Community radio in an increasingly digital world

Source: ACORAB/CIN

Tim Unwin

ACORAB, 13 January 2024

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Outline

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- Very much meant to be interactive
  - So please ask questions and interrupt
- Many possible layers of integration between
  - Remaining traditional AM/FM
  - Variations in mixed usage
  - Fully converting to digital (small-scale DAB)
- Importance of supportive regulatory environments
- Open-Source and commercial options for delivering DAB
- Emergency scenarios

Digitalization and digital transformation

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- Fundamentally a socio-political question: communal or individual interests
- The transformation of analogue processes to digital ones
  - Gartner (2024) “the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business”
- Driven by private sector interests
  - But many governments also see it as valuable, increasing efficiency, reliability and reducing costs
    - Although very difficult to measure cost savings)
- Be wary of digital instrumentalism/determinism
  - Digital tech does not cause anything by itself
  - The ultimate “cause” is the people who conceive, construct and market these products in their own interests.
- Often implicit assumption that digital is inherently good
  - But now increasing awareness of very real harms
- It is important to remember that we do not need digital to live fulfilled lives

Broad context in Nepal

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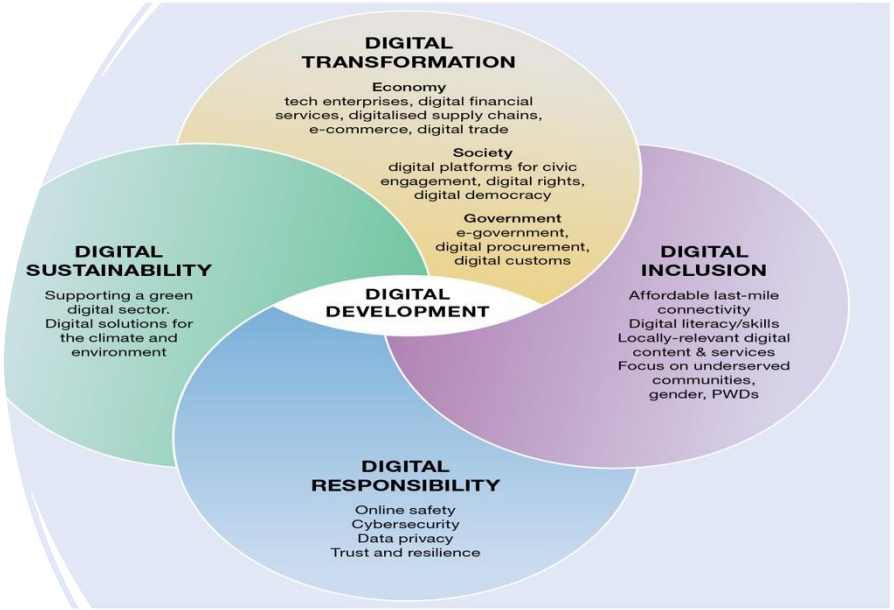
- 2023 Radio Frequency (Allocation and Pricing) for Telecommunication Service Policy
  - Makes no mention of community radio
- Next decade will be IT decade
  - May 2024 “Nepal would be developed as a global information technology hub encouraging to development IT industry as the major sector of employment and service export.”
- Creation of new public sector broadcaster
  - Sept 2024 merging of Radio Nepal and Nepal Television into a new public media entity
- What are the implications for community radio?

Community Media Networks: Envisioning the Future

AHM Bazlur Rahman

Chief Executive Officer
Bangladesh NGOs Network for Radio and Communication



Challenges and Emerging Trends Beyond 2025

- Community Radio's traditional business model is at a breaking point.
- Growing numbers of community media outlets have been forced to cut down on staff, resulting in revenue losses to digital giants.
- Audio content vs Visual Content
- Policymakers Attention
- Radio Set vs Mobile Phone Set
- Harmonize with the Digital Transformation process for digital community media

Different possible levels of integration between FM and Digital radio/media

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Purely analogue

Combining FM with web-based services

Purely digital

Advantages and disadvantages: a reminder of what you already know

Source https://www.mediasupport.org/voices-for-change-and-peace-community-radio-in-south-asia/

Analogue (AM/FM) or Digital?

