Revolutionizing Mining: Coal India's Amlohri Mine Deploys Tejas 5G for Next-Generation Automation

Coal India Limited, one of the world's largest coal producers, operates a large network of mines and infrastructure that supports India's power and industrial ecosystem. For its vast Amlohri mine in the state of Madhya Pradesh, it required a next-generation connectivity solution to drive mining automation, enhance safety, and operational efficiency.

Challenges

Operating in deep pits and rugged terrain presents unique hurdles that standard commercial networks cannot mitigate -

- **Unreliable connectivity:** limited cellular coverage in deep pits and tunnels disrupted real-time operations.
- **Compromised safety:** Communication "dark zones" hindered emergency response times, posing risks to on-site personnel.
- **High uplink demands:** traditional networks are designed for downloads (consumer data). However, mining applications—such as HD video surveillance, drone inspections, and smart helmets—are uplink-intensive, requiring massive bandwidth to transmit data from the deep mine to the control center.

Solutions

BSNL, India's leading CSP, deployed a private 5G Stand-Alone (SA) network specifically engineered for the mining environment at the Amlohri mine, utilizing 20 MHz spectrum in the n41 Band. The deployment leveraged Tejas Networks' cutting-edge hardware and software stack:

- **Radio:** Tejas 5G NR, 4T4R TDD Radio (n41 Band) featuring high-power 40W/port transmission for deep penetration.
- **Baseband:** Tejas TJ1400UCB BBU, a versatile platform supporting 4G/5G RAN alongside transport functionality.
- **Core:** 3GPP-compliant 5G Core.
- **Mining-Specific TDD Optimization:** Tejas offered a tailored 40:60 (DL:UL) TDD split for mining applications—where uplink performance is critical for real-time video surveillance, drone inspections, and smart safety devices.

Results

- **Multi-Fold Reduction in Operational Costs:** powered by the 5G network, intelligent automation, and remote monitoring have significantly lowered Op-Ex by reducing manual labor.
- **New Applications:** The high-speed, low-latency network unlocked several transformative applications for the customer, including smart helmets, AI-driven video analytics, and drone based inspection
- **Uncompromised Worker Safety:** The integration of smart wearables and real-time alerts has proactively mitigated risks, creating a safer working environment.
- **Improved Operational Uptime:** Early fault detection and remote diagnostics enable faster recovery times, ensuring continuous production.
- **Future-Ready Infrastructure:** A scalable, high-performance network designed to support advanced digital mining applications and seamless 4G to 5G evolution.

Key Value Propositions

- **Advanced Radio Support:** Tejas system supports 2T2R, 4T4R, and 8T8R configurations, ensuring superior coverage and capacity even in complex terrains.
- **Future-Proof Flexibility:** The TJ1400 BBU is engineered for demanding environments, supporting NR-5G cells across n28, n41, and n78 bands.
- **Technology-Agnostic Design:** The solution seamlessly supports both 4G and 5G concurrently, allowing operators to adapt based on the device ecosystem readiness without replacing hardware.
- **Deployment Flexibility:** Full compatibility with third-party cores ensures smooth integration and cost efficiency.

Tejas Networks

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