world dab

DAB+ for national emergency warnings in Germany

DAB+ for emergency warnings:
Two-Part Presentation - Strategy and Technology

- Carsten will talk about strategy and communication
- Andreas will talk about technical details (receiver specifications)

Why warning messages via DAB+?

Saving lives, enhancing the DAB+ broadcasting system

1. With its **data services**, DAB+ may save lives. With this added feature, we want to **strengthen** the DAB+ broadcasting system
2. Emergency warnings will be **more precise and up-to-date** with DAB+ data services than „only spoken“ FM warning messages
3. Everything will be put in **international standards**: ETSI, TC heavily involved
4. Warning messages will be able to **address big and smaller regions**, cities and parts of cities
5. Future radios will be able to **wake from stand-by**, alarming people at night etc., Chip manufacturers involved in developing process
6. Receivers will have to be **tested against the forthcoming ETSI standards** and rules

DAB+ for emergency warnings: Why Germany went forward

Times of crisis

- **Floods** in Germany killed over 140 people in 2021
- **Climate change** is everywhere
- Times of **war** in Eastern Europe: Ukraine
- Germany is the **biggest country** regarding inhabitants in Western Europe

Big DAB+ market

- Germans listen to about **185 minutes** of radio each day
- **30 per cent of all households** now are able to listen to DAB+ radio
- In recent years, some 2.2m home receivers were sold p.a.
- Some 2.6m new passenger cars are sold p.a., amounting to around **5m new DAB+ radios in Germany per year**

Industry alliance

- Broadcasters wanted a **robust and reliable answer to mobile phone apps** and their warning messages (”Cell broadcast, 3GPP TS 23.041”)
- **Strategically secure DAB+ system** with federal and state governments as a backbone of public information
- **Digital Radio Germany Association** and **WorldDAB Technical Committee** are pushing things forward

DAB+ for emergency warnings:
Industry and Network Operators‘ Group Germany

- 34 participants
- Working group has been meeting every 6 weeks since June 2022
- Technical specifications for radio industry
- Network operators should enable complete set of alerts as soon as possible (to avoid chicken-and-egg problem)

1. Systematic description of the procedures and implementation in the device (Alarm Announcement, Alarm Announcement Other Ensemble etc.)
2. Detailed exchange with the aim of concrete instructions and specifications (ETSI standards)
3. Networking with WorldDAB Technical Committee and international rollout
4. Best Cases: Examples from BY (cooperation with BLM) for colleagues from the Netherlands etc.

DAB+ for emergency warnings: Broadcasters‘ and Regulators‘ Group in Germany

- 19 participants
- Working group has been meeting every 6 weeks since June 2022
- Specifications how messages are being broadcast, written and read

