

## **PROFILE OF DR MUKUND KADURSRINIVAS RAO, ADJUNCT FACULTY, NIAS**

### **A1 PERSONAL DETAILS:**

Born on January 26, 1959 at Hiriyur, Karnataka. Completed schooling in 1975 from Kendriya Vidyalaya. Obtained B.Sc. degree from Gujarat University with special distinction of 1<sup>st</sup> Rank in Geology. Completed M.Sc. from Gujarat University, Ahmedabad and secured the First Rank in Geology. Awarded MPhil degree from Andhra University, Vishakhapatnam (2002) and later in 2006 obtained Ph.D. degree in Remote Sensing and GIS from Andhra University, Vishakhapatnam.

### **B1 OVERALL EXPERIENCE:**

Started career in 1980 at Narmada dam site investigation at Kevadia, Gujarat working for the Gujarat Government and quickly joined the Indian Space Research Organisation at the Space Applications Centre, Ahmedabad in 1981 and later moved to ISRO Headquarters, Bangalore in 1994 where he held different positions and worked till 2005. Since 2005, he has led business initiatives in EO/GIS/Space in India as CEO/President and presently he is an independent International Consultant in EO/GIS/Space and guides/steers EO/GIS/Space activities of various government agencies and international agencies.

Over the past ~33 years, have assimilated the following experiences:

- technological, applications and business knowledge of information systems design and implementation - with specific reference to space-based EO and communications satellites, use of EO images and maps, organising GIS applications – both within government and private sector systems
- unique experience of governmental and business environments – thereby able to combine “best of both worlds” to bring efficiency in outputs and costs, quality performance and process adherence which helps to position innovative and futuristic EO/GIS/Space information systems
- excellent ability to team-work, align “disparate” groups and motivate people to problem-solving and implementation of solutions efficiently

Present Positions (as of January, 2014):

- International Consultant on EO, GIS and Space (May, 2010 onwards) – offering technical knowledge and expertise to government, private sector and academia.
- Adjunct Faculty, National Institute of Advanced Studies (NIAS), Bangalore (March, 2011 onwards)
- Adviser, Karnataka State Remote Sensing Applications Centre (KSRSAC), Government of Karnataka (May, 2013 onwards)
- Principal Investigator, DST Sponsored project on National GIS Standards at NIAS (October, 2014 onwards)

Major Positions held (Past/Completed):

- Member of National Task Force on Geo-spatial Education of MHRD (October 2010 to September, 2013)

- Member of Karnataka Knowledge Commission (January, 2012 to March, 2013) and Chairman Karnataka-GIS Task Force (March, 2012 to March, 2013)
- Adviser, Karnataka State Remote Sensing Applications Centre (KSRSAC), Government of Karnataka, Bangalore (December, 2011-November, 2012)
- Principal Investigator to Department of Science and Technology (DST), India sponsored projects on “GI Policy Perspectives” at NIAS (January, 2012 – November, 2012)
- Consultant on National-GIS, Planning Commission of India (May, 2011 - Feb, 2012)
- Member-Secretary, National GIS Interim Core Group, Government of India (May, 2011 to October, 2011)
- Associate President for Business Development, Devas Multimedia Ltd (May, 2010 to March, 2011)
- International Consultant to a New-Zealand GIS Group (February, 2011 – February, 2013)
- ESRI Technology Strategist to ESRI India (November, 2010 – April, 2011)
- Executive Consultant to President, ESRI (May, 2010 to November, 2010)
- President and COO at ESRI India, New Delhi (August 2008 - April, 2010)
- Consultant to a Canadian agency for EO/GIS (2008)
- Chief Executive Officer at Navayuga Spatial Technologies Pvt Ltd (NST), Bangalore (India) and Director, Navayuga Middle East FTC, Ras-Al Khaimah (2005 - 2008)
- Deputy Director (Natural Resources Repository), Indian Space Research Organisation (2003-2005) - Secretary, Planning Committee of National Natural Resources Management System (PC-NNRMS); Member-Secretary of NNRMS Standing Committee on Urban Management (SC-U), Standing Committee on Cartography (SC-C) and Programme Coordinator (Natural Resources Repository), Indian Space Research Organisation
- Deputy Director (Technology and Systems), Indian Space Research Organisation (1998-2003) and Project Manager (Natural Resources Information System, Indian Space Research Organisation; Member-Secretary of NNRMS Standing Committee on Urban Management (SC-U), Standing Committee on Cartography (SC-C); Member-Secretary, UN CSSTEAP Advisory Committee
- Manager (User Services and Utilisation, Indian Space Research Organisation (1995-1998)
- Scientist/Engineer, Indian Space Research Organisation (1981 – 1995)
- Junior Geologist at Narmada Dam Project, Kevadia, Gujarat (June, 1980 to Jan, 1981)

