



France's FR-Alert: The Role of Mobile Network Operators in Early Warning Systems

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Executive summary

This report examines FR-Alert, France's mobile-based early warning system (EWS), and highlights how effective collaboration with mobile network operators (MNOs) can strengthen EWS globally.

Launched in 2022, FR-Alert marks a major modernisation of France's EWS, introducing mobile-based alerts on a national scale. The transition from a siren-based network to dual mobile dissemination technologies was driven by successive crises, including the 2019 Lubrizol industrial fire, and by the 2018 European Union directive for all Member States to implement a national EWS with mobile alerting capabilities.

The result is a comprehensive system that combines cell broadcast (CB) and location-based SMS (LB-SMS) mobile technologies, covers both mainland and overseas France and is fully embedded in national disaster management (NDM) processes. MNOs have played an instrumental role in the success of FR-Alert, coordinating with public authorities from the outset to build and deploy the system. Today, MNOs maintain the core infrastructure and system upgrades, participate in testing and ensure interoperability across networks.

Drawing on lessons from FR-Alert, this report highlights 10 key considerations for effective MNO engagement in mobile-based EWS:

1. **Robust regulatory frameworks** provide clarity and structure on the roles and public safety obligations of MNOs and other EWS stakeholders.
2. **Strategic governance and stakeholder coordination** ensure trusted, collaborative relationships between MNOs, regulatory bodies and government.
3. **Institutional capacity building** with public authorities builds confidence and helps ensure the alerting tool is used effectively and appropriately.

4. **Building public trust and awareness** increases the effectiveness of alerts and gives communities the tools to take appropriate action.
5. **Adoption of the Common Alerting Protocol (CAP)** enables consistent messaging across dissemination channels and interoperability between MNOs.
6. **Multi-channel alerting** maximises the reach of alerts to the widest possible audience, complementing core mobile technologies with traditional dissemination methods.
7. **Inclusive design** helps ensure no one is left behind when a disaster is imminent.
8. **Iterative testing and evaluation** promote continuous improvement and system reliability.
9. **Handset compatibility** reduces exclusion and supports the delivery of CB messages to intended recipients.
10. **Sustainable financing** guarantees the long-term viability of alert systems.

While the FR-Alert example offers valuable insights, it is important to recognise that the enabling environment in France – strong regulation, high mobile penetration and sustained financial resources – may not be present in other contexts. By showcasing the French model, this report aims to highlight key lessons and considerations for governments, MNOs, humanitarian actors and donors seeking to enhance national early warning capabilities through public-private collaboration.

01 Introduction



Around the world, climate change is causing more frequent and intense disasters, with severe impacts on people and the ecosystems on which they depend.

Early warning systems (EWS) are cost-efficient and effective tools for providing the critical lead time necessary to protect lives and livelihoods. Countries with stronger EWS, especially ones that respond to multiple hazards (multi-hazard early warning systems or MHEWS) experience fewer disaster-related deaths than countries with weaker systems.¹

Yet, one-third of people worldwide are not covered by an EWS, most of whom live in low-income countries (LICs) or Small Island Developing States (SIDS).² To address this, the United Nations Early Warnings for All (EW4All) initiative seeks to accelerate investment and action to ensure every person on Earth is covered by an EWS.³

Mobile network operators (MNOs) are uniquely positioned to support emergency preparedness and response. For decades, they have partnered with disaster management agencies, humanitarian organisations and other stakeholders to help safeguard lives and livelihoods. With 96% of the global population covered by a mobile network,⁴ mobile technology presents a significant opportunity to scale up the reach of EWS.

This report looks at France's national EWS, FR-Alert, as a model with effective MNO engagement. It examines the role of MNOs in FR-Alert, highlighting key considerations that can maximise MNO participation in EWS globally and guide governments and other stakeholders, such as policymakers, disaster management stakeholders, MNOs, humanitarian actors and donors, in creating enabling environments for engagement.

The report begins by examining France's disaster risk profile and mobile connectivity landscape. It then provides an overview of FR-Alert and the role of MNOs within it. The report explores FR-Alert with respect to policy and regulation, stakeholders and coordination mechanisms, technology and infrastructure and financial models. Based on these insights, it outlines 10 key considerations for effective MNO engagement.

¹ World Meteorological Organization (WMO). (2022). Early Warnings for All: The UN Global Early Warning Initiative for the Implementation of Climate Adaptation. Executive Action Plan 2023–2027.

² Ibid.

³ Ibid.

⁴ GSMA. (2024). The State of Mobile Connectivity Report 2024.

02 Methodology



This research explores how MNOs have engaged in the design and delivery of France's EWS, and the conditions that have enabled their participation. Four key research questions guided the study:



Policy and regulation
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Technology and infrastructure
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Financial models
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Research for this case study was conducted in four phases:

Phase 1: **Desk-based research**

The research began with a desk review of France's disaster risk landscape, EWS architecture, institutional governance and the role of MNOs. This provided a foundation for understanding the enabling environment and existing coordination mechanisms. In parallel, preliminary stakeholder mapping was conducted to identify key public and private entities involved in the alerting chain.

Phase 2: **Stakeholder interviews**

Semi-structured interviews were conducted with representatives of national and subnational government agencies, the telecommunications industry, international organisations and regional associations. Interviewees included the former and current FR-Alert Programme Directors and their deputy at the Ministry of Interior, the Defence Electronic Communications Authority (CCED), the Prefectures of Bouches du Rhône and Réunion, the Regulatory Authority for Electronic Communications, Postal Services and Press Distribution (ARCEP), key MNOs in both mainland and overseas France, Intersec, the European Emergency Number Association (EENA) and the International Telecommunication Union (ITU). Interviews were held both in person, in the greater Paris area and online.

Phase 3: **Field visit**

Additional in-depth interviews, site visits of operational facilities and demonstrations of the FR-Alert platform were conducted during a field visit in France. Interviewees included the CCED, Directorate General for Civil Security and Crisis Management (DGSCGC), Interministerial Crisis Management Operations Centre (COGIC), the Prefectures of Yvelines and Nord, the Nord zonal authority, Free and Intersec.

Phase 4: **Analysis and stakeholder review**

Interview data collected during phase 2, along with information gleaned from the desk review in phase 1, were analysed across the four thematic areas defined by the research questions. Key FR-Alert stakeholders were consulted to validate the findings prior to finalising the analysis.

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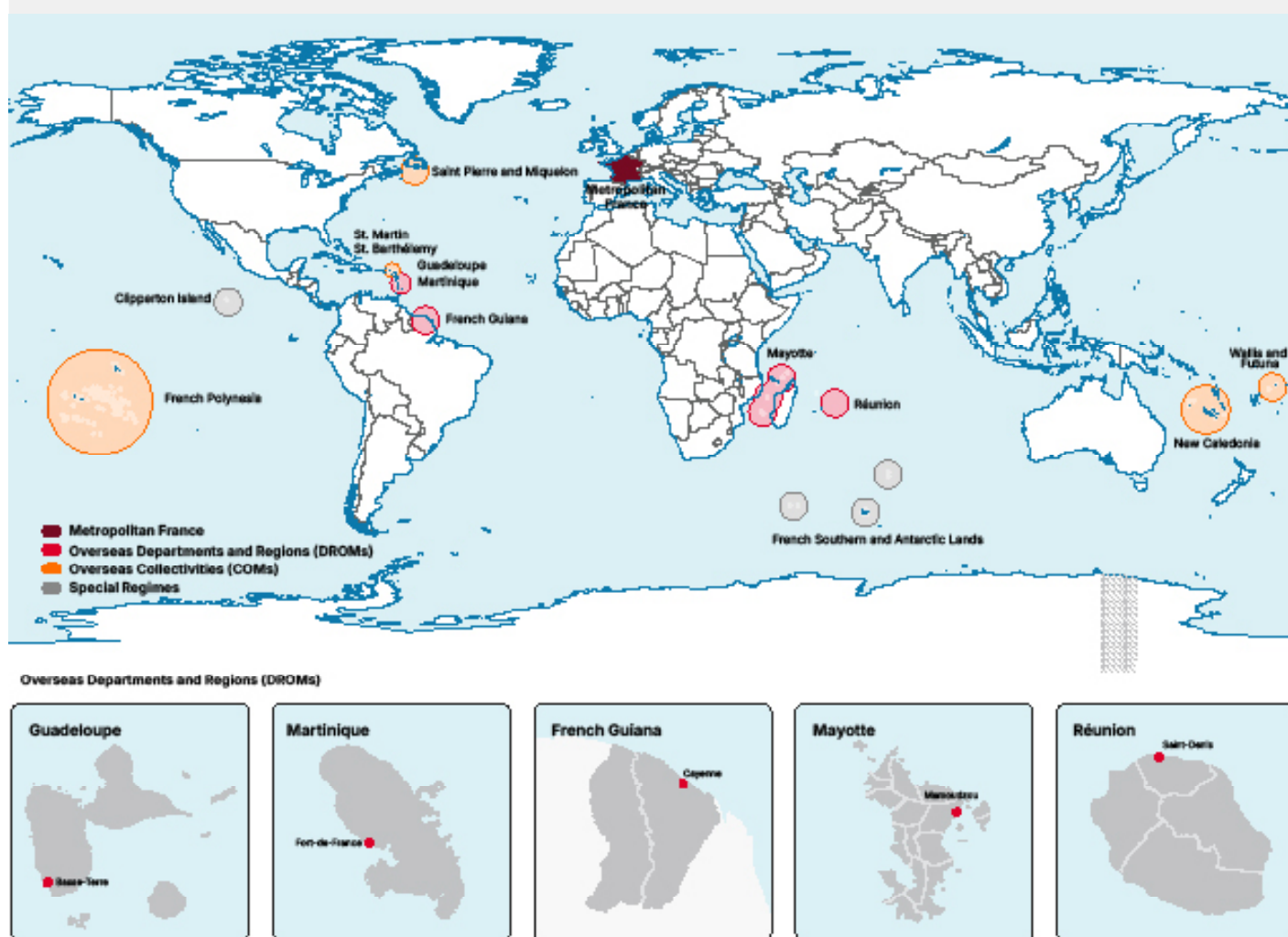
France's disaster risk profile



France is exposed to an array of hazards due to its varied geography and climatic zones, which span the continental mainland and Corsica in Europe, as well as 12 overseas territories located across four oceans. With a population of more than 68 million, including around 2.3 million people in the territories,⁵ French disaster management authorities face the challenge of implementing a cohesive national framework across a complex and diverse territory.

Figure 1:

Map of Metropolitan and Overseas France



Source: MapTiler, NaturalEarth, and IGN AdminExpress

⁵ Institut national de la statistique et des études économiques (INSEE). (2025). "Population – Demographic balance sheet 2024".

There are eight major natural hazard risks in France: floods, forest fires, cyclones, storms, earthquakes, volcanic activity, landslides and avalanches.⁶

The overseas territories, comprised mainly of small and remote islands, face distinct risks like tropical cyclones, earthquakes, volcanic activity and coastal erosion. For example, Cyclone Chido in December 2024 caused extensive damage to Mayotte and was reported to be the worst storm to hit the Indian Ocean island in 90 years.⁷ Seismic and volcanic activity affect the islands of Guadeloupe, Martinique and Réunion in particular, due to the presence of historically active volcanoes.

In contrast, the primary risks for Metropolitan France⁸ are floods, forest fires and industrial or technological hazards. Flooding represents the most significant hazard, affecting more than 16,000 municipalities and 18 million people who live in areas susceptible to river overflows.⁹ Severe storms such as Lothar (1999), Klaus (2009) and Xynthia (2010) have demonstrated the widespread exposure of Metropolitan France to

destructive winds and coastal flooding. Forest fires are increasingly affecting southern and western regions, notably the Mediterranean, Corsica and Landes, where the frequency and intensity of “mega-fires” have increased sharply.¹⁰

Geological risks include seismic and volcanic activity as well as subsidence, landslides and clay shrinkage – concerns in nearly 55% of municipalities in France. Approximately 19,800 French municipalities were classified as at risk of ground movement in 2016.¹¹

Industrial, nuclear and biological risks stemming from mining operations, the transport of hazardous substances, major dams, nuclear power plants and industrial facilities are also key concerns for disaster management actors. Hazardous facilities that pose a danger to nearby residents are referred to as Classified Facilities for Environmental Protection (ICPE). These include petroleum, gas, pharmaceutical and chemical facilities and warehouses, as well as explosives plants. Seveso sites¹² are a subset of these industrial facilities.



⁶ Service de la données et des études statistiques (SDES). (30 January 2024). [Chiffres clés des risques naturels – Édition 2023](#).

⁷ WMO. (17 December 2024). “Tropical cyclone Chido devastates Mayotte in Indian Ocean”.

⁸ The European mainland and island of Corsica are referred to as “Metropolitan France”. Overseas France is comprised of the French territories outside Europe. Together, Metropolitan and Overseas France make up the French national territory.

⁹ Ministère de la Transition écologique et de la Cohésion des territoires et BRGM. (n.d.). “Les risques naturels sur le territoire français : chiffres clés”, Géorisques.

¹⁰ France24. (7 August 2025). “Researchers race to predict wildfire behaviour as France battles biggest blaze in decades”.

¹¹ Commissariat général au développement durable. (30 September 2020). “Mouvements de territoire : risque naturel majeur le plus présent en France après les inondations”.

¹² Seveso sites are industrial facilities handling large amounts of hazardous substances, subject to strict EU safety rules to prevent major accidents and protect people and the environment.