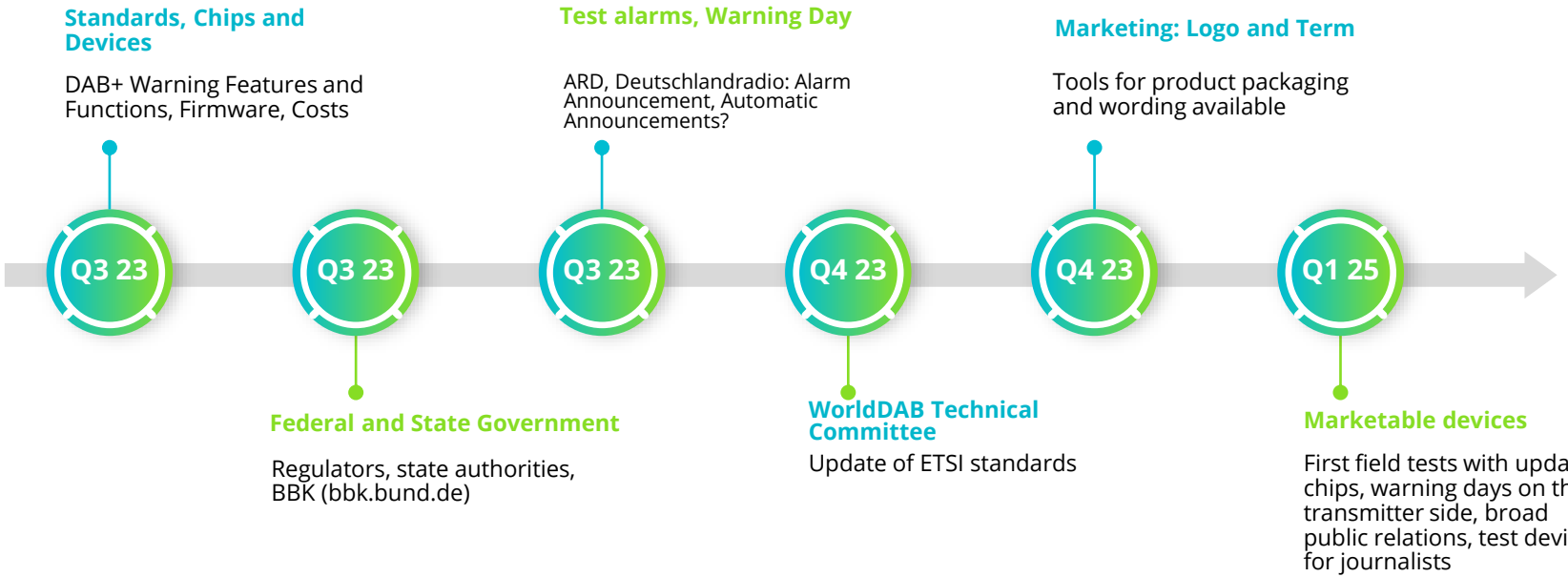
1. How do the alarm messages get on air? Automatically vs. via speaker
2. How is the wording of the messages? Aim: simple, clear instructions for action
3. What do the broadcasters need from the network operators?
4. How are the messages distributed in a mux? Which programme is interrupted?

DAB+ for emergency warnings:
Full “System Concept“ and Management Summary

- **System Concept** explaining the results from over 25 sessions within the Digital Radio Association Germany
- 50 pages
- Detailed needs and requirements for upcoming ETSI standard
- “living document“ from Q4 2022, to be updated in Q4 2023

- **System Concept Management Summary** available in **English and German**
- Target groups: stakeholders and CEOs of DAB+ Eco System
- Making sure that this new DAB+ emergency warning system can be available in as many regions worldwide as possible, aiming at an international rollout once the chipsets are available

DAB+ for emergency warnings: Timings in Germany



Marketing and Emergencies

DAB+ for emergency warnings:
Warnings and communications challenge

We take a new perspective!
Warning and emergency become
an instantaneous protective message.