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Traditional AM and FM: advantages

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- Relatively easy to use – and widespread dissemination
  - Uses existing radio spectrum
- Serving the needs and interests of local communities
  - UNESCO (2001): *The audience as protagonists*
  - Integrated with local languages and culture
- Generally quite low cost
- Can have two-way asynchronous interactions
  - Feedback and inputting ideas
- Often Community owned
- Linked to Human Rights Agendas and good governance
  - UNESCO (2001): "Citizens have a democratic right to reliable, accurate, and timely information"
- Widespread positive uses in emergencies

Source: https://aesanetwork.org/blog-92-community-radio-in-south-asia-potential-for-sharing-community-information-and-connecting-people/

Traditional AM and FM: disadvantages

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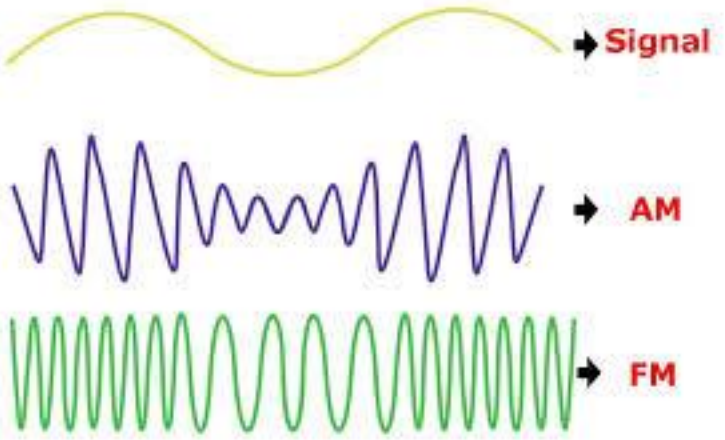
- Overall challenge presented by advantages of digital, the Internet and Social Media
- AM and FM (two types of modulation)
  - AM – amplitude varies to incorporate sound information (has longer range and is cheaper, but poorer audio quality)
  - FM – frequency is varied (better sound quality and less prone to interference, but physical barriers influences reception)
- Usually FM is quite short range
- Only audio – does not include video, which is becoming increasingly popular
- Less interactive than digital



Digital community radio: advantages

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- Sound better quality with less interference
- More channels
- Can provide data services (such as song name or news updates)
- Ease of use
  - Can be searched by channel name
- Multiplexing
  - Several stations can be bundled together on a single frequency, making better use of the spectrum
- Available through multiple platforms (mobile devices, DAB radios…)
- Widely seen as being “the future”
- Can be integrated with websites providing many other services

Digital community radio: disadvantages

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- Coverage not universal
  - Especially in marginal areas
- Need new training and expertise to deliver digital
- Cost: DAB radios and equipment are more expensive
  - Users also have to pay data costs
  - Costs of buying new equipment and training producers and journalists
- Not compatible with older FM/AM radios
- DAB has poor efficiency (uses wider and higher frequency ranges)
- Focus tends to be on quantity of channels rather than quality broadcasting
- Early versions did not have emergency break-in system to interrupt broadcasts
- Slight signal delay
  - Problematic for live events

Blended options in transition to digital

Combining recorded audio through websites and social media

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Short term solutions: combining existing AM/FM with web-based services

