3	A K Verma , K K Jha, SC Prasad	“ Propagation delay in radio signals due to tropospheric thermal lenses”	<i>Speculation in Science and Technology, An International Journal of Innovation and Creativity, Science and Technology Letters (UK), Vol 17, no1, pp 49-61, 1994,</i>
4	A K Verma , K K Jha, R K Tewari	“ The effect of the atmosphere on radio and radar performance”	<i>Fourth IEEE-Region-10: International Conference of Information Technology for the 90’s: Energy, Electronics, Computers and Communication, Bombay, pp 844-847, 22-24 November, 1989,</i>
5	A K Verma , K K Jha	“ The Pattern of tropospheric thermal lenses in desert climate and its effect on	<i>Proc. of International Symposium on Radio Propagation (ISRP), Aug 18-21, 1993, China</i>

		radiowave propagation”	
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6	A K Verma , K K Jha	"Aircraft Interference signature of radio wave signals in tropospheric communication",	Proc. of 3 rd <i>International Conference in Electromagnetic Interference and Compatibility (INCEMIC-92)</i> , 2-4 December, 1992, Calcutta
7	A K Verma , K K Jha, S C Prasad	" Phase delay in radio signals due to tropospheric thermal lenses",	Proc. of <i>International Conference on mm and microwave (ICOMM)</i> , PP 705-8, December 21-23 , 1990
8	B S Jassal, A. K. Verma , Lal Singh	" Modeling of raindrop size distribution and attenuation for Indian Climate"	Proc. of Fourth <i>International Symposium on Recent Advances in Microwave Technology (ISMART-93)</i> , pp 483-486, December 15-18, India,

Research Paper: Publications: National

Sr No	Authors	Topic	National Name of Journal
1	K K Jha, A K Verma	" Estimation of propagation delay and range error of radio signals due to tropospheric thermal lenses"	<i>IETE (Institution of Electronics & Telecom Engineers) -Tech Review</i> ,1993
2	A K Verma , K K Jha S C Prasad	" A theoretical model to explain fading of radio signals due to tropospheric thermal lenses"	<i>IJRSP (Indian Journal of Radio and Space Physics)</i> , Vol-21, No-05, P 282- 85, 1992,
3	A K Verma , K K Jha	" Radar Range Reduction due to formation of thermal lens"	<i>IJRSP (Indian Journal of Radio and Space Physics)</i> , Vol -21, no-06, p 334-37. 1992
4	B S Jassal, A K Verma , Lal Singh	"Influence of raindrop size distribution and attenuation for Indian Climate"	<i>Indian Journal of Radio and Space Physics</i> , Vol 23, pp 193 -196, 1994.
5	A K Verma , K K Jha	"Influence of raindrop size distribution of specific attenuation at mm waves"	<i>Indian Journal of Radio and Space Physics</i> , Vol 25, p 179-186, 1996,
6	A K Verma , K K Jha	"Raindrop size distribution model for Indian Climate"	<i>Indian Journal for Radio and Space Physics (IJRSP)</i> , Vol 25, p 15-21, 1996,
7	K K Jha, A K Verma R K Tewari	"A structured review of propagation conditions in tropospheric duct"	<i>Journal of IETE (Institution of Electronics & Telecom. Engineers)</i> , Vol 35, 476-82, 1989,
8	K K Jha, A K Verma R K Tewari	" Atmospheric effects and Interference in point to point communication"	<i>Journal of IETE(Institution of Electronics & Telecomm Engineers)</i> , Vol 35, no6, p 317-322, 1989,