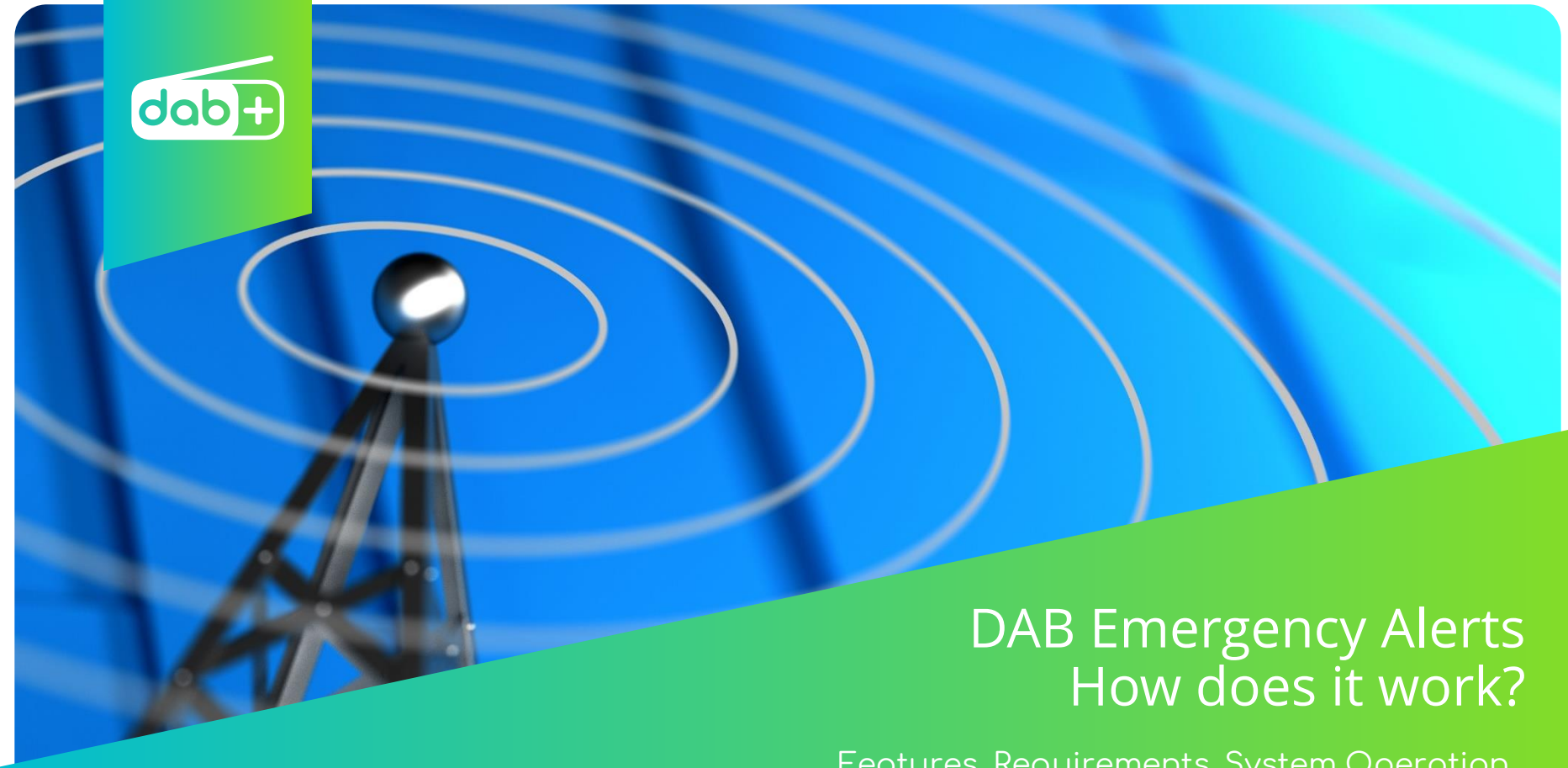
DAB+ for emergency warnings:
Warnings and communications challenge

With every new (DAB+ warning included) radio,
we gain happy listeners
who feel safe and secure.

DAB+ for emergency warnings:
Warnings and communications challenge

The new logo and the new terminology should…

- …make sure DAB+ is **conveyed as modern and up-to-date**
- …**convey comfort, protection, security, and the assurance**
- …**be easy to understand**, in English-speaking countries as well as abroad



DAB Emergency Alerts
How does it work?

Features, Requirements, System Operation

Agenda

- System Outline & Features
- Receiver Requirements
- Introduction: Location Code
- System Operation
- Ecosystem Considerations

System Outline

Alert Announcements

- Spoken announcement message for essential information: what, where, what to do?
- Proven system known from DAB announcement function
- Works with receiver on any ensemble, full support of Other Ensemble switching
- Alert meta-data provides for user control of alert playback

Sleep and Wake-up

- Receivers support Sleep mode: function to keep listening to DAB signal while in very low-power mode
- Wake-up: when Alert Announcement signal is detected, receiver transitions to full-on mode to play back Alert
- Alert Ensemble: any ensemble that carries an “Alert Flag” identifies as part of the Emergency Warning system

Geofencing

- DAB has native regionalisation feature due to size of broadcast cell
- Strong demand for alert region smaller than broadcast cell has led to development of novel “Location Code“ scheme
- DAB signalling includes encoded alert region, receiver performs location matching before Alert playback