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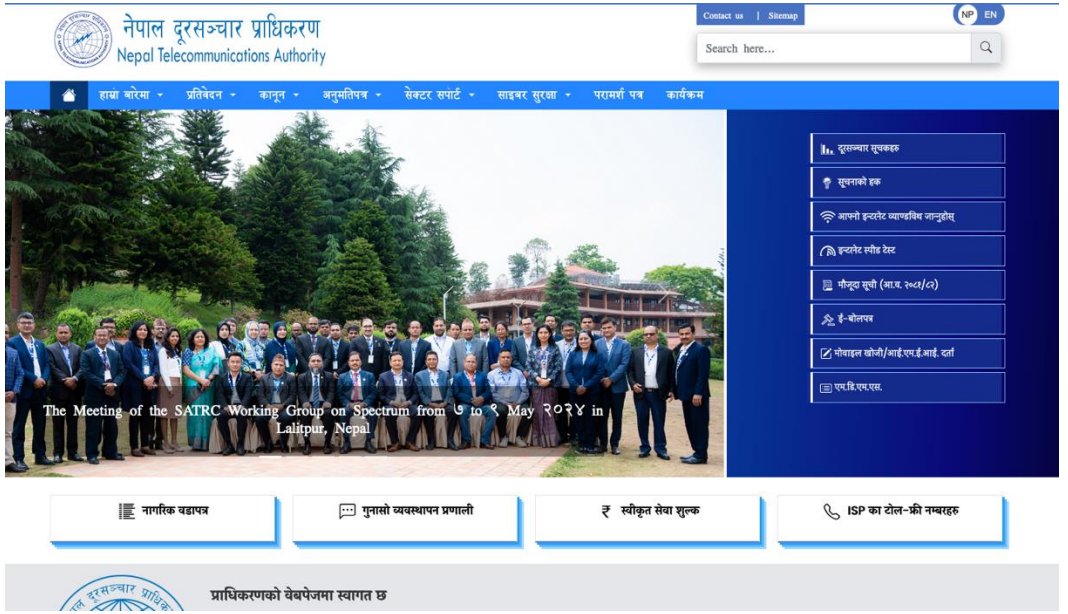
- Basic model elements:
  - Continuing traditional community radio
  - Linked with proactive website
    - Posting links to audio files
    - Must provide feedback mechanisms
  - Enhancing through social media
    - Podcasting
    - Interacting through Facebook (91% of social media in 2024), and other platforms (perhaps in future Bluesky)
- Transitioning to community media using video
  - Cheap and easy now to produce good quality basic videos
    - Distributed through Instagram and YouTube.

Crucial importance of regulatory environments



नेपाल दूरसञ्चार प्राधिकरण
Nepal Telecommunications Authority

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https://ict4d.org.uk

The crucial importance of regulation

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- National regulators need to plan for digital radio networks that will eventually replace analogue ones
- ITU WRC-23 in Dubai
  - Led to new 2024 Radio Regulations that came into force 1 January 2025.
  - Identified new spectrum resources to foster technological innovation and expand global connectivity
- Two main approaches since early 2000s
  - DAB Digital Audio Broadcasting
    - First European roll-out in 1995 based on research from early 1980s
    - Some countries who experimented with it have now stopped
    - Note DAB+ developments (since 2006)
      - 80 kBs^{-1} rather than 128 kBs^{-1}, enables more stations, and using MPEG-4 (rather than MP2)
  - DRM Digital Radio Mondiale
    - First formed in China in in 1997 to digitise the AM bands up to 30MHz
    - DRM+ uses FDM (Coded Orthogonal Frequency Division Multiplexing) with QAM (Quadrature Amplitude Modulation), and 100 kHz channel for transmission

Differences between DRM/+ and DAB/+

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- Both standards are open (with full and free access to all technical specifications), hosted by ETSI and ITU recommended for worldwide adoption
- DRM+ fits with the current band-II channelization (100 kHz bandwidth) used by AM and FM, whereas DAB is a multiplex solution requiring roughly 1500 kHz bandwidth for the transmission signal
  - With DAB+ need to fill a multiplex (c.16 services on a single transmitter), or share infrastructure
  - DRM offers a small multiplex enabling smaller scale control

Parameters	DAB+	DRM+
Frequency	174 to 240 MHz Band III	47 MHz to 68MHz 87.5 MHz to 108 MHz 174 MHz to 230 MHz
Programs per channel	9 to 24 (Typically), 64 (Max.)	1 to 4 (Max.)
Channel Bandwidth	1.5 MHz	96 KHz
Modulation	Multi carrier (1536) OFDM, DQPSK type modulation over -768KHz to +768KHz	Multi carrier (106) OFDM, 4 to 16 QAM modulation over -48KHz to +48KHz
Digital data speed (Kbits/sec)	2400	120
Input of transmitter	Digital ETI 2.048 Mbps or EDI (ETI over IP)	Multiplex Data Interface (MDI) 37 to 186 kbps