Vulnerabilities of overseas territories

Today, the 12 overseas territories experience varying degrees of autonomy, as defined in the French Constitution and other legal frameworks.¹³ Although France is a high-income country,¹⁴ residents of the territories face unique vulnerabilities, such as higher rates of poverty and socio-economic challenges

compared to Metropolitan France.¹⁵ The territories are also particularly vulnerable to increasingly severe extreme weather events caused by climate change, requiring new and more robust climate adaptation strategies.¹⁶

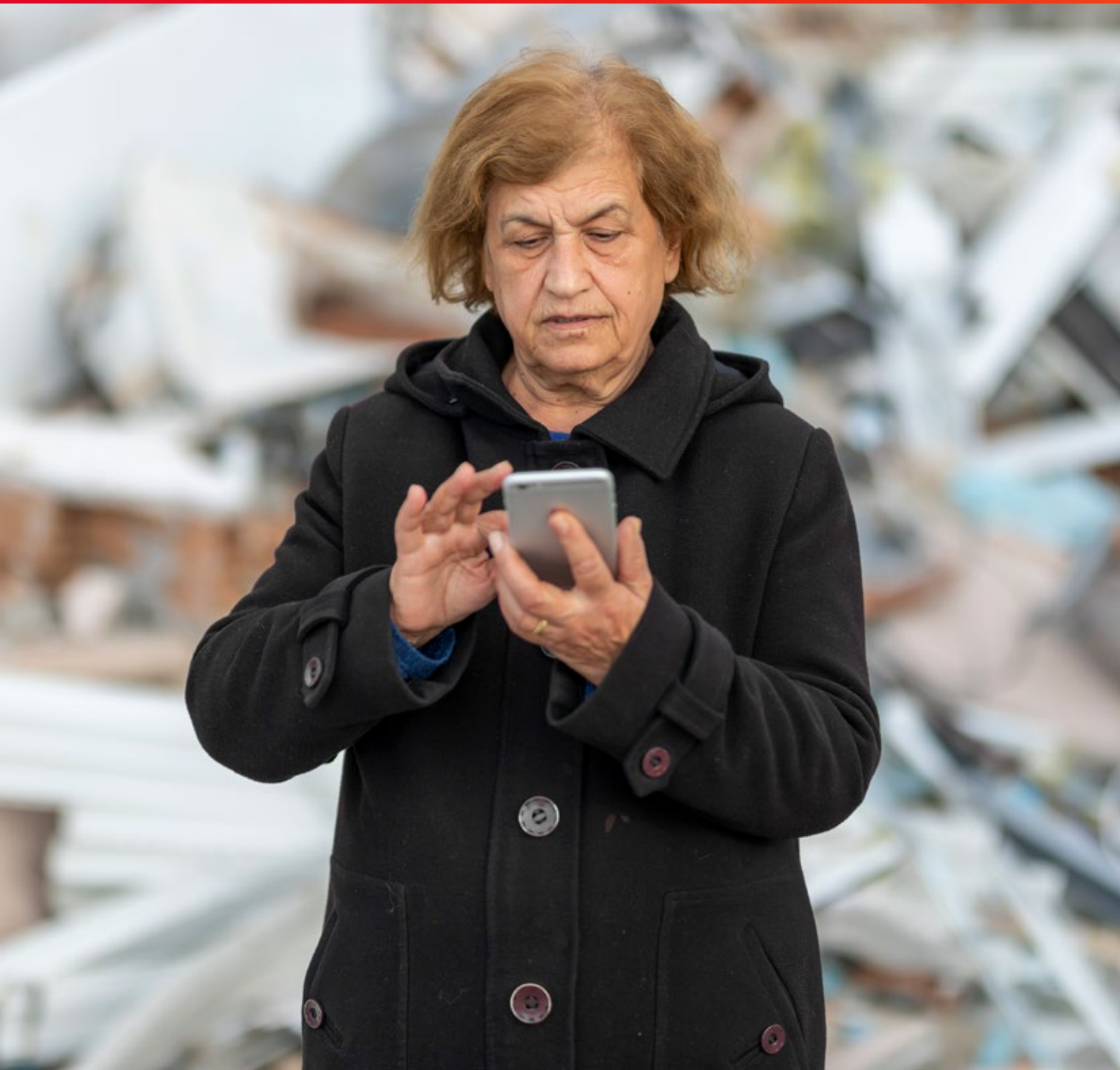
Table 1:
Classification of French overseas territories

Categories	Territories	Legal basis	Governance
Overseas departments and regions (DROMs)	Guadeloupe, Martinique, French Guiana, Réunion and Mayotte	Article 73 of the French Constitution	These territories share the same legal status as mainland departments and regions, applying French law by legislative identity. They are part of the European Union.
Overseas collectives (COMs)	Saint-Pierre-et-Miquelon, Saint-Barthélemy, Saint-Martin, Wallis and Futuna, French Polynesia and New Caledonia	Article 72-3 and 74 of the French Constitution	These entities benefit from varying levels of legislative specialisation and local autonomy. New Caledonia is a COM with special status, granted more autonomy under a 1999 law.
Special regimes	French Southern and Antarctic Lands (TAAF) and Clipperton Island	Specific administrative frameworks	Both are governed under distinct administrative frameworks.

13 Republic of France. [Constitution of 4 October 1958](#). See Articles 72-74.
14 [World Bank classification](#), defined as national economies with 2024 Atlas Gross National Income (GNI) per capita of more than USD 13,935.
15 L'Institut de relations internationales et stratégiques (IRIS). (17 January 2025). "[Natural disasters in Mayotte: France's overseas policy put to the test](#)".
16 IDDRI. (2022). [French overseas territories facing the challenge of adapting to climate change: The example of French Polynesia](#).

04

The mobile landscape in France



France is a unique context for the deployment of mobile-based EWS. Its territory combines a highly connected European mainland with dispersed islands and remote geographies. These territories differ greatly in climate, population density and network maturity, ranging from dense 5G urban zones to remote areas still relying on 2G or 3G.

Such diversity creates technical and operational challenges for national coverage. Yet, the state has made the deliberate and ambitious choice to extend the FR-Alert system beyond the mainland. This inclusive approach reflects a strong national commitment to ensuring that all citizens of France have access to timely and reliable mobile-based alerts.

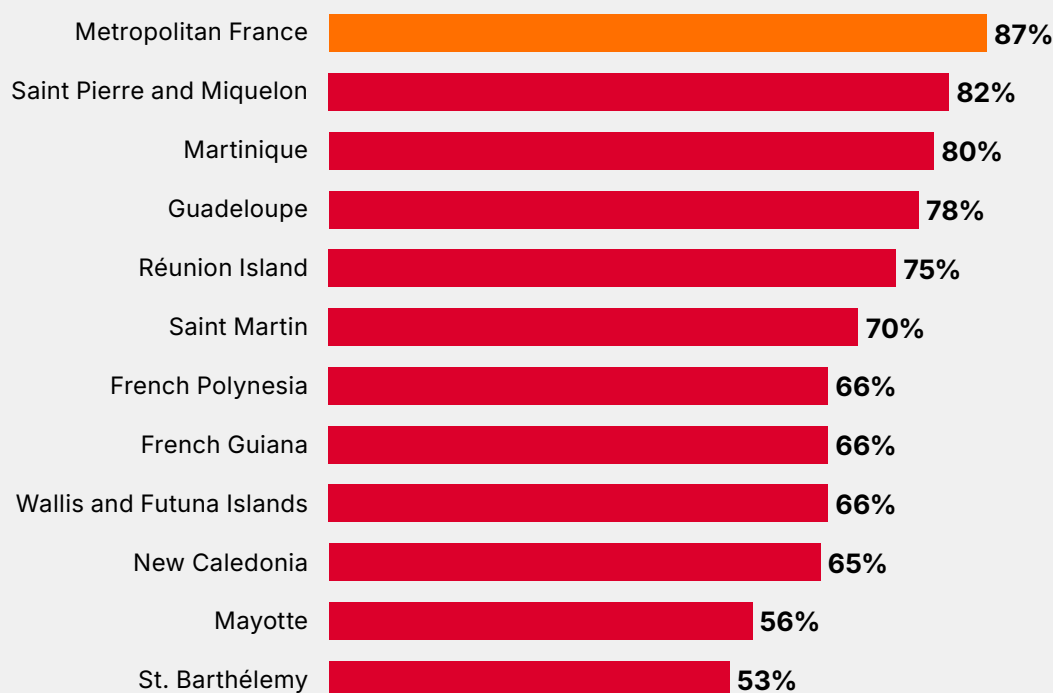
In Metropolitan France, the mobile ecosystem is mature and competitive. There are nearly 57 million unique mobile subscribers out of a primarily urban population of 66 million, representing a market

penetration of 87%.¹⁷ The four national MNOs – Bouygues Telecom, Free Mobile, Orange and SFR – provide either 4G or 5G network coverage to virtually all (98.5%) of the population, with 86% of connections via smartphone.¹⁸ This high degree of mobile connectivity and access, coupled with an advanced market, provides an enabling ecosystem for mobile emergency alerts.

France's overseas territories have a different set of realities. These regions are characterised by diverse topographies, tropical climates, dispersed populations and varying network maturity. Connectivity challenges are compounded by limited local resources and the logistical complexity of maintaining network performance in isolated or challenging terrains.¹⁹ While mobile penetration reaches most of the populations across the territories, it varies from 53% to 82%.

Figure 2:

Market penetration of unique mobile subscribers in Metropolitan France and Overseas France



Source: GSMA Intelligence

¹⁷ GSMA Intelligence, Q3 2025.

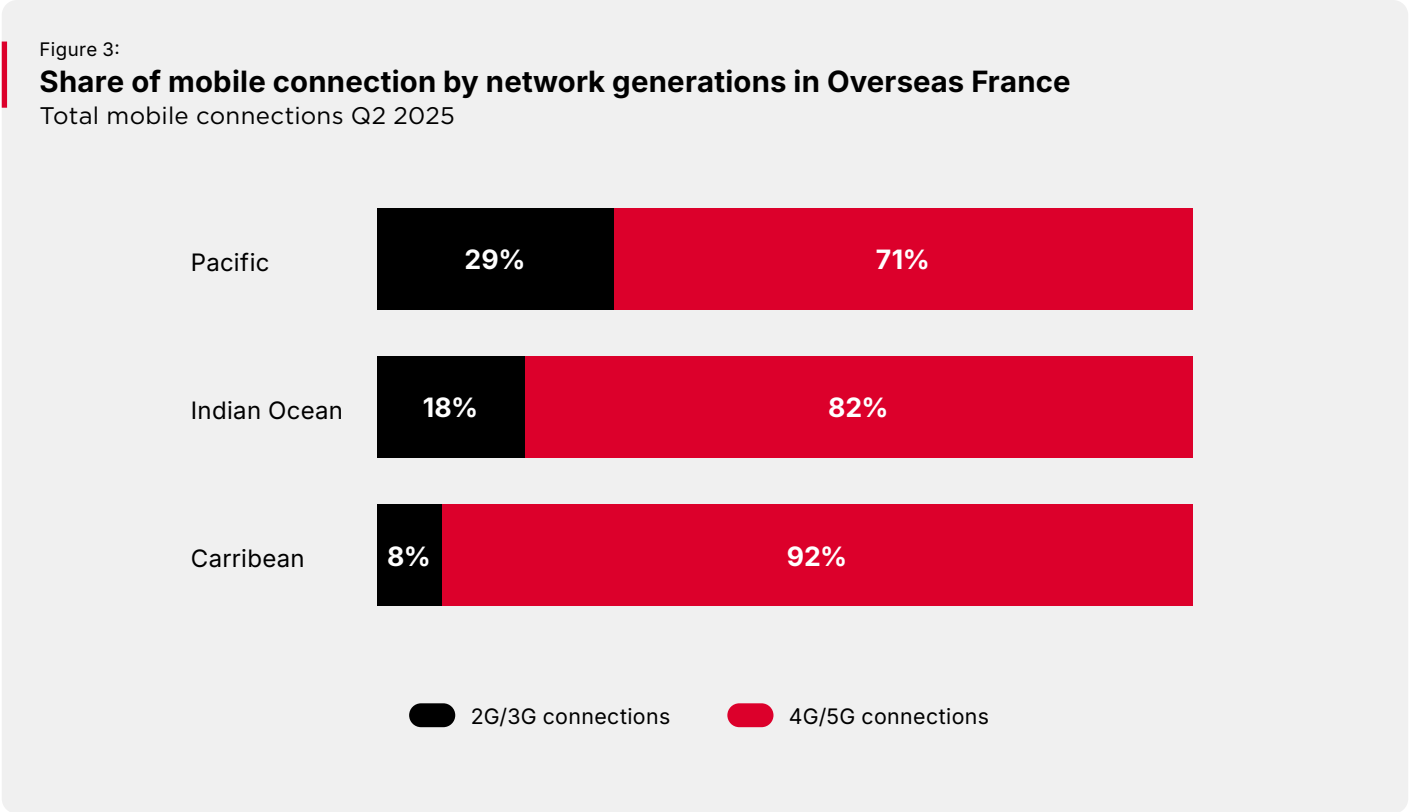
¹⁸ Ibid.

¹⁹ KIs with MNOs.

The use of CB for FR-Alert was only planned for 4G/5G networks, due to budget considerations (see section 6.3, Technology and infrastructure). While all territories are covered at least partially by 4G, there is a higher proportion of 2G and 3G users, particularly in the Pacific region. It is estimated that around 1 million devices in Overseas France are incompatible with CB, as they operate only on 2G or 3G networks.²⁰ This varied landscape influenced both the technological choices and implementation strategy for FR-Alert,

particularly the decision to include both CB and LB-SMS dissemination channels to address the 4G/5G coverage gap.

Different MNOs operate across the territories, some of which are subsidiaries of groups already active in Metropolitan France, while others are independent. In total, the deployment of the FR-Alert system has involved the implementation and coordination of 21 MNOs across all territories.



Source: GSMA Intelligence

²⁰ KII with Digital Transformation Directorate (DTNum).

Figure 4:

MNO presence in Metropolitan and Overseas France

- Overseas Departments and Regions (DROMs)
- Overseas Collectivities (COMs)



Source: Ministry of Interior, Digital Transformation Directorate

05

France's approach to disaster management and governance



A multi-tiered and highly coordinated operational response

Disaster management in France follows a clearly defined, hierarchical chain of command, which is outlined in the Organisation of Civil Security (ORSEC) framework for contingency planning.

Authority to direct disaster response is determined based on the scale of the crisis and factors such as severity, complexity, geographic scope and resources required. Depending on these factors, responsibility may fall to the prime minister (nationwide), zonal prefect (defence zone), departmental prefect (department) or mayor (municipality).^{21,22}

This tiered structure enables both strong coordination between response actors and rapid, localised action through devolving oversight to subnational authorities when appropriate. This chain of command is also linked to the European level, with the option to activate support from EU Member States through the EU Civil Protection Mechanism.

The process for alerting the public in the event of an emergency, including the activation of FR-Alert, follows this same hierarchical chain. Compared to some countries where the national government has alerting authority through the national EWS, the French approach is decentralised, with public authorities trained and authorised to use FR-Alert at subnational levels.

Responsibility for public alerting lies with the authorities exercising police powers: the mayor at the municipal level, the prefect at the departmental or zonal level and the prime minister at the national level. Each of these authorities is responsible for the decision to issue an alert, the channels used and validation of the message content. Access to the FR-Alert platform, which enables the creation and launch of an alert, is currently only held by prefects and higher levels of command. Mayors do not have direct access to the system but may request the activation of FR-Alert through the departmental prefect.

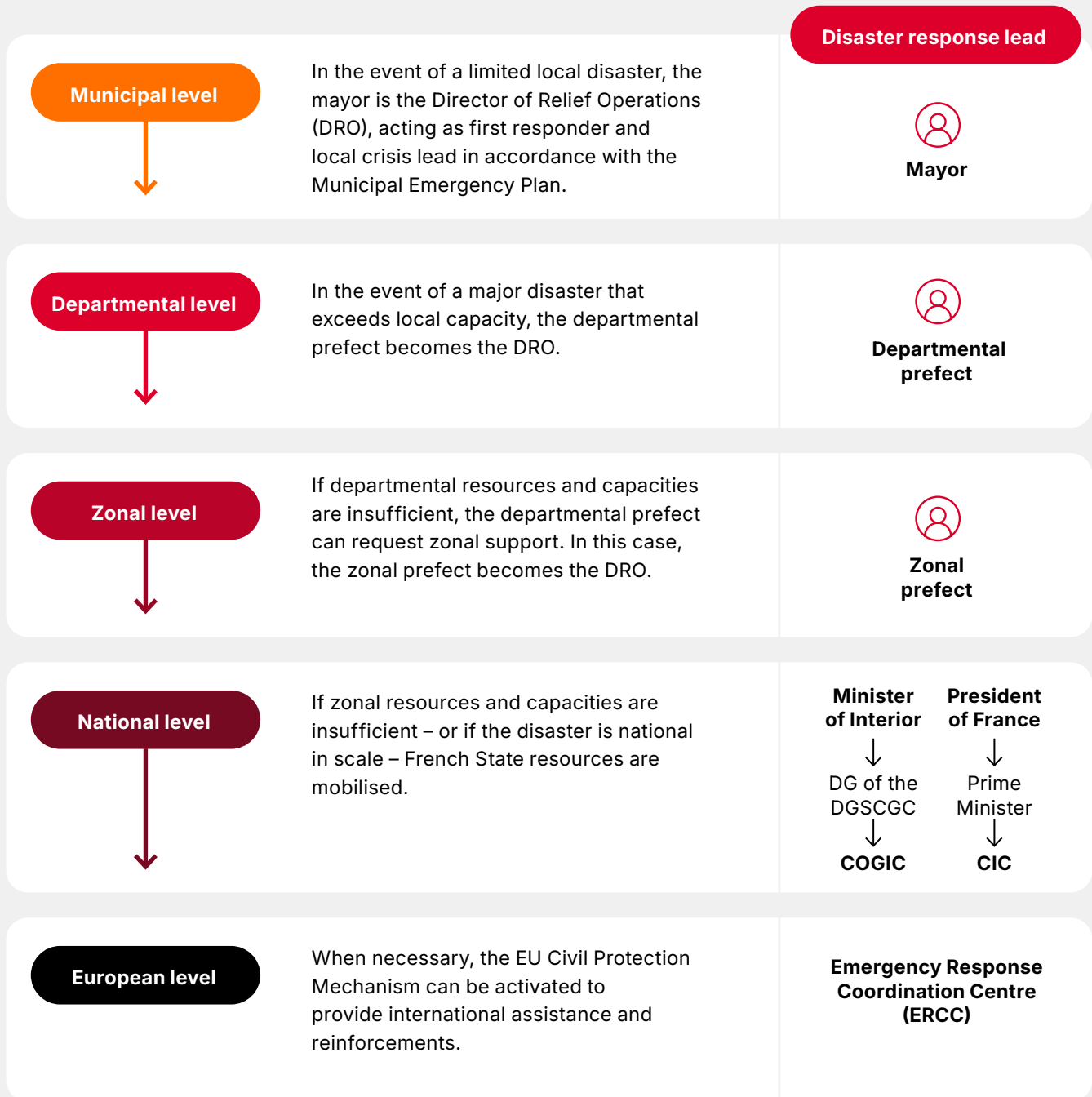


²¹ Metropolitan France is made up of 13 regions, 96 departments and approximately 35,000 municipalities, each with their own mayor. Each department is managed by a departmental council for local matters, headed by an elected departmental council president, as well as a prefect, who oversees issues related to the national government. The prefect is appointed by the prime minister and is viewed as a representative of the central state, rather than an elected local official. See [State and regional organisation](#).