Receiver Requirements
Technical Criteria supported by every receiver

1 DAB Signalling

- Alert Status: meta-data with alert id, alert stage, wake-up flag
- Alert Region: set of location codes to define alert region

2 Receiver Behaviour

- FIC monitoring: permanent listening on alert ensemble for alert signal
- Alert Ensemble selection at install and regular intervals
- Test Alerts (User option)

3 Sleep Mode

- Very low-power mode to enable background alert monitoring
- Wake-up transition to full-on when alert is detected
- Fast update function

4 Geofencing

- Location Awareness: receiver has its own position in memory (any method)
- Alert Region: function to region match own position with Alert Region for conditional Alert play-back

5 Presentation Constraints

- Conditional Requirements
- DAB text and slideshow presentation during alert announcement need to conform to presentation rules

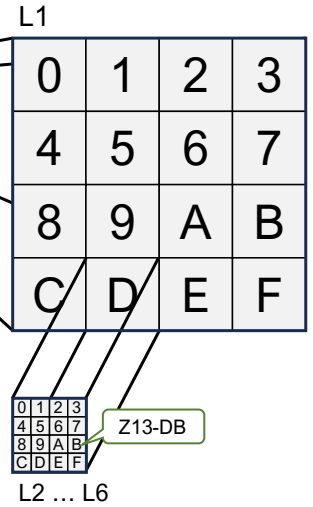
6 Certification

- Receiver certification with logo mark as system safe-guard
- Manufacturer and 3rd party testing to obtain logo mark licence

Location Code
Introduction to novel geofencing technique

- Hierarchical Code scheme of WGS84 Coordinates
  - Granularity scales with code length
    30-bit code (L6) has ~1km resolution (vertical)
  - Shorter codes are larger square
  - Serves to define
    - Alert Region in a set of codes
    - Receiver location with single 30-bit code
- Properties
  - Universal
    Code scheme provides for any location globally
    No region-specific mechanisms involved
  - Light-weight
    Receiver support feasible in entry-class model
    No special requirement to UI, memory or CPU
  - Efficient
    Compact encoding of arbitrary region, low (FIC) data capacity, fast transmission (<1sec) of alert region

NOTE: Mercator projection, Z1-Z40 are polar squares 36°x36°



Level	Size [°]	Size [km]
L0 – Zone	36.000	4003.0
L1	9.000	1000.8
L2	2.250	250.2
L3	0.563	62.5
L4	0.141	15.6
L5	0.035	3.9
L6	0.009	1.0

NOTE 1: Polar zones (Z0, Z41) extend 18° from pole
NOTE 2: Length of spherical rectangles is only independent from latitude in N-S direction. Given sizes apply to E-W direction only at equator.

