



# **GEOSAFE PWS** Public Warning System

# Driven by innovation, steered by purpose



Disruptive innovation  
Customer excellence  
Business ethics  
Tech for good

Founded in 2004

Headquarters in France

20 years of telecom expertise

10 years of GovTech innovation

Presence in 50 countries

1B people & devices connected

400M people covered

40% of the EU population

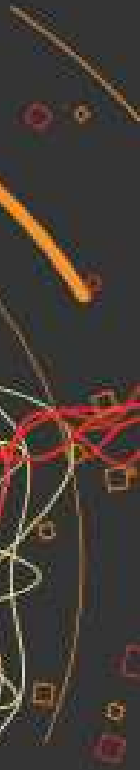
ITU member







Mission statement  
**TO TURN TELECOM  
METADATA INTO  
TANGIBLE VALUE  
FOR BUSINESS AND  
SOCIETY.**



# Global footprint, local expertise

Among our prestigious clients:



# AI-powered **safety & security** use cases

Seamless scaling with ready-to-use applications



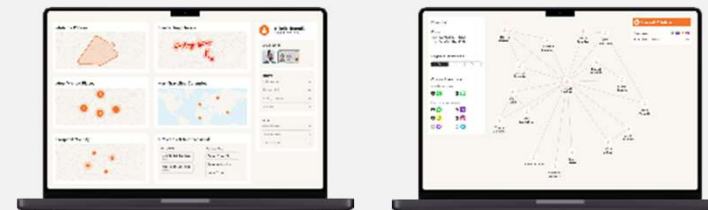
## Civil protection

- ✓ Early warning & public alerts
- ✓ Emergency call location



## Homeland security

- ✓ Location intelligence
- ✓ Online interactions



Powered by  
**AGORA**



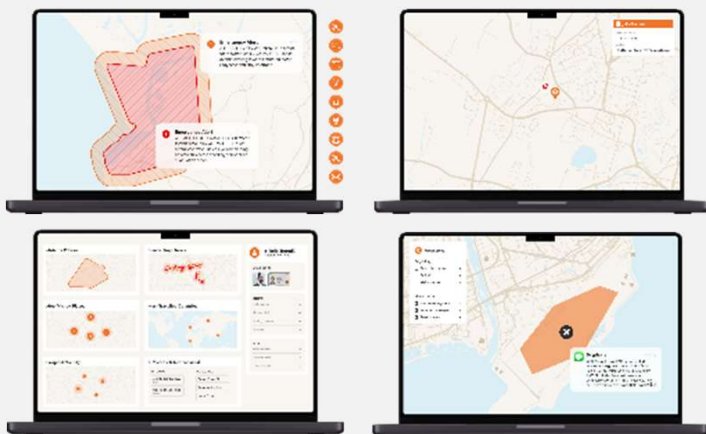
# AI-powered **telecom** use cases

## Seamless scaling with ready-to-use applications



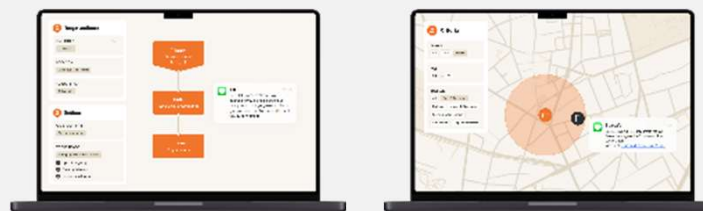
### Network location

- ✓ Standards & legal obligations
- ✓ Network exposure (CAMARA)



### Marketing & advertising

- ✓ Internal monetization
- ✓ External monetization



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## EARLY WARNING & PUBLIC ALERTS





# Disasters are increasing in frequency & intensity



## 4.5 billion

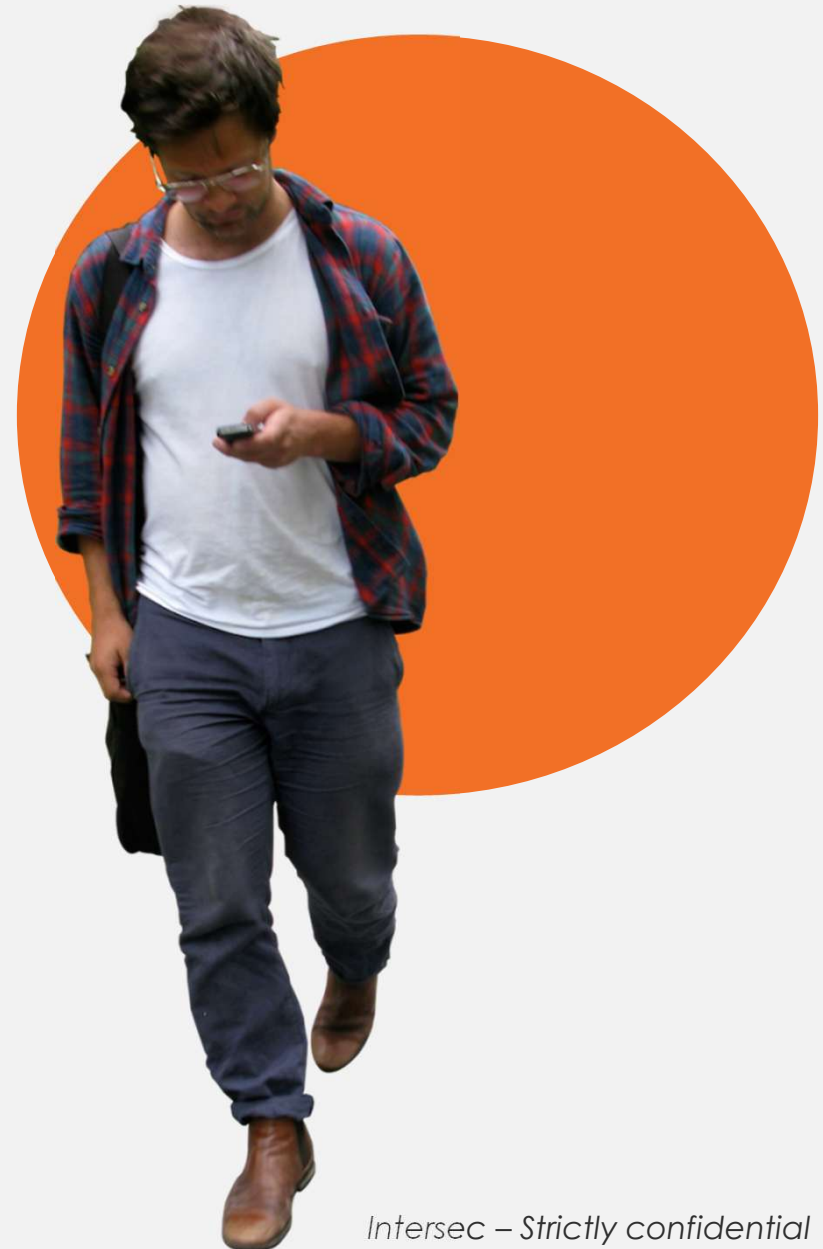
More than half the global population is at high risk of experiencing an extreme weather event. *World bank*