9	A K Verma , K K Jha	“ Propagation delay and range error of radio signals	<i>Technical News Letters,</i> <i>Communication Electronics</i>	<i>Joint</i> <i>Staff</i>
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	R K Tewari	due to tropospheric thermal lenses”,	(Army), pp 24 -33, 1993
10	K K Jha, A K Verma , R K Tewari	“ Radiowave attenuation due to formation of thermal lenses”	<i>Indian Journal of Radio and Space Physics</i> , Vol 21, pp 1-4, 1992
11	A K Verma , K KJha	“ Estimation of propagation Delay and range correction error of radio signals due to tropospheric thermal lenses”	<i>Journal of IETE</i> (Institution of Electronics & Telecom. Engineers): Technical Review, Vol 10, no 1, pp 9 - 14, 1993
12	A K Verma , K K Jha	“ A New Propagation model to explain Trans-Horizon Communication”	<i>Journal of IETE</i> (Institution of Electronics & Telecom. Engineers), Vol. 42, p 41-46, 1996
13	A K Verma , K KJha R K Tewari	“ A Blackout of Radio signals due to formation of Diffraction grating in the atmosphere ”	Proc. <i>National Conference on Electronics Circuits and Systems</i> , Nov 2-4, 1089, PP 549-551, University of Roorkee,
14	A K Verma	“Radiowave propagation andelectromagnetic interference”	<i>Akhil Bhartyia Vagyanik Sangosthi</i> ,Nov , 2005, DEAL, Dehradun
		Space-Borne Synthetic Aperture Radar (SAR) Sensors & Remote Sensing	
14	A K Verma , R K Goyal	“ Mathematical Formulation for estimation of Base-line in SAR Interferometry”	Published in <i>SADHNA: Academy Proceeding in Engineering Science</i> , Vol. 21, pp 511-522, 1996
16	A K Verma , R K Goyal	“ A Novel Two Dimensional Theory for Topography Estimation with Interferometric Synthetic Aperture Radar”	<i>Journal of I E T E</i> (Institutional of Electronics & Telecom. Engineers) , Vol 43, no 1, p 33-40, 1997,
17	A K Verma	“Mapping of Fishery potential for NER”	Proc. of <i>Conference for Development of Fishery in NER</i> held at Shillong, 2000, Organised by National Bureau Fish Genetic Research , ICAR, Lucknow.
		ICT : Digital Healthcare	
18	A K Verma	“ Development of Telemedicine Network of NER: A view”	<i>First Telemedicine Live Conclave</i> Arranged by Asia Heart Foundation, Bangalore in association with Department of Space, 2003
19	A K Verma	“ Development of Telemedicine Network Planning for NER”	<i>National Conference on Information Technology</i> , Shillong, 2003

20	A K Verma	Invited Talk on “ Telemedicine Programmes in Semi Urban Settings”	Organised by <i>Chairman, Confederation of Indian Industry (CII)</i> , Health Care Sub- committee, Sept 12, 2003
21	A K Verma	“ Telemedicine: An alternate healthcare infrastructure”	<i>Workshop cum Training for Telemedicine for Doctors / Nurses</i> , Organised by Asia Heart Foundation (AHF) Bangalore, June 2003
22	A K Verma	“ Interoperability of Telemedicine System and Network: An Important Factor to Revolutionize Healthcare Services in Multi- Service Provider Environment”	<i>International conference of Telemedicine</i> , ISRO Hqrs, Bangalore, Feb 2005

Citation / Reference of Major Area of Research Paper Publication

**(a) Microwave Imaging: : Microwave Image Processing and Remote Sensing Technology
(Space Technology Applications)**

Research Paper:

- i. “ Mathematical Formulation for estimation of Base-line in SAR Interferometry”
Published in SADHNA: Academy proceeding in engineering science, Vol 21, pp
511-522, 1996 (Dr A. K. Verma and R. K. Goyal)
- ii. “ A Novel Two Dimensional Theory for topography estimation with
Interferometric synthetic Aperture Radar” Journal Of I E T E, Vol 43, no 1, p 33-
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- i. NASA, SAR Interferometry Group, NASA-Library List, *JPL*(Jet Propulsion Lab,
California)
- ii. *NASA Scientist: Review Paper “ Synthetic Aperture Radar Interferometry”*
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hazard programme office, NASA.
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- v. “*Crustal Deformation Studies Using SAR Interferometry*” : <http://www.radar.jpl.nasa.gov/sect323/insarcrust/home.html>”
- vi. Paper : “ *Forest Mapping and monitoring with Interferometric SAR (INSAR)*” : Author Prof Heiko Baltzer, Progress in Physical Geography Vol 25, p 159-77, Year 2001 (Our reference 26/65)
- vii. INSAR “ Leicester Research Archive”