55 countries using DAB/+ by 2022

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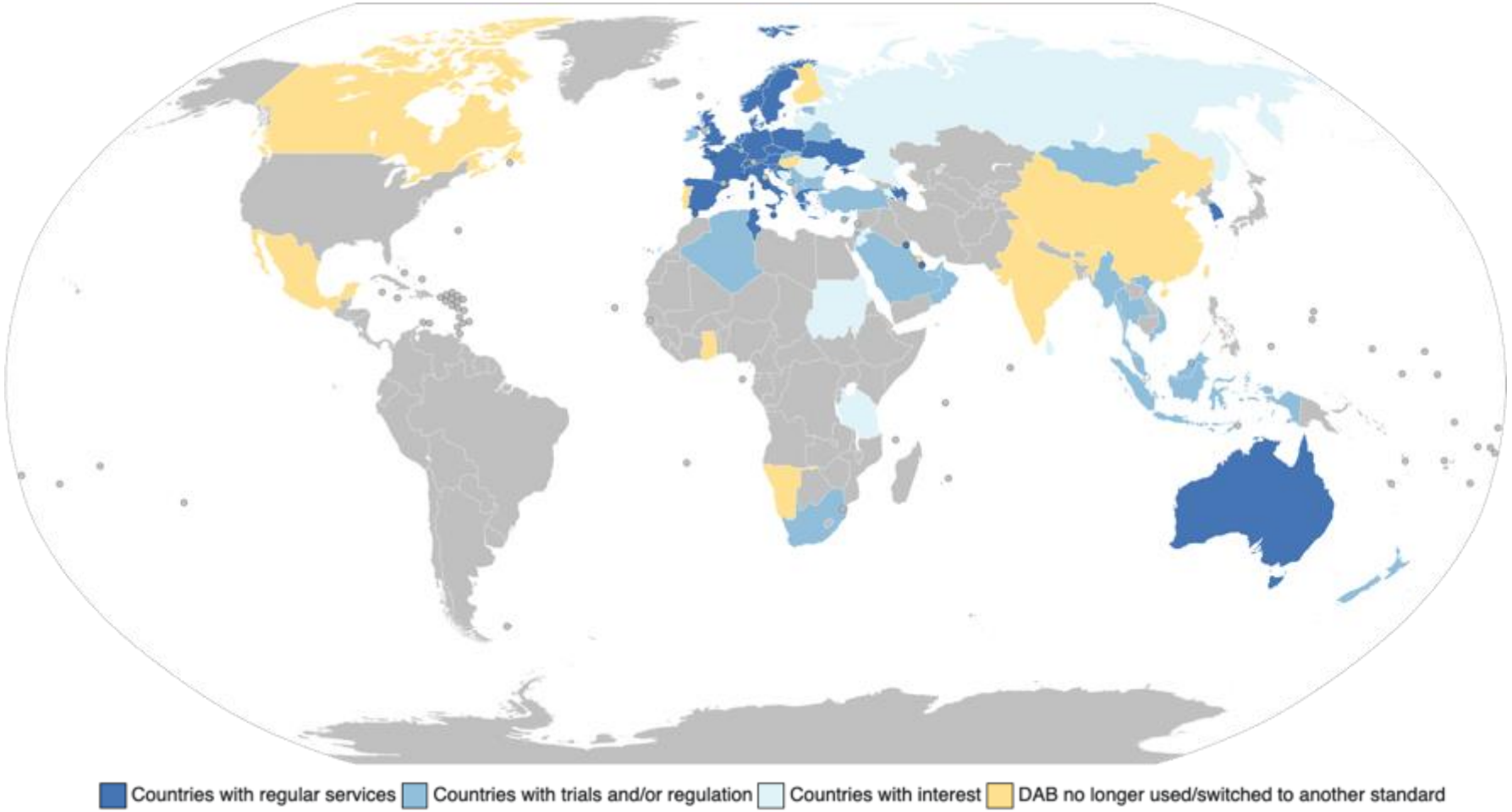

Source: https://en.wikipedia.org/wiki/Countries_using_DAB/DMB

DRM 11 countries broadcasting or planning to roll out DRM/+ (2024)

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- India – main country using DRM
- Pakistan
- Indonesia
- China
- Russia
- Brazil
- South Africa
- Germany
- Romania
- Kuwait
- New Zealand

What is the regulatory context in Nepal?