## 95%

of the world's population has access to mobile broadband networks. *ITU*

## 77%

of people, in 2023, who experienced a disaster but received no warning own a mobile phone. *World Risk Poll*





# Giving people a little extra time to evacuate



## 6x

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Countries with limited warning systems face six times higher disaster mortality than those with comprehensive coverage. *UNDRR*

## 30%

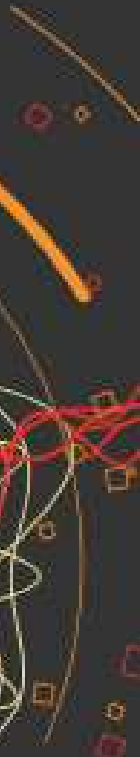
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Early warnings, issued within 24 hours of a hazard, can reduce the damage of that event by 30%. *WMO*

## 1\$

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Every US\$1 invested in risk reduction and prevention can save up to US\$15 in post-disaster recovery. *UNDRR*



# Committed to protecting every citizen on Earth



## EARLY WARNINGS FOR ALL

The UN Global Early Warning Initiative for the Implementation of Climate Adaptation



WORLD  
METEOROLOGICAL  
ORGANIZATION



International  
Telecommunication  
Union



EU directive  
EECC Art. 110

eena

EUROPEAN EMERGENCY NUMBER ASSOCIATION

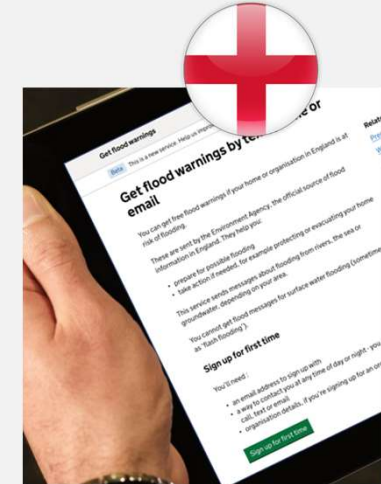
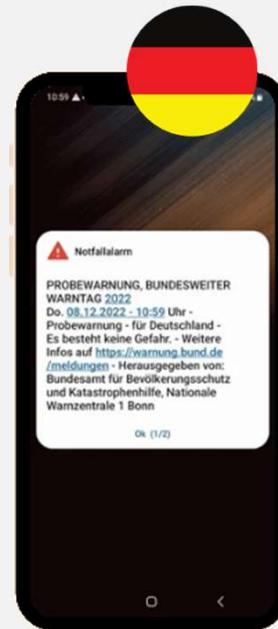


METEOALARM  
EUMETNET

# The EU uncontested PWS leader (40% of the EU)

## Multichannel

- ✓ Telecom networks
  - Cell Broadcast
  - Location-Based SMS
- ✓ Traditional channels
  - Sirens
  - TV
  - Radio
- ✓ Digital channels
  - Mobile apps
  - Social media
  - Websites
  - Emails
  - Digital panels
- ✓ Galileo-ready
- ✓ Etc.