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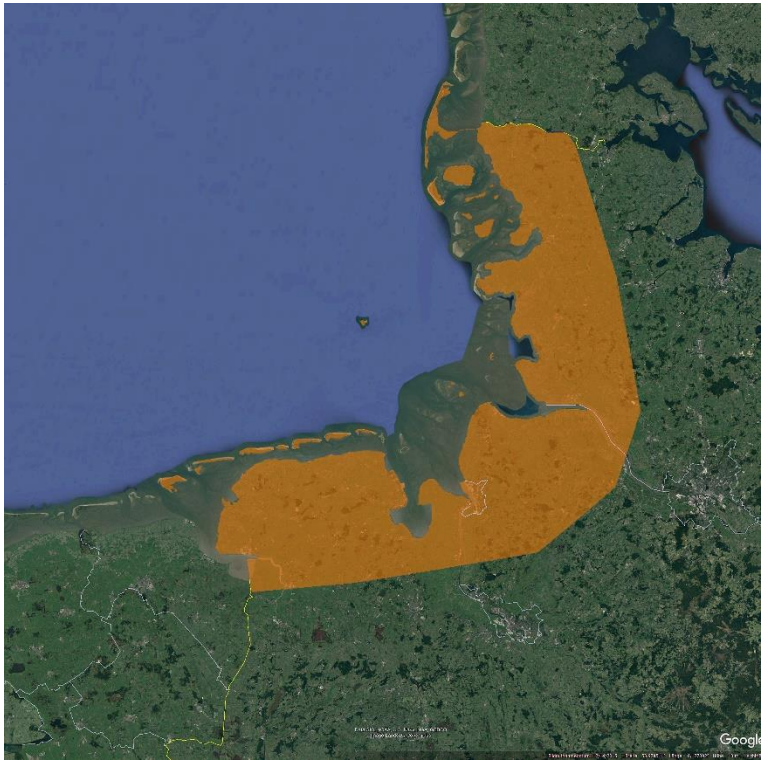
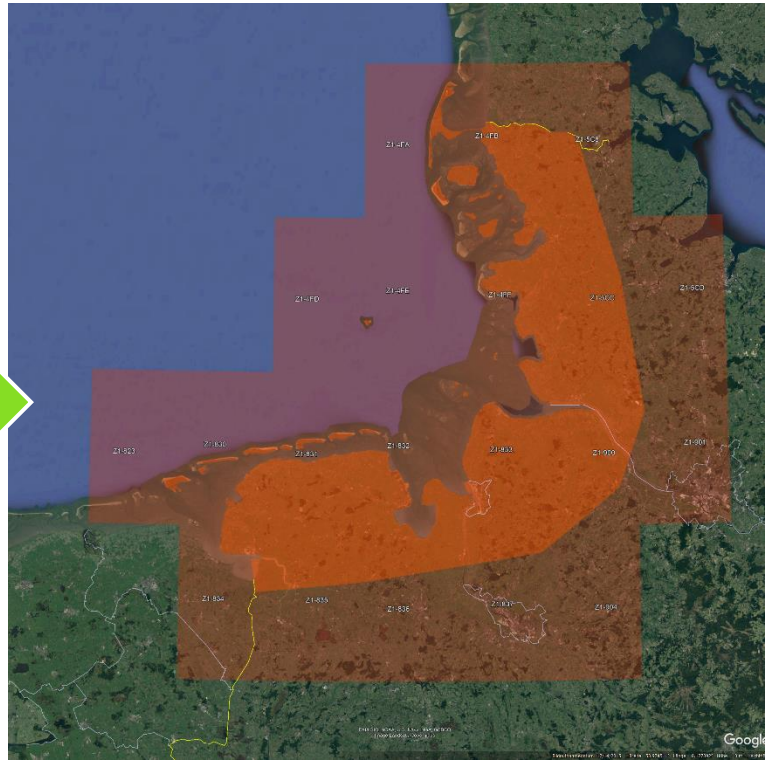
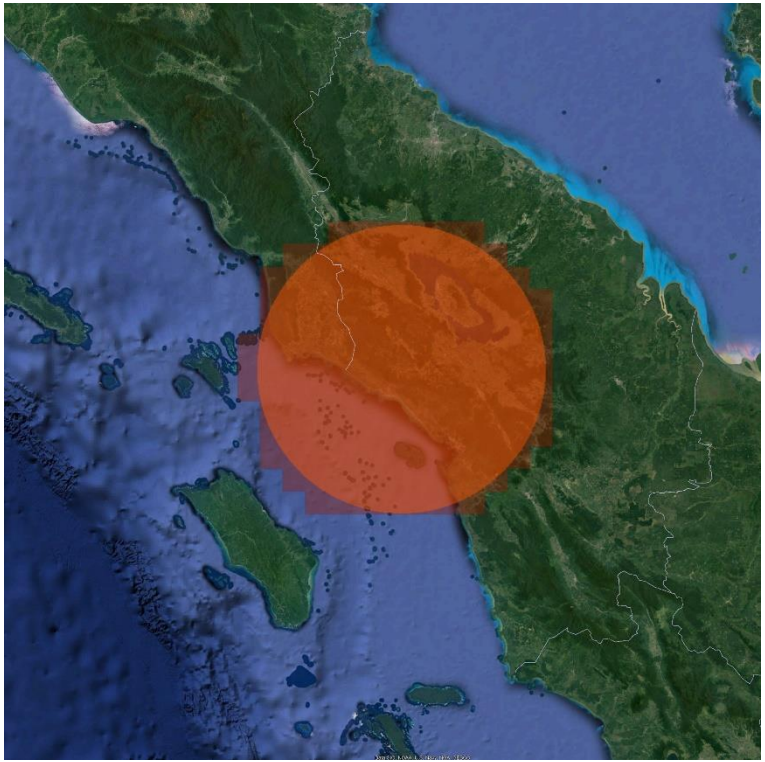
Location Code
Principle



