



Broadcast resilience - the role of DAB+ and ASA in strengthening emergency communications

Bernie O'Neill, Project Director, WorldDAB
MBT, 22 May 2025

Core benefits of broadcast radio

- + News and local culture
- + Free to air
- + Reliable in emergencies

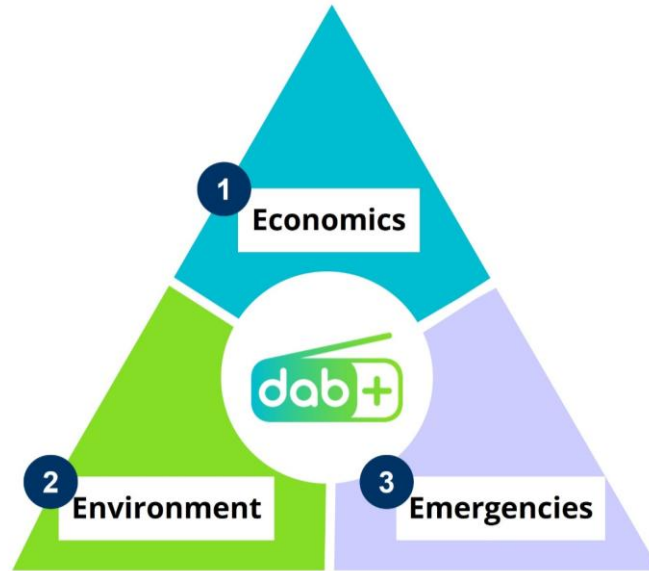


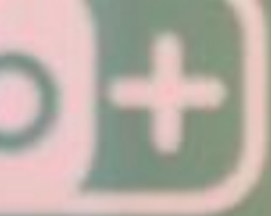
DAB+ - the digital backbone for broadcast radio



- Digital Audio Broadcasting
 - digital terrestrial radio
 - Band III
- DAB+ ~ 18 services on a single frequency
 - simulcast
 - new services

Why DAB+? Macro reasons





ASA

Automatic
Safety Alert

Automaticité

Zone d'alerte précise

radio

sécurité automatique :
supplémentaire du DA

7
2024 ASA

0927
30-8-2024 ASA

KENWOOD

Emergency warnings



We need to understand better:

- what emergencies actually look like
- how people use their radios
- what radios can do

Lindsay Cornell, Principal Systems Architect, BBC Digital
Chair, WorldDAB Technical Committee

Disasters: How do we categorise them?



- Natural events, man-made
- They can happen anywhere – area affected may be large or small
- May last hours, days or weeks

The Traditional Alarm Feature

- The Alarm Feature (sometimes called “EWF”) is a way to signal an emergency
- It applies to the whole coverage area of the radio service
 - Every radio tuned to the transmission will play out the Alarm audio message
 - But radios tuned to other services won’t respond (*)
 - And radios that are switched off won’t respond (**)
 - So only the people ***already listening to the alarm message will hear it!***
 - ***Which is not very useful!***
- ***An emergency system works best when it alerts those not listening to the news***

(*) Note that if the tuned service is part of a group of services on the same frequency (e.g. in the same DAB+ ensemble) and one of the other services transmits an alarm message, the radio will play it; if additional information is signalled on a DAB+ or DRM signal for other services, then the radio may be able to retune to that service and play the alarm message

(**) Note that a wake-up function is possible, but it is not specified in any international standards, so it has not been implemented in receivers

- The DAB+ ASA system is designed to overcome the problems with traditional alarms
 - ❑ Alerts are filtered geographically so only those affected are alerted
 - ❑ Every aspect of receiver behaviour is specified
 - ❑ Minimum receiver requirements, test sequences and test files are provided
 - ❑ A receiver certification scheme is now in operation using this registered trademark logo