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- Is the government sympathetic to community radio?
- How does this fit within emerging government IT policy?
- Key role of ACORAB (and CIN) in advocating for community radio, and gaining policy and financial support of government.
- Need to decide which route to go down, and in the meanwhile supporting existing systems with web-based solutions.

Technical aspects: setting up a digital radio platform

- **Open Source options**
  - Open Digital Radio
- **Commercial offerings: competition between**
  - DAB: Radio.co and Broadcast Radio (UK-based)
  - DRM: Capgemini/Cambridge Consultants

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Opendigitalradio

An Open Source option

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ODR mmbTools Open-Source DAB Transmission Chain

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- **ODR-DabMux** implements a DAB multiplexer that combines all audio and data inputs into an ETI (Ensemble Transport Interface) output
- **ODR-DabMod** is a software-defined DAB modulator that receives or reads ETI, and generates modulated I/Q data usable for transmission
- **ODR-AudioEnc** contains a MPEG-1 Layer II audio encoder that is used to encode audio for the DAB standard and uses fdk-aac to encode for DAB+
- **ODR-PadEnc** can read DLS from a text file and slides from a folder, and prepare the PAD data stream for injection into the audio encoder.
- **ODR-EncoderManager** presents a web GUI for managing the audio encoder

The Opendigitalradio wiki introductory page

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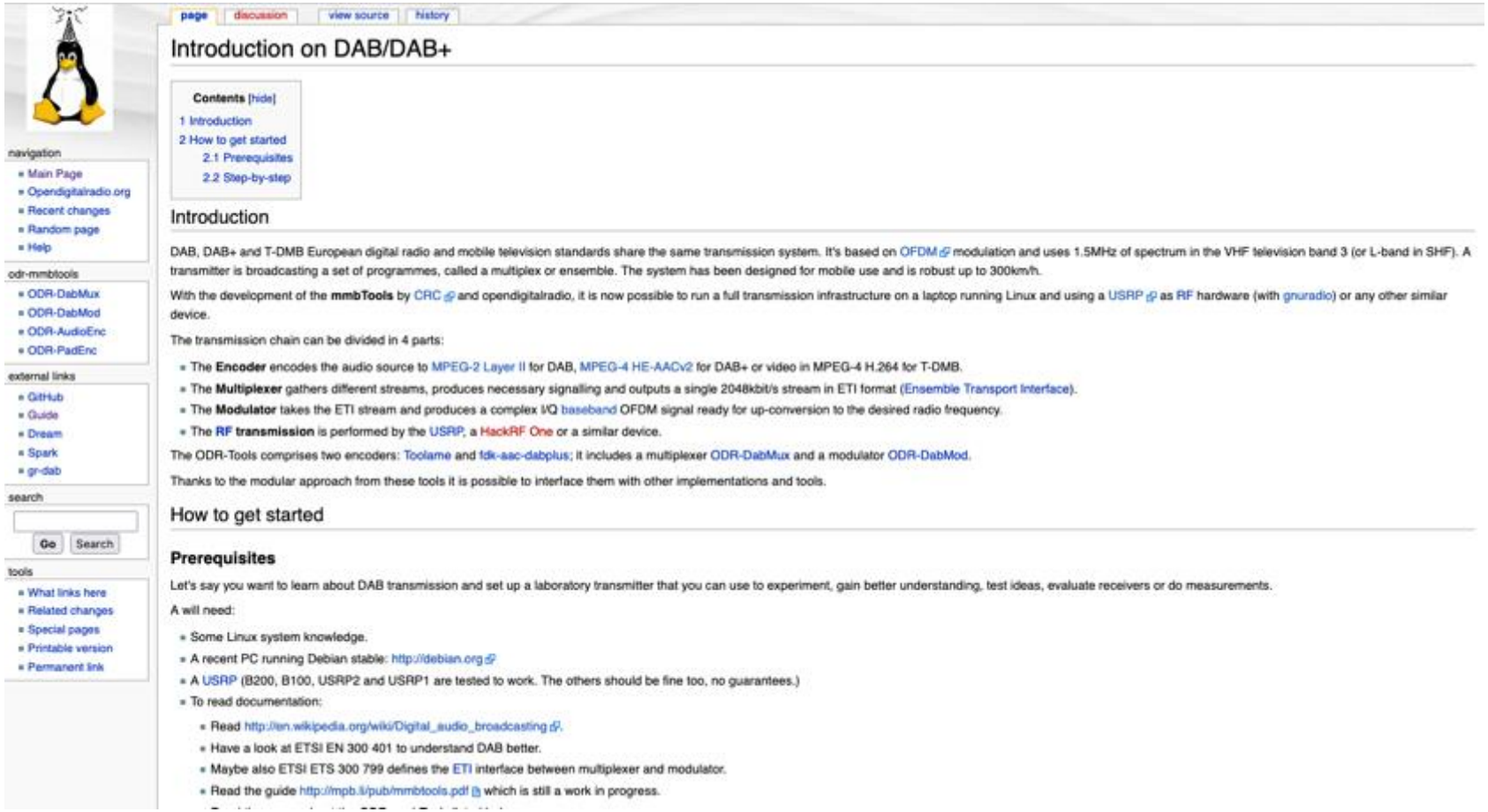

