

TV RAMACHANDRAN

WHEN EVERY SECOND COUNTS, INDIA'S MISSION NETWORK

When disasters strike and seconds decide outcomes, India's mission-critical communications network keeps responders connected and lives protected.



In today's lightning-paced, hyperconnected, and increasingly VUCA—volatile, uncertain, complex, and ambiguous—world, instant communication is often taken for granted. We stream videos, send messages, and make calls with ease, rarely pausing to consider the intricate web of systems that keeps us connected. Yet behind this seamless convenience lies a different universe—the world of critical communications (CC).

catastrophic consequences. Critical communications networks operate quietly in the background, ensuring that the nation's emergency responders, defence forces, disaster management teams, police, and railways remain connected when all else fails. These systems form the invisible backbone of public safety and national resilience, providing a secure communication lifeline in moments of chaos and uncertainty.

It is a world where every second counts, and where a missed signal or a failed connection can have

LESSONS FROM DISASTER MANAGEMENT

Few citizens realise the extent of India's progress in

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As India builds its digital future, resilience must be engineered into every signal that carries a message of safety, coordination, and hope.



Every message that saves a life in India's disaster zones is powered by unseen, critical communication systems that connect first responders.

building such networks. The Balasore rail tragedy, for instance, demonstrated how effectively police and railway communication systems could coordinate rescue and recovery efforts amid overwhelming challenges.

The evolution of critical communications can perhaps best be seen by comparing two major cyclones that hit India decades apart. In 1999, when the Paradeep cyclone struck Odisha, the country lost over 12,000 lives. At the time, disaster communication systems were limited and fragmented, with alerts slow to reach vulnerable populations. In contrast, in 2023, an equally intense Cyclone Biparjoy struck Gujarat—yet not a single casualty was recorded.

This extraordinary achievement was possible because of the systems painstakingly built by the Department of Telecommunications (DoT) and the Centre for Development of Telematics (C-DoT). Over 32 million early warning messages were sent via the Common Alerting Protocol (CAP) network, enabling mass evacuations and real-time coordination among agencies. The technology worked exactly as intended—proving that timely, reliable communication can save lives on an unprecedented scale.

These lessons reaffirm that in preparing for uncertainty and disasters, communication is not just a tool—it is a weapon of protection. Investing in interoperable and resilient communication systems must therefore remain a national priority. During crises, authorities cannot rely solely on commercial mobile networks, which are vulnerable to overload, or on outdated Professional Mobile Radio systems that lack interoperability and broadband capabilities. Modern critical communications systems based on broadband infrastructure are essential to enable Public Protection and Disaster Relief (PPDR) and to safeguard critical national infrastructure.

CRITICAL NETWORKS VS. PUBLIC SYSTEMS

At its core, a critical communications network is built to serve when everything else collapses. It is engineered for reliability, resilience, availability, and security, ensuring that the correct information reaches the right people at

the right time. These systems are indispensable across domains—public safety, emergency response, transport, utilities, healthcare, and even smart cities.

Commercial networks, by contrast, are designed for mass convenience rather than mission-critical reliability. In any large-scale emergency, the public instinctively reaches for their phones—checking on family, streaming live news, or posting on social media. As millions attempt to connect simultaneously, commercial systems get congested. In such a scenario, if first responders used the same networks, they would face the same delays as everyone else.

Critical communications networks eliminate this risk. They prioritise emergency traffic, offering guaranteed connectivity and redundant architecture that prevents failures. Dedicated infrastructure ensures durability, while specialised features like push-to-talk enable instant coordination across teams. In disaster zones, these capabilities can mean the difference between order and chaos.

The importance of critical communications extends to national defence as well. In modern warfare, data is the new ammunition. With operations now spanning land, air, sea, space, and cyber domains, armed forces depend on real-time information sharing to outmanoeuvre adversaries. Cloud technologies are indispensable for fusing distributed data from multiple sensors and for enabling shared computation and storage at scale. Meanwhile, satellite communications ensure long-range connectivity even when terrestrial networks are disrupted, shortening decision-making cycles to seconds and providing a critical tactical edge.

Reinforcing this view, TRAI Chairman Anil Kumar Lahoti highlighted at India's first national conference on critical communications that the subject carries "immense strategic importance for both India and the global community" amid climate vulnerabilities, urban communication challenges, and evolving security threats. His message was clear: the ability to communicate reliably during crises defines a nation's preparedness.

As disasters grow in frequency, India's hybrid broadband alert systems like Sachet are transforming how warnings reach citizens in seconds.

INDIA'S CRITICAL COMMUNICATION BACKBONE

India's journey to strengthen critical communications systems rests on four foundational pillars—infrastructure, policy, spectrum, and standards—each evolving rapidly. For decades, emergency services relied on narrowband technologies such as TETRA and P25 for secure voice connectivity. However, as the need for high-speed data and multimedia communication grew, India began transitioning toward hybrid models that integrate TETRA with 4G/5G broadband (MCX) for video, data, and advanced situational awareness.

This hybrid integration is guided by the Interworking Function, a key enabler that enables seamless communication between Land Mobile Radio or LMR systems and next-generation broadband networks. The DoT, working closely with the National Disaster Management Authority, has expanded mobile-enabled disaster communications nationwide.

One of the most notable initiatives is Sachet, an integrated alert system developed by C-DoT using ITU's CAP standard. It delivers real-time, geo-targeted warnings to citizens via SMS—already covering the entire country. This early warning infrastructure has been credited with saving lives during cyclones, floods, and other natural disasters.

Policy developments have kept pace. Recommendations for critical communications now include assigning exclusive spectrum—10 MHz in the 700 MHz band for LTE-based disaster management networks to enhance railway passenger safety, and another 10 MHz in the 800 MHz band for a nationwide PPDR network. Avoiding silos and ensuring interoperability through open standards are key to maximising the effectiveness of these systems.

Globally, India is not alone in strengthening its critical communications capabilities. The mission-critical communications market is projected to grow from USD 20.9 billion in 2025 to USD 31.1 billion in 2029, at a CAGR of 10.4%, according to The Business Research Company. South Korea pioneered the world's first public safety broadband network, PS-LTE, operational since 2018.

Belgium is following suit with a nationwide broadband MC rollout by 2025, while Dubai's Nedaa has developed a secure government broadband network dedicated entirely to professional communications.

These international examples illustrate how nations are prioritising resilient communication as a foundation for safety, governance, and security—an approach India is now accelerating with its own ecosystem of public and private stakeholders.

WARRIORS OF MISSION-CRITICAL COMMUNICATIONS

In an age when uncertainty is constant and every second matters, secure and interoperable communication systems are no longer a luxury—they are a necessity. India's next leap must focus on creating a holistic ecosystem that blends policy foresight, spectrum availability, indigenous R&D, and public-private collaboration.

Building critical communications networks faster and smarter requires dedicated resources and recognition. The policy imperative is clear: ensure dedicated spectrum, promote open standards, certify interoperable devices, and encourage cross-agency collaboration. These steps will make India's critical communications infrastructure more agile, resilient, and future-ready.

As retired Lt Gen Syed Ata Hasnain observed, the silent warriors behind mission-critical communications—engineers, technicians, and planners—rarely receive the recognition they deserve. Their work ensures that when calamity strikes, alerts reach millions, emergency teams stay connected, and the nation's response machinery operates with precision. India owes its safety and stability to these unseen protectors—the guardians of the nation's most vital yet invisible network: its critical communications lifeline. 🧑‍💻

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Views are personal.

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