Surendran Natarajan

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SUMMARY

Telecommunications engineer with 23 years of experience designing, optimizing, and operating optical, wireless backhaul, and IP/MPLS networks across 2G–5G infrastructure. Founder of NodalWire LLC, developing AI-assisted telecom digital twins and optical network simulation tools, with a patent-pending invention in infrastructure verification. Research interests focus on AI-driven fault prediction, network resilience, risk-aware automation, and sustainable communication systems.

RESEARCH & TECHNICAL DEVELOPMENT

Multi-Sensor Telecom Infrastructure Verification and Inventory Reconciliation

NodalWire LLC | 2026–Present | U.S. Provisional Patent Application No. 64/183,955 |https://exploren2p.com

- Developing a telecom infrastructure digital twin combining computer vision, equipment-position association, and inventory records to identify discrepancies between observed and documented assets.
- Designed multi-sensor reconciliation logic to evaluate equipment presence, mounting positions, and inventory inconsistencies for automated telecommunications infrastructure verification.

Optical Network Design- Engineering Simulator

NodalWire LLC | 2026–Present | In Development |https://exploren2p.com

- Designing a browser-based optical network simulator with eight configurable component types, enabling visual topology construction and automated point-to-point optical power budget calculations.
- Specifying a TypeScript calculation engine to evaluate optical power, insertion losses, receiver sensitivity, overload thresholds, and configurable safety margins.

WORK EXPERIENCE

Infosys Limited, Texas, USA | Technology Analyst-Network Eng **Since Nov 2024**

Clients: Lumen | Verizon

- Led validation of 100+ Ethernet circuits during a Tier-1 telecom system migration by designing structured test cases, ensuring 98% successful provisioning across integrated platforms.
- Performed multi-GIS audit of as-built fiber infrastructure by reconciling routes, splice points, ducts, and fiber counts across planning systems, reducing network planning discrepancies and deployment risk.
- Automated fiber inventory comparisons using Python scripts to identify discrepancies between GIS records and legacy as-built documentation, supporting route verification and engineering review.
- Integrated Frontier FTTH network data into Verizon's K2View platform by establishing source connectivity and performing end-to-end validation of equipment inventory, provisioning data, and alarm processing.

Indigo Telecom Group, Boston, USA | Field Engineer-Network **Apr 2024 – Nov 2024**

Clients: GoogleFiber | Meta | Orange

- Identified and reported software/system crashes under different network condition in 2 new devices using QXDM and vendor specific tools, enhancing device performance and reliability for the vendor.
- Executed comprehensive static and mobility testing in the assigned market, installing daily MPSS and Meta updates on 2 devices, aiding the manufacturer in identifying firmware bugs.

Ericsson, India, USA, Nigeria | Senior Specialist-Network Eng **May 2006 – Sep 2022**

Clients: T-Mobile-US | Sprint- US | Airtel-India | MTN-Nigeria

- Designed 3,000+ microwave LOS/nLOS/NLOS links using Pathloss 5 and IQlink, applying cost-conscious engineering principles to support network rollouts and technology integration.
- Successfully conducted Field LOS surveys for 300+ links using Google Earth, Pathloss 5, IQlink, and field surveys, achieving a 95% success rate in diverse terrains.
- Engineered and deployed 12+ Dense Wavelength Division Multiplexing (DWDM) networks by analyzing over 100 fiber characterization reports, enhancing high-capacity network performance across 50 regional nodes.

- Improved Radio Network KPI by 2% through strategic optimization of the RAN Transport network, effectively addressing RF KPI degradation by aligning it with identified Backhaul Issue Sites.
- Dimensioned capacity for 1000 interfaces across GSM/LTE/5G using System Method and an in-house tool, ensuring robust network capacity and support for diverse technologies.
- Enhanced end-user experience by optimizing RAN transport network, resulting in a 1-5% improvement in Radio network KPI across multiple technologies.
- Planned and maintained a large-scale Carrier Ethernet network in the US for 7 years, leveraging OpenNMS, proprietary tools, and Wireshark, facilitating faster network rollout and maintaining network KPIs at 92%.
- Audited 5 backhaul networks (~150 sites), diagnosed delay, jitter, packet loss, and utilization issues via OpenNMS, and resolved root causes achieving 95-99% availability and 10-15% fewer outages.
- Delivered over 15 trainings at Ericsson Academy, using real world examples and engaging presentation skills, earning the Best Trainer Award, and successfully advancing mentees to higher positions.

Hutch, Aircel | Engineer **Oct 2001 – May 2006**

- Gained extensive experience in GSM Network Operations & Maintenance.

EDUCATION

Master of Science, Project Management	*Northeastern University, USA*	**2024**
Postgraduate Diploma, Internet of Things	*BITS Pilani, India*	**2019**
Master of Science, Software Systems	*BITS Pilani, India*	**2010**
Master of Business Administration	*Bharathiar University, India*	**2008**
Bachelor of Engineering, Electronics & Communication	*University of Madras, India*	**2001**

SKILLS

Network Architecture & Design	*2G–5G transport networks, RAN backhaul, IP/MPLS, Carrier Ethernet, SDH/SONET, DWDM, FTTH/PON*
Network Resilience & Optimization	*Topology optimization, redundancy planning, ring protection, hub dependency reduction, capacity dimensioning, congestion analysis*
Wireless & Propagation Engineering	*Microwave LOS/nLOS/NLOS design, link budgets, interference analysis, frequency planning, propagation assessment*
Network Operations & Observability	*Fault isolation, alarm analysis, network performance monitoring, SNMP, synchronization, SLA/KPI analysis*
Programming & Data Engineering	*Python, SQL, Java, REST APIs, Kafka, Cassandra, K2View*
Engineering & Analysis Tools	*Pathloss 5, IQlink, TEMS Link Planner, QGIS, 3GIS, CRAMER, OpenNMS, Wireshark, OTDR*

BOOKS

Geographic Information Systems: From Fundamentals to Professional Practice

Manuscript in preparation

Optical Networks *— working title*

Book project in development

ACADEMIC CONTRIBUTION

- Delivered invited lectures and technical training at five Indian colleges, connecting telecommunications engineering concepts with practical network design and operations.
- Developed telecommunications learning resources through NodalWire Academy, covering optical networks, wireless infrastructure, and network engineering.
- Offered telecommunications projects to Northeastern University students through its experiential-learning programme, connecting academic learning with practical engineering challenges.