Small Scale DAB

Lindsay Cornell
Chair, Technical Committee

In the beginning…

- CRC started to create the mmbTools software package in around 2000

- The software allowed DAB multiplexes to be created and modulated on a Linux PC connected by USB to an Ettus Research Universal Software Radio Peripheral, the USRP

- At the EBU Digital Radio Summit in 2011 CRC announced that mmbTools was being made open source

And bit by bit…

- A community of "hackers" improved the code

- Extra tools were developed to allow IP streams as audio sources

- Cheaper Software Designed Radio hardware was integrated

- A dedicated, low-cost, open source, hardware DAB modulator was developed (EasyDAB)

- EasyDAB was enhanced with GPS inputs for SFN capability

Opendigitalradio.org

Stan Roehrich
Matthias Brändli

Mathias Coinchon
Rash Mustapha

http://www.opendigitalradio.org/software/odr-usage-map

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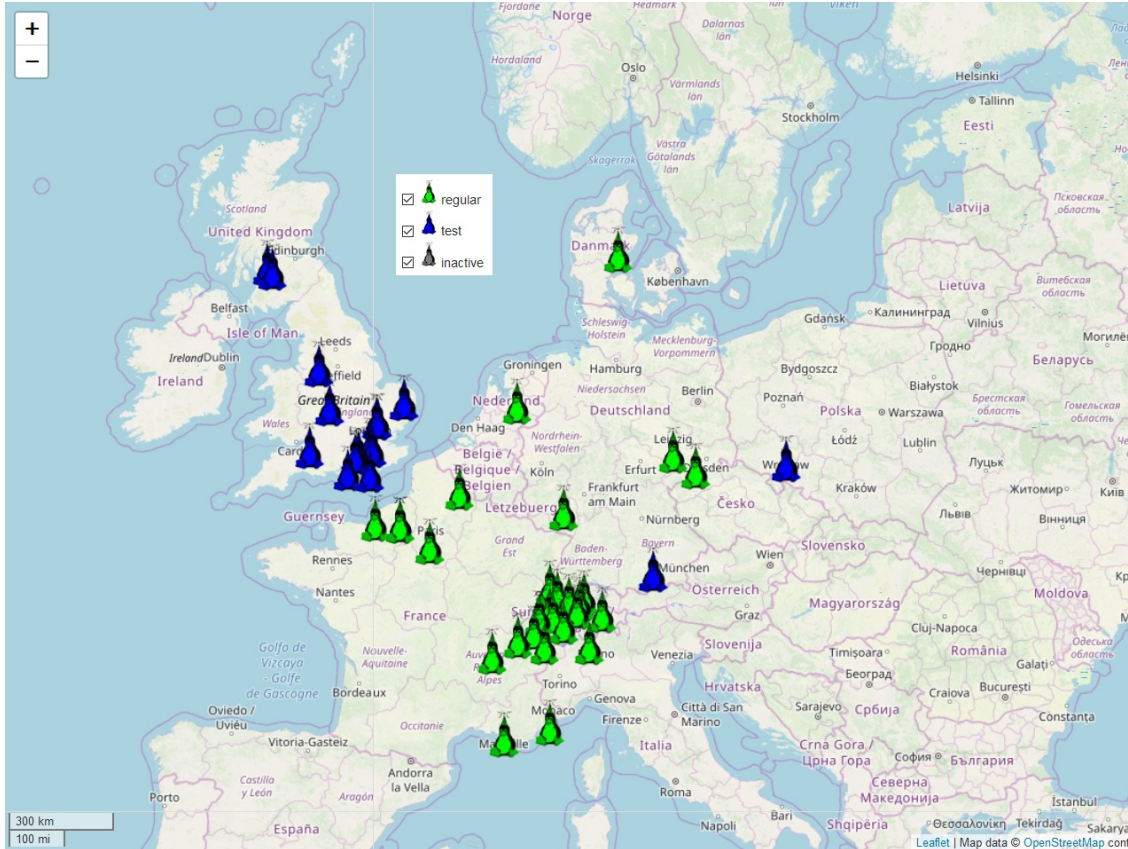
Small scale networks in Switzerland

With thanks to Rene Wehrlin

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

**Federal Office of Communications
OFCOM**

Swiss DAB+ network coverage

- SRG SSR:
  - 1 ensemble in *each* language region (public)
- SwissMediaCast:
  - 4 regional ensembles in the *German* part (commercial)
- Romandie Médias SA:
  - 1 ensemble in the *French* part (commercial)

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Complementary non-profit-oriented radio programme services: Part of private public service

- Must differentiate thematically, culturally and musically
- Must take account of the linguistic and cultural minorities
- The broadcasting of advertising is not permitted
- Funded from the licence fee

Ordinance on Radio and Television (ORTV)

Art. 36

**Complementary non-profit-oriented radio programme services**

[1] A complementary non-profit-oriented radio programme service must differentiate itself thematically, culturally and musically from other licensed radio programme services that can be received in the same coverage area. In particular, a non-profitoriented programme service must take account of the linguistic and cultural minorities in the coverage area.

[2] In a non-profit-oriented radio programme service, the broadcasting of advertising is not permitted, with the exception of self-advertising, which predominantly serves to build audience loyalty, including references to media partnerships as defined in Article 22 paragraph 6. The licence may provide for the broadcasting of advertising for broadcasters which make a special contribution to the training of media workers in a coverage area with fewer than 75,000 inhabitants aged 15 or more.