## Multi-languages





# The four pillars of Early Warning Systems

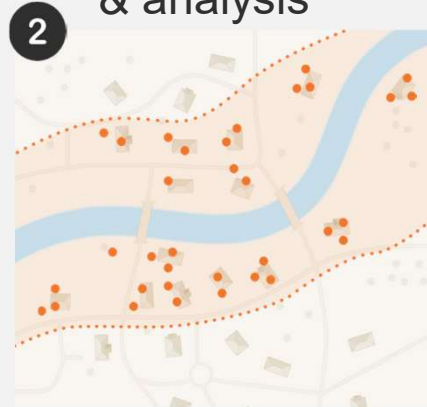


Disaster risk knowledge



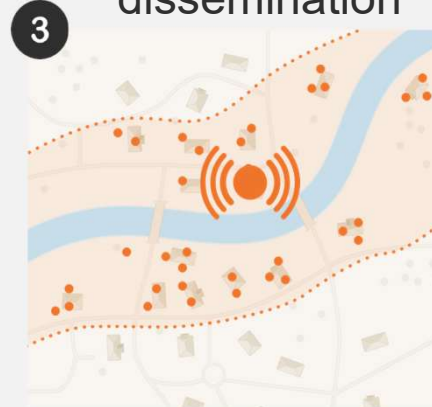
Fast floods within 24h

Monitoring & analysis



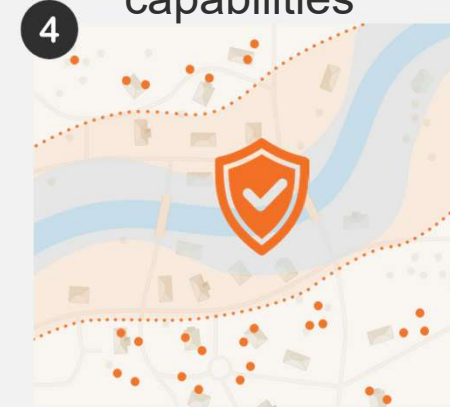
Real-time field data

Warning dissemination



Targeted alerts to evacuate

Response capabilities



People kept safe

MONITOR



ALERT



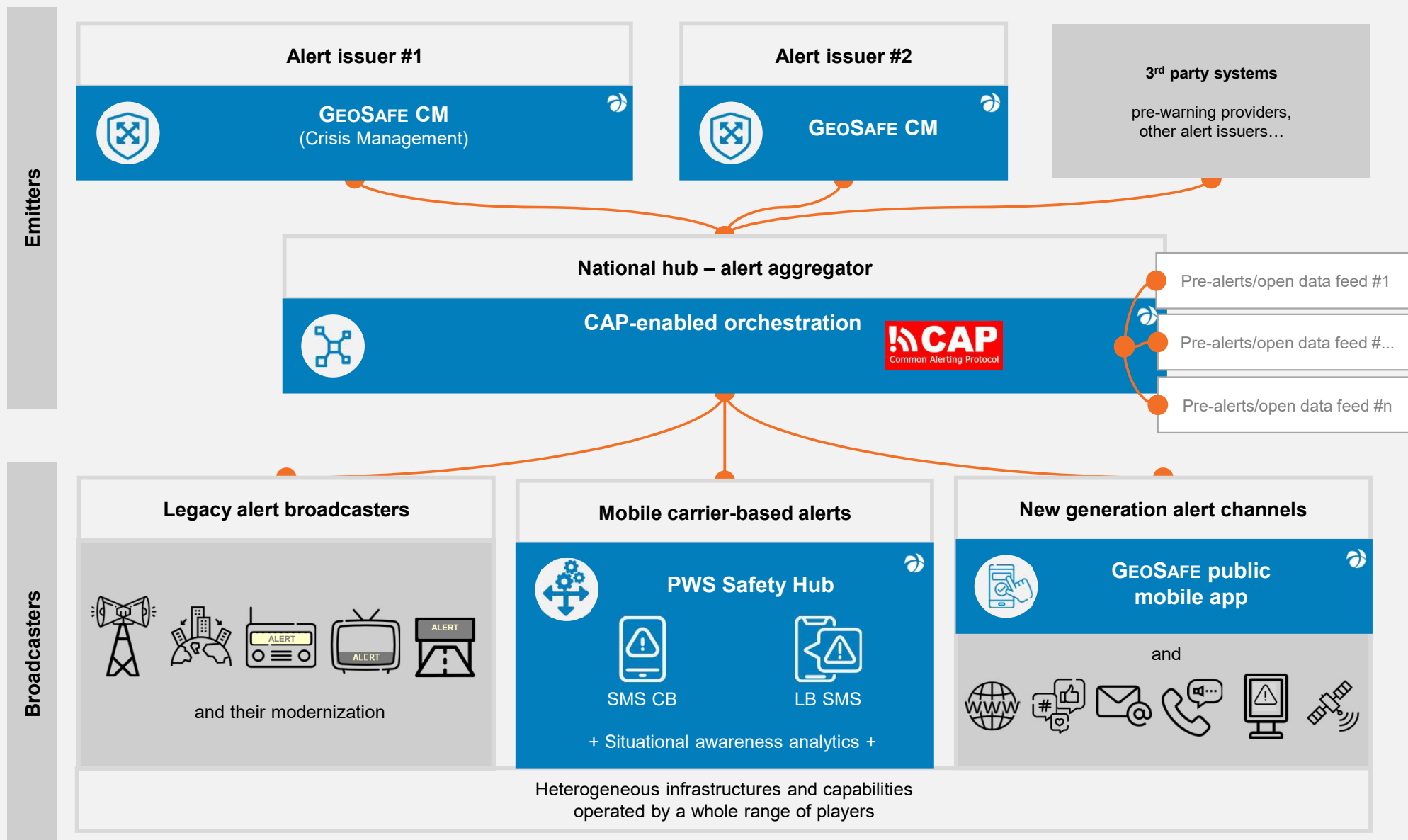
COMMAND



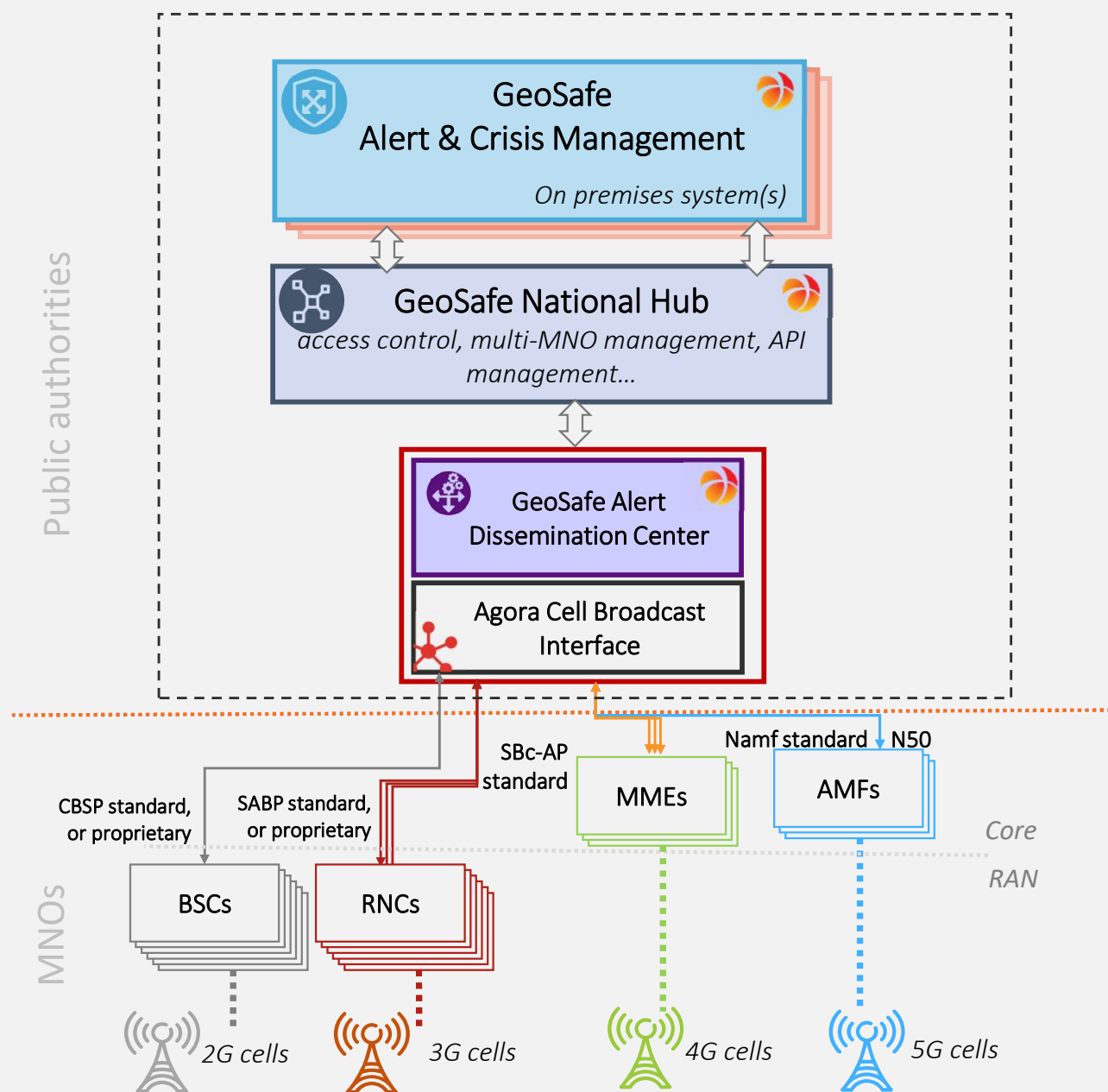
PUBLIC SAFETY  
DUTY OF CARE  
BUSINESS CONTINUITY



# Intersec end-to-end and modular approach of national public warning architecture



# Example of a CB centralized architecture





# Public Warning & Crisis Management



## Multiple communication channels

Cell Broadcast (CB)

Location-based SMS (LB-SMS)

