



# **Operating DAB+ Networks**

## **ABU/ASBU WorldDAB Technical Workshop**

Kenny Skillen

# Managing DAB+ at Scale



**+1bn**  
hours of  
radio listening /  
week



**61 DAB**  
multiplex  
ensembles  
managed



**60**  
Radio Studio  
Locations



**+240**  
Radio  
stations managed



**380**  
Sources



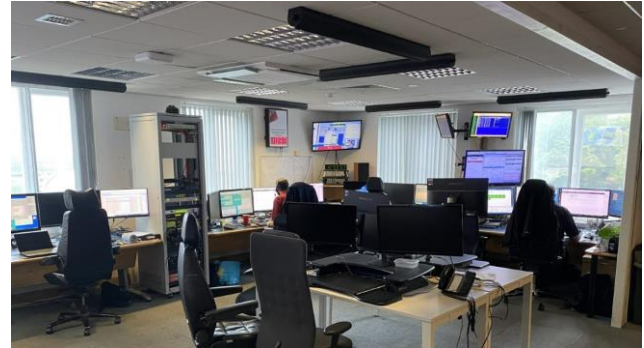
**1259**  
Transmitter  
Systems



**506**  
Radio Broadcast  
sites

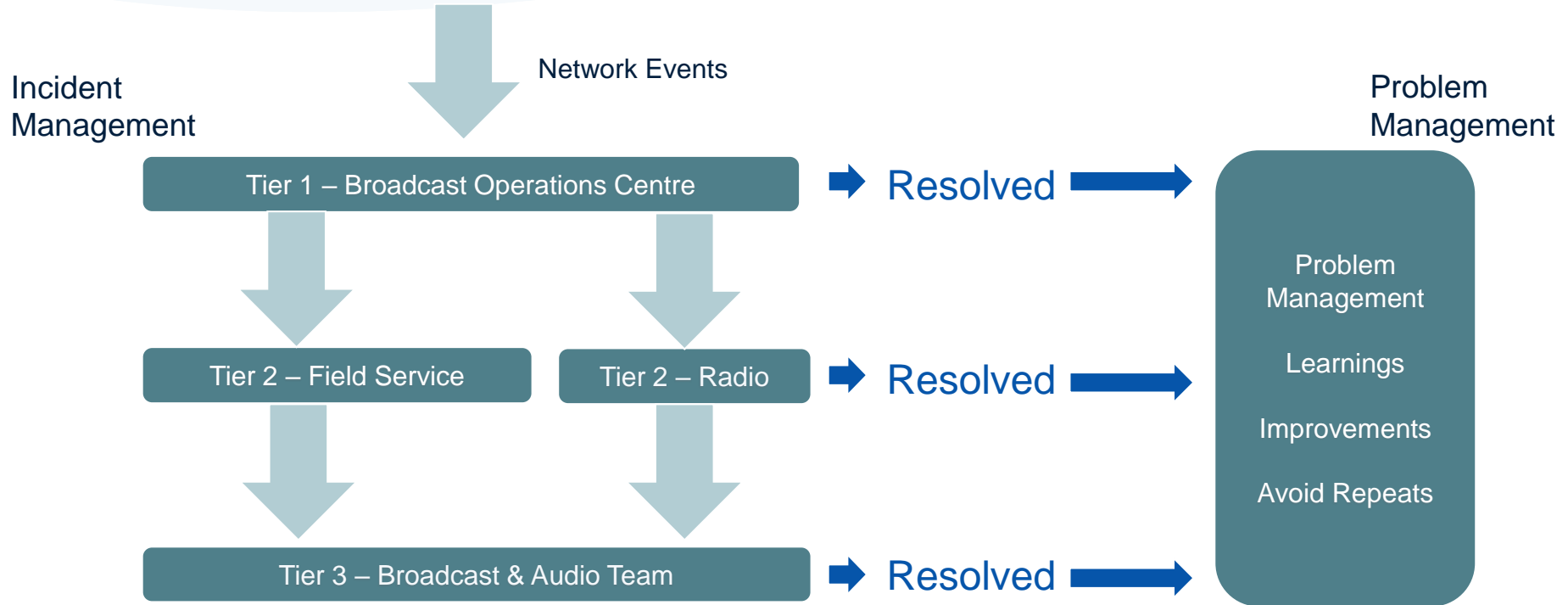


**640**  
DAB  
Services



24/7 Broadcast Operations Centre  
Yorkshire, England

# Service Management for DAB+ Services



# How do we manage health of the services?

## Install & Commission

- Component Tests
- Functional Tests
- Checking of remote management to Ops Centre
- Timing Checks
  - Static Delays
  - Coverage Checks
- Content Checks
- Regulatory Compliance Tests

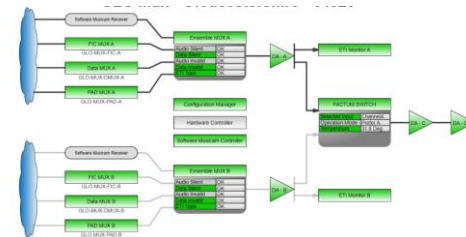