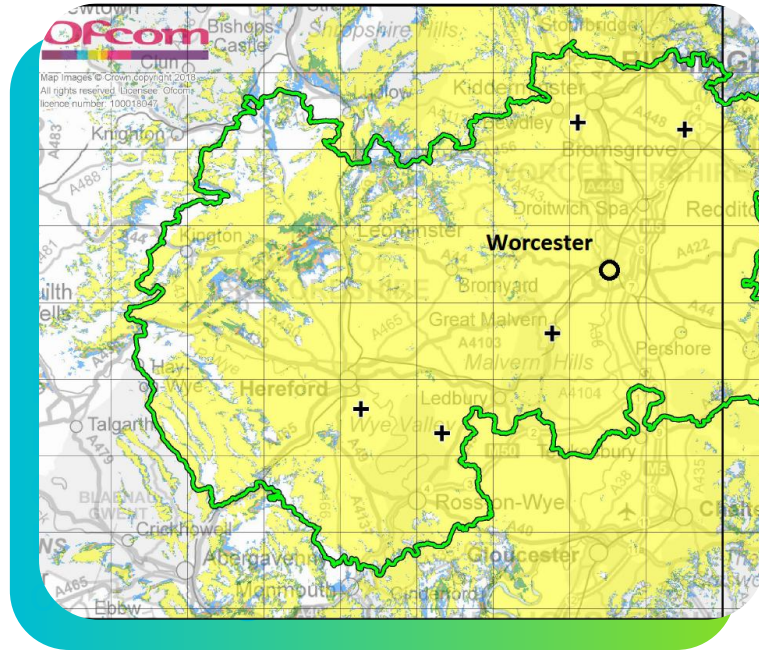


Geographic coverage issues



- Worcester, England, February 2024
- Cricket ground in the foreground
- City of Worcester population = 100,000
- Effects of the flooding significant
- Flooding made national news

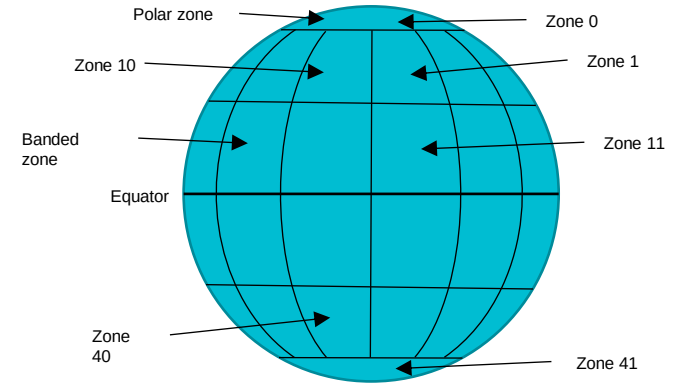
DAB+ coverage area including Worcester



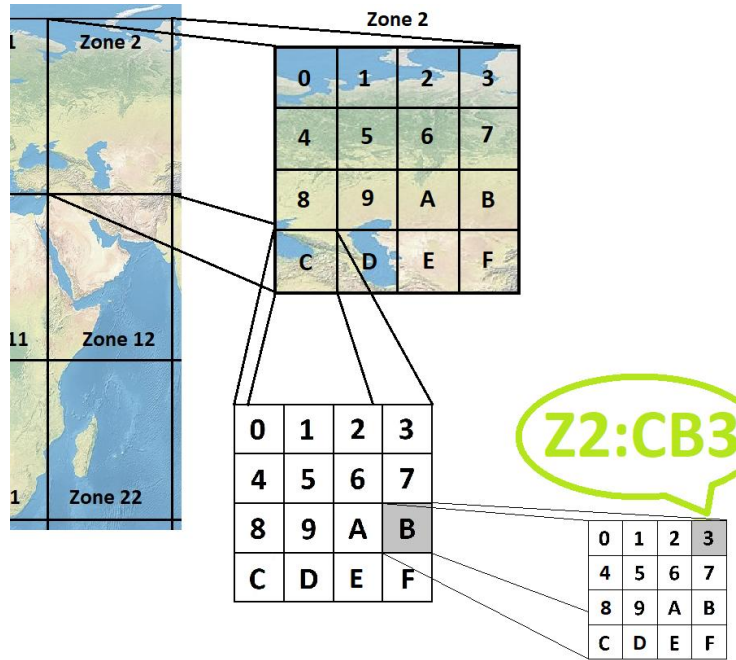
- Map shows coverage area of DAB+ ensemble
- Population coverage circa 1m people
- Coverage covers several nearby large towns

Universal location coding system

- Global solution needed
 - Algorithmic
 - High efficiency
 - Low device requirements
- We divide the globe using a hierarchy of spherical rectangles
- The first division is into “zones”
 - 42 zones each $36^\circ \times 36^\circ$