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Introduction on DAB/DAB+

Contents [hide]

1 Introduction
2 How to get started
2.1 Prerequisites
2.2 Step-by-step

Introduction

DAB, DAB+ and T-DMB European digital radio and mobile television standards share the same transmission system. It's based on OFDM modulation and uses 1.5MHz of spectrum in the VHF television band 3 (or L-band in SHF). A transmitter is broadcasting a set of programmes, called a multiplex or ensemble. The system has been designed for mobile use and is robust up to 300km/h.

With the development of the **mmbTools** by CRC and opendigitalradio, it is now possible to run a full transmission infrastructure on a laptop running Linux and using a USRP as RF hardware (with gnuradio) or any other similar device.

The transmission chain can be divided in 4 parts:

- The **Encoder** encodes the audio source to MPEG-2 Layer II for DAB, MPEG-4 HE-AACv2 for DAB+ or video in MPEG-4 H.264 for T-DMB.
- The **Multiplexer** gathers different streams, produces necessary signalling and outputs a single 2048kbit/s stream in ETI format (Ensemble Transport Interface).
- The **Modulator** takes the ETI stream and produces a complex I/Q baseband OFDM signal ready for up-conversion to the desired radio frequency.
- The **RF transmission** is performed by the USRP, a HackRF One or a similar device.

The ODR-Tools comprises two encoders: Toolame and fdk-aac-dabplus; it includes a multiplexer ODR-DabMux and a modulator ODR-DabMod.

Thanks to the modular approach from these tools it is possible to interface them with other implementations and tools.

How to get started

Prerequisites

Let's say you want to learn about DAB transmission and set up a laboratory transmitter that you can use to experiment, gain better understanding, test ideas, evaluate receivers or do measurements.

A will need:

- Some Linux system knowledge.
- A recent PC running Debian stable: http://debian.org
- A USRP (B200, B100, USRP2 and USRP1 are tested to work. The others should be fine too, no guarantees.)
- To read documentation:
  - Read http://en.wikipedia.org/wiki/Digital_audio_broadcasting.
  - Have a look at ETSI EN 300 401 to understand DAB better.
  - Maybe also ETSI ETS 300 799 defines the ETI interface between multiplexer and modulator.
  - Read the guide http://mpb.li/pub/mmbtools.pdf which is still a work in progress.