**C1 24 YEARS IN ISRO - GOVERNEMENT EXPERIENCE (Jan 1981 – Aug 2005)**

Over 24 years in ISRO, was charging its EO Applications programmes through active involvement in IRS programme; National Natural Resources Management System (NNRMS); India’s National Spatial Data Infrastructure (NSDI) and also furthering EO Applications and SDI concepts at international levels. Key accomplishments include:

- Started tryst with EO and GIS in 1981 and developed applications – especially based on digital analysis of EO images and GIS integration for change analysis of Ahmedabad city;
- During 1982-1988, contributed significantly in coordination of ISROs Joint Experiments Programme (JEP) – especially programme monitoring and implementation for geological applications. Later, significantly contributed in definition of Indian Remote Sensing Utilisation Programme (IRS-UP) and its systems implementation coordination.
- During 1983-1987, was one of key persons involved in conceptualization of ISRO’s nation-wide Natural Resources Information System (NRIS) and initial demo-studies for Mineral Exploration and landuse change analysis. Undertook an exhaustive design re-engineering study for GIS software.

- During 1984-1990, led a team to implement the first GIS projects in urban management and regional planning – GIS for Delhi Metropolitan Area (DMA); GIS for Mumbai MRDA; GIS for regional district planning (Bharatpur); GIS Wasteland development (Dungarpur) and National Capital Region (NCR) GIS. Worked on standardizing design of GIS projects – especially focusing on multi-layered GIS data for districts focussing on GIS for District planning.
- During 1988-1994, was principal scientist and lead of technical team that developed ISROs indigenous GIS software – ISROGIS. Key person involved in design, development coordination, testing and systems applications – resulting in India’s first GIS software that was available in market under ISRO technology transfer.
- Have actively contributing to national- and international-level efforts at EO/GIS standardization – developed and scripted GISMARK – a test suite for GIS package evaluation in 1988; defined inter-operable EO/GIS Design Standards in 1994; significantly contributed to EO-based NRIS Standards in 1996; led the development of geo-spatial Metadata Standards for NSDI in 2004 and provided leadership in development of the widely-referenced NNRMS Standards for EO and GIS Applications in 2005.
- During 1995-2002, played a programmatic lead role in development and implementation of the nation-wide NRIS programme as a multi-institutional GIS effort in 35 districts and 17 states – GIS concepts and applications were taken into state and district environments for first time.
- From 1994 onwards, was coordinating the EOS programme in ISRO by working for planning and management of IRS. Was key person in developing, for the first time, the Remote Sensing Data Policy for India and also in shaping India’s National Map Policy. Played a leading role in ISRO for developing the ISRO EO-2025 Strategy – defining key actions for growth and leadership of Indian EO programme and definition of a 25-years rolling road-map of IRS missions and applications of benefit to society and commercial development.
- During 2001-2003, was key person for ISRO undertaking a Peer-Review of IRS Applications that involved 12 ministries/users in India and developing frameworks of national GIS applications leading to definition of some important user-ministry led initiatives - National Urban Information System (NUIS), National Soil and Land Degradation mapping, National geomorphological mapping project and many others.
- Was actively involved in development of ISROs 9th and 10th Five-Year plans for IRS and EO applications.
- From 1994 onwards, as Member-Secretary, NNRMS Standing Committee on Urban Management (SC-U), key person in conceptualizing/developing NUIS programme – in terms of design and definition, project proposal preparation, NUIS Standards preparation and working with MUD/TCPO to make the programme into a reality.
- During 2000-2005, key anchoring person for the conceptualization and development of India’s National Spatial data Infrastructure (NSDI) Strategy and Action Plan and have been spear-heading the propagation of SDI concepts through enterprise GIS Applications development. In 2002, undertook the first demonstration of NSDI at national level. In 2004,

conceptualized and operationalised the NNRMS Portal enabling the first-of “EO and GIS Data Services”.

- In 2003, steered the re-structuring of NNRMS activities under a new programme of Natural Resources Repository (NRR) and headed the NRR programme as its Programme Coordinator – steering concept and implementation of Natural Resources Census using satellite images, Natural resources Data Base (NRDB) as a repository of all data, Cadastral Referencing database (CRD) to bring in cadastral reference to satellite images, Large Scale Mapping (LSM) for mapping at 1:10000 scale from images and development of a NNRMS Portal – a single gateway for NNRMS data. Heading NRR, he was the key person who prepared the NNRMS Standards in 2005.
- In 2004-2005, through ISRO worked with NIC and Planning Commission and undertook the design and establishment of National GIS demonstration exercise with nation-wide GIS data and visualisation/query.
- In ISRO, provided leadership and intense efforts at institutional building – establishment of UN-CCSSTEAP, its international level management and developing education programmes and accreditation; preparatory activities coordination and establishment of North Eastern – Space Applications Centre (NE-SAC); providing headquarters coordination for EO and GIS activities of SAC/ISRO, NRSA, RRSSCs, State RS Applications Centre and constant development of user-interfaces with large number of Ministries and departments at centre and state-level.
- Served as Local organizing Secretary for the 90<sup>th</sup> Indian Science Congress of 2003; Organising Secretary for India – United States Conference On Space Science, Applications, and Commerce - Strengthening and Expanding Cooperation (2004); IAA Asia Pacific Regional Conference on Advances in Planetary Exploration (2005) and others.