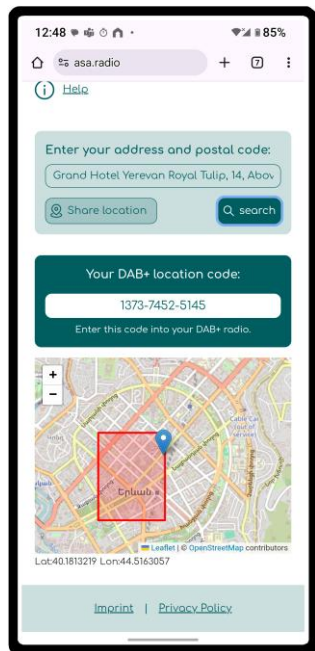


Universal location coding system



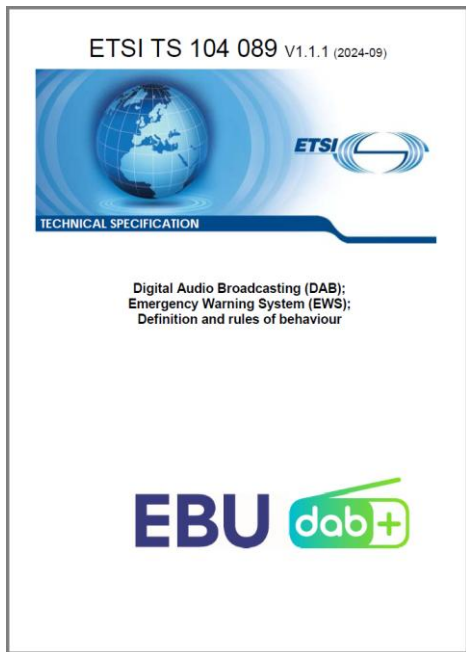
- Hierarchical Code scheme of WGS84 Coordinates
 - Full code has ~1km resolution
 - Shorter codes = larger “square”
 - Defines
 - Alert area (set of codes)
 - Receiver location (single full-length code)
- Properties
 - Globally universal
 - Very low device impact
 - Very low signalling overhead

Device presentation code example



- Coordinates are algorithmically turned into a DAB location code
- The location code is not user friendly!
- Simpler code using just the numbers 1 to 8
- Check out asa.radio for your location code
 - Now live in German, English, French and Spanish

Introducing the other ASA innovations



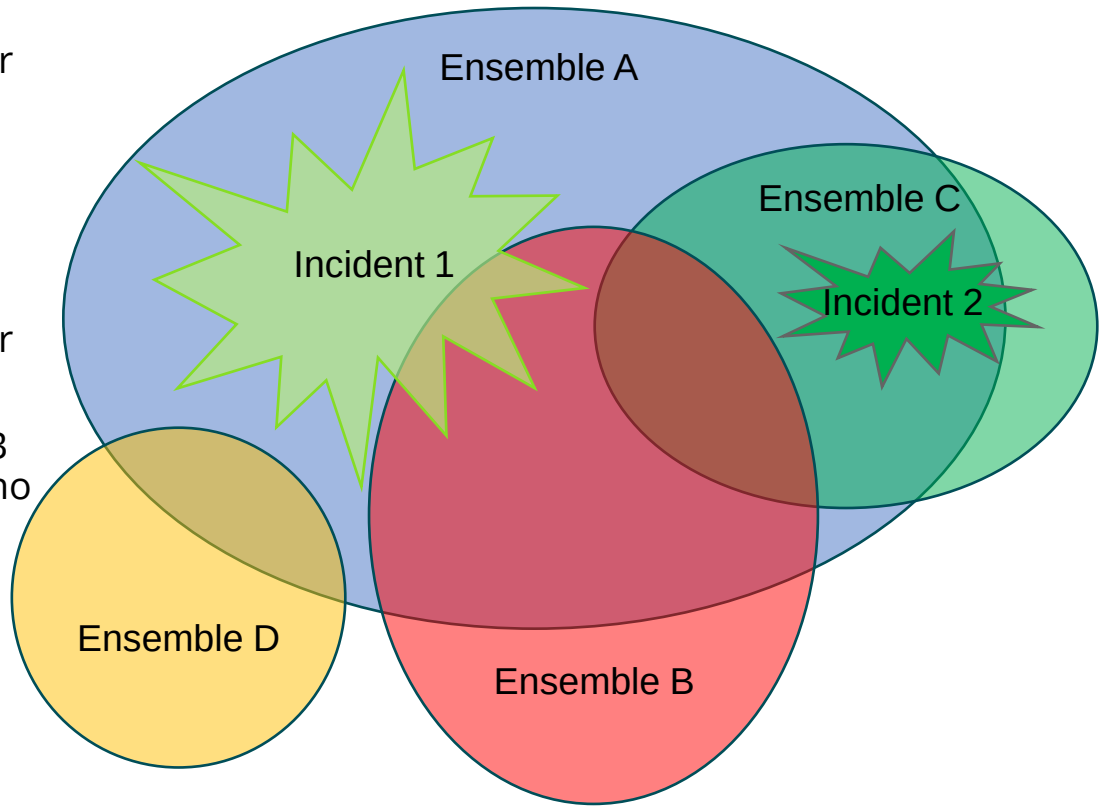
- An effective emergency warning system must reach as many of the affected people as possible
 - “Switched off” radios must respond
 - Radios tuned to other services must respond
- This means the radio has to know when and on which service there is an emergency alert
- ASA uses
 - Ensemble identification
 - Ensemble cooperation
 - Receiver synchronization