Simplified DAB+ transmission chain with two audio programmes

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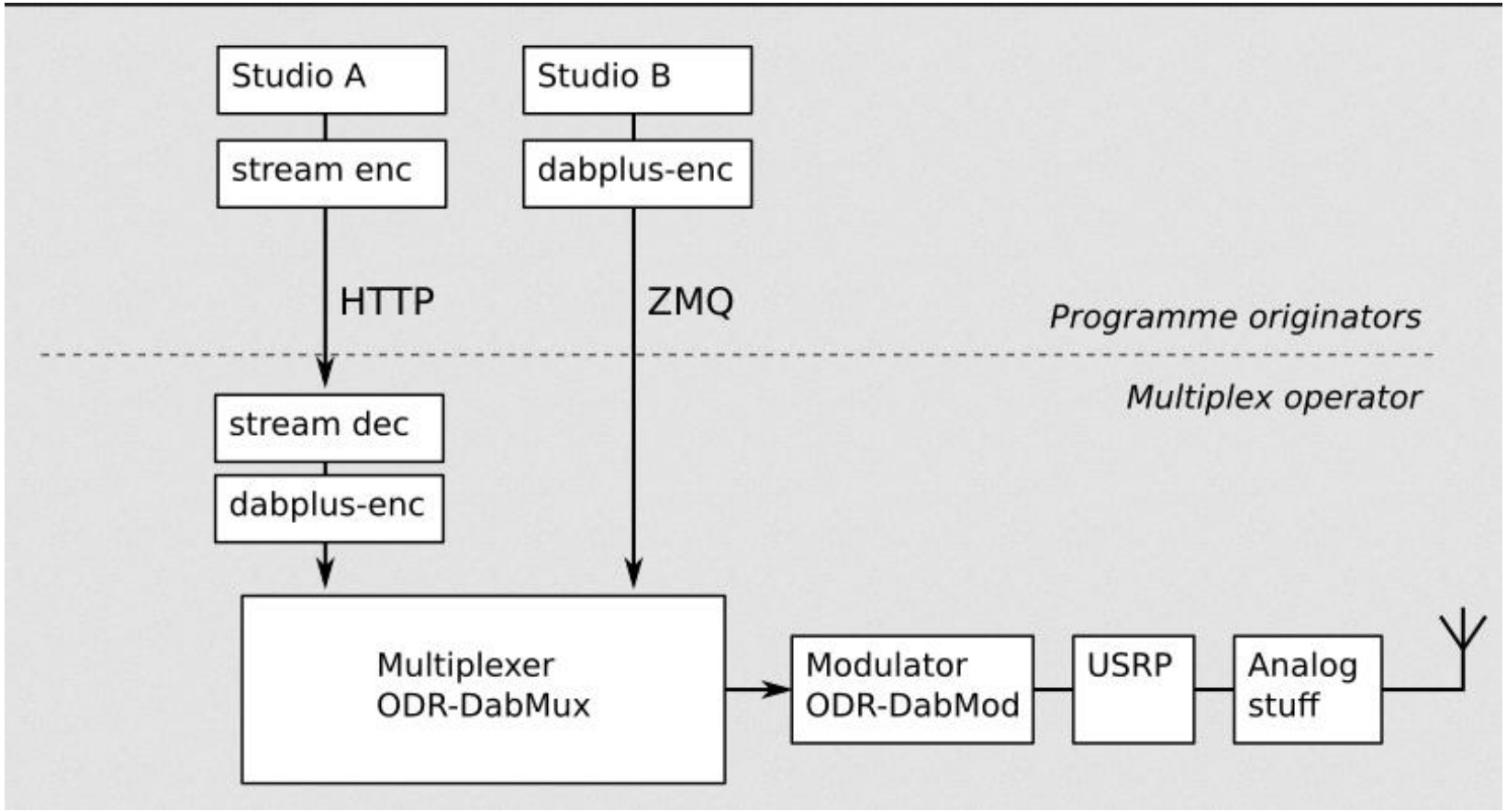

Single-Frequency Network (SFN) setup with two transmitters

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