**D1 ~6 YRS INDUSTRY EXPERIENCE (Aug 2005 –Apr 2011):**

After 2005, leading as CEO in a start-up GIS company (Navayuga Spatial Technology Pvt Lrd) and later as President in a leading Indian GIS company (NIIT-GIS – distributor of ESRI in India), established efficient and successful business models for GIS Applications and Enterprise GIS Solutions. Major achievement was to convert a start-up into a leading GIS solutions/services company within 3 years; in bringing solution-centric efficiency for distribution of GIS software in India and positioning GIS as an important element of business processes and architecturing large GIS solutions with an efficient business model.

In the private sector, was instrumental in acquiring large GIS solution projects in India/ME/Japan/US and other geographies. Provided technical leadership in positioning efficient delivery processes for GIS projects - bringing profit-centricity to GIS projects and addressing GIS solutions for governance, enterprises and citizen services.

Key leadership role in architecturing the Delhi SDI based on images/GIS; the NSDI Geo-Portal development; the UAE-Ras Al-Khaimah Enterprise Image/GIS solution; Singapore's 1-Map Geo-Portal solution; Kanpur's Municipal GIS solution based on EO; CRRI's Road Information System Portal on images/GIS; Karnataka's EO-based Disaster Management Portal; the design of Mumbai EO/GIS solution; design of Power-Utility Image/GIS solutions and many other projects.

For a short stint of 9 months (at Devas Multimedia Solutions), provided leadership for ideating and designing of new applications through synergy of personalized satellite communications technology with GPS/GIS technology to position unique integrated solutions/services for government sector - Railways Real-time Positioning and Tracking solution, Defence and Security field communication and positioning solution, Cadastral Tracker etc

**E] ~3 YEARS IN CONSULTING DOMAIN (May 2011 onwards)**

My deep understanding of EO/GIS/Space technology; strategic approach at large solutions development, excellent networking skills – are being sought by government, global and national private sector entities and academia – especially for EO/GIS systems design/configuration and implementation; EO/GIS applications solution designing and architecturing; EO/GIS project design and guiding and for establishing efficient test and evaluation and quality assessment processes.

As Expert Consultant to Planning Commission and to Government of Karnataka (GOK), driven the conceptualization and definition of the National GIS and Karnataka-GIS vision and also strong advocacy for a national agency responsible for GIS

- **National GIS Programme and Vision definition:** As part of this my major role has been in:
  - Preparation of the National GIS Vision/Programme document by adopting a unique model of multi-pronged consultation and visioning exercise with government, industry and academia/NGOs.
  - Generation of National GIS Standards inputs by assessment of national and international standards activities.
  - Drafting the proposals on National GIS and INGO for EFC and Cabinet approvals
  - Served as Member-Secretary of and coordinated all activities of National GIS Interim Core Group constituted by Planning Commission vide Order No 12016/8/2010-S&T of April 25, 2010.

As Chairman, Karnataka Knowledge Commission's GIS Task Force and in role of Advising KRSAC:

- **Karnataka-GIS Visioning and User Needs Assessment:** Undertook a visioning exercise for a State GIS system for Karnataka – dove-tailed to National GIS and led the development of a comprehensive assessment of user needs, in terms of GIS data and applications for various state departments, citizens etc. Reports on Vision of K-GIS and User Needs for K-GIS have been brought out and submitted to GOK.
- **GIS Portal of KRSAC:** Advising and guiding KRSAC in the design and development of a GIS Portal for Karnataka – based on available image/map layers and web-interface for user display and query operations. The Portal is a proto-type GIS Portal demonstrating K-GIS concept.

In strategic Consulting in space-based EO and GIS eco-system undertaking consulting and “think-tank” activities in advanced technological and policy aspects of Earth Observation, GIS and Space in National Institute of Advanced Studies:

- **National GI Policy:** For a DST Sponsored project to NIAS, led the study for a policy-analysis on Geographic Information (GI) in the context of National GIS. Undertook an exhaustive analysis of policies of world and of Indian scenario and a parametric analysis for

GI Policy for India. A NIAS report has been published for this study including a proposed a draft GI Policy for India.