TV/Radio

Sirens

Highway panels

Social media

Websites

Mobile apps

Galileo-ready

## Multiple use cases

In-zone Alert

Zone-Entry Alert

Missing Child / Amber Alert

Follow-up communications

Alert your citizens abroad

## Crisis management

Opt-in targets: SMS/email to opt-in citizens

Dynamic management of Contacts list

Assets Management: Communicate with field agents

Procedures: Ease crisis procedures

Population density for situational awareness

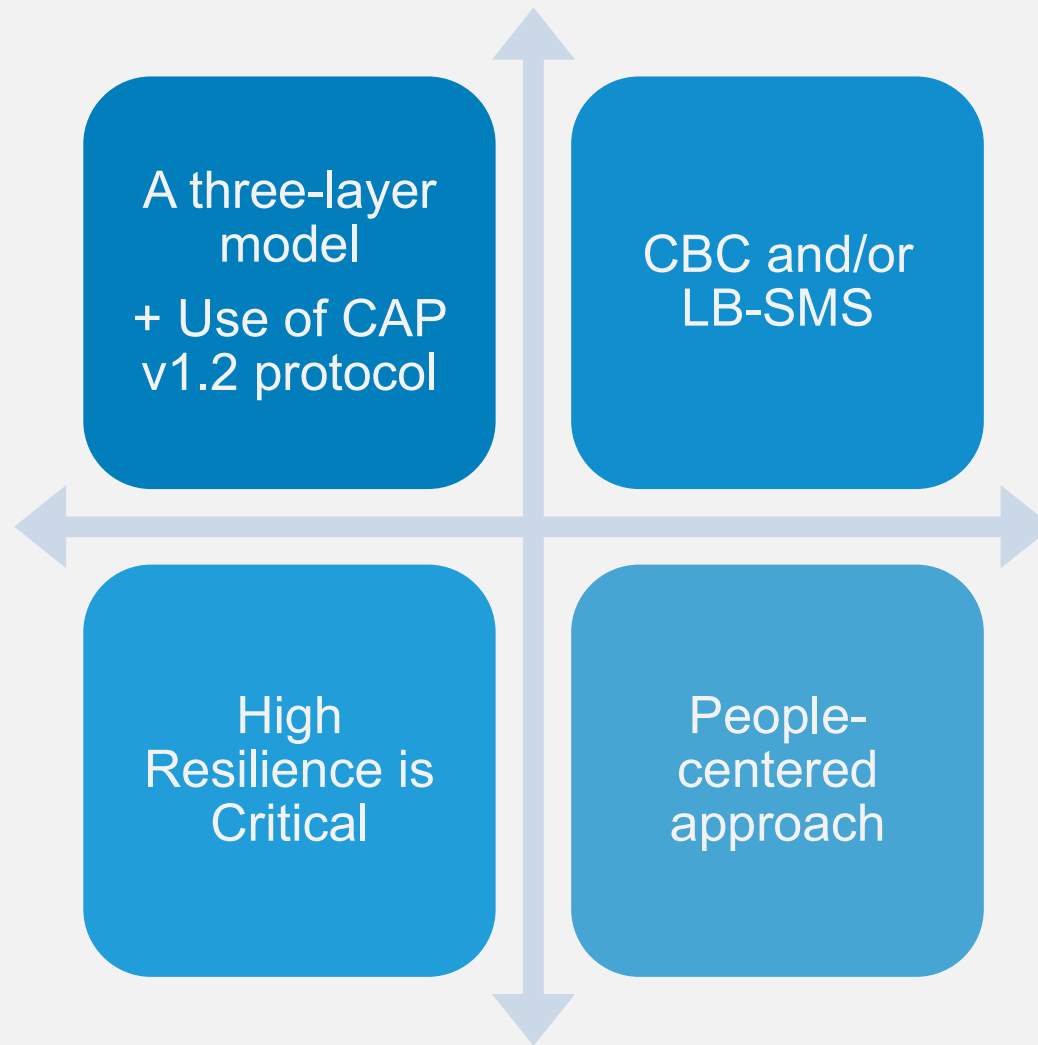
Density historization

Notifications based on population density



# PWS in Europe – Best Practices

# Best practices from EU PWS implementations





# Transparency and Education: Strengthening Public Understanding



## Purpose and use of the system

- Purpose: quickly and efficiently provide emergency information
- Explain when the system will be used
- No registration or app installation is required
- Reassure on system security and data protection

## Who is authorised to send messages

- Clearly defined who is in charge

## Define and explain the various alerts levels

- Levels according to the level of danger
- Examples of possible messages

## Define a test strategy toward the public

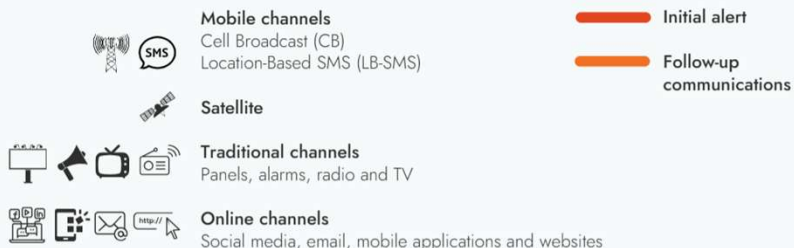
- Several national and/or regional public test is recommended before using the system

Message level	Level 1	Level 2	Level 3	Level 4	Missing persons	Test
<b>Description</b>	The national alert is an alert for the highest level of danger	Alert of extreme danger	Alert of severe danger	Alert with recommended measures to protect people, animals and property	Urgent child abduction alert	Testing of operators in the security alert system
<b>Disable option</b>	No	Yes	Yes	Yes	Yes	Yes
<b>Sound duration</b>	Until user interaction or up to 5 minutes	10,5 seconds	10.5 seconds	10.5 seconds	10.5 seconds	10.5 seconds
<b>Vibration pattern</b>	Morse code SOS	Morse code SOS	Morse code SOS	Morse code SOS	Morse code SOS	Morse code SOS
<b>Vibration duration</b>	Until user interaction or up to 5 minutes	10.5 seconds	10.5 seconds	10.5 seconds	10.5 seconds	10.5 seconds
<b>Plays in do-not-disturb mode</b>	Yes	Yes	No	No	No	No

# A crisis strategy for every incident type



## COMMUNICATION CHANNELS



Nature of the incident	LIFECYCLE			How channels can be combined
	Pre-crisis	Crisis	Post-crisis	
Earthquake Tsunami		Initial alert		Mobile channels, Satellite
		Follow-up communications		SMS, Traditional channels, Online channels
Fast floods/ Lightning		Initial alert		Mobile channels
	Follow-up communications			SMS, Traditional channels, Online channels
Landslides/ Avalanche		Initial alert		Mobile channels
		Follow-up communications		SMS, Traditional channels, Online channels
Gas explosion		Initial alert		SMS
		Follow-up communications		SMS, Traditional channels, Online channels
Dirty bomb		Initial alert		Mobile channels, Satellite
		Follow-up communications		SMS, Traditional channels, Online channels
Extreme temperatures	Initial alert			SMS
	Follow-up communications			SMS, Traditional channels, Online channels
Pandemic	Initial alert			SMS, Satellite
	Follow-up communications			Online channels, Traditional channels
Cyclone	Initial alert			Mobile channels, SMS, Satellite
	Follow-up communications			SMS, Traditional channels, Online channels