²² Articles L.731-3 and L.742-2 of the Internal Security Code (Code de la sécurité intérieure), Chapter 7, Civil Security.

Figure 5:

Operational chain for French disaster response



Source: DGSCGC

Table 2:

Administrative levels of disaster management and alerting responsibilities in France

Administrative level	Main authority	Coordination bodies	Key responsibilities	FR-Alert activation
National	Prime minister	Interministerial Crisis Cell (CIC) Interministerial Crisis Management Operations Centre (COGIC)	Provides strategic direction and ensures unified governmental decision-making during major crises. CCED serves as the main governmental focal point for MNOs, ensuring technical coordination and network resilience for alert dissemination.	Authorised to activate FR-Alert. Disseminates public alert messages at a national level. To date, only test activations have occurred at the national level.
Zonal	Zonal prefect	Zonal Operational Centres (COZ) and Zonal Staff Headquarters (EMZ)	Coordinates interdepartmental disaster management and mobilises resources across departments.	Authorised to activate FR-Alert; assumes this role if requested by multiple departments.
Departmental	Departmental prefect	Departmental Operational Centre (COD); Fire & Rescue Services (SDIS); Departmental Directorates for Population Protection (DDPP); Territorial Directorates (DDT); Regional Health Agencies (ARS); and Fire and Rescue Operational Centre (CODIS)	Leads and coordinates operational crisis response; ensures tactical command through the Incident Commander (COS); mobilises and supervises departmental resources.	Authorised to activate FR-Alert and assumes this role when an event affects one or more municipalities. This may be done on their own initiative or at the request of a mayor, particularly when local response capacities are exceeded. Most common actor activating FR-Alert to date.
Municipal	Mayor	Municipal Safeguard Plan (PCS) and Inter-Municipal Safeguard Plan (PICS, Matras Law 2021)	Initiates first response, informs and protects the population, ensures local preparedness and cooperation among municipalities.	Not authorised to activate FR-Alert. Can make a request to the departmental prefect to activate FR-Alert if deemed necessary. Mayors use other channels to alert the public during localised emergencies (e.g. websites, social media, door-to-door community mobilisation).

Hazard monitoring agencies

Several hazard monitoring agencies support disaster management and response. These expert bodies are embedded in day-to-day operations as contributors of data and scientific advice. They are consulted by operations centres to refine the geographic footprint of alerts, forecast timelines and produce guidance for the public.

These agencies do not disseminate alert messages directly through FR-Alert. The forecasts and advisories from these bodies can, however, be published through their own dedicated websites, in addition to being integrated in early warning messages sent via FR-alert. Stakeholders directly involved in FR-Alert are detailed in section 6.

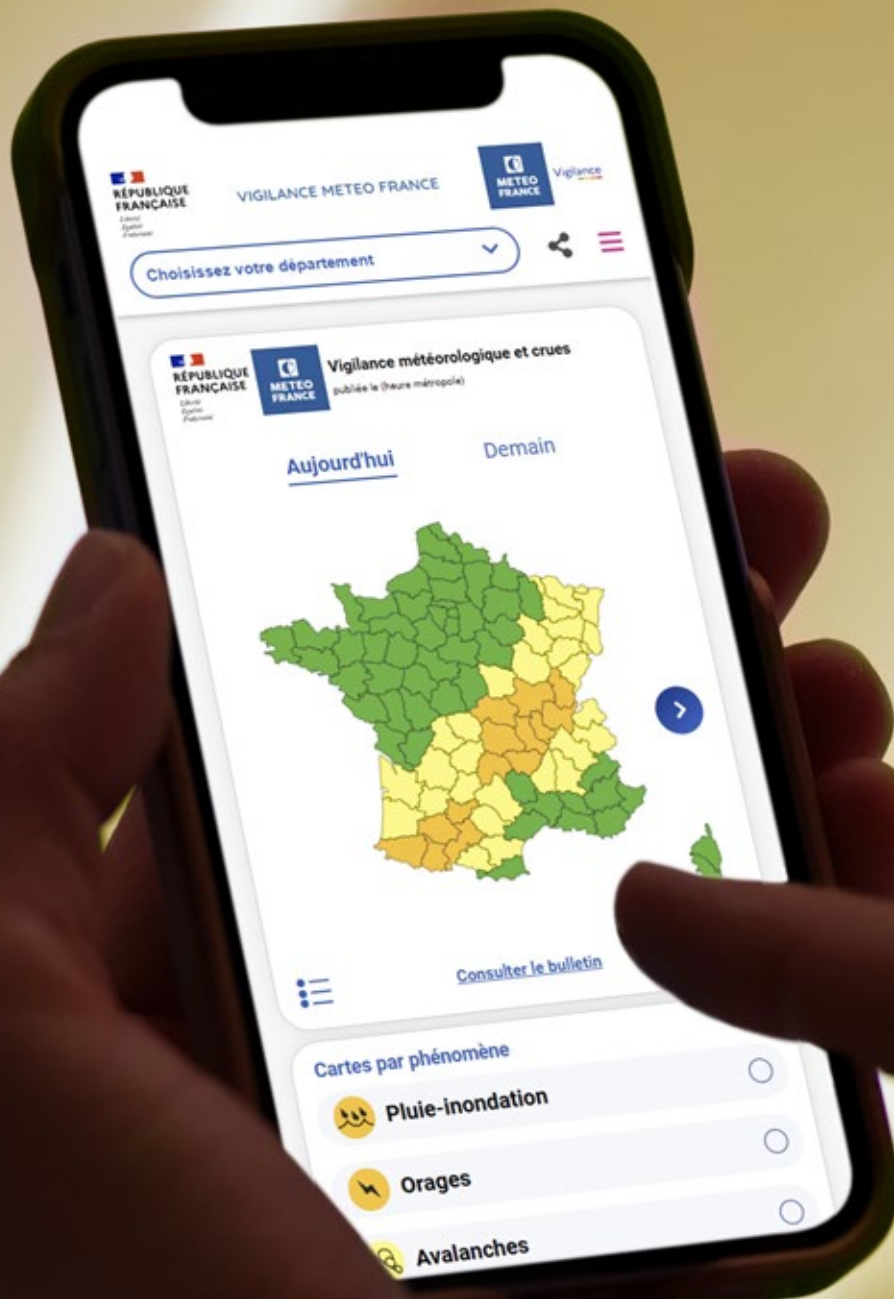
Table 3:

Hazard monitoring agencies contributing to early warning and disaster management in France

Agency	Role
<u>Météo France</u>	Provides continuous meteorological and hydrometeorological surveillance and publishes warnings for hazardous weather.
<u>Central Service of Hydrometeorology and Support for Flood Forecasting (SHAPI) with Vigicrues</u>	Monitors river flooding and provides river-level forecasts and rise rates.
<u>French Geological Survey (BRGM)</u>	Provides expertise on ground-based risks, including earthquakes, landslides, volcanic eruptions and erosion.
<u>National Tsunami Warning Centre (CENALT)</u>	Detects seismic events that may generate tsunamis and issues forecasts and advisories.
<u>National Institute for Industrial Environment and Risks (INERIS)</u>	Provides technical support during industrial incidents and guidance on protective measures for the public and emergency responders.
<u>Institute for Radiation Protection and Nuclear Safety (IRSN)</u>	Supports the management of radiological and nuclear incidents, including protective measures for the public and responders.

06

France's mobile-based early warning system: FR-Alert



FR-Alert is France's national EWS, which disseminates public alert messages through multiple channels for a variety of hazards, both natural and human-induced.

Key features of FR-Alert are its dual mobile technologies, which enable alerts to be sent via cell broadcast (CB) or location-based SMS (LB-SMS), and its geographic coverage, which spans both Metropolitan and Overseas France. MNOs were engaged from the outset of the FR-Alert project, with the French state establishing strong multi-stakeholder coordination and governance processes. This early and structured engagement supported smooth implementation and fostered sustained MNO cooperation, removing the need to secure buy-in later in the process.

The system was deployed in 2022, in compliance with an EU-wide directive²³ for all Member States to implement a public warning system capable of sending public alert messages via a mobile channel. FR-Alert has served as a model for other European countries because of its robust technology, geographic scope and governance.²⁴

The evolution of France's public alerting capabilities

The journey towards a modern, multi-channel EWS in France required a shift away from the country's extensive network of sirens. The first efforts to modernise the national public alerting infrastructure were in 2009, with the launch of the Population Alert Information System (SAIP).

With SAIP, the aim was to integrate and streamline the operation of a network of more than 4,500 sirens through a centralised software platform run by prefectures. An SMS-based alerting channel was initially envisioned but was ultimately replaced with a mobile phone app. Recurring technical issues and low adoption rates led to the app being discontinued in 2018.

The 2019 Lubrizol industrial fire in Rouen, the capital of the northern French region of Normandy, further exposed gaps in France's public alerting and crisis communications system. Despite activating ORSEC and mobilising emergency services, public information was delayed and unclear, leading to confusion among residents.

Lessons from both SAIP and Lubrizol underscored the limitations of siren-based systems, such as low public awareness of alert codes, the inability to disseminate precise guidance and dependence on audible range. Recommendation 5 of the official Lubrizol lessons-learned report called for the development of a mobile public alerting system capable of sending geotargeted messages, providing clear information and complementing existing siren and media broadcast channels.²⁵ In this sense, Lubrizol was a catalyst for the creation of FR-Alert.

Figure 6:

Image of Lubrizol industrial fire, Rouen, France, 26 September 2019



Source: Daniel Briot, Licensed under CC0 1.0 Universal Public Domain Dedication

²³ Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code.

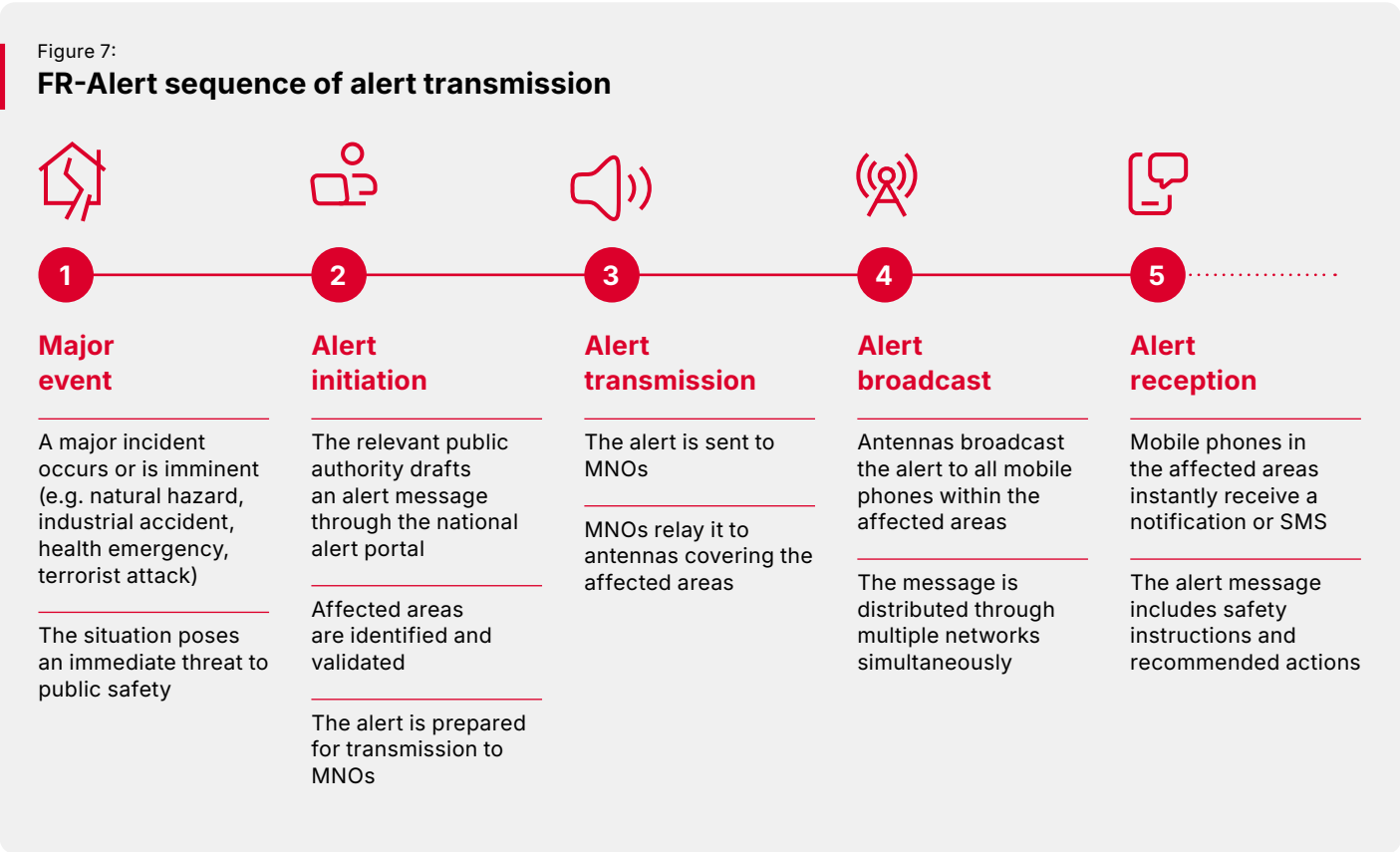
²⁴ Intersec. FR-Alert: A European reference for public alerting.

²⁵ Lubrizol lessons learned report. See: Ministère de l'Agriculture, de l'Agro-Alimentaire, et de la Souveraineté Alimentaire. (28 September 2020). Retour d'expérience après l'incendie de l'usine Lubrizol à Rouen en septembre 2019.

From decision to dissemination: FR-Alert today

FR-Alert enables rapid, consistent and geographically targeted dissemination of alert messages to the public in the event of a crisis. It is based on a clearly defined alert chain linking national, zonal and departmental authorities, each with a specific role

in managing and transmitting alerts. This structured approach ensures that each alert originates from the relevant public authority and reaches citizens with timely instructions.



