Delivering **Mobile Connectivity in a 100-Year-Old Government** Landmark

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Case Study

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Client

Bihar Vidhan Sabha A **100-year-old** heritage complex housing VIP offices, staff chambers, and underground conference halls.

Project Type

Deployment of a **Distributed Antenna System (DAS)** with no structural modifications allowed.

Business Need

To enable sound mobile network coverage across all telecom operators inside the building, eliminating call drops and data issues, especially during VIP visits and assembly sessions.

Challenges

- No structural modifications permitted
- Lack of cable route documentation
- Network blackouts in VIP offices and underground halls

Solution

A hybrid, **fibre-fed DAS** with **small cells,** manual site survey, and surface cabling fully integrated with operator core networks.

Results

- 99% call setup success rate
- <0.5% dropped calls
- **Strong indoor signal** (RSRP > -90 dBm, SINR > 10 dB)
- Zero escalations from government authorities

Background

The Bihar Vidhan Sabha is one of India's most prominent legislative buildings. However, this 100+ year-old heritage structure had long struggled with severe mobile signal blackouts. Coverage was poor across underground conference halls, VIP offices including the Speaker's and Chief Minister's chambers, and critical operational areas.

The staff was heavily reliant on landlines and intercoms, often unable to send or receive documents via mobile. And with restrictions on drilling or structural changes, and no accessible cabling blueprints, the project came with its own set of challenges.

Scope of Work

- Deliver complete multi-operator mobile signal coverage
- Avoid structural impact–no drilling or invasive cabling
- Support high user density in underground halls
- Operate under restricted timeframes (no access during sessions)
- Integrate with all telecom operators under a neutral-host model
- Build for LTE and 5G scalability across 700–2600 MHz bands

Solution Approach

Site Survey & Planning

A full manual walkthrough was conducted to identify black zones. RF (Radio Frequency) data such as RSSI, RSRP, SINR, and RSRQ was recorded using tools like iBwave and Atoll. Floor-wise cable routing and shaft locations were manually documented. Link budget analysis was performed to ensure signal reliability.

Technology Selection

- Hybrid Distributed Antenna System (DAS)
- Fibre-fed active architecture
- Multi-band design (700, 1800, 2100, 2600 MHz) for LTE & 5G
- Small cells for high-traffic zones (VIP offices, halls, staircases)
- BBU (Baseband Unit) for direct signal sourcing
- IP/MPLS-based backhaul for operator integration

Stakeholder Coordination

iBUS coordinated directly with BSNL, Airtel etc and other telecom providers. All permissions were secured from the Vidhan Sabha authorities. A neutral-host model was approved and implemented.

Implementation Overview

Phase 1:
Design & Planning

- RF modeling via iBwave
- Link budget and KPI framework established
- Multi-operator neutral-host architecture finalized

Phase 2:
Infrastructure Deployment

- 300+ indoor antennas installed
- 17 Remote Radio Units (RRUs) connected
- Small cells installed in lobbies and critical chambers
- Central hub established in the building's technical room
- Surface-mounted coaxial and fiber cabling deployed without structural impact

Phase 3:
Optimization & Testing

- Walk tests and drive tests conducted using TEMS & NEMO
- Signal strength fine-tuned via gain, tilt, and antenna orientation
- KPI benchmarks pre and post deployment: RSRP, SINR, CSSR, DCR, throughput

Phase 4:
Monitoring & Handover

- Real-time dashboards deployed for ongoing monitoring
- System integrated with operator BTS and BBUs
- Facility management team trained on fault alerts and escalation

Execution Steps

- Manual site survey and shaft mapping
- RF measurements using Test Equipment Manufacturer (TEM) tools
- Floor-wise planning and link budget analysis
- Procurement: antennas, splitters, RRUs, coaxial/fiber, UPS systems
- Cabling installation with zero architectural disturbance
- Post-deployment testing and optimization with KPIs

Implementation Challenges and Solutions

Challenge

- Thick walls, shadow zones
- No cable route data
- No donor signal
- Macro interference risk
- Cabling/power limits
- High costs
- Post-install gaps

Solution

- Dense antenna layout and hybrid DAS
- Manual drawing and shaft tracing
- Directional antennas + BBUs + fiber-fed backhaul
- RF optimization and frequency management
- Low-loss fiber + UPS + segmented DAS loops
- Shared neutral-host model and phased rollout
- Real-time KPI tuning and periodic re-optimization

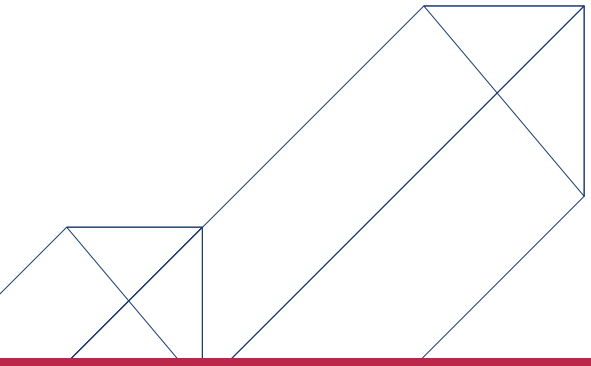
Results and Outcomes

Indoor Coverage

- Signal strength RSRP > -90 dBm
- SINR > 10 dB across all underground, stairwell, and office zones

Voice & Data Performance

- Call Setup Success Rate (CSSR): >99%
- Dropped Call Rate (DCR): <0.5%
- Consistent indoor data speeds >100 Mbps



Network Load and Mobility

- Macro network load reduced at peak times
- Seamless handovers with zero session interruption
- QoS (Quality of Service) sustained across multiple use cases

Quantified Business Impact

- Staff can now communicate freely via mobile
- Officials use mobile apps and digital documentation without restriction
- Canteen payments shifted to mobile transactions
- The project is now cited as a benchmark by:
  - Aaranya Bhawan
  - Purnia Medical College & Hospital
  - Bihar Building and Construction Department

Key Takeaways

Area	Learning
Planning	Don't skip RF simulations and site surveys
Stakeholders	Early coordination prevents delays
Technology	Hybrid DAS is flexible and scalable
Signal Sourcing	Clean input is critical (BBU + directional)
Installation	Quality equals long-term reliability
Optimization	KPI-based tuning is ongoing
User Experience	Performance should be felt, not seen
Future Readiness	Must support next-gen telecom tech (5G, beyond)

Conclusion

Connectivity Without Compromise

This project proved that world-class mobile infrastructure can be delivered without compromising architectural integrity. By combining manual precision, smart network design, and seamless operator collaboration, iBUS empowered a heritage institution with future-ready mobility setting a new benchmark for IBS deployments in sensitive government environments.

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