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Swiss DAB+ network coverage – small scale networks

- 16 DAB islands in bigger agglomerations

- Most with one transmitter - some SFN

- Access rights for 9 private non-commercial FM stations

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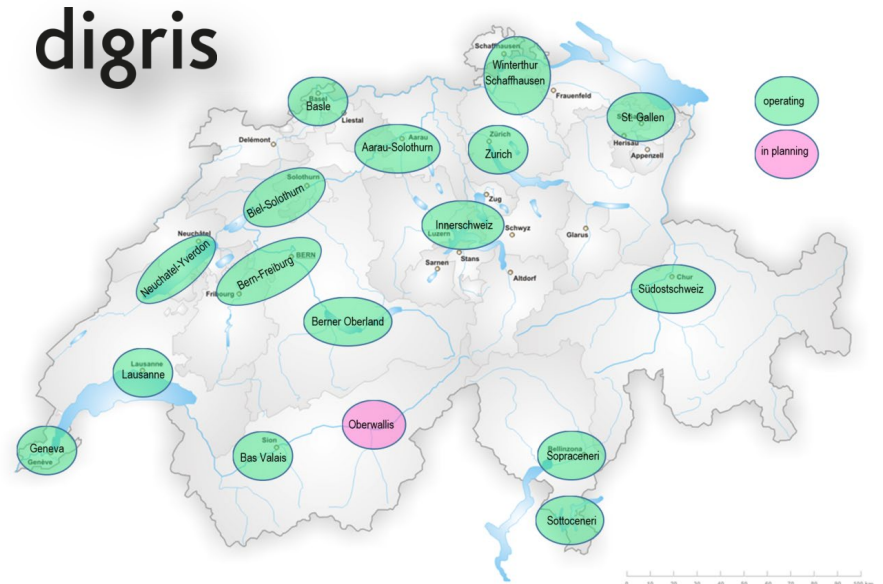
Small scale networks – pro and cons

- Smaller coverage area – much lower distribution costs (between factor 1 : 5 and 1 : 10) ✔
- Financing of DAB+ is also possible for noncoms and small stations ✔
- All licensed FM radio stations have the possibility to transmit via DAB+: main requirement for a successful migration is fulfilled ✔
- Chance for new stations and start ups – more diversity ✔
- Only DAB+ islands – without reception between: bad for car drivers ✘
- Less transmission power – poorer indoor reception ✘

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Small scale networks in UK

With thanks to Peter Madry

UK DAB network coverage (March 2019)

- Three national ensembles
- 54 regional ensembles (called local in the UK!)

Multiplex	Type	Households	Major roads
BBC	National – public	97.4%	87.4%
Digital 1	National - commercial	91.7%	80.2%
Sound Digital	National - commercial	82.6%	72.6%
Local (composite coverage)	Local - commercial	91.0%	75.2%

Note: local coverage excludes further multiplexes currently being licensed by Ofcom in three locations:
Channel Islands, Morecambe Bay and Cumbria

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Why small scale DAB?

- In 2012, Rashid Mustapha, an Ofcom engineer, persuaded his colleagues to provide a Test & Development license to run a trial DAB ensemble in Brighton using the open source tools

- He recognised the potential for small-scale DAB technology to offer a pathway to digital radio for those services too small to fit on national and regional ensembles

- More than 300 such services are broadcast in analogue in the UK

- Subsequent work was carried out to verify the concept and government funds were provided to establish the formal trials

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Small-scale DAB coverage

Area	Households
Birmingham	69,000
Brighton	118,000
Bristol	48,000
Cambridge	78,000
Glasgow	279,000
London	1,585,000
Manchester	467,000
Norwich	86,000
Portsmouth	198,000
Woking and Aldershot	67,000
Total	**2,995,000 (Approx 11% of UK)**

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Experiences with small-scale DAB trials

- Trial multiplexes have been on air since 2015

- The technology has worked well and reliably after some teething trouble

- Around 100 unique radio stations are carried, most new to DAB

- The ten trial operators have gained extensive practical experience

- Some operators have been directly involved in innovating further technical enhancements to the small scale concept

- The multiplex licensee acts as a gatekeeper of digital capacity
  - safeguards may be appropriate to prevent abuse of that position

- The trials have prompted wider market interest

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Next steps

- UK Government legislation is going through Parliament to establish a framework for licensing small-scale DAB across the UK

- Ofcom has been consulting on how it intends to plan and license small-scale services

- Ofcom expects to invite applications early in 2020 and to award licences from Q2 2020

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Small scale networks in Poland

With thanks to Krystyna Rosłan-Kuhn

KRRiT
KRAJOWA RADA
RADIOFONII i TELEWIZJI

Local radio in Poland

- More than 200 local radio stations operate
  - Mainly single low power FM transmitters (100W – 1 kW) in towns of different size
  - 16 mini-networks with 3 or 4 transmitters covering a small region
- High level of spectrum occupancy in the FM band
  - Limited possibilities of coverage extension or improvement
- Small market share - in total less than 10%

Small Scale DAB test transmissions

- Regular DAB services
  - National ensemble for Polskie Radio (public broadcaster)
  - Regional public stations
  - Overall about 56% of population covered

- Small scale DAB test transmissions
  - 6 locations within regular coverage area
  - Trial periods of less than two years
  - About 3 million people (7% of population) covered

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Test transmission objectives

- For operators
    - Verify coverage predictions
    - Experiment with parameters
- For broadcasters
    - Evaluate affordability
    - Reaction of consumers

- Test transmissions are operated by three different companies using their own software solutions based on open source

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Next steps

- Test transmissions provided a good experience and increased the interest of local broadcasters

- Licence procedures will be completed during November 2019

- Initial 7 local ensembles will start regular services

- Then remaining local ensembles will launch using low power on frequencies outside of GE06 agreement

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Conclusions

Small scale DAB

- Makes use of open source software and hardware
- Provides affordable access to smaller radio stations
- Compliments more traditional solutions
- Makes analogue switch-off more feasible

Thanks for listening!