Source: [Government of France - FR-Alert website](#)

Hazard monitoring agencies are the first link in the chain when a disaster is imminent or occurring. They provide operations centres with forecasts and advisories that explain the predicted trajectory and exposure of a hazard, as well as protective guidance for populations at risk. Authorities in charge of disaster management and relief operations compare these analyses with field reports from emergency services to verify and harmonise situational awareness, in turn informing the decision to issue a public alert. The decision to issue an alert is guided by three key criteria:

- 1. Immediacy of the threat
- 2. Potential severity
- 3. Geographical scope

Messages must remain concise, action-oriented and conform to operational guidance established by the Mol (see Training and capacity building in Section 6.2). The message content is drafted by officers in the public authority. For example, in prefectures, this is done by officers of the Interministerial Service for Defence and Civil Protection (SIDPC). The prefect (or prime minister for a national-level alert) will then validate the message and decision to alert, before dissemination via FR-Alert.

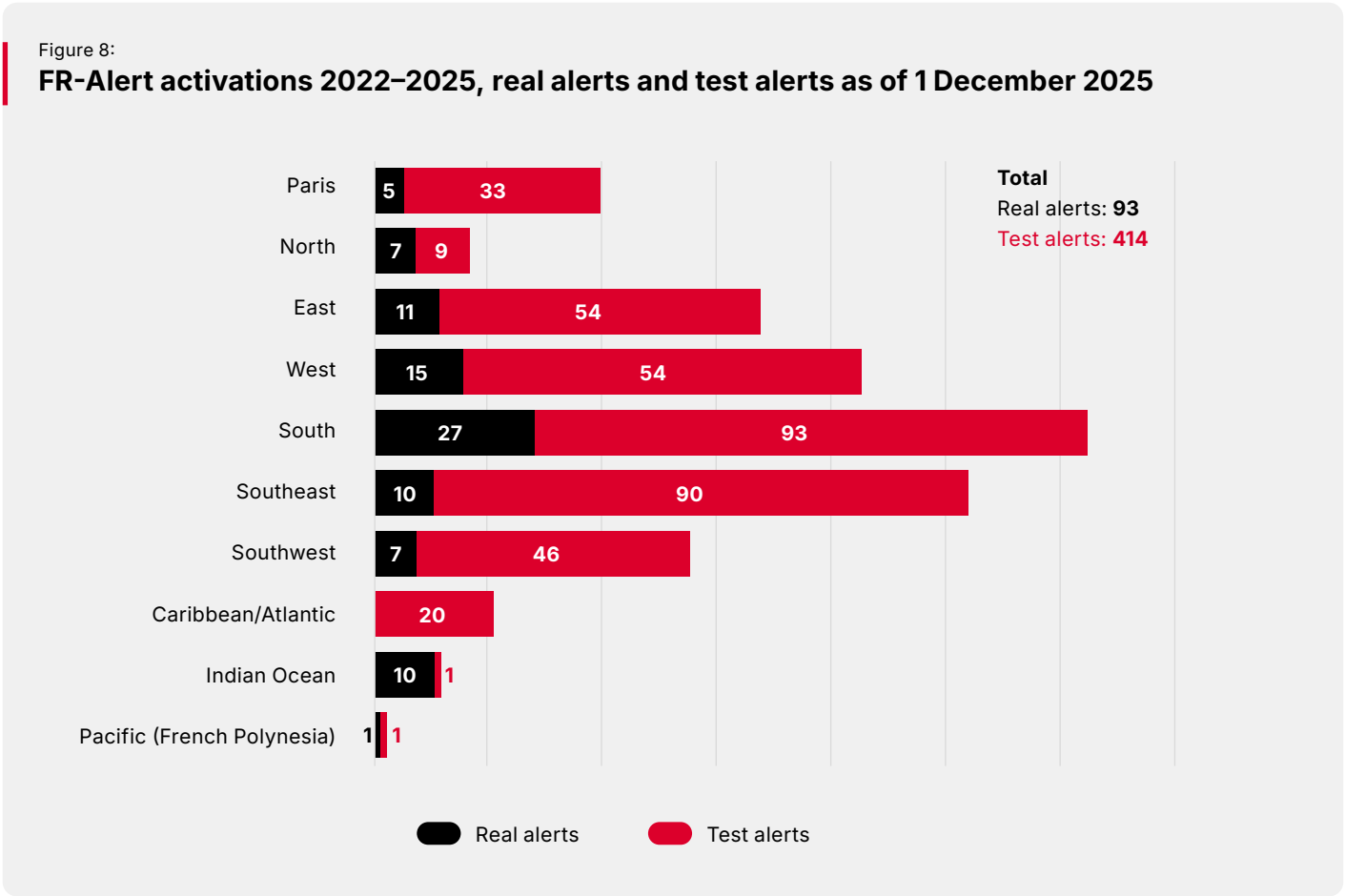
The role of MNOs in this process is primarily technical. MNOs ensure the availability, interoperability and reliability of the system without participating in alert decision-making or broader disaster response. Once the alert is validated by the relevant authority, it is disseminated automatically without any further action required by MNOs. This division of roles is in line with France’s legal and regulatory framework (see Section 6.1, Policy and regulation).

The FR-Alert system has four alert levels²⁶ corresponding to the severity of the event. This graduated approach ensures that messages are prioritised by urgency. The most severe alerts have the most prominent notifications, with sound and vibration, while lower-level warnings are sent with more discreet notifications, such as text only. While Level 1 alerts are mandatory and cannot be disabled on mobile devices, recipients may choose to deactivate Level 2, 3 and 4 CB messages on their handsets. This tiered structure helps maintain public trust by preventing alert fatigue, ensuring that people pay attention when the highest-severity messages are issued.

FR-Alert levels

Level 1	Governmental	(Also referred to as “Presidential” alerts) – reserved for national-level use; not activated to date; users cannot opt out
Level 2	Extreme	Opt-out possible
Level 3	Severe	Opt-out possible
Level 4	Warning	Informational only; no sound or vibration accompanying the message; opt-out possible

While the system is relatively new, as of December 2025, FR-Alert has been activated for 93 real alerts and over 400 test exercises.²⁷



Source: [Government of France – FR-Alert activation dashboard](#)

26 KII with DGSCGC.
27 Government of France, [FR-Alert website](#).

6.1 Policy and regulation



The 2018 EU directive establishing the European Electronic Communications Code (EECC) was a key driver for the creation of FR-Alert, underpinning France's decision-making around timelines, technology choices and MNO responsibilities. Specifically, Article 110²⁸ required all Member States to deploy a "public warning system" capable of transmitting emergency alerts via mobile communications services by June 2022.

France transposed the directive into national law in 2021, which entrusted the Ministry of the Interior, acting through the DGSCGC, with responsibility for the FR-Alert system.²⁹ Oversight and compliance would be ensured by the national telecoms regulator, ARCEP, which monitors service quality and verifies that MNOs fulfil their public service obligations.

The role of MNOs was also defined in both European and national laws, complemented by technical coordination agreements with the state and strict data protection policies. Under the law, MNOs were mandated to:

- Disseminate state-issued alerts across their networks, including to roaming users
- Ensure technical interoperability with other European systems

In practice, this required MNOs to deploy the technology, ensure national coverage both in Metropolitan and Overseas France and maintain compatibility with European standards for emergency roaming.

France's Postal and Electronic Communications Code (CPCE) is the key legal framework that defines the wider public interest obligations of MNOs. Under Articles L33-1 and L34-1, MNOs must ensure the availability, integrity and security of their networks and cooperate with public authorities in implementing systems serving national safety.

France's clear policy framework outlining the role of MNOs gives operators a well-defined place in the system, ensures expectations are transparent and enables their effective participation, helping to keep public warning delivery coordinated and consistent.

Differing obligations across Overseas France

France's overseas territories were not subject to identical regulatory obligations or implementation timelines under the European directive, due to the different constitutional status of Overseas Departments and Regions (DROMs) versus Overseas Collectives (COMs).

The **DROMs** – Guadeloupe, Martinique, French Guiana, Réunion and Mayotte – were covered by Article 110 of the EECC and therefore had to comply with the June 2022 deadline.

In contrast, the **COMs** fall outside the EU's territorial scope and were not legally bound by the EECC deadline. However, their inclusion in FR-Alert was pursued as part of France's commitment to national cohesion and equal protection for all citizens. These territories were also motivated to meet the EECC deadline as state funding to reimburse costs incurred by MNOs was tied to meeting the corresponding implementation deadlines set by the government.

²⁸ Article 110 of the EECC: "By 21 June 2022, Member States shall ensure that, when public warning systems regarding imminent or developing major emergencies and disasters are in place, public warnings are transmitted by providers of mobile number-based interpersonal communications services to the end-users concerned."

²⁹ Ordonnance n° 2021-650 du 26 mai 2021 portant transposition de la directive (UE) 2018/1972. Arrêté du 27 septembre 2021 pris pour l'application de l'article D. 98-8-7 du Code des postes et des communications électroniques et relatif à l'acheminement des communications des pouvoirs publics.



Beyond a legal obligation

The legal and regulatory conditions set forth in the EEC and French national law provide an important foundation to define the role of MNOs. In interviews, however, MNOs emphasised that they are not merely driven by the imperative of regulatory compliance. Although such projects are complex and resource-intensive, they have fully embraced their role in contributing to public safety and are committed to the implementation and maintenance of the FR-Alert system on their networks.

MNOs noted a strong sense of public duty and reputational responsibility. While these systems generate no direct commercial return, their contribution to public safety strengthens their credibility, fosters public trust and enhances their societal value. Subscribers expect their service providers to play an active role in public safety. Taking part in the public alerting effort is therefore regarded as a natural and expected practice.

Data protection and privacy

FR-Alert fully complies with European and national privacy standards. In accordance with the General Data Protection Regulation (GDPR) and the French Data Protection Act, FR-Alert does not process personal data or individual geolocations. Messages are broadcast through cell towers within a defined area without identifying recipients. MNOs must also comply with their general obligations concerning network security and confidentiality of communications; all technical data used for alert dissemination is anonymised and deleted once the operation concludes. The French Data Protection Authority (CNIL) issued a positive report in February 2022 after confirming that only temporary, non-personal technical data is used.³⁰

“Participating in the deployment of FR-Alert fully reflects Bouygues Telecom’s deep commitment: putting innovation and the reliability of our networks at the service of everyone’s safety. It is in our DNA to contribute, alongside the authorities, to solutions that have a concrete and positive impact for citizens.”

– Bouygues Telecom

³⁰ The CNIL opinion is not publicly available.

Maintaining network resilience

MNOs are required to integrate and maintain the interfaces connecting their core networks to the FR-Alert platform, using standardised protocols such as the Common Alerting Protocol (CAP). They must also perform regular technical tests with the Mol and ARCEP to verify message delivery rates, latency and coverage reliability. These tests ensure that the system operates seamlessly across all mobile networks and geopolitical zones, including overseas territories.

During emergencies, MNOs are responsible for maintaining the resilience of their networks by prioritising alert traffic, ensuring power redundancy and implementing contingency measures in case of congestion or partial network failure.³¹ They are required to maintain access to emergency communications, give priority access and bandwidth to emergency and public services, activate their business continuity plans (BCP) and cooperate within the ORSEC emergency response framework. Oversight of these responsibilities falls under the Defence Electronic Communications Authority (CCED) to ensure that emergency communications remain functional even under exceptional circumstances.

Cooperation and transparency are also integral to MNO duties. They must provide technical assistance to public authorities during the automatic activation of alerts, ensure the traceability of alert dissemination and report any anomalies or service interruption that could affect the reliability of the system. These reports contribute to the continuous evaluation of FR-Alert's performance and feed into the broader European monitoring framework under the EU Civil Protection Mechanism for Member State EWS.

European interoperability and standards

France participates in European initiatives aimed at strengthening cross-border interoperability of national EWS. MNOs are required to guarantee that FR-Alert messages reach all users roaming in France, regardless of their country of origin or home operator. Conversely, French citizens travelling abroad must be able to receive local alerts issued by equivalent systems in other EU Member States. This principle of emergency roaming is grounded in the interoperability and transparency requirements of the EECC and the guidelines of the Body of European Regulators for Electronic Communications (BEREC).³²

From its inception, FR-Alert was designed to align with international and European standards. By adhering to globally recognised specifications, France has fostered technological diversity and healthy competition among solution providers, avoiding dependency on a single vendor. Standardisation also promotes state-to-state cooperation and the exchange of best practices in public warning. For citizens, this ensures a consistent experience, with alerts received in a uniform format even when travelling across borders, supporting a shared European approach to safety.

Technical standards

FR-Alert complies with the EU-ALERT framework and is built upon 3rd Generation Partnership Project (3GPP) standards:

- TS 22.268³³ defines functional requirements for public warning systems
- TS 23.041³⁴ specifies the technical implementation of the Cell Broadcast Service (CBS) across 2G, 3G, 4G and 5G networks

At the European level, ETSI TS 102 900 establishes the reference framework for PWS implementation under the EECC, ensuring coherence among EU Member States.

³¹ Article D98-4 I: MNOs "shall take all necessary measures to ensure uninterrupted access to emergency services."

³² Body of European Regulators for Electronic Communications (BEREC).

³³ 3GPP. (2024). TS 22.268: Public Warning System (PWS) requirements.

³⁴ 3GPP. (2024). TS 23.041: Technical Realization of the Cell Broadcast Service (CBS).

6.2 Stakeholders and coordination



Table 4 lists the key stakeholders involved in France's mobile emergency alert ecosystem and their roles in the deployment of FR-Alert.

Table 4:

Key stakeholders in the FR-Alert ecosystem

Category	Stakeholder	Role
National disaster management entity	DGSCGC (Directorate General for Civil Security and Crisis Management – under the Ministry of Interior)	Central authority in charge of the public alerting doctrine. Developed and disseminated the national operational doctrine governing FR-Alert and associated training for public authorities.
National electronic communications entity	CCED (Defence Electronic Communications Authority – Under the Ministry of Economics and Finance)	Coordinates with MNOs and facilitates their implementation of government directives; provides oversight and monitoring; led institutional governance of FR-Alert.
National digital technology entity	DTNum (Digital Transformation Directorate – Under the Ministry of Interior)	Oversight of the technology and digital infrastructure underpinning the FR-Alert system; ensures interoperability between government systems and MNO networks.
Telecoms regulator	ARCEP (Regulatory Authority for Electronic Communications, Postal Services and Press Distribution)	Regulates MNOs and manufacturers; ensures MNO compliance with technical and legal requirements.
MNOs	MNOs in Metropolitan France: Bouygues, Free, Orange and SFR MNOs in Overseas France: Dauphin, Digicel, Flow, Globaltel, Manuia, OPT, Ora, SPM Telecom, Vini, Vodafone Polynesia and Zeop, as well as subsidiaries of Free, Orange and SFR in the Caribbean and Indian Ocean territories.	Disseminate alerts via FR-Alert; maintain infrastructure; perform system tests and maintain service continuity.
Technology provider	Intersec	Designed the FR-Alert core architecture and interface. Technology provider selected by the Mol and most MNOs.
Hazard monitoring agencies	Météo France, SHAPI with Vigicrues, BRGM, CENALT, INERIS and IRSN	Expert bodies providing data and scientific advice to disaster management authorities; guide decision-making around alerts and broader emergency response planning.
Public authorities	Prime minister, zonal prefects, departmental prefects and their offices	Lead decision-making for FR-Alert activation; develop and validate message content for FR-Alert dissemination.
Public	General public	Receives alerts via FR-Alert mobile channels.

Institutional coordination and governance

The FR-Alert project was steered through strong interministerial coordination, led by the CCED. Acting as the central interface between the DGSCGC, DTNum, ARCEP and MNOs, the CCED ensured that the technical, regulatory and operational aspects of the project were aligned. Its role was essential in defining technical specifications, establishing a coherent timeline and guaranteeing full interoperability across MNOs and public agencies.