# Best practices: Data governance & Security

## Confidentiality and Subscriber Privacy (especially for LB-SMS)

- Principle of data minimization and limitation of the information collected to what is strictly necessary
- No "sensitive" data (no PII)
- Regular purging of data to comply with the data retention policy
- Data access is allowed only to users with eligible user profiles
- Reporting to **CBE with Aggregated data only**





# Best practices: Data governance & Security



## Securing Interfaces

- **Encrypted flows**
  - HTTPS on all exposed APIs (CAP V1.2 & Intersec APIs) for :
    - Public Alerts requests Handling
    - Reports on Alerts status/Alerts statistics
  - TLS 1.3 as per the recommendation of National Agency for the Security of Information Systems (ANSSI)
  - OCSP and CRL to automatically check the revocation status of an X.509 digital certificate.
  - Internal encrypted flows
  - Web UI over HTTPS
- **Authentication and IP address control**
  - API Authentication/token (HTTP Basic)
  - IP address source check on authentication (host or subnet)
- **CBE/CBC Authentication with CAP Digital Signature**
  - CBE authentication by checking the Digital Signature
  - in the CAP Requests
  - CBC CAP Responses can also be authenticated by the CBE
- Reporting to **CBE with Aggregated data only**

# Best practices: Data governance & Security



## Securing the platform

- OS and System Hardening based on Intersec and Local Security Policies
- Following Industry Security Policies (ANSSI, NIST)
- Secure Remote CLI access via SSH/SFTP with chroot
- Intersec support connection through a VPN (site-to-site VPN recommendation)

## Securing the Web UI Portal

- Several authentication methods with 2FA (login/password, SSO via LDAP/SAML 2)
- Strong Password Policy configurable to match local policy
- Granular rights management for each user with custom user profiles
- Multi-Tenancy with isolated workspaces (configurable) - Ex: 1 workspace for each CBE, 1 workspace for internal Tests etc.

# Best practices: Logs for any event at all levels



## CAP Transaction logging

The CAP request logs are available within the GeoSafe user interface with the following:

- CAP Request timestamp
- Transaction origin (CBE app/local User CBE)
- Software component involved in transactions
- CAP Request content/dump

## Logging of application and system events (audit trail)

- Web UI, application events
- System events (OS, CLI etc.)

## Security Information & Event Management solution integration

Several authentication methods with 2FA (login/password, SSO via LDAP/SAML 2)

- Strong Password Policy configurable to match local policy
- Granular rights management for each user with custom user profiles
- Multi-tenancy with isolated workspaces (configurable) - Ex: 1 workspace for each CBE, 1 workspace for internal Tests etc.

# Apple and Google coordination



## Message presentation on devices

- **Alerte Display Behavior** (Full screen vs banner alerts, distinctive alert tone and vibration, accessibility requirements, etc...)
- **Multi-language handling**

## Device Firmware & OS Considerations

- **Minimum Supported OS Versions**
- **OEM Android Variants** (Google's oversight on handset manufacturers)

## Activation and Configuration of Channels

- **Channel IDs / Message IDs**

Defining which 3GPP standard channels are mandatory: E.g., **4370, 4371, 919**, etc. depending on the region.

Whether custom channels (e.g., for local authorities) are allowed.

- **Device Manufacturer Presets**

Ensuring channels are **enabled by default** (typically required by law) and not exposed to user deactivation if regulations prohibit it.

## Certification & Approval Workflow

- Apple's requirement for country-wide PWS deployment validation before enabling alerts
- Google's requirements for Android Partner Standards (APS) compliance.
- Government or regulator involvement in approval.

# LB-SMS or CB?



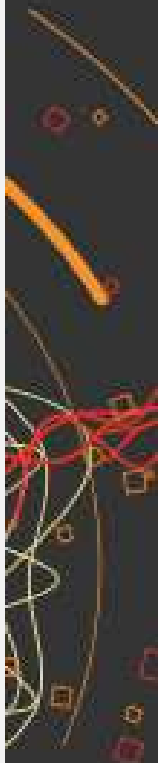


# Location-based SMS technology



- ✓ All cell phones are **natively compatible**, without any configuration
- ✓ **Rich-customization** according to mobile identity, past locations and previous alerts
- ✓ Possibility to **use Flash SMS** to transmit alerts (auto popped-up SMS)
- ✓ Optional **delivery notice** for some campaigns
- ✓ **Messages remain available** to be read again in SMS inbox with which users are familiar

- ✗ SMS delivery through in mobile network → several options:
  - SMS-C bypass
  - Network traffic dimensioning and prioritization
- ✗ **Higher delivery delay** compared to CB technology

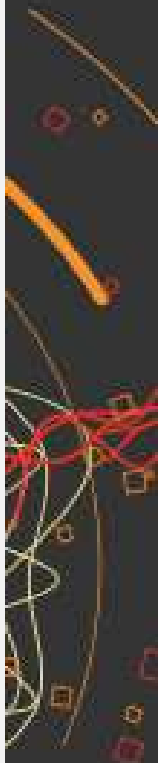


# Cell Broadcast technology



- ✓ Is delivered **quickly to millions**, in seconds
- ✓ It is **not affected** by, and will not affect network congestion
- ✓ Support **multi-language** pages

- ✗ Cell phones **must be tuned to CB channels** used in the country -- States/MNOs may require phone suppliers to apply/deploy local CB configuration
- ✗ **No retargeted communications**, except targeting on the current area
- ✗ Cell reselections can **impact effectiveness** of CB message delivery
- ✗ **No statistics** on effective delivery
- ✗ **Public** is generally less used to UX provided for emergency messages



# GEOSAFE PWS: A hybrid solution to maximize alert message dissemination



## Benefit from best of CB and LB SMS technologies

- ✓ CB excels in fast delivery of wide-spread alerts
- ✓ Geo-targeted SMS provides universal support, flexibility and unlocks beneficial functionalities