(b) Radio wave Propagation Theory (Electromagnetic Field Theory) and EM Wave Propagation Modeling (Tropospheric Thermal Lenses and its effect: Ph.D. Area)

Research Paper:

- i. “Radiowave attenuation due to tropospheric thermal lenses” IJRSP, Vol 21, no-1, P 1-4, Feb 1992: Jha, Verma and Tewari, and work related to the effect of thermallenses on radio and radar signals
- ii. “ Atmospheric effects and Interference in point to point communications” Journalof IETE, Vol 35, No 6, P 317-22, 1989 : Jha, Verma and Tewari;
- iii. “Structured review of propagation conditions in tropospheric ducts” IETE Technical Review, pp 476-82, 1989; KK Jha, A.K.Verma, R KTewari

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- i. “*A Novel empirical model of the K-factor for radio wave propagation in southern Africa for communication planning Applications*” : By Palmer Andrew J., 2004 ; Department of Electronics, Electrical and Computer Engineering; Supervisor:Prof D C Beker: Committee Chair (10-09-2003), *University of Pretoria, Southern Africa* : Doctoral Thesis
- ii. “ *Statistical characteristic of atmospheric noise temperature induced by rain at mm waves band in Xiaing in China*”, S. Gong, Wei , T Zheng, X. Li, School of Science, Xidian University, Xian , China, *PIERS Proceedings , Kuala Lumpur, Malaysia, March 27-30, 2012,Pp 1188-1193*

- iii. "A Practical MGA ARIMA Model for forecasting real time dynamic rain induced attenuation" S. Gong, Wei, Zheng and Li, School of Science, Xidiaain University, PP 1-14
- iv. *adsabs.harvard.edu, NASA: Astrophysics Data System*

(c) Microwave and mm wave Communication System: Planning and Link Design (Terrestrial, Satellite and Space to Earth Path Communication System) ; Effect of Hydrometeors in microwave and mm wave (up to 100 GHz) ; Atmospheric / Climate Modeling: Rain Drop Size Distribution Models/ Specific attenuation Characterization

Citation/ Reference (Major) : Recent

- i. " Variability of mm wave rain attenuation and rain rate Prediction: A survey" : R. Bhattacharaya et al, Department of Environmental Science, University of Kalyani, Kalyani, WB : *Indian Journal of Radio and Space Physics, Vol 36, 2007*, pp 325 -344
- ii. "Computation of scattering parameters using long-normal DSD at 16.0, 19.3 and 34.8 GHz for spherical and oblate spheroidal rain models."Aderemi Sikiru Adekola, Department of Physics, Federal University of Technology, Nigeria, *Asian Journal of Scientific Research , 1 (3), 213-222, 2008*
- iii. "Shape of Rain drop Size distribution and classification of rain type at Gadanki": M. Konwar, DK Sarma,J Das and S.Sharma, Nagaland University, and ISI, Kolkatta: *IJRSP, Vol 35 (5), P 360-67, Oct 2006*
- iv. "Retrieval of RDSD from L-Band and VHF Wind Profilers during convective and stratiform rain". S. Sharma, DK Sarma and M Konwar, Nagaland University and J Das, ISI Kolkatta, *IJRSP, Vol 37 (3), PP 185-196, 2008*
- v. Modelling of RDSD for tropical hot semi arid site in India: B. S. Jassal et al, Graphic Era University, Dehradun, *IJRSP Vol 40 (6) , pp 330-339, December 2011*
- vi. "Comparison of DSD between stations eastern and western coasts of India" R Harikumar, S. Sampath and others, Atmospheric Science Division, Centre for Earth Science Studies, Thiruvananthapuram, *Journal Indian Geophysics Union, April 2007, Vol 11, no 2, P 111-116, 2007*