This interministerial mechanism formed the backbone of the FR-Alert project's overall governance structure, reflecting strong leadership from the state. From the outset, all relevant stakeholders were brought to the table, ensuring a shared understanding of objectives, timelines and technical constraints. This inclusive approach fostered trust, alignment and operational efficiency, with MNOs regarded as key partners in safeguarding the French population, rather than simply service providers.

One critical factor was ensuring close collaboration between public and private stakeholders. Cooperation between the state and MNOs was facilitated by the CCED, which operates under the authority of the prime minister and the Secretary-General for Defence and National Security (SGDSN).

A defining strength of FR-Alert's implementation was that MNOs were involved from the outset, with structured and predictable coordination led by the CCED. MNOs described the CCED's role as the system's "state champion" and primary point of contact – an approach they viewed as central to the project's success. Regular interministerial meetings between the DTNum and MNOs, convened by the CCED every two months, helped monitor progress and resolve issues collectively. This was complemented by monthly coordination sessions with MNOs in Metropolitan France representing their overseas subsidiaries, alongside dedicated meetings for MNOs working exclusively in Overseas France. This early, sustained engagement created continuity, reduced implementation risks and supported a coherent national roll-out.

Once the system was live, this governance framework evolved into quarterly interministerial meetings, maintaining the same spirit of collaboration. These meetings, involving the French Telecommunications Federation (FFT), the CCED and MNOs, continue to serve as a platform for discussing ongoing operational matters, ensuring consistency, transparency and continuous improvement in the management of the FR-Alert system.

Operational coordination

The CCED also plays a central role in maintaining the resilience, security and continuity of communications networks, including during emergencies. It chairs the Interministerial Commission for the Coordination of Electronic Communications Networks and Services (CICRESCE), which brings together relevant ministries, regulatory authorities and major MNOs. This body defines technical standards, security requirements, dissemination priorities and message transmission procedures.

Under its supervision, joint tests are conducted to assess latency, coverage and reliability, while ensuring that FR-Alert remains interoperable with other European systems. In cases of network disruption, the CCED coordinates redundancy and continuity measures for critical communications, in conjunction with ARCEP and the DGSCGC, to ensure essential services remain available during crisis response.

Training and capacity building for public authorities

The DGSCGC, as the authority primarily responsible for public alerting, developed and disseminated the national operational doctrine governing FR-Alert. This doctrine defines how alert messages should be structured, formulated and disseminated, promoting common best practices among all public authorities.

To ensure consistent application of the operational doctrine across different alerting authorities and a standardised operational approach nationwide, the DGSCGC implemented a comprehensive training-of-trainers programme, enabling the systematic training of prefectural staff responsible for drafting and sending alerts through FR-Alert. A pool of 32 interregional operational instructors (FIO) was established, ensuring coverage across all defence zones in Metropolitan and Overseas France, with at least three instructors per zone. Coordinated and monitored by the central administration, more than 750 individuals have been trained through this programme since the roll-out of FR-Alert in 2022.³⁵

³⁵ Presentation by DGSCGC, September 2025.



Technical exchanges between MNOs and public authorities also played a crucial role in building capacity by strengthening mutual understanding of the system's functionalities and operational limitations. This early collaboration helped build shared ownership and fostered smooth coordination during the national roll-out.

As FR-Alert is still relatively new, some local authorities remain cautious about triggering alerts. In interviews, they noted the heavy responsibility of "pushing the red button," referring to the activation of an alert and the risk of potential mistakes or unintended reactions from the public. In addition, although the operational doctrine is a valuable resource for public authorities, varied understanding and application of this doctrine across departments is still a challenge for a decentralised EWS governance model.

These human dimensions reflect the learning curve inherent in any new emergency communication tool. Over time, with more training, experience and feedback from real activations, confidence and consistency is expected to grow.

Building public engagement and trust

To complement the training of public authorities, a broad public awareness campaign³⁶ was conducted to support the FR-Alert roll-out. This included televised and social media campaigns, as well as regular simulation exercises involving the population. These exercises provided an opportunity to test the FR-Alert system under real conditions and gauge message clarity and population response. These lessons could then feed into preparedness efforts and further public outreach.

The government also partnered with the University of Avignon through the ESPACE Laboratory to produce academic research studies examining the technical performance of both CB and LB-SMS channels, coverage disparities between MNOs and user perceptions and understanding of the alerts they received. Studies were conducted during national exercises from 2022 to 2024 in Cannes and along the Mediterranean coast, including the 2022 DOMINO exercise.³⁷ Findings highlighted the system's capacity for rapid dissemination of alert messages, but also how message structure, tone and length can directly influence public response. This work has helped refine message design, harmonise institutional practices and strengthen public trust in FR-Alert.

In addition to direct engagement through exercises, the FR-Alert website³⁸ is a key communication tool for the state and informational resource for the public, providing FR-Alert FAQs, maps displaying alerts for both metropolitan and overseas territories and historical data on FR-Alert activations since its 2022 roll-out.

³⁶ Informational website for French citizens: [FR-Alert : le dispositif qui vous prévient en cas de danger majeur](#).

³⁷ CNRS – Institut des sciences humaines et sociales. (14 February 2025). "Des scientifiques engagés au côté du dispositif FR-Alert".

³⁸ [FR-Alert dashboard](#)

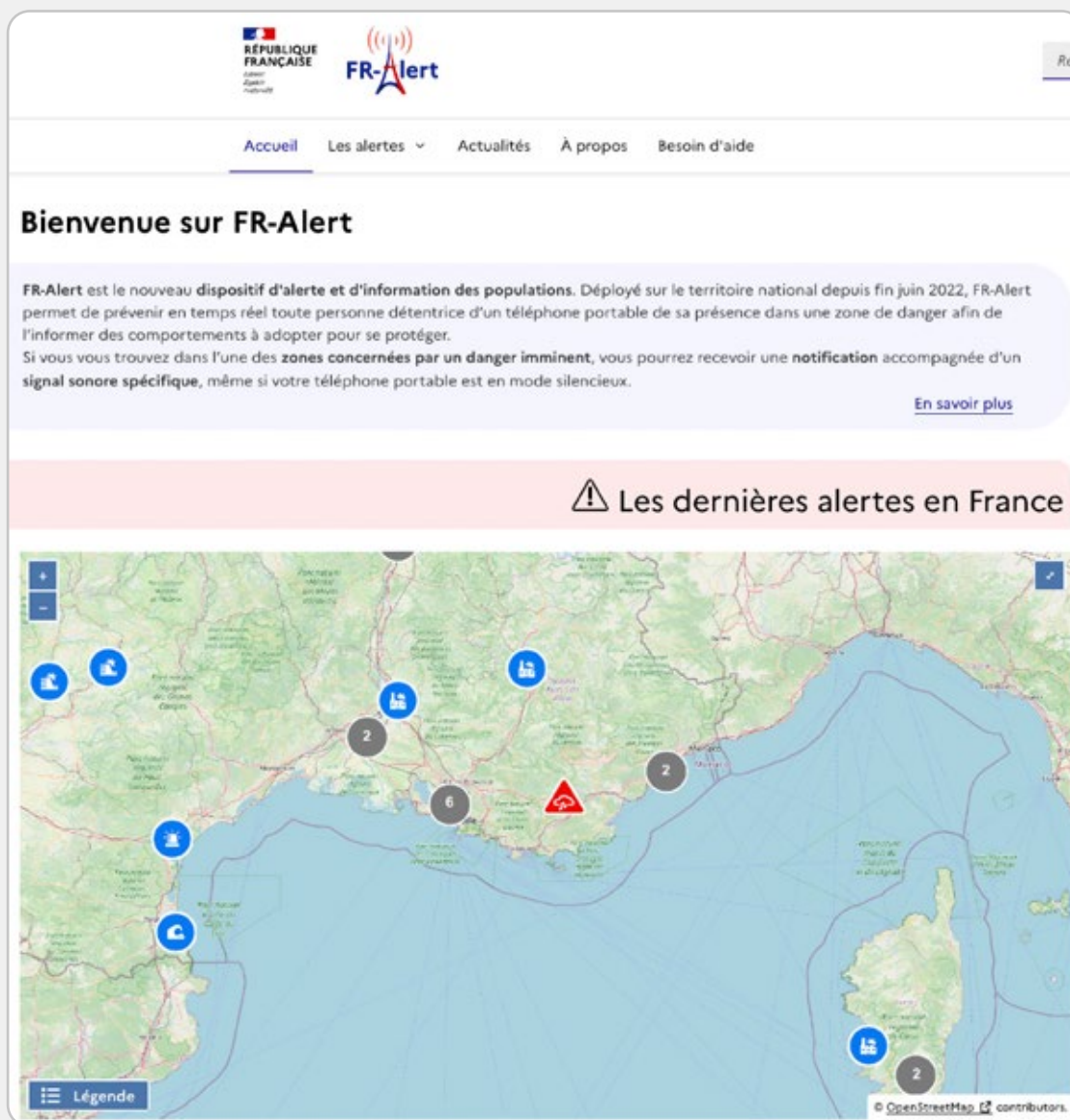
2022 DOMINO exercise

The first simulation involving FR-Alert was the May 2022 DOMINO exercise, which tested the cell broadcast component in real time, one month before the national roll-out. DOMINO was a large-scale European civil protection exercise, taking place in the southwestern department of Bouches-du-Rhône,

and involving more than 1,000 emergency personnel from Germany, Austria, Belgium, Spain and France for 48 hours. The successful testing of FR-Alert during DOMINO validated both the system's technical performance and its integration in France's national disaster management protocols.

Figure 9:

Screenshot of FR-Alert welcome page with map of activations



Source: [FR-Alert](#)

Figure 10:

Screenshot of webpage showing the alert for a forest fire in the Bouches-du-Rhône region



Incendie - Feu de forêt

Feu de forêt (Pennes-Mirabeau et Septèmes-les-Vallons)

 **Lundi 28 juillet 2025, 17h59**
Fuseau horaire : UTC+2 "Europe/France" Heure de Paris

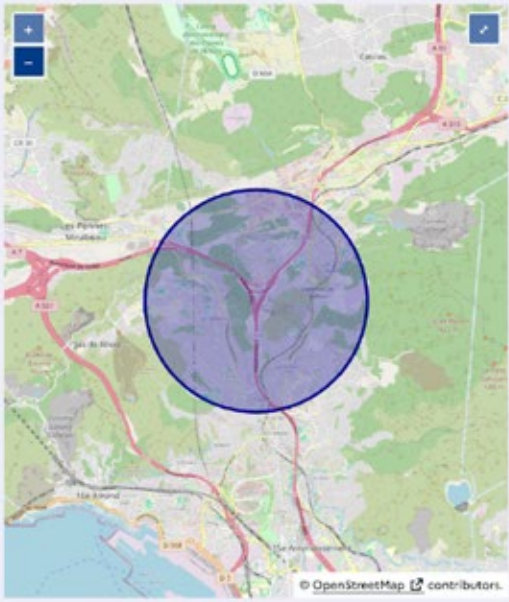
 **Communes des Pennes Mirabeau et de Septèmes-les-Vallons (C1)**

Informations complémentaires

- > Urgence : Immédiat
- > Sévérité : Extrême
- > Certitude : Observé
- > Fin de l'alerte : Lundi 28 juillet 2025, 21h17
Fuseau horaire : UTC+2 "Europe/France" Heure de Paris
- > Source : Préfecture des Bouches-du-Rhône

Message du préfet des Bouches-du-Rhône
Alerte - Un incendie est en cours sur les communes des Pennes Mirabeau et de Septèmes-les-Vallons.

- 1 / Mettez-vous à l'abri des fumées.
- 2 / Évitez de prendre les autoroutes A7 et A51 fermées à la circulation.
- 3 / Évitez de vous rendre à Aix et à Vitrolles par les axes secondaires.
- 4 / Évitez la D59C et D8N à partir de Saint-Antoine et en direction d'Aix.
- 5 / Appelez le 18 ou le 112 uniquement en cas d'urgence.
- 6 / Respectez les consignes des autorités diffusées à la télévision, à la radio, sur les réseaux sociaux et les sites institutionnels.



© OpenStreetMap contributors

Source: [FR-Alert](#)

6.3 Technology and infrastructure



Through FR-Alert, France has implemented a balanced and future-proof public alerting strategy, one designed to combine technological performance with inclusivity and long-term resilience. This was achieved by adopting both CB and LB- SMS technologies for Metropolitan France and selected overseas territories. The dual mobile channels at the heart of FR-Alert are complemented by traditional dissemination methods, with sirens and digital signage also integrated in the system. This multi-channel approach strengthens redundancy and ensures that alerts can reach different user groups with varying network access and availability.

Technologies for mobile alerting

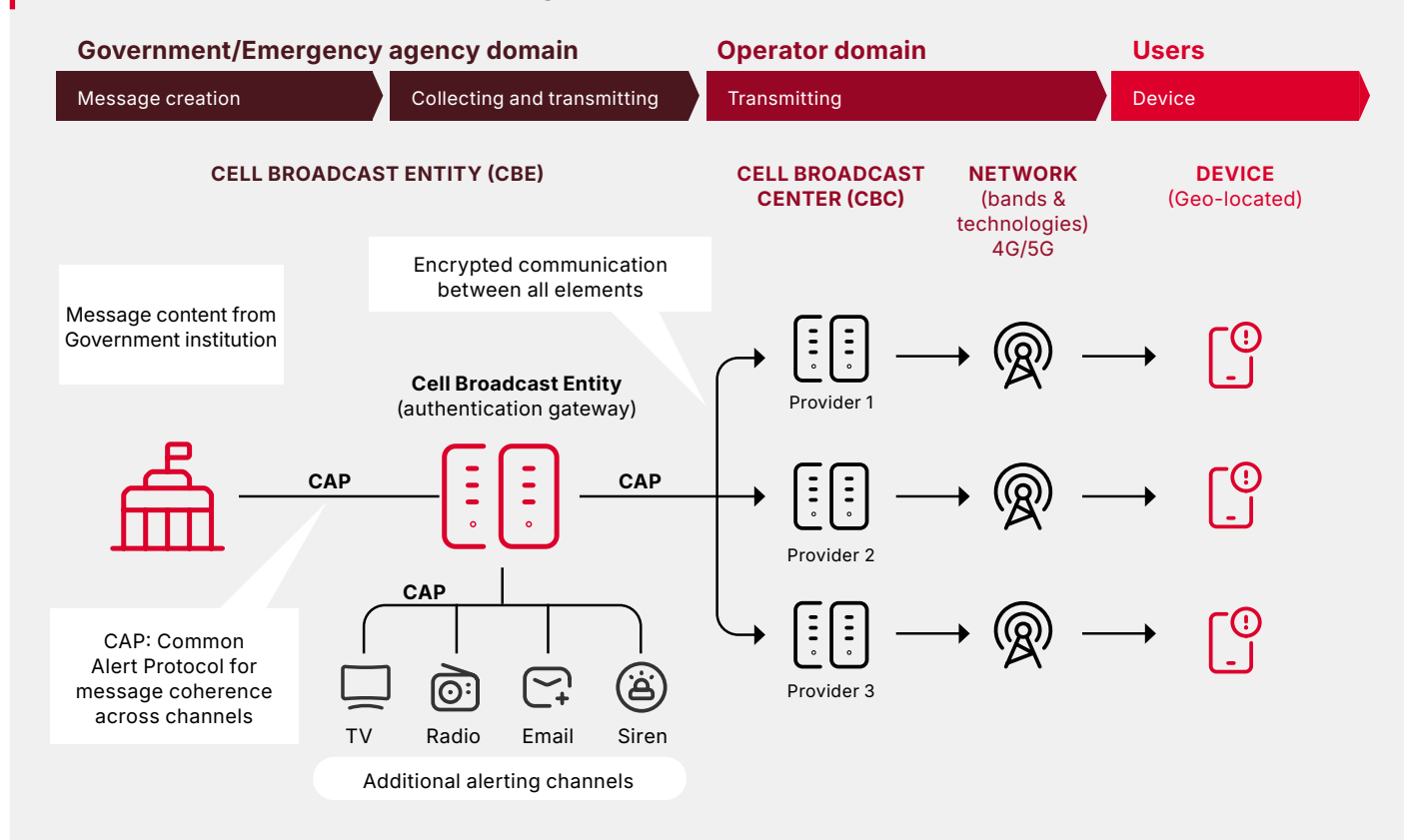
CB allows for the transmission of a single message to millions of compatible mobile handsets within

a defined area without the need for user data or subscribers.³⁹ This technology is particularly effective for early warning and rapid onset emergencies, as it enables public authorities to send messages instantly and without the risk of network congestion.