## Setup strategies to optimize message dissemination

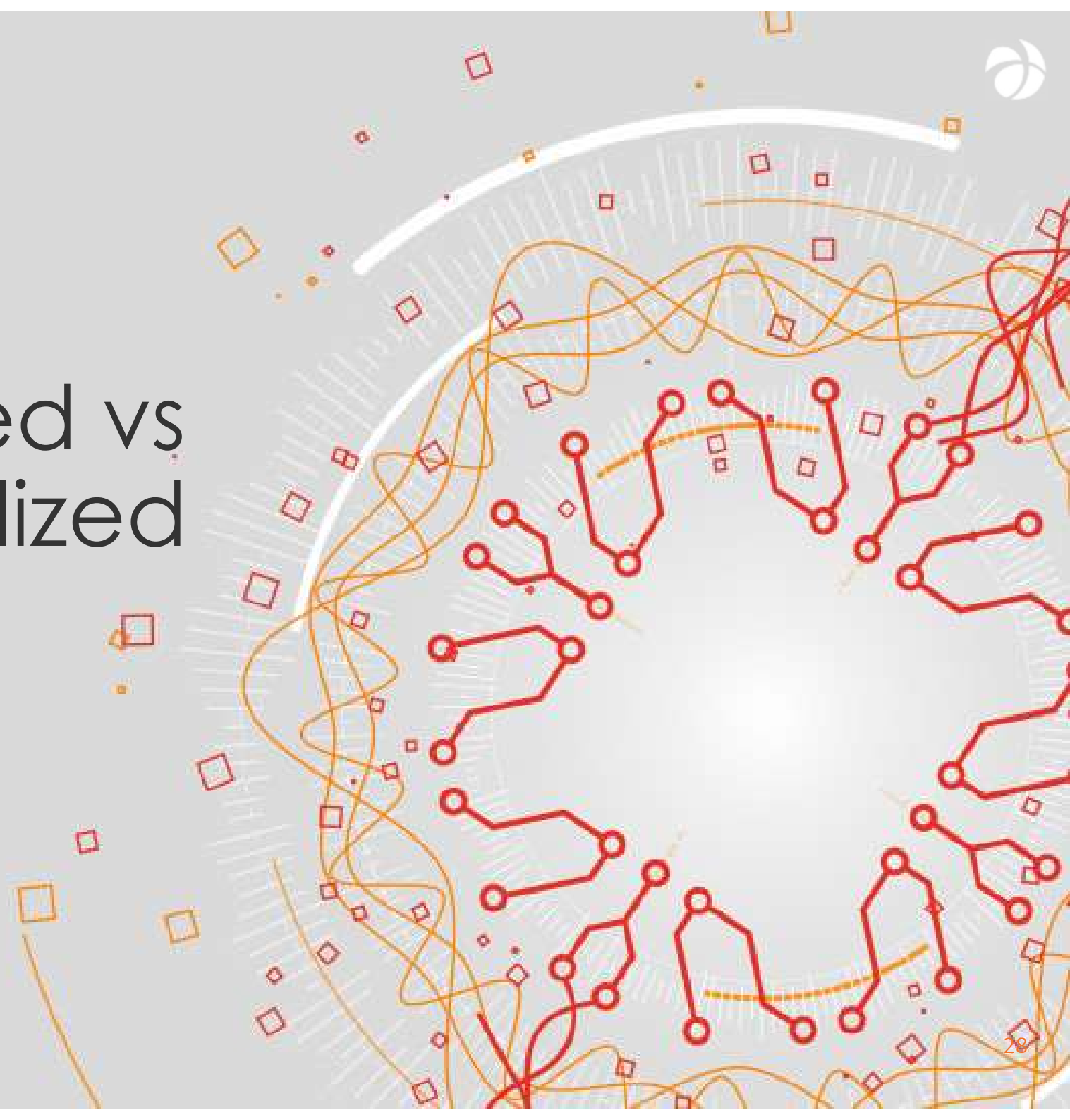
- ✓ Broadcast message on CB + send through LB-SMS in case of cell failure
- ✓ Broadcast message on 4G/5G CB + send through LB-SMS to devices not supporting 4G/5G
- ✓ Broadcast message on 4G/5G CB + send through LB-SMS to devices which were last seen on a 2G/3G cell
- ✓ LB-SMS sent only to new people entering the danger zone

## SMS-C not supporting required throughput?

- ✓ Load-balance SMS issuance on multiple SMS-C nodes
- ✓ Activate Intersec SMS-C bypass feature:
  - First delivery attempt
  - Store and retry



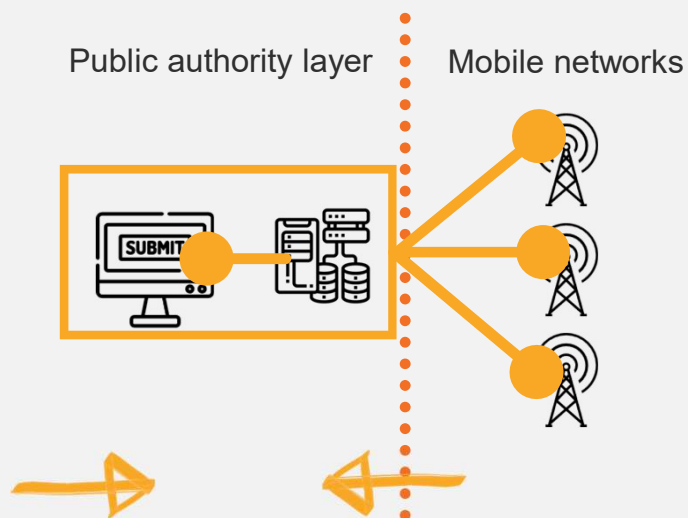
# Centralized vs Decentralized



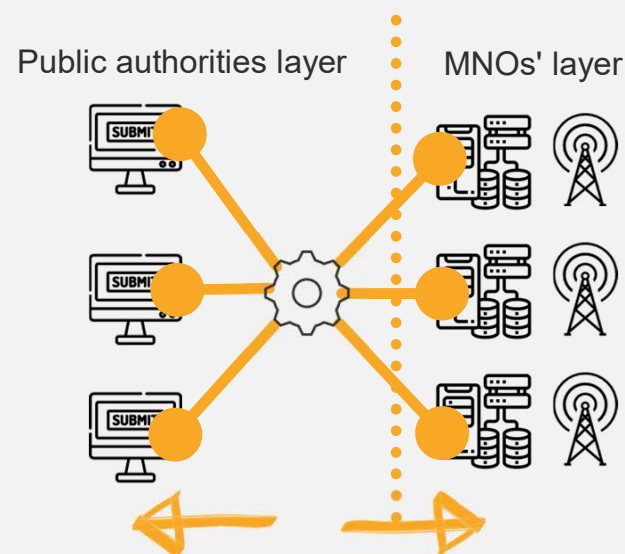
# Technical architecture



Centralized & consolidated  
under a single public authority



Decentralized in public authorities layer,  
delegated at mobile carrier layer

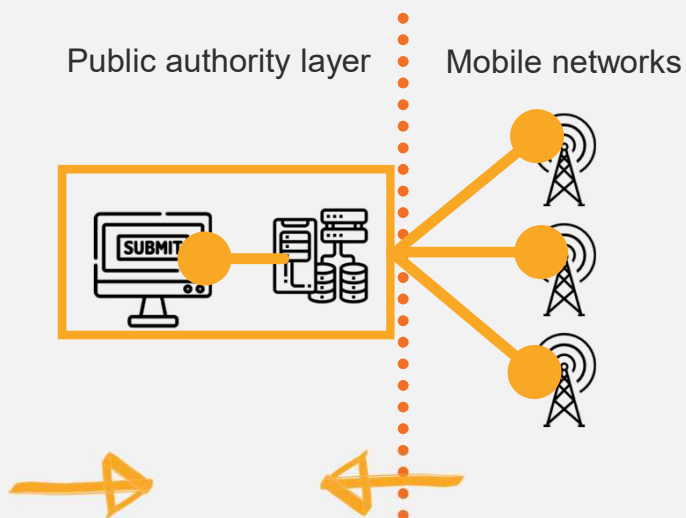




# Centralised technical architecture



Centralized & consolidated  
under a single public authority



## Prerequisites of this model:

- ☐ Simple political/administrative context
- ☐ Availability of skills

## Pros:

- ✓ Speed of implementation
- ✓ Simplification of responsibilities

## Cons:

- ✗ Risks of dependency & long-term scalability
- ✗ Interventionism in MNO network operations

