

# Narendra Mangra

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## Summary

Narendra Mangra is a telecommunications advisor, consultant, and educator at GlobeNet LLC. His experience spans technical and leadership roles across the end-to-end mobile wireless architecture and ecosystem from the radio access network (RAN) to international roaming functions, end-to-end wireless network deployment lifecycle from RAN design to decommissioning, and program management lifecycle from new project initiation to project portfolio management. Narendra is the Co-Chair for several IEEE activities for smart cities standards development, agriculture and smart rural development, technology roadmap development, telehealth, and public safety. He also teaches graduate level courses on 5G systems and project management with a focus on smart cities at the George Mason University College of Engineering and Computing.

## Education

- **MBA (Strategy)** - Robert H. Smith School of Business, University of Maryland, College Park, MD
  - **Business Innovation Competition (Top 10 Finalist) -M2M Supply Chain Information Network**
- **MSEE/BSEE** – Polytechnic University, Brooklyn, NY
- **PMP Certification**– Project Management Institute, Newtown Square, PA

## Expertise

- **Technical Expertise**- Designed and deployed wireless cellular and non-terrestrial network with end-to-end system technical expertise across 3G/4G/5G, Wi-Fi, P25/LMR, and Globalstar satellite.
  - **End-to-End Mobile Architecture and Ecosystem Components** –includes spectrum management, devices, RAN planning and optimization, site development, operations / business support systems (OSS/BSS), international roaming.
  - **End-to-End Network Deployment Life Cycle Phases** – includes technology & vendor selection, design, site development, integration & commissioning, optimization, launch, live network cutover, and decommissioning.
- **Invited speaker and panelist** – Participate in various technical conferences and workshops such as IEEE FNWF, Informa Big 5G Event, Globecom, PIMRC, CTU Summit, ComSoc, IEEE 5G Summits, Latin American Industry Forum (LAIF), IEEE WCNC, NPSTC, CONV2X, IEEE 5G World Forum (5GWF), WFIoT, IEEE 5G Technologies for Tactical and First Responder Networks.

## Selected Terrestrial and Non-Terrestrial Wireless Experience

- **IEEE Future Networks INGR and IEEE Standards Association** – 5G/6G Technology Roadmaps and Standards Development
  - Align technology roadmap objectives on 5G and the path towards 6G for 14 Working Groups (WGs).
  - *P1950.1: Standard for Communications Architectural Functional Framework for Smart Cities* Chair – includes connectivity for urban areas.
  - *P1942.1: Standard for Massive Multiple Input Multiple Output (MIMO) Architectural Framework* – includes massive MIMO antennas.
  - Develop annual technology roadmaps through the *2020-2023 IEEE FNWC INGR Applications and Services Chapters*.
  - Participate in Connecting the Unconnected (CTU) and related initiatives to support rural connectivity and access to services.
- **First Responder Network Authority (FirstNet) – 4G LTE Radio Network Access (RAN) Consultant:** Managed the 4G RAN Planning team to create the FirstNet RAN strategy development, RF analysis, and solicitation requirements, Network Deployment Life Cycle Framework, NPSBN Emergency Preparedness, State Plan value proposition.
  - **Sprint / Nextel** - Created a National RF Design Standards Framework for engineering teams in local markets, and led commercial and Public Safety 800 MHz spectrum rebanding for northeast PS NPSAC regions.
- **Alcatel Lucent**
  - 4G LTE RF Network Performance for the Sprint 3G/4G Southeast Region
  - AT&T Baltimore/Washington UMTS/HSDPA & Verizon EVDO Norfolk, VA network optimization
  - CricKet Communications CDMA Network Design & Optimization Team Lead, Mid-South Region (AR, OK & TN)
- **Qualcomm / Globalstar MSS** - CDMA Subsystem Subject Matter Expert (SME) for worldwide satellite gateway commissioning
- **American Tower Corporation – 4G LTE Small Cells & Wi-Fi:** Developed 4G LTE Small Cells & Wi-Fi Playbook and assisted in a local market trial for outdoor Wi-Fi deployment for cellular offloading.
- **Time Warner Cable – Wi-Fi Deployment**– Developed Wi-Fi customer playbook for internal TWC operations
- **NII Holdings, Inc (LATAM) – International PTT VoIP & Prepaid Roaming** –PTT (QCHAT) VoIP & Prepaid International Roaming in Peru, Chile, and Mexico. Analyzed roaming feasibility via roaming HUBs, spectrum, GSMA roaming standards (e.g., IREG, TADIG), roaming partner spectrum, and technologies.
- **Ericsson – AT&T, formerly Bellsouth Mobility, Mobile, AL** - Managed the live system cutover from Hughes/Alcatel to Ericsson infrastructure.

- **Redhorse 4G LTE Wireless Mobility SME** - Created LTE multi-band service area coverage valuation methodology, UE capabilities, & (inter)national roaming potential across USDA
- **Unefon (Mexico) - Technology & Vendor Selection Advisor, Mexico City, Mexico**
  - Led the Vendor Selection Contract Negotiation Team for the largest Mexican nationwide CDMA wireless local loop.
  - Developed the Network Design Criteria, Deliverables List and Acceptance Testing Procedure (ATP) exhibits.
- **Infonet (Venezuela) - GSM System Design, Maracaibo, Venezuela** - Designed Maracaibo & COL GSM system.
- **Lucent Technologies - Sprint PCS Network Deployment Team Lead** – Led the Lucent Technologies / Sprint PCS CDMA Network Design & Optimization for the First Wave of PCS Networks in MI, OH, WI, PA, and NY.
- **Public Safety Networks**
  - **Altairis Technology Partners** - 800 MHz P25 Network Assessment and technical policy parameters for a new *shared* Microwave/IP MPLS multi-jurisdictional interoperable public safety system.
  - **ARS Systems Corporation – New York City Transit (NYCT) DAS:** Developed transit subway station heat map generation and above ground leakage test procedures for the NYC UHF Police Radio System (PRS) Enhancement DAS.
  - **CDCG – Public Safety Network Consultant:** Recommended RF simulcast delay parameters to improve public safety LMR network.

***George Mason University, College of Engineering and Computing, Adjunct Professor Aug 2009 – Current***

- Develop and teach graduate courses on 5G/6G (TCOM652), and project management and smart cities (TCOM547).
- Nominated for the 2013 Teaching Excellence Award.

## **Public Testimony on Wireless Communications**

Testified on wireless communications in the State of Maryland in Calvert County, Charles County, Montgomery County, St Mary's County, and Talbot County; State of Virginia in Rockingham County; State of Oklahoma in City of Tulsa; and in the State of Wisconsin for selected counties in the Milwaukee BTA.