- vii. "Regional Variability of RDS model in India" A Vidyarthi, BS Jassal , R Gowri and AK Shukla (Space Application Centre, ISRO, Ahmedabad), Graphics Era University, Dehradun, *Progress in Electromagnetics Research Letters, Vol - 34, P 123-135, 2012*
- viii. "Obtaining RDS model using method of moments and its applications for South Africa radio system." *Progress in Electromagnetic Research-B, Vol 46, p 119- 138, 2013*, Authors: Snzo J Malinga, PA Owolawi, Department of Electrical Engineering, Mangosuthu University of Technology, Kwazulu-Natal, South Africa
- ix. "An artificial neural network based approach for estimation of rain intensity from spectral moments of dopplar weather radar" *Advances in Space Research, Vol 47, issue-11, p 1949-57, June 2011* , Authors: Devjoyti Dutta, Deptt of Physics, Kohima Science College, Kohima, Nagaland, GK Sen, Jadavpur University, BAM Kanan, IMD, New Delhi; S.Vekatasawarlu, Cyclone Warning system, IMD, Vizag; RM Goirala, SAC Ahmedabad,; J Das, Ex- ISI, Kolkatta; G. Viswanathan, Ex-ISRO, Radar Div. , Bangalore
- x. "Characterisation of rain integral parameters during tropical convective, transitional and stratiform rain at Gadanki and its application in rain retrieval" *Journal Applied Meterology and Climatology, Vol 48, p 1245-66, 2009* ; M. Sharma, DK Konwar, AR Sen
- xi. "Detecting rainfall interception in an Amazonion rain-forest with eddy flus measurement" Mathew J. Czikowsky and David R Fizjarrald, *Journal of Hydrology, Vol 337, Issues 1-2, 20 Oct 2009, pp 92-105*
- xii. "An Empirical model for variation of RDS with rain rate at few locations in southern India" *Advances in Space Research, Vol 43, Issues-5, March 2009, pp 837-84*, R Harikumar, S. Aampath and V Sasi Kumar
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- xiv. "Generalised mathematical model for RDS for applications in radiowave propagation and meteorological studies" K.L.Timothy and S K Sarkar,

Electronics Letters, Vol 33, Issue-10, 8 may 1997, P 895-97; Radio Science Division, NPL, New Delhi

- xv. *“Regional Variability of rain drop distribution model in India” Progress in Electromagnetic Research Letter, A.Vidyarthi, B.S.Jassal, R.Gowri and A.K.Shukla, Vol 34, p 123-135, 2012*
- xvi. *“ Modelling of RDSD for Indian Region “ A.Vidyarthi, BS Jassal, R. Gowri; Microwave Technology & Computational Electromagnetic (INCEMIC), 2011, IEEE International Conference; 22-25 May 2011, P 350-353*
- xvii. *Rain attenuation modelling from measurements of rain drop size distribution and Comparison between empirical log-normal and gamma rain drop size distribution models for Indian region” A. Vidyarth, BS Jassal, R. Gowri & A.K. Shukla; Microwave Conference Proceedings, 2011, Asia-Pacific Microwave Conference Proceedings pp 1686-89, 2011*

15. Additional Course

Course	Specifications	Institute/ University	Year
Advance Course	mm Wave Communication Technology	Institute of Radio Physics and Electronics (IRPE), Calcutta University, Kolkatta	Nov 1991 to Jan 1992

16. Additional Information

- (a) *35+ years of Research and Technology Development; Technology Policy Planning & Management; Co-ordination with Different Central/ State Government Agencies, and Administration and Management of multi-domain Institutions*
- (b) *More than 10 years of experience as Technology Policy/ Plan during 9th/ 10th /11th Five Year Plan of Government of India and member of various national committee / task force/ working group / constituted by Planning Commission and different Central Ministry*
- (c) *Internationally Accredited Radio Scientist by International Union of Radio Science (URSI), Belgium*