## Implications of this model:

- ▶ State bears full responsibility
- ▶ Extraction of sensitive data from operators

# Decentralised technical architecture



## Prerequisites of this model:

- ❑ Alert aggregator in a public entity
- ❑ Define interface contracts

## Pros:

- ✓ Scalable and resilient architecture
- ✓ Empower all involved parties

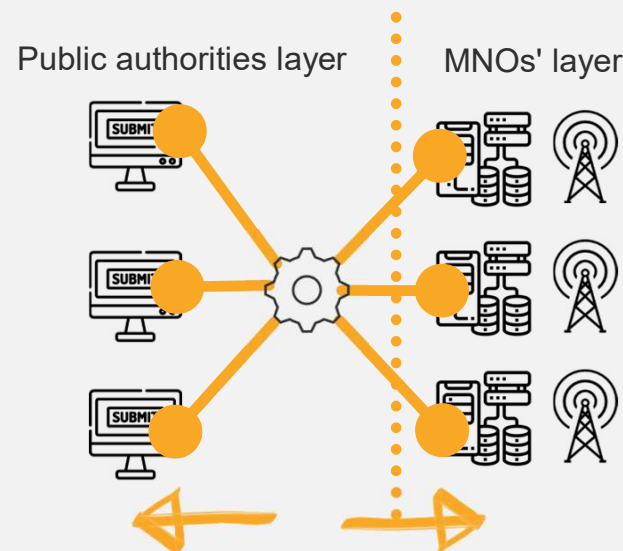
## Cons:

- ✗ Longer upstream phases
- ✗ Complex program management

## Implications of this model:

- Balanced sharing of responsibilities

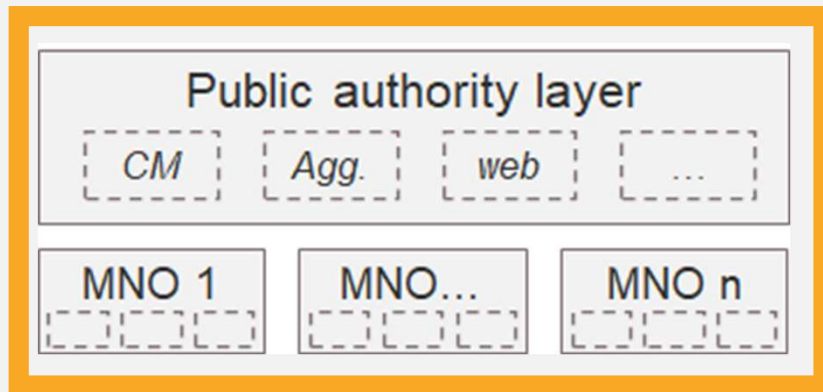
Decentralized in public authorities layer,  
delegated at mobile carrier layer



# Tendering process



Centralized/consolidated purchase process:

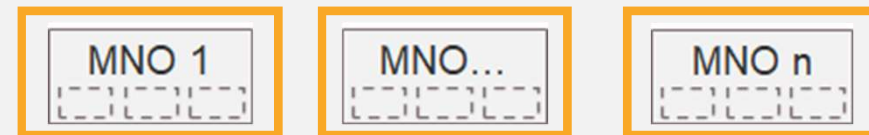


- Fast bidding process
- Upfront optimization

Tender(s) at public authority level:



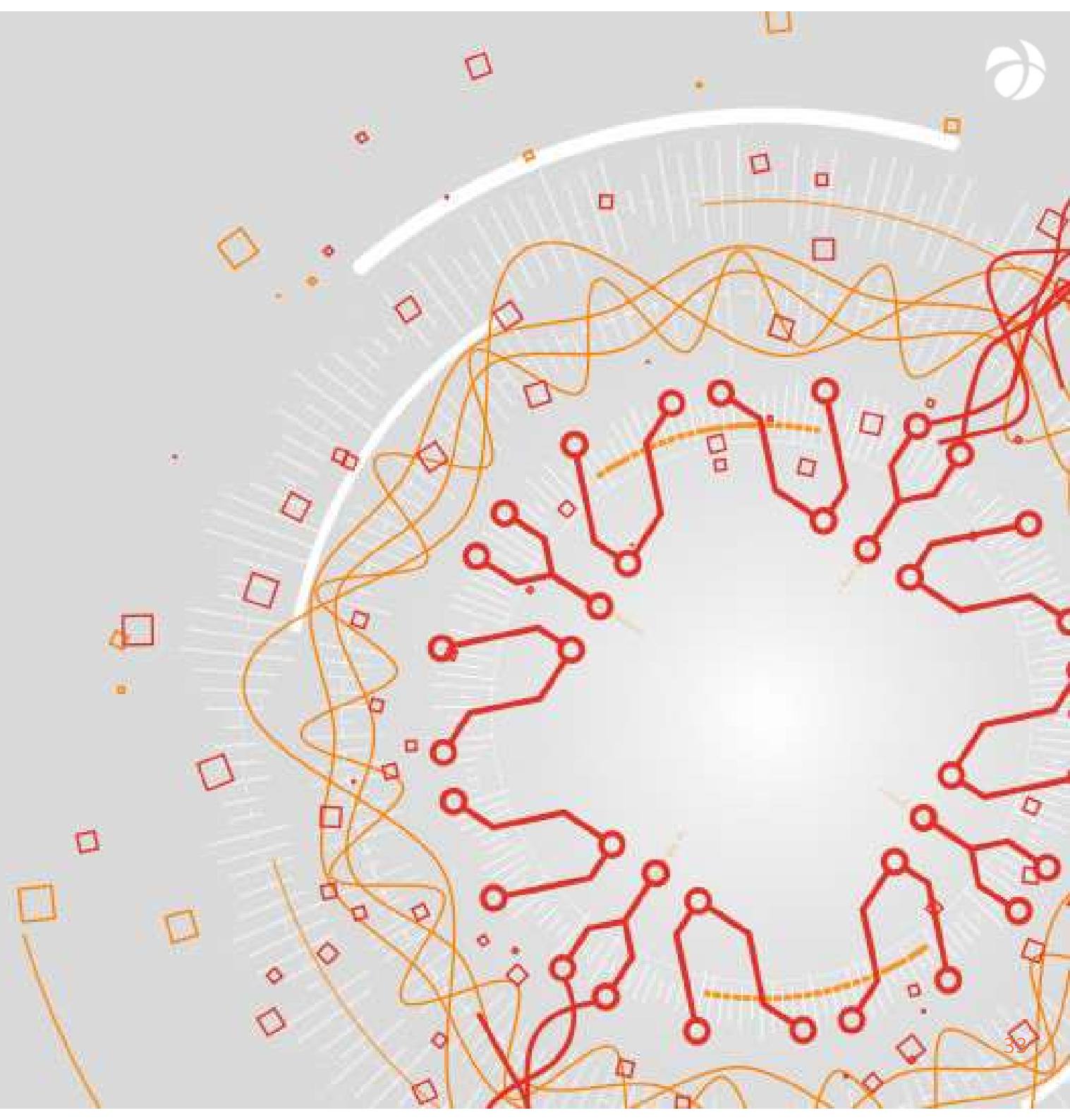
Tenders at MNO level:



- Open, standard, agile and ecosystem
- Search for the optimum for each block
- Autonomy of decision of MNOs

# AI

Predict.  
Prevent.  
Protect.  
Manage.