- **National GIS Standards, Spatial Framework and Technologies:** Presently leading the DST Sponsored techno-study at NIAS to define GIS Standards, define and design Spatial Framework and identify technology-slate for National GIS. Assessing the world status of GIS Standards and also the Indian scene of GIS Standards. A report is being prepared for this.
- **Technology Policy perspective studies** – assessing policy status, assessing technology requirements and articulating policy tenets in specific high-technology regimes for India being undertaken – am providing key leadership to these activities.

Continue to provide consultancy to private sector agencies – national and international level in terms of technically helping and assisting - especially for EO/GIS systems design/configuration and implementation; EO/GIS applications solution designing and architecturing; EO/GIS project design and guiding and for establishing efficient test and evaluation and quality assessment processes.

Invited and participate in many national and international media interactions (national and local TV and print) for TV debates, TV discussions and articles/interviews on topics related to EO, GIS and Space.

Also guide students for their project dissertations, PhD courses etc.

#### **F] INTERNATIONAL POSITIONS/EXPERIENCE:**

Well-known in India and also in the world and has held many important international positions. Was the ISRO Member of CEOS Working group on Information Systems and Services (1995-2005); Member of IAF EO Committee (1996-continuing); ISRO Member of international Committee on Earth Observations Satellites (CEOS) Secretariat (1996-99); first Chairman of CEOS Working group on Education (1999-2005); Member of UNISPACE-III Secretariat (1999); Member of UN CSSTEAP Advisory Committee (1998-2005); Vice-President of the International Astronautical Federation (IAF) (2002-2006); founding and first President of the international Global Spatial Data Infrastructure Association (GSDI) (2003-2004); elected Member of International Academy of Astronautics (IAA) (2004-Continuing); Member of IAA Study Group on Space for Peace (2003-2004); elected Member of International Institute of Space Law (IISL) (2013 onwards).

Have been an active participant in International Society for Photogrammetry and Remote Sensing (ISPRS) activities and also supported UN-Office for Outer Space Affairs and UN-ESCAP activities.

During 1995-1996, served as Consultant to ESCAP's Space Technology and Applications programme for preparing a "Handbook for GIS" – which was published by ESCAP in 1997?

Played a major role in the IAA study on "Space for Peace" which helped IAA to position an inter-agency initiative for peace activities and reconstruction of Afghanistan using space technology.

#### **G] MAJOR ORGANISATIONAL ACTIVITIES**

Have also organized major national and international Conferences – bringing visibility to Indian EO and GIS and also enabling a forum for Indian experts to gain visibility to international trends/prospects:

- Organising the Committee on Earth Observation Satellites (CEOS) Working group on Information Systems and Services Meeting in Bangalore, India in October, 1998.
- As CEOS Secretariat, organised international Committee on Earth Observation Satellites (CEOS) Plenary and International Global Observing Strategy (IGOS) Forum meeting in Bangalore, India in November, 1998.
- Organising Secretary of 91st Indian Science Congress (ISC) in Bangalore, India in January, 2003.
- Presidential leadership for the 7th GSDI Conference in Bangalore, India during February, 2004 and taking over as President of GSDI association in 2003 for 2 years.
- Coordinating, steering and conduct of the Indo-US Conference on Space Technology Cooperation and Commercialization in Bangalore, India in 2004 – which paved the way for adoption of a Indo-US Space Vision that has been the basis of subsequent space cooperation activities between India and US.
- Coordinating and conduct of the International Academy of Astronautics & International Institute of Space Law Conference on “Advances in Space Exploration” and “Bringing Space Benefits to Asia Pacific region” – a major international initiative of ISRO in 2005.

#### **HI AWARDS/DISTINCTIONS:**

Have been honored with many distinctions/awards:

- Recognized as a “GIS HERO” in ArcNews ([www.esri.com](http://www.esri.com)) in Winter/2010 issue.
- GIS Professional of 2009 Award at the Map India, 2010 Conference
- National Geospatial Award for Excellence in Spatial Technology of the Indian Society of Remote Sensing (ISRS) in 2009
- Exemplary Service Medal from international Global Spatial Data Infrastructure (GSDI) association in 2009
- Hari Om Ashram's Vikram Sarabhai Young Scientist Award in the area of "Systems Analysis and Management" in 2002.

#### **II PUBLICATIONS**

Have more than 210+ publications – important ISRO reports/publications, peer-reviewed Conference Publications, Journal publications, Study reports and inter-national study publications.

**Possess an excellent understanding and in-depth knowledge of EO, GIS and Space and have significantly contributed to various national and international activities to develop/establish successful national-programmes and business models in EO and GIS and Space. Am articulate, focused and seen as a “passionate EO/GIS/Space person”.**

January 31, 2014

(Mukund Kadursrinivas Rao)