## In life Operation

### 24/7 NOC

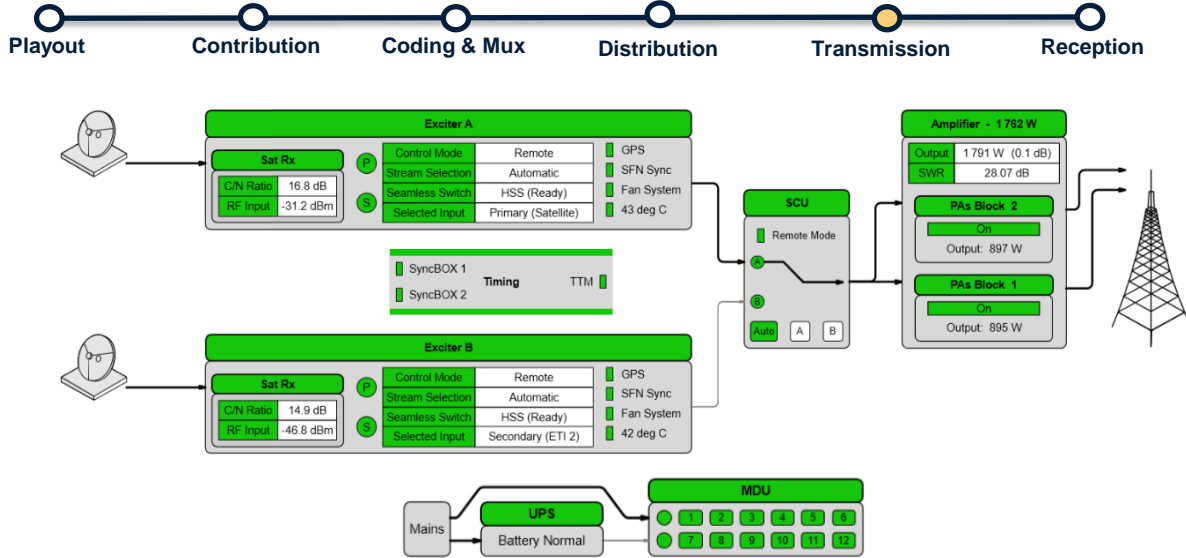
- Real Time Monitoring
- 24/7 Event Response
- Corrective Actions
- Remote Fixes
- Engineer Despatch
- Operational Change
- Reactive Maintenance
- Software Upgrades

### Periodic Checks

- MER
- Frequency
- Timing
- Spectral Occupancy
- Functional Checks
- Cooling & Ventilation
- Operating Temperature



# Service Monitoring Example - Transmission



- Input Status
  - Receive Levels
  - Carrier to Noise
- Exciter Status
  - Temperature
  - Seamless Switching Available
  - Input Selection
  - GPS
  - SFN health
- Exciter Switch Unit
  - Mode
  - Selected
  - Availability of Sources
- Amplifier
  - Output Power
  - Return Loss
- Ancillary
  - UPS
  - Battery
  - Cooling

Present simplified filtered key data point information for Tier 1 Teams

For example:

Is Service on or off?