Encoding



Location Code
Example: CAP files from Asia



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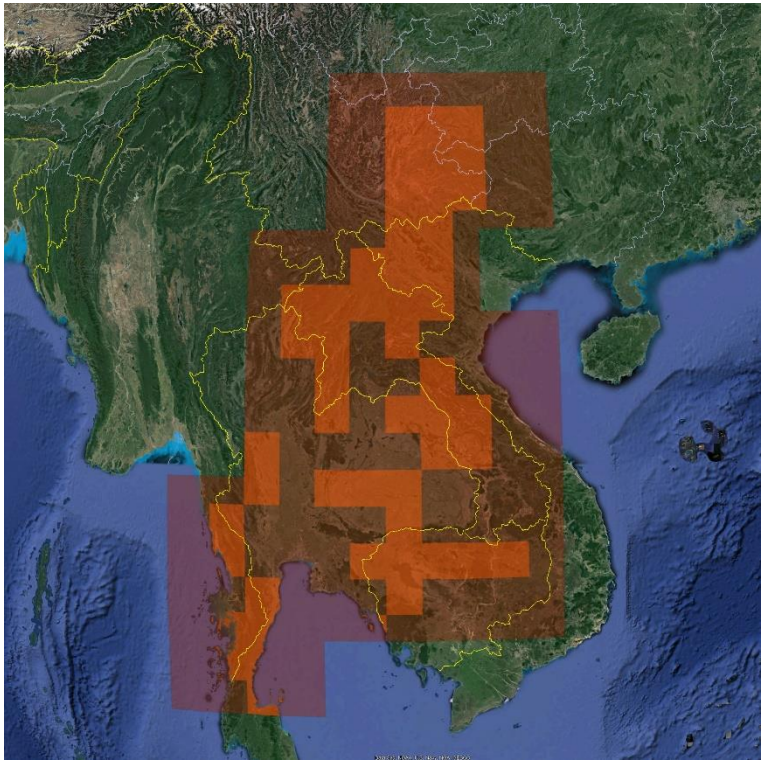
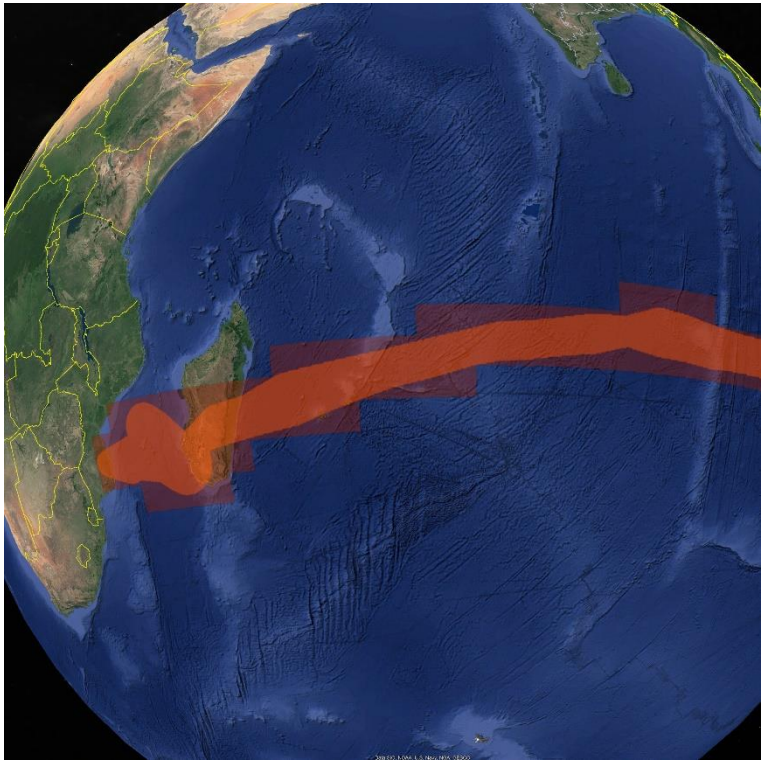
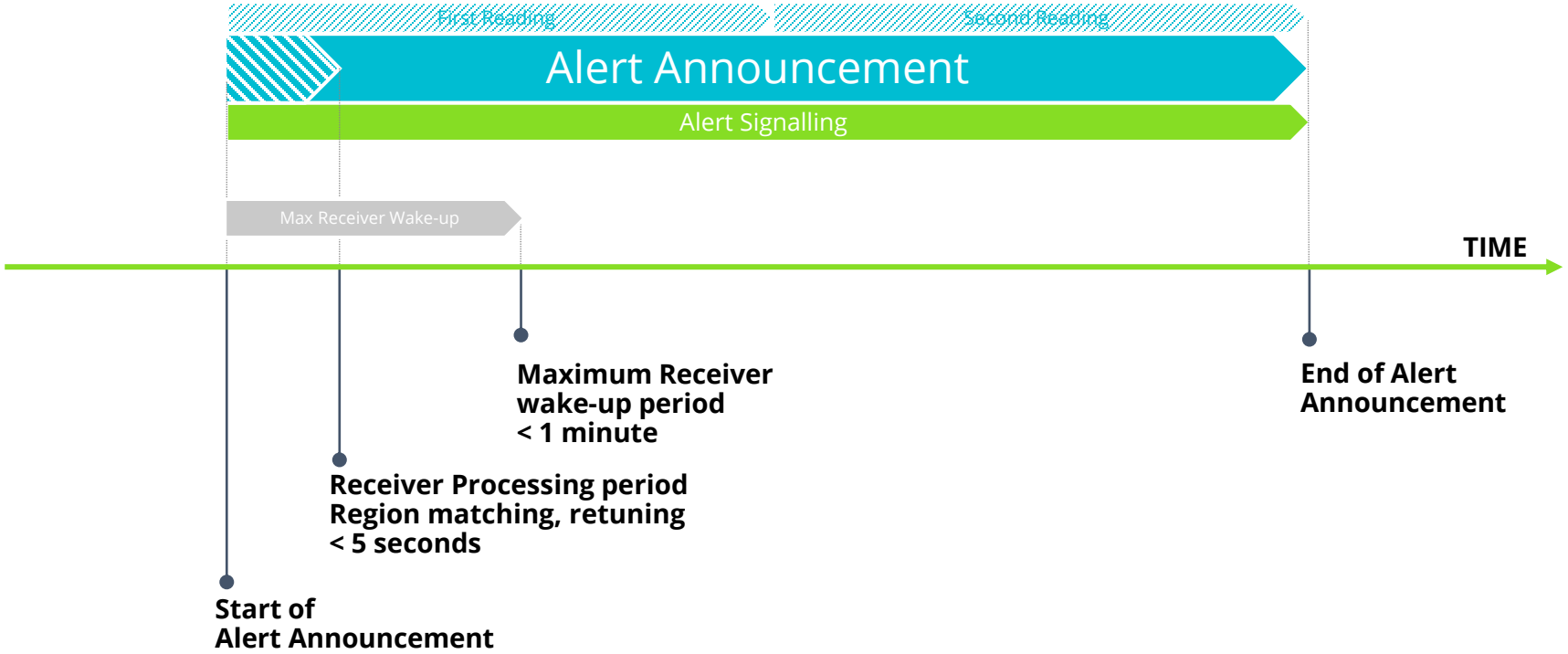
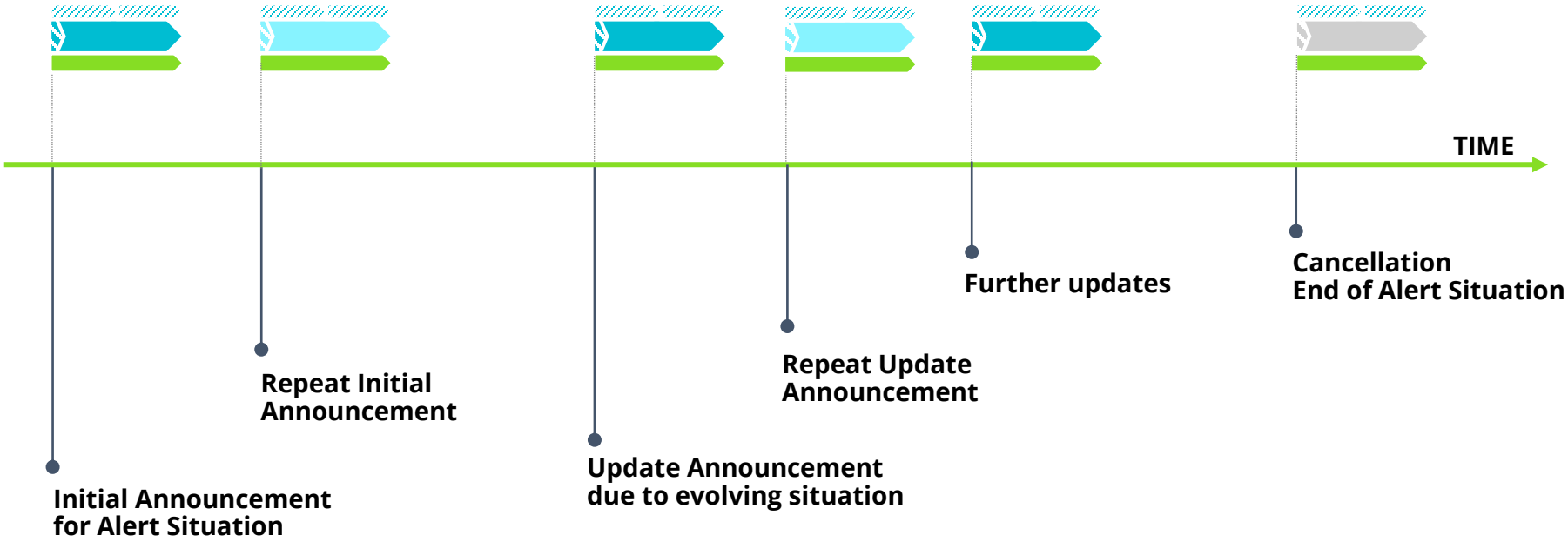




System Operation
Time-line of an Alert Announcement



System Operation
Time-line of an Alert Situation



System Operation
Support for multi-layer eco system

Ecosystem Considerations

Receiver Side

- Receivers are certified
  - Only certified receivers will be able to respond to Emergency Alerts
  - Safe-guarded by licensed logo on product
  - 3rd party testing to verify compliance
- Certified receivers implement full functionality
  - Functional guarantees
  - Performance guarantees

Broadcast Side

- Ensembles opt-in
  - No mandate for ensembles to participate EWS signalling is voluntary for ensembles
  - However: participating ensemble must support all EWS requirements
  - One ensemble sufficient to run EWS National ensembles can address any alert due to geofencing
- Every EWS Ensemble must
  - Signal ALL alerts within broadcast signal range
  - Alerts running in an own service (Tuned ensemble alert)
  - Alerts running in another ensemble (Other ensemble alert)
- IDEAL : all ensembles are EWS ensembles
  - Receivers tuned to non-EWS ensemble locked-out

Q & A