CB requires specialised hardware and software. The process begins with the cell broadcast entity (CBE) – a secure gateway that receives, authenticates and routes alert messages created by authorised agencies. Once validated, the CBE sends the alert to the cell broadcast centre (CBC). The CBC serves as the hub for processing and transmitting alerts within an MNO's network. MNOs can opt for either a decentralised CBC system in which each operator manages its own CBC, or a centralised system in which a shared CBC serves multiple networks.

Figure 11:

Alert dissemination process through cell broadcast



Source: Telefónica

³⁹ GSMA. (2023). [Cell broadcast for early warning systems: A review of the technology and how to implement it.](#)

LB-SMS, conversely, uses a unique number assigned to mobile subscribers to transmit targeted alerts via text message, based on a defined geographic area.^{40,41} This approach is more vulnerable to delays due to network congestion, which is typically higher during or after a disaster. However, LB-SMS alerts can be sent to any mobile handset model operating on any generation of network (2G, 3G, 4G, 5G)

without needing further configuration, mitigating compatibility issues that can be faced when using CB. To send LB-SMS alerts, MNOs can also have their own SMS centre (SMS-C), which processes and routes the message to users in the defined area.

Table 5 provides a detailed comparison of the two technologies.

Table 5:
Comparison of CB and LB-SMS technologies across key dimensions

	Cell broadcast	LB-SMS
REACH		
Compatible with all handsets	⊗	✓
No handset configuration needed	⊗	✓
Language selection	✓	✓
Cell location accuracy	✓	✓
Text length in number of characters	1,395	160 (concatenated SMS possible)
DELIVERY		
Delivery method	All devices in area	Individual numbers by location
Delivery per minute	Millions	Hundreds of thousands
Alert appearance	Automatic display, ringtone	Standard SMS
Not impacted by network congestion	✓	⊗
Delivery confirmation	⊗	✓
TECH AND FEATURES		
Data privacy	No personal data required	MNO-held, GDPR, compliant
Technical requirements	CBE + CBC	Existing SMS infrastructure
Targeting	Geographic (cell-based)	Geographic (device-based filtering)
Can be used for other use cases	⊗	✓

Source: [Intersec](#)

40 This unique number is called a Mobile Station International Subscriber Directory Number (MSISDN).
41 Intersec. (22 January 2024). "[Location-based SMS for targeted alerts](#)".

Central to the integration of multiple alerting channels like CB and LB-SMS is the CAP standard, a structured format for creating and disseminating alerts across

multiple systems. CAP enables standardised message content and consistent delivery of alerts across all channels.

The Common Alerting Protocol

The Common Alerting Protocol (CAP) is an international standard (ITU-T X.1303) developed by OASIS and adopted by the International Telecommunication Union (ITU). It provides a structured, XML-based format for creating and exchanging emergency alert messages across multiple systems. CAP enables a single message to be disseminated simultaneously through multiple channels such as SMS, CB, radio, television, apps and sirens, ensuring consistency and broad reach. Its standardised format also reduces operational complexity and cost by removing the need for multiple custom interfaces across the many warning sources and dissemination systems used for all-hazard alerts.^{42,43}

Dual mobile technologies: a context-driven choice

France's decision to implement both CB and LB-SMS technologies for FR-Alert was reached jointly with MNOs. This decision recognised that neither technology could satisfy all operational and technical requirements,⁴⁴ whereas the dual technology approach ensured:

- Inclusive population coverage, covering all mobile devices and network generations
- Operational adaptability, enabling authorities to choose the most appropriate channel based on the dynamics of the crisis
- Economic efficiency by avoiding unnecessary investment in obsolete technologies
- Public trust through a disciplined doctrine of use: CB for urgent alerts and LB-SMS for informational messages

CB forms the backbone of the system and is used for mass, real-time public alerting. However, deploying CB across all network generations would have required substantial financial investment. Given that 2G and 3G networks are progressively being decommissioned in France,⁴⁵ the decision was made to implement CB exclusively on 4G and 5G infrastructure, where it could deliver the greatest impact and efficiency.

LB-SMS was selected as a complementary channel to ensure users with feature phones or phones operating outside 4G and 5G areas still received alerts – a key consideration in overseas territories where there are higher rates of 2G and 3G users. It was also considered a more suitable channel for providing contextual information, updates or guidance following an initial alert when immediate public attention or action are not required.

France's dual-technology approach stands out internationally⁴⁶ allowing real-time mass alerting to be paired with continued coverage for older devices and harder-to-reach areas. The result is a system that delivers speed and efficiency without sacrificing reach. By employing both technologies, 95% of the French population is reported to be covered by FR-Alert.⁴⁷

42 GSMA. (2023). *Cell Broadcast for Early Warning Systems: A review of the technology and how to implement it*.

43 ITU. (n.d.). *Common Alerting Protocol and Call to Action*.

44 2022 Finance Bill: Security (Civil Security)

45 Orange. (5 September 2025). "Fermeture du réseau mobile 2G : avec un téléphone adapté, vous restez joignable en toute sérénité".

46 India has also adopted a combined approach using both CB and LB-SMS nationwide through its SACHET platform. For further details, see: GSMA. (2025). *India's SACHET Public Warning System: Case Study*.

47 Intersec. (17 October 2022). "Intersec announces the end of the deployment of FR-Alert". Press release quoting Romain Moutard, former FR-Alert Director.

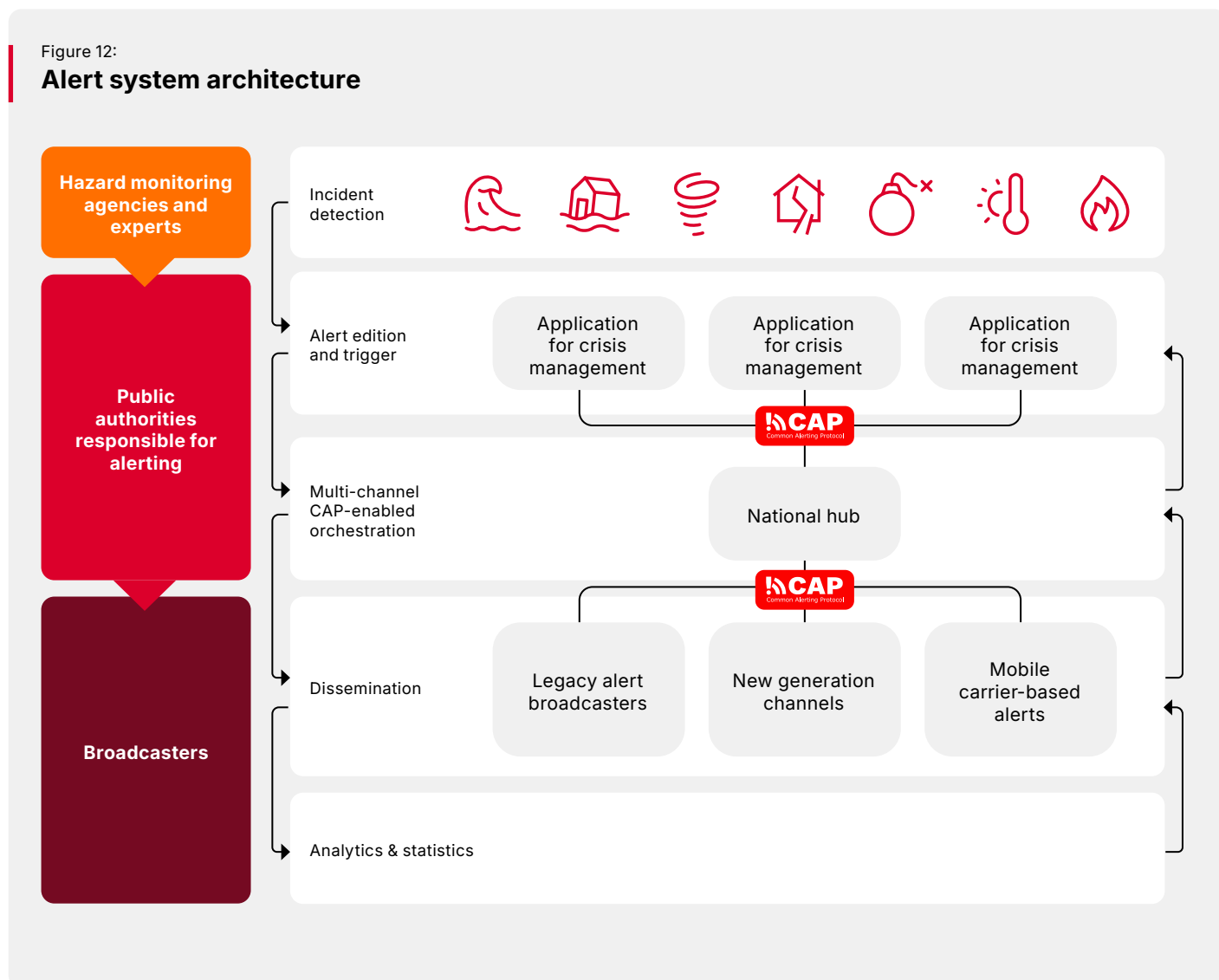
Decentralised three-layer architecture

In France, a decentralised CBC model was initially chosen for cost-efficiency. This approach also ensured greater security, resilience and competitive

neutrality. In the event of one MNO experiencing system failure, the others could continue to disseminate alerts seamlessly.

Figure 12:

Alert system architecture



Source: Intersec

"The technological solution was adapted to the regulation, not the other way around."

– DGSCGC

The FR-Alert architecture was designed by Intersec, the technology provider selected by the Mol to implement the state's core alerting solution. Although each MNO retained full independence in selecting its own provider, most chose the same supplier as the state. This alignment was driven by financial synergies, integration efficiency and the comprehensive nature of the solution, which supports both CB and LB-SMS channels.

Free was the only MNO to develop its technology in-house, for both its mainland operations and overseas subsidiaries. This decision was based on Free's organisational values and "do-it-yourself" approach.⁴⁸ In doing so, it was able to develop the necessary components on top of the core network components they had already developed in-house. This approach also required closer coordination with the state-operated layer and efforts to align key performance indicator (KPI) monitoring.

Each layer in the FR-Alert system performs a distinct yet complementary function that ensures operational resilience and clear institutional accountability.

1. Alert application

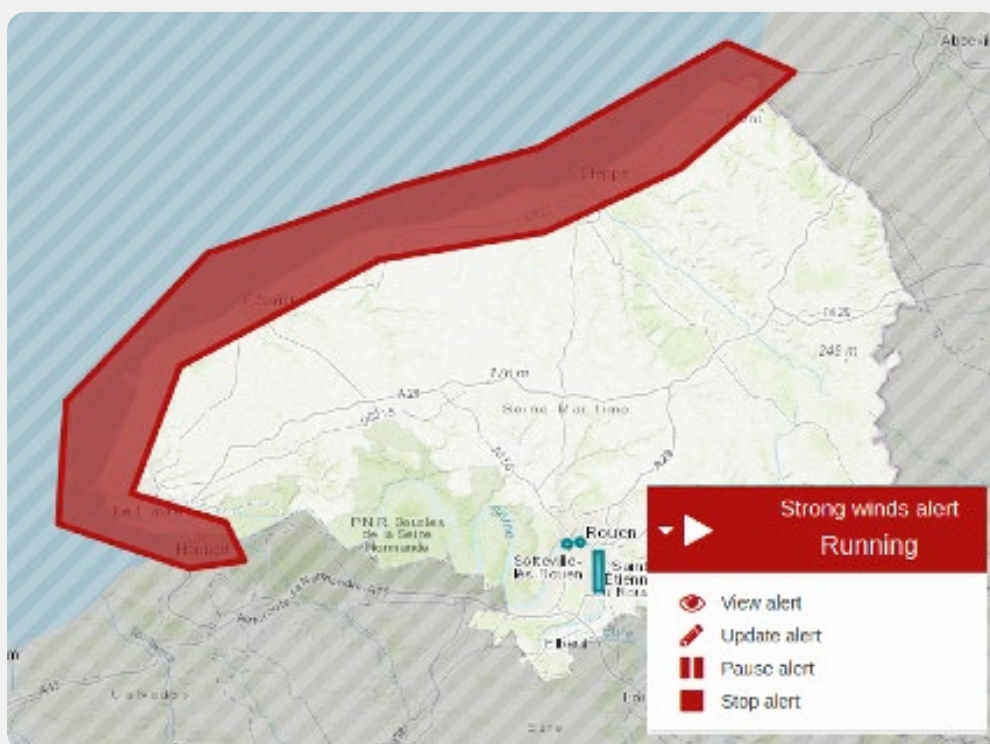
The application layer is the interface that public authorities access to craft messages, define the alert parameters (geographic perimeter, dissemination

channel) and ultimately launch the alert. Public authorities access their area of responsibility on a map interface. They can display tactical information on the map to enhance situational awareness and decision-making, for example, displaying data on wind orientation to help define the zone of exposure during a wildfire.

The interface was developed by Intersec and was designed to simplify alert triggering for authorities. The interface provides preformatted message templates adapted to various risk types and includes predefined geographical perimeters. These perimeters correspond either to administrative municipal boundaries or to specific hazard zones associated with known industrial risk sites. This design minimises technical decision-making during emergencies, ensuring rapid and standardised activation of alert messages.

Figure 13:

Screenshot of the FR-Alert interface, as seen by public authorities



Source: Intersec

⁴⁸ KII with Free.

2. National alert hub

This component serves as a multi-channel mediation platform. Acting as the central point of coordination, it enables a functional separation between alert initiation and dissemination while ensuring seamless interaction between public authorities and MNOs.

3. Dissemination layer

This ensures the effective delivery of alerts to users through all required channels, including mobile networks. Managed independently by each MNO, it connects to the CBCs and SMS-Cs responsible for delivering alerts via their respective networks.

Key considerations for the technical design of France's mobile EWS:

- **Data protection and sovereignty:** The system guarantees complete segregation between state and MNO infrastructure. No personal or location data is transferred. Only aggregated, anonymised data is shared for performance monitoring, in full alignment with GDPR requirements.
- **Technological independence and scalability:** The separation between the alert application and the hub ensures long-term flexibility. Should the Mol or an MNO change or upgrade its internal technologies, adhering to international standards maintains interoperability without having to depend on a single vendor.
- **Operational resilience:** Decentralised CBCs and SMS-Cs reinforce redundancy across networks, ensuring service continuity under degraded conditions or partial outages.
- **International interoperability:** By adopting CAP and aligning with recognised ETSI international standards, FR-Alert ensures compatibility with broader European and global frameworks for EWS.

Sequential implementation across French territory

Assessments were carried out in both Metropolitan and Overseas Assessments were carried out in both Metropolitan and Overseas France, in order to define the necessary scope for each territory. Key factors, such as population density, mobile network coverage, existing infrastructure and the capacity of local MNOs, would inform how the project would be

implemented and, in overseas territories, the optimal combination of mobile technologies.