Is Input present?

Is timing good or bad?

# Monitoring Network Timing

## DAB Timing - DAB

274 TTMs: 1 Major 1 Minor

Calculate Master Values

Site	GPS	Tx RF Frame	Exciter A	ETI Frame Zero	Tx RF Frame	Exciter B	ETI Frame Zero
Aberdare	■		1 668 033 us	2 us			
Alexandra Palace	■	40 613 us	0 us	1 668 031 us	0 us	40 613 us	0 us
Alsagers Bank	■	40 614 us	1 us	1 668 031 us	0 us	40 614 us	1 us
Alton	■	40 612 us	-1 us	1 668 033 us	2 us		
Amiwh Nebo	■	40 612 us	-1 us	1 668 030 us	-1 us		
Angus	■	40 613 us	0 us	1 668 031 us	0 us	40 613 us	0 us
Ardovie Quarry	■	40 612 us	-1 us	1 668 034 us	3 us	1 668 032 us	1 us
Ashbourne	■		1 668 033 us	2 us			
Ashburton	■	40 611 us	-2 us	1 668 030 us	-1 us		
Aylesbury ATE	■	40 612 us	-1 us	1 668 031 us	0 us		
Bala	■		1 668 033 us	2 us			
Ballycastle Forest	■	40 612 us	-1 us	1 668 031 us	0 us		
Bampton	■	40 611 us	-2 us	1 668 029 us	-2 us		
Bangor	■	40 612 us	-1 us	1 668 031 us	0 us		
Barrow MF	■	40 613 us	0 us	1 668 031 us	0 us		
Basingstoke	■		1 668 032 us	1 us			
Bath	■	40 612 us	-1 us	1 668 031 us	0 us	40 614 us	1 us
Beacon Hill	■	40 613 us	0 us	1 668 031 us	0 us	40 613 us	0 us
Beccles South Road	■	40 612 us	-1 us	1 668 030 us	-1 us		
Beer	■	40 613 us	0 us	1 668 031 us	0 us		
Belmont	■	40 612 us	-1 us	1 668 031 us	0 us	40 612 us	-1 us
Betws Y Coed	■		1 668 031 us	0 us			
Biggar	■	40 611 us	-2 us	1 668 030 us	-1 us		
Bincombe Hill	■	40 614 us	1 us	1 668 033 us	2 us	40 612 us	-1 us

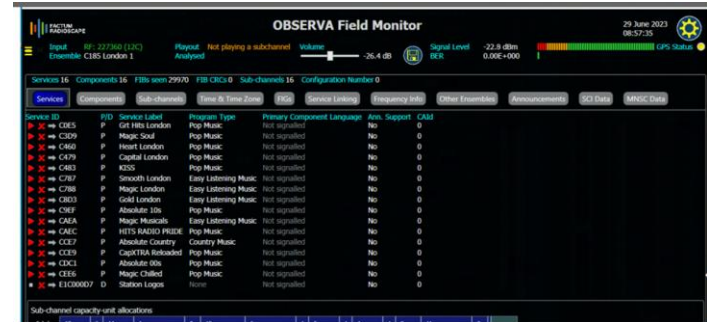
- Timing of networks is monitored globally
- Timing delta data presented
- Mix of Transmitter Types in Network
- Warning and Alert limits set
- Detects localised and global issues
- Operator is able to see timing health at a glance
- Detailed data available for Tier 2 and Tier 3 teams.



# Summing Up

- Think end to end
- Simplified graphical presentation design helps diagnose issues faster
- Group and display timing information of same SFN sites together
- Set thresholds to trigger alerts, trust your systems
- IP Contribution Changes – beware of risk in sending wrong content to an ensemble – difficult to detect
- Learn from incident events to improve your network performance
- Data Gathering and Analytics. Trend your data to find operating efficiencies.

Network Status at a glance



# Thank you for listening



Kenny Skillen  
Head of Engineering – Media & Broadcast  
kenny.skillen@arqiva.com

[arqiva.com](https://www.arqiva.com)  
[linkedin.com/company/arqiva](https://www.linkedin.com/company/arqiva)