ASA ensemble identification and cooperation

- All DAB+ ensembles that participate in an ASA operation have obligations
 - The ensemble identifies itself as an ASA ensemble with a “heartbeat” signal
 - This means radios can build a list of suitable ensembles to monitor for alerts
 - The ensemble signals all alerts carried on services in the ensemble and alerts carried in all other ASA ensembles with overlapping coverage areas
 - This means that listeners can choose to listen to any service in any ASA ensemble and the radio will respond to active alerts, retuning to another ensemble if needed
 - Because DAB+ ensembles could exist that are not part of the ASA operation, receivers are required to signal to the user if a non-ASA service has been selected

Example of ASA ensembles

- Ensemble A provides an alert for Incident 1
 - It is signalled in all four ensembles because they overlap
- Ensemble C provides an alert for Incident 2
 - It is signalled in ensembles A, B and C but not in ensemble D (no overlap)



Dealing with “switched off” radios

- An emergency warning system is much more effective if it activates playback automatically
- So, the radio can't be permanently switched off – it needs to tune to a radio signal from time to time
- Every time the radio checks for an emergency, it will use power, so to extend the life of the batteries, the radio might only check for a signal occasionally...
 - But how often should it check?
 - If the audio messages are only a few minutes long, then the radio needs to check every few seconds – otherwise a lot of information could be lost

ASA receiver synchronisation

- ASA radios synchronise to real time so that all sleeping ASA radios check for alerts at the same instant, every minute
 - This means that when broadcasters align their audio message to the minute's edge all affected radios will play the whole alert message
 - The checking takes about 1 second, so the batteries will last a long time
 - Due to the "heartbeat", the radio also knows whether the ASA ensemble it is monitoring is still operating
 - If no heartbeat is detected when the radio checks for alerts, it must select another ASA ensemble before it goes back to sleep

Three key innovations

- A novel **location coding** system
 - Alert areas and DAB ensemble coverage areas will rarely align
 - Globally applicable with a resolution of c.1 km²
 - Lightweight with high coding efficiency
- **New signalling** specifically tailored to alerting
 - Identification of participating ensembles
 - Identification of incidents, the alert stage, its importance, its location
- **Receiver synchronisation**
 - to minimise audio loss at the start of an alert
 - to maximise battery life

Roll-out plans: Germany

- + Major flooding in 2021
- + **Over 180 people killed**
- + **extensive damage** to roads, bridges
- + water contamination, crop losses,
- + Mobile phone networks out of action for days



Roll-out plans: Germany



- Public broadcasters committed
- Safety authorities
- Federal and State Governments
- September 2025 - live trial
- 2026 - regular use

Evaluation underway: Switzerland

- Live demo ASA held Zurich 5 May
- Collaboration: OFCOM, SRG SSR, and Sumatronic
- Alerts triggered successfully across public and private broadcasters
- Radios woke up, retuned, and played synchronised alert messages
- Evaluation underway for potential national rollout





Automatic Safety Alert



World premiere of DAB+
ASA system: press release

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"Worldwide Launch of EWS
Marketing Toolbox" video

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ASA Automatic Safety Alert
factsheet

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ASA / EWS ETSI
specifications

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DAB+ emergency warnings:
news

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"Emergency Warnings via
DAB+" video

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<https://www.worlddab.org/dab/asa-emergency-warnings>

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ASA Approved Products

Licence Number	Date Certified	Category	Product
2025004	30/04/2025	DAB End Product - Domestic	TechniSat Digital GmbH - DIGITRADIO 3 ASA
2025003	30/04/2025	DAB End Product - Domestic	Albrecht DR 455
2025002	03/04/2025	ASA Approved DAB Core Technology	KeyStone K61 series
2025001	18/03/2025	ASA Approved DAB Core Technology	Frontier Smart Technologies Kino4 Pro Siena Pro DAB 7.3

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<https://www.dtgtesting.com/asa-approved-products/>

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- + Offering knowledge, expertise and advice
- + Specialist committees
 - Technical
 - Spectrum and Network implementation
 - Automotive
 - Marketing
- + Events, workshops and networking





ASA - Automatic Safety Alert
Warnings via DAB+ radio

Thank you

www.worlddab.org