The project was implemented in a sequential manner, beginning with deployment in mainland France before being extended to the overseas territories. This phased and adaptive approach allowed the characteristics of each area to be taken into account, including the distinct operational environments and the MNOs active in each territory. MNOs in mainland France deployed the system centrally before rolling out the implementations in their overseas affiliates, following a centralised management approach.

In Metropolitan France, implementation began with the central roll-out of CB over 4G networks – later extended to 5G – alongside the integration of LB-SMS to ensure full device and network coverage. This phased deployment – first CB, then LB-SMS – was also followed in the overseas territories that were using both technologies.

The implementation of LB-SMS is considered more complex than CB due to the processing of subscriber location data at the MNO level. Consequently, Free chose to validate the LB-SMS system in mainland France before proceeding with implementation in its overseas subsidiaries. Intersec noted that implementing both technologies simultaneously would accelerate and simplify deployment by capitalising on synergies, both in terms of the internal resources involved and the associated costs.⁴⁹

In the overseas territories, the roll-out required greater flexibility due to diverse network conditions, budgetary constraints and varying handset compatibility. As of Q3 2025, all territories have rolled out FR-Alert, except in New Caledonia where it is in final testing, and Wallis and Futuna where it is expected to be ready to go live between 2026 and 2027.⁵⁰ As both are state-owned MNOs, they are subject to public procurement procedures. This public purchasing process can also contribute to delays and extended timelines.

This phased and context-specific roll-out reduced implementation risks for both government and MNOs, giving MNOs the clarity and sequencing needed to manage deployment across very different network environments. By allowing lessons from the mainland to inform work in the territories, government and MNOs were able to adapt effectively to local conditions while still building a coherent and reliable national system.

⁴⁹ KII with Intersec.

⁵⁰ KII with DTNum.

Table 6:

Implementation status of FR-Alert across France

ZONE	MNO	CB	LB-SMS
Metropolitan	Bouygues	Yes	Yes
	Free	Yes	Yes
	Orange	Yes	Yes
	SFR	Yes	Yes
Caribbean	Dauphin	Yes	Work in progress
	Digicel	Yes	Work in progress
	Free	Yes	Yes
	OMT	Yes	Not planned
	Orange	Yes	Not planned
	UTS	Yes	Not planned
Saint-Pierre And Miquelon	Orange	Work in progress	Not planned
	Globaltel	Yes	Not planned
Indian Ocean	Orange	Yes	Not planned
	Free	Yes	Not planned
	SFR	Yes	Not planned
	Zeop	Yes	Not planned
New Caledonia	OPT-NC	Work in progress	Work in progress
French Polynesia	Onati	Yes	Work in progress
	Viti	Yes	Not planned
	Vodafone (PMT)	Yes	Work in progress
Wallis and Futuna	SPT-WF	Work in progress	Not planned

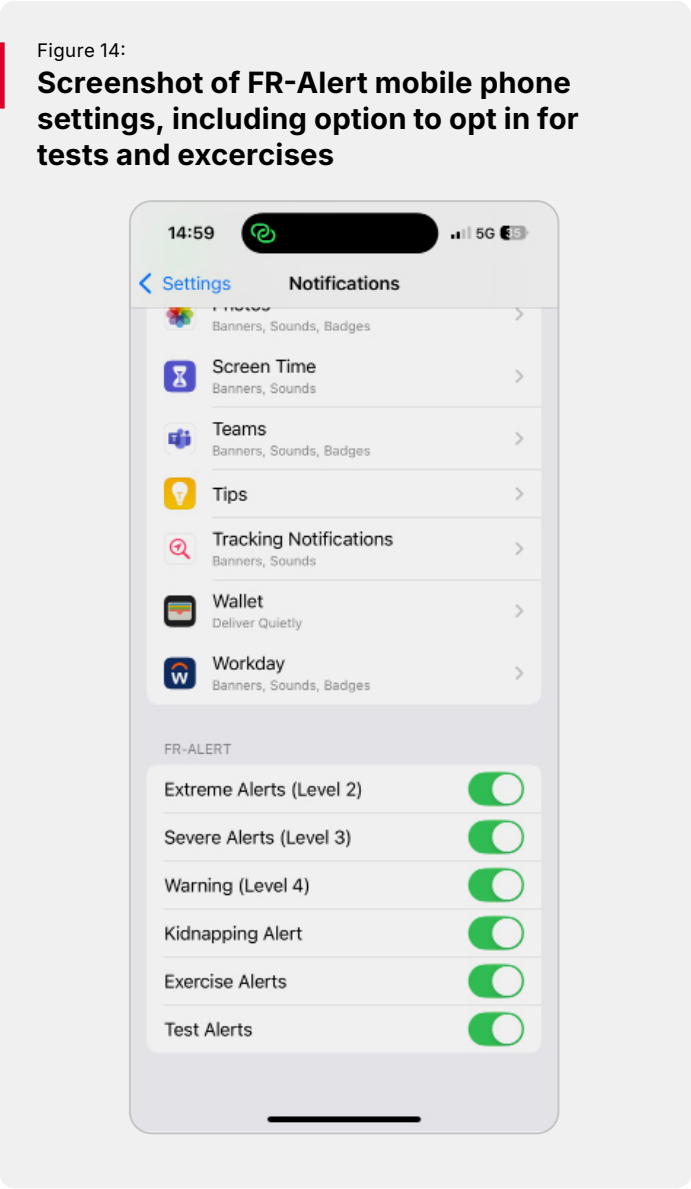
Source: CCED, Intersec

Challenges

Service testing and monitoring

FR-Alert differs from other network-operated services in that it remains inactive until an alert is triggered. This lack of continuous activity complicates the early detection of potential faults, as regular usage does not reveal system anomalies in real time. MNOs are considering the development of a simulation mechanism to proactively identify issues before they affect live operations.

CB testing currently takes place on a dedicated channel reserved for MNOs on an ad hoc basis, with an opt-in system for users. For SMS dissemination, MNOs have discussed a whitelist-based testing approach, but consensus has yet to be reached. The long-term objective is to implement regular and reliable testing.



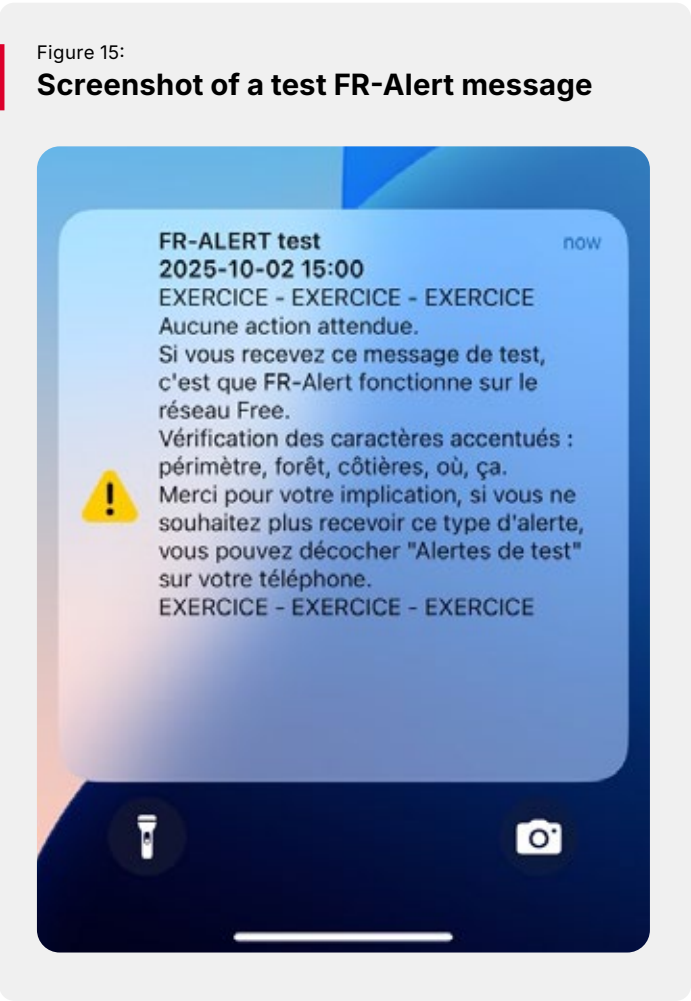
Source: GSMA

Key performance indicators (KPIs)

There are currently two main KPIs used for performance monitoring. For CB, the percentage of cell towers covered is tracked, and for LB-SMS, reported message delivery from MNOs is used.

Evaluating the reach of CB alerts is challenging, as data can only be collected on cells rather than individual handsets reached. When an alert area covers multiple cells, which is typically the case, it is common for some to be inactive due to maintenance, energy-saving modes or the absence of users. Yet, such cases can misleadingly contribute to a failure rate, which does not reflect actual field performance.

FR-Alert stakeholders are currently discussing how to improve performance measurement. A proposal, supported by the Ministry, the CCED and Intersec, suggests calculating KPIs at the antenna site-level instead. Free has volunteered to pilot this approach, demonstrating its strong commitment to FR-Alert performance.⁵¹



Source: GSMA

51 KIIs with Free and Bouygues Telecom.

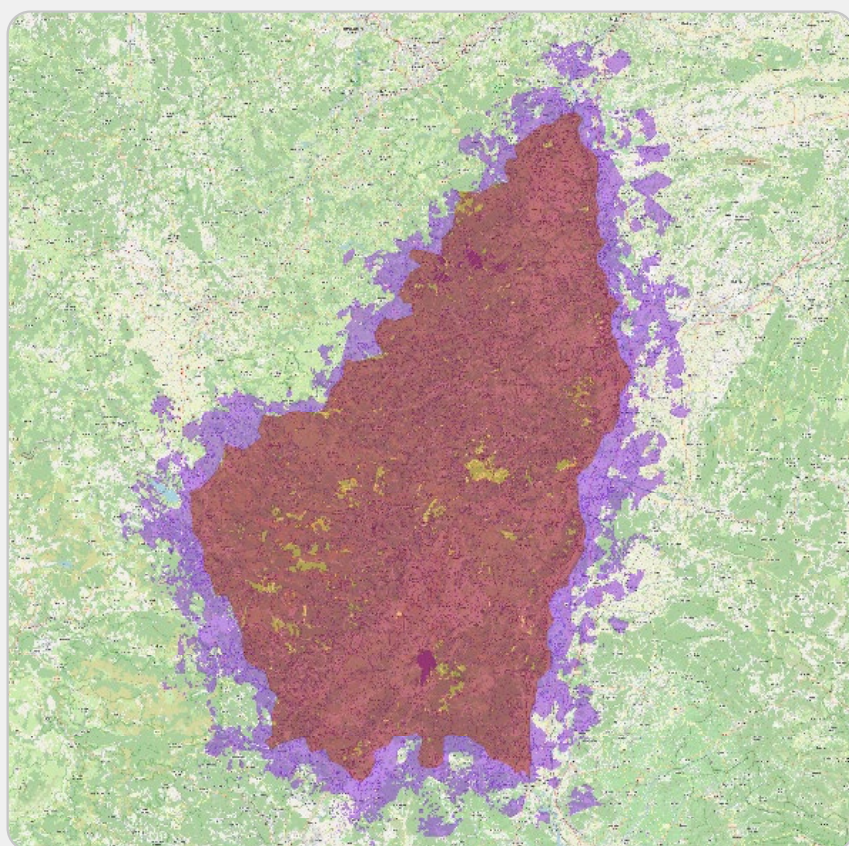
Location accuracy

CB does not always allow for perfect alignment between the defined perimeter of the alert and the actual broadcast area. While network core technologies could technically enhance precision, the current level is considered adequate for public warning purposes. Any additional investment to improve accuracy will need to consider the

operational benefit versus resources required. Raising public awareness and building the capacity of the authorities responsible for managing alerts can also help to mitigate location accuracy challenges by improving understanding of how alerts are targeted and received.

Figure 16:

Simulation map of target coverage versus actual coverage of a CB message



- Red zone:** Target area initially defined for alert transmission.
- Violet zone:** Actual coverage area reached by the alert during dissemination.

Source: Free

Network evolution and device compatibility

As mobile networks continuously evolve, FR-Alert must be updated regularly to remain compatible with new infrastructure. In interviews with overseas MNOs, device compatibility with CB technology emerged as a key challenge as MNOs faced difficulties obtaining the necessary updates from operating system (OS) vendors. As a result, tests conducted in several territories have revealed that certain devices did not receive CB messages.⁵²

While equipment manufacturers and OS vendors have the technical capacity to deploy corrective updates, the absence of a legal requirement to do so may slow or limit implementation. In smaller markets such as France's remote island territories, where penetration rates might be lower, MNOs found it challenging to convince OS providers to deliver the necessary upgrades given the limited reach it would have. Ensuring consistent compatibility across all devices remains a key challenge for the long-term reliability of FR-Alert.

⁵² KIIs with overseas MNOs.

6.4 Financial model



France has adopted a government-funded model for FR-Alert, reflecting a public investment approach that avoids placing disproportionate financial burdens on MNOs. By recognising public warning as a state responsibility, this approach supports predictable, long-term MNO participation and protects MNOs from absorbing costs that could otherwise limit engagement or affect service quality.

The initial capital expenditure (CapEx) required by MNOs for the deployment of the CB and LB-SMS channels was fully financed by the state, primarily with funds from Le plan national de relance et de résilience – the national COVID-19 recovery and resilience plan.⁵³ The recovery plan budget was used rather than the traditional civil security budget to accelerate deployment and concentrate investment in a short time frame.

According to official budgetary documents, the total cost of setting up the FR-Alert system is estimated at 50 million euros.⁵⁴

This public funding covered the procurement and integration of CBCs, the adaptation of SMS-C infrastructure and the implementation of secure interfaces with the national alert hub. Following this initial phase, the state extended its support to include maintenance and operational readiness activities, ensuring that FR-Alert remains functional, interoperable and aligned with evolving network technologies.

In certain contexts, particularly in overseas territories where technical resources and skilled personnel in MNO teams was more limited, the government also financed the use of external technical integrators or specialised contractors to support deployment and system integration.⁵⁵ This approach has ensured equitable implementation across all French territories, regardless of local capacity.



⁵³ France's national COVID-19 recovery plan set out priority investments in climate resilience and green energy, digital transformation and socio-economic competitiveness and cohesion. The plan has a total budget of €100 billion, with close to €40 billion in support from the EU through its Recovery and Resilience facility.

⁵⁴ 2022 Finance Bill: Security (Civil security).

⁵⁵ Kils with overseas MNOs.

Principles underpinning the French model

The financial model for FR-Alert applied two core principles, both of which are also defined in French law.

Free public access to emergency communications

Under the CPCE and the CSI, emergency calls are recognised as a public-interest service that must be available to all users free of charge. This extends to public alerts issued during emergencies and must also be transmitted by MNOs at no cost to citizens.⁵⁶

Juste remuneration (fair compensation)

As outlined in the CPCE,⁵⁷ MNOs must receive fair compensation from the state for actual, necessary and proportionate costs incurred in fulfilling their legal obligations. To compensate MNOs for these expenditures, the government employs a cost reimbursement mechanism.

Both initial investment costs and operational maintenance expenses are eligible for reimbursement under this scheme. However, the policy draws a clear distinction between infrastructure-related costs and operational usage costs. Recurrent expenses, such as the sending of individual SMS messages or network utilisation costs during alert activations, are not included in the state's financial coverage. MNOs bear these operational costs as part of their ongoing service obligations.

The French model thus provides a balanced and sustainable approach in which MNOs are relieved of heavy upfront investment while remaining responsible for broader service continuity, message quality and technical compliance. This approach also reflects a long-standing principle of solidarity between public authorities and private operators in serving the public interest, guaranteeing that FR-Alert remains free for citizens, economically viable for MNOs and aligned with France's broader resilience and civil protection objectives.