# INTERSEC AI: Metadata analysis & user assistance



## Automated alert triggered

Sensors have detected abnormally high levels of precipitation centred on the River Ellen area. Would you like to send an alert to that area?



"Prepare an automated alert to notify at-risk individuals if the river level exceeds the safety threshold."

"Create a multilingual alert for a wildfire in the Black Forest, factoring in wind direction and traffic to plan evacuation."

"What are the most appropriate channels for disseminating alerts in this flooding situation?"



# AI-assisted crisis management

## ✨ ASSISTANCE FOR USERS:

- ✓ Contextualized help & assistance
- ✓ Alert creation leveraging history
- ✓ Multilingual translation
- ✓ Channel selection: CB & LB-SMS; Traditional (TV, radio...); Digital channels (social media, websites, mobile app...); Satellites.
- ✓ Zone creation

## ✨ INCLUSIVITY FOR PEOPLE:

- ✓ Text to speech + language adaptation
- ✓ Voice recorded messages
- ✓ Visual generation

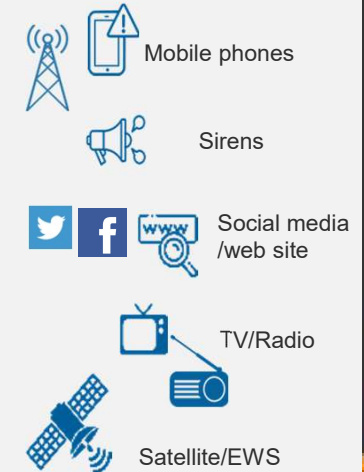
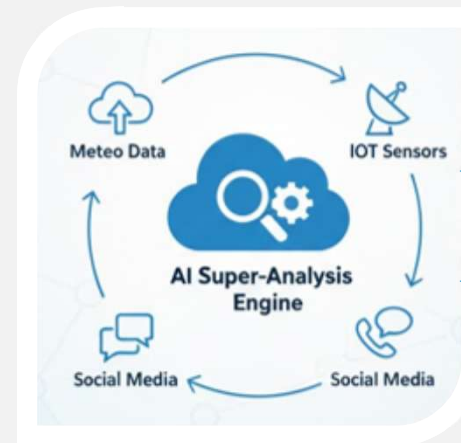
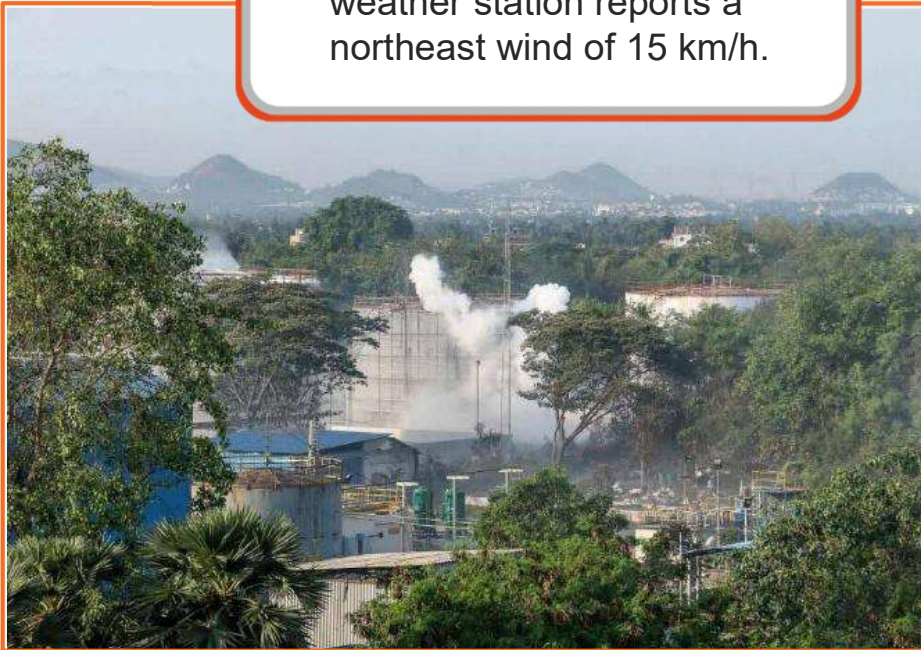


# Gas explosion scenario



## Automated alert triggered

Toxic gas leak. The site's weather station reports a northeast wind of 15 km/h.



- ✦ Real-time data ingestion & correlation
- ✦ Automated signal detection
- ✦ Automatic content generation
- ✦ Automatic alert parameters definition
- ✦ Enhanced alerting zone creation
- ✦ Automatic channels selection
- ✦ Alert message generation



# GEOSAFE PWS suite



## **Comprehensive**

From data collection and monitoring to impact analysis, GEOSAFE PWS covers all the crisis lifecycle



## **Multichannel**

We provide MNOs with CBC & LB-SMS and give access to legacy & new generation channels with consistency using CAP Protocol



## **Crisis-oriented**

Extended set of features for preparedness and response leveraging on real-time situational awareness



## **Future-proof**

Ready for Galileo and IoT



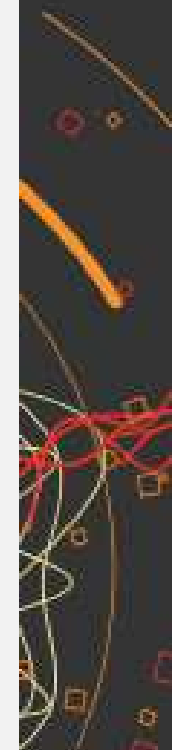
## **Seamless integration**

Our solution is available on Cloud, SaaS and On Prem through hybrid deployment



## **European leader**

We cover more than 40% of European population





## WANT MORE INFO?



Nicolas Delaunay

**+33 7 60 28 27 69**

[nicolas.delaunay@intersec.com](mailto:nicolas.delaunay@intersec.com)

Nikola Vuković

**+381 64 810 90 13**

[nikolav@terieng.co.rs](mailto:nikolav@terieng.co.rs)