

# CASE STUDY

## DEPLOYING A CELL BROADCAST SYSTEM FOR A SMART CITY IN A HIGH-RISK DISASTER ZONE



### INTRODUCTION

A government-led urban authority, established under India's Smart Cities Mission, is responsible for driving infrastructure modernization and digital public services for a major city in northern India, serving a population of over 1.5 million residents. Located in a high-risk Himalayan region, the city has historically faced severe natural disasters, including large-scale flooding and seismic activity, resulting in significant economic and human impact.

Despite improvements in forecasting and early warning systems, a critical gap remained in the last-mile dissemination of alerts, where warnings often failed to reach citizens before disaster impact. To address this challenge and strengthen public safety preparedness, the administration partnered with PertSol to deploy an end-to-end Cell Broadcast System, enabling real-time, geo-targeted emergency alerts across all telecom networks and device types.

### CHALLENGES

To establish an effective disaster warning mechanism, the administration needed to overcome several structural and operational challenges:

The region's exposure to multiple natural hazards, including floods, earthquakes, landslides, avalanches, and extreme weather, each requiring different alerting protocols, urgency levels, and geographic targeting.

The absence of an existing Cell Broadcast infrastructure across telecom networks, combined with a fragmented multi-operator environment spanning 2G, 3G, 4G, and 5G technologies.

The complexity of mountainous terrain and uneven network coverage, along with a dynamic population comprising residents, tourists, pilgrims, and seasonal workers.

The limitations of traditional communication channels such as sirens, media broadcasts, and SMS alerts, which were often delayed, reactive, or ineffective during emergencies.

The need to reach a large base of feature phone users without relying on mobile data, applications, or user opt-in mechanisms.

## WHY THEY CHOSE PERTSOL

The administration selected PertSol to implement a standardized and scalable public warning system capable of operating seamlessly across a multi-operator telecom environment. PertSol's iAlert Cell Broadcast Solution is aligned with globally recognized standards, including ETSI and 3GPP frameworks, ensuring interoperability across all network technologies from 2G to 5G.

PertSol enabled a telecom-integrated approach that required no intrusive changes to existing network infrastructure, allowing operators to support emergency alerting without impacting live services. This minimized deployment risk while ensuring rapid rollout across networks.

With its experience in delivering mission-critical communication solutions for government and public safety agencies, PertSol provided the operational reliability, scalability, and support required to establish a long-term, future-ready emergency communication framework.

## SOLUTION

### **Solution Implemented: PertSol iAlert Cell Broadcast System (CBE + CBC)**

PertSol deployed a complete Cell Broadcast ecosystem integrating centralized alert origination with distributed telecom network delivery. The solution enabled authorities to issue a single alert from the city's command center, which is then broadcast simultaneously across all participating telecom networks, reaching every device within the targeted area in real time.

## KEY COMPONENTS AND CAPABILITIES IMPLEMENTED

- ✔ iAlert Cell Broadcast Entity (CBE) deployed at the command and control center for real-time alert creation, management, and activation.
- ✔ iAlert Cell Broadcast Centers (CBCs) integrated within telecom operator networks to enable simultaneous broadcast across all base stations.
- ✔ Support for multi-RAT delivery across 2G (GERAN), 3G (UTRAN), 4G (LTE), and 5G (NG-RAN) networks, ensuring compatibility with all mobile devices.
- ✔ Geo-targeted alerting using polygon-based mapping, enabling precise dissemination from localized zones to city-wide coverage.
- ✔ Integration with government disaster management systems using CAP (Common Alerting Protocol – ITU X.1303) for automated and standardized alert generation.
- ✔ Multi-language alert delivery with text-to-speech capabilities to ensure accessibility across diverse population groups.
- ✔ Broadcast lifecycle management, allowing alerts to be created, updated, and cancelled with defined validity periods and operational control.
- ✔ Congestion-free broadcast mechanism, ensuring reliable message delivery even during peak network load conditions.
- ✔ This implementation enabled real-time, large-scale public communication while maintaining telecom network stability and operational continuity.

# RESULTS

- ✔ The deployment enabled the administration to establish a real-time, reliable, and scalable public warning system capable of reaching all citizens within seconds. The solution transformed emergency communication from a reactive process into a proactive, immediate response mechanism.
- ✔ Geo-targeted alerts are now delivered simultaneously across all telecom networks, ensuring consistent messaging and eliminating delays caused by fragmented communication systems.
- ✔ The system provides universal reach across all mobile devices, including feature phones & smartphones, without requiring mobile data, applications, or prior user registration, ensuring inclusivity across all user segments.
- ✔ By leveraging a broadcast-based delivery approach, the solution ensures reliable performance even during network congestion, maintaining communication continuity during critical situations.
- ✔ Additionally, the platform supports test broadcasts, mock drills, and audit logging, enabling authorities to maintain compliance readiness and continuously improve disaster response strategies.
- ✔ The scalable architecture provides a strong foundation for future expansion across additional regions and integration into broader state and national emergency alerting frameworks.

# KEY HIGHLIGHTS

| Challenge                                      | Solution Approach                                          | Business Impact                                 |
|------------------------------------------------|------------------------------------------------------------|-------------------------------------------------|
| No existing public warning infrastructure      | Deployment of end-to-end Cell Broadcast System (CBE + CBC) | Enabled real-time emergency alerting capability |
| Multi-operator, multi-technology networks      | Standards-based integration across 2G–5G environments      | Unified and consistent alert delivery           |
| Ineffective traditional communication channels | Direct-to-device broadcast mechanism                       | Faster and reliable citizen reach               |
| High feature phone penetration                 | Data-independent alert delivery                            | Inclusive communication across all users        |
| Complex geography and population dynamics      | Advanced geo-targeting capabilities                        | Precise and relevant alerting                   |
| Network congestion during disasters            | Broadcast-based delivery architecture                      | Guaranteed performance under peak load          |

“In disaster-prone regions, the difference between life and death is measured in seconds. Cell Broadcast closes that gap, transforming early warnings into immediate action.”