This mechanism works as follows:

1

Cost assessment from MNO

The MNO submits an estimate of the expenses required to meet public alerting obligations.



2

Validation of proposed costs

The CCED reviews and approves the assessment.



3

Reimbursement

After costs are incurred, the MNO requests and receives compensation based on the pre-defined sum. The final reimbursement is negotiated bilaterally between the state and the MNO, with oversight from the CCED.



⁵⁶ Postal and Electronic Communications Code (CPCE), Article L33-1.

⁵⁷ Postal and Electronic Communications Code (CPCE), Article D98-7 - IV.

6.5 The future of FR-Alert

The evolution of FR-Alert is shaped by technological progress, lessons from real activations and the refinement of its usage doctrine. New features are planned or under consideration to ensure that FR-Alert remains responsive, reliable and aligned with the needs of both France's emergency responders and its citizens.

Integration of additional media channels

As a multi-channel system, the state plans to expand the range of media through which FR-Alert messages can be disseminated. The system's consistency and cross-channel coordination are made possible by its adoption of the CAP, which ensures uniform message structure and synchronisation across all dissemination platforms.

A partnership agreement with Radio France⁵⁸ enables the transmission of alerts via national and regional radio networks. In parallel, initial tests are being conducted with advertising company JCDecaux to enable the display of emergency messages on "street furniture", such as bus shelters, free-standing information panels and communication hubs.⁵⁹ Discussions are also underway with television broadcasters to extend coverage to mass media channels.



⁵⁸ KIIs with DGSCGC and DTNum.

⁵⁹ JCDecaux [website](#).

Satellite-based alert dissemination

The EU is expanding its use of space-based technology for public safety through the Galileo Early Warning Satellite Service (EWSS). This new service will allow Europe's Galileo satellites to broadcast warning messages directly to smartphones and navigation devices equipped with Galileo-compatible receivers. Crucially, because the system uses satellite signals rather than terrestrial networks, it will remain functional even when ground-based communications are overloaded or disrupted.

The Galileo EWSS will be made available at no cost to EU Member States, which will have the discretion to activate the service for their national EWS.⁶⁰ FR-Alert is already technically capable of integrating Galileo as soon as the service becomes operational. MNOs explained that the integration of this new channel in FR-Alert will not have a direct impact on their networks or infrastructure, but they considered the inclusion of Galileo a positive complement to mobile dissemination methods.⁶¹

Extending access to new alerting authorities

The government is planning to expand access to FR-Alert beyond the current public authorities to include new alerting authorities at Seveso-classified industrial sites and mission-critical organisations. At present, these groups rely mainly on sirens or SMS distribution lists to warn nearby at-risk populations.

Granting this controlled access to the FR-Alert platform represents a step forward in integrating all actors involved in public safety in a coherent national alerting framework. It also raises new challenges in terms of governance, rights management and oversight – in particular, clarifying the role and accountability of the competent higher authority and defining a precise doctrine of use to ensure proportional and responsible activation.

The chosen approach, enabled by the system's decentralised architecture, provides access through a secure cloud-hosted instance connected to the National Hub, under state control. Again, CAP is the key enabler of interoperability and consistency.

Integration of artificial intelligence (AI)

Future FR-Alert developments are expected to increasingly integrate AI to enhance both efficiency and accessibility. AI offers significant potential in three complementary areas: decision support, operational management and inclusion.

AI has the potential to enable anticipation and modelling of crisis dynamics, supporting authorities in forecasting the progression of an event through analysing multiple data sources and contextual factors. Predictive models may also help simulate the potential impact of proposed response measures, allowing for more informed, timely and proportionate alerting decisions.

From an operational standpoint, AI-based user assistance could play a vital role in supporting local authorities who must act rapidly under stress. Intelligent interfaces could guide users step by step, optimise workflows and reduce the risk of error when the system is activated in complex or time-sensitive conditions.

Lastly, AI can enable inclusion and accessibility – core principles for any EWS. Automated translation, vocalisation and visualisation tools can make alerts more understandable and accessible, including for persons with disabilities and non-native speakers, ensuring that no one is left behind in times of crisis.

⁶⁰ European Commission. (January 2024). "[Galileo emergency warning satellite service is underway](#)".

⁶¹ KIIs with MNOs.

07

Considerations for effective MNO engagement in early warning systems





The success of France's FR-Alert offers valuable insights into the role of MNOs in mobile-based EWS globally.

Examples of how the system has been adapted in overseas territories yield further lessons for small island states. However, many of the enabling factors observed in France, such as high mobile penetration, widespread network coverage, a strong regulatory framework and sustained financial resources, may not be present in low-income or less connected markets.

While the underlying principles remain valuable, these considerations should be interpreted flexibly and will depend on the country context.

1. Robust regulatory frameworks

A robust and clearly defined regulatory framework at both French and European levels was essential for effective MNO participation. Legal mandates clearly specified the roles, responsibilities and obligations of each actor: government authorities, regulatory bodies and MNOs. This clarity ensured a transparent distribution of responsibilities and effective coordination during both the design and operational phases of FR-Alert.

Regulation can foster a stable and protective environment for all EWS stakeholders. In France, it provided MNOs a predictable environment and shielded them from mid-project changes to rules or obligations. For the state, it ensured service continuity and framed the commitment of partners under clearly defined legal and technical conditions.

2. Strategic governance and stakeholder cooperation

In the French model, building relationships based on trust and collaboration between MNOs, the regulator and state authorities has been fundamental to success. The CCED's leadership as a "state champion" was instrumental.

MNOs were able to communicate their technical and operational limitations in clear and accessible terms, enabling public authorities to understand the realities of network implementation and maintenance. Conversely, the state and regulatory authority could articulate operational objectives and public safety requirements. Maintaining structured coordination mechanisms throughout the project life cycle and adapting them for long-term operations enabled this two-way communication.

3. Institutional capacity building

The introduction of an EWS at a national scale requires a comprehensive approach to change management that considers both operational users and the general population. Specific training and awareness programmes for public authorities were developed by the DGSCGC, with practical learning materials and easily deployable solutions such as e-learning modules, in-person workshops and mobile training teams. The comprehensive operational doctrine, also created by the DGSCGC, served as a foundation for training and capacity building materials. This doctrine remains a living document that is adapted as technologies evolve and lessons surface from FR-Alert activations.

Clear operational guidelines supported by ongoing capacity building can help maintain continuity and alignment across public authorities and MNOs. They ensure that roles, processes and technical requirements are applied consistently and strengthen the reliability of the system over time.

4. Building public trust and awareness

For the wider public, awareness is equally crucial. To support the roll-out of FR-Alert, communication campaigns through television, social media and press releases were used to explain the objectives and benefits of the system, as well as what to do after receiving an alert. Moreover, involving citizens in preparedness exercises like the 2022 DOMINO exercise enhanced understanding and responsiveness.

Clear and accessible messaging with regular opportunities for the public to encounter or practise alerts can help build trust and ensure that people understand what actions to take when a warning is issued.

5. Adoption of the CAP standard and interoperability

France's use of CAP aligns MNO systems with international messaging standards, enabling multi-channel dissemination and consistency across networks and hazards. FR-Alert required the integration of two core mobile technologies – CB and LB-SMS – each with their own operational characteristics and network implications. Such integration may require infrastructure upgrades

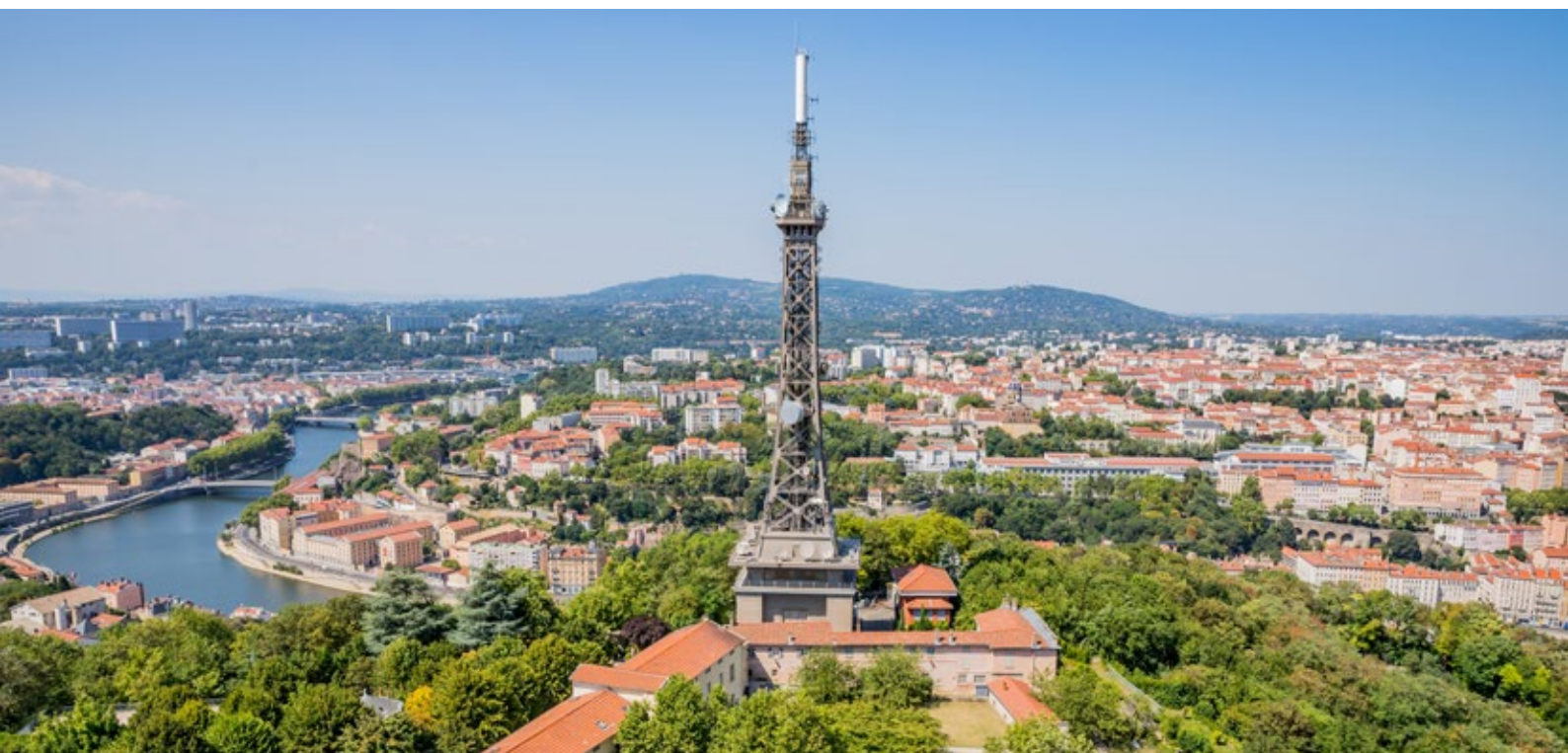
and the establishment of a secure interface with state-operated layers to protect both the system and user data.

Adopting CAP and other open standards is essential to building interoperability and security and to preventing dependency on proprietary solutions that can limit the evolution of the EWS. Common formats make it easier to connect multiple channels, integrate MNO systems and maintain consistency across hazards and technologies.

6. Multi-channel alerting to maximise reach

Ensuring that alerts can be received in a variety of ways is vital for an inclusive and effective EWS. Integration of multiple, complementary dissemination channels minimises gaps in reach and coverage, with each method contributing distinct strengths in terms of coverage, speed, trust, accessibility and resilience.

At the heart of FR-Alert are the dual mobile components of CB and LB-SMS. When used together, these technologies ensure that alerts reach the widest possible audience, regardless of network conditions or device compatibility. Beyond mobile, channels like sirens, radio and television broadcasts, digital signage and satellite systems enhance the reach and resilience of the system and help ensure messages are accessible even in cases of partial or complete network disruption. CAP underpins this entire architecture, ensuring message consistency and delivery across all available channels.



7. Inclusive design

The ability of all segments of society to receive, understand and act upon alerts is vital for an effective EWS. In France, the decision to include all overseas territories, including territories where the EU directive did not apply, reflects a commitment to ensure all citizens were covered by FR-Alert. By implementing CB and LB-SMS, the state aimed to ensure that all handsets and network generations were capable of receiving alerts.

Additional inclusivity considerations for EWS in other contexts include digital literacy, literacy, language and other accessibility barriers. Engaging marginalised communities in EWS design, considering rural-urban coverage differences and ensuring accessibility across a range of devices, all help create systems that are equitable and effective for everyone.

8. Iterative testing and evaluation

MNOs in France participate in iterative testing of FR-Alert, ensuring continuous monitoring and improvements can be made. Simulation exercises like DOMINO provided a valuable opportunity for both authorities and MNOs to test the CB component, while a dedicated CB testing channel was established to allow all stakeholders, including the public, to ensure they were prepared. In addition, MNOs report any system anomalies and service interruptions that could affect longer-term reliability. These reports are part of the regular evaluation of FR-Alert's performance.

Regular testing and continuous evaluation are essential for any EWS. Structured exercises, routine system checks and transparent reporting processes can help all stakeholders identify issues early, maintain readiness and strengthen long-term system reliability.

9. Handset compatibility

CB enables the instant dissemination of alerts to mobile handsets without risk of network congestion and delays. However, its effectiveness is hampered when certain handsets or operating systems are unable to receive these alerts. Several territories in Overseas France experienced this challenge during CB tests. Because of their small markets and relatively low mobile penetration rates, these islands found it more challenging to convince OS vendors to deliver the necessary upgrades. Ensuring the functionality of CB in these contexts relies on active collaboration with handset manufacturers and OS providers. Having a state champion such as the CCED that can support these discussions, can support faster resolution. Early coordination with handset and OS vendors can also help to ensure that alerts work reliably across all handset types, providing equitable access to CB alerts.

10. Sustainable financial model

An important lesson from the French case was the need to consider financing for the entire project life cycle, including the initial investment phase as well as maintenance, regular upgrades and ongoing operational costs. A sustainable approach to continued coverage of these costs requires a comprehensive and transparent financial model. For FR-Alert, the state has shouldered much of this investment, aiming to minimise undue financial burden on MNOs while ensuring they still meet their legal obligations to support public safety initiatives. Coordination from CCED and regulatory oversight from ARCEP ensured that the cost recovery mechanism put in place for MNOs worked effectively.

This financial model may not be viable in all contexts, but it highlights the value of an approach that avoids placing the primary financial responsibility on MNOs. In settings where MNOs are expected to contribute more directly to EWS costs, long-term sustainability can be harder to guarantee. In such cases, mechanisms such as universal service funds (USF), tax incentives or offset expenditures can help ensure that MNOs remain engaged without absorbing disproportionate financial burdens, particularly in low- and middle-income markets.

08

Conclusion

France's FR-Alert stands out as a strong example of a mobile-enabled EWS built through effective partnerships between government institutions and MNOs.

Strategic leadership and coordination from the French government enabled open dialogue and joint decision-making among MNOs, public authorities and regulators. From the outset, clear governance structures and a time-bound EU directive provided a strong foundation for ambitious decisions, such as two complementary mobile technologies and ensuring coverage across all French territories. Today, MNOs remain actively involved in the operation of FR-Alert, contributing to testing and exercises, monitoring and reporting issues, maintaining infrastructure and deploying system updates.

While still relatively new, FR-Alert is firmly embedded in France's national disaster management framework. Across stakeholder groups, it is recognised as a valuable tool that can improve public safety and help save lives.

France's approach benefits from a high degree of mobile connectivity and state investment that may not be replicable everywhere; however, the French model offers many insights and practical considerations for governments seeking to engage MNOs effectively in developing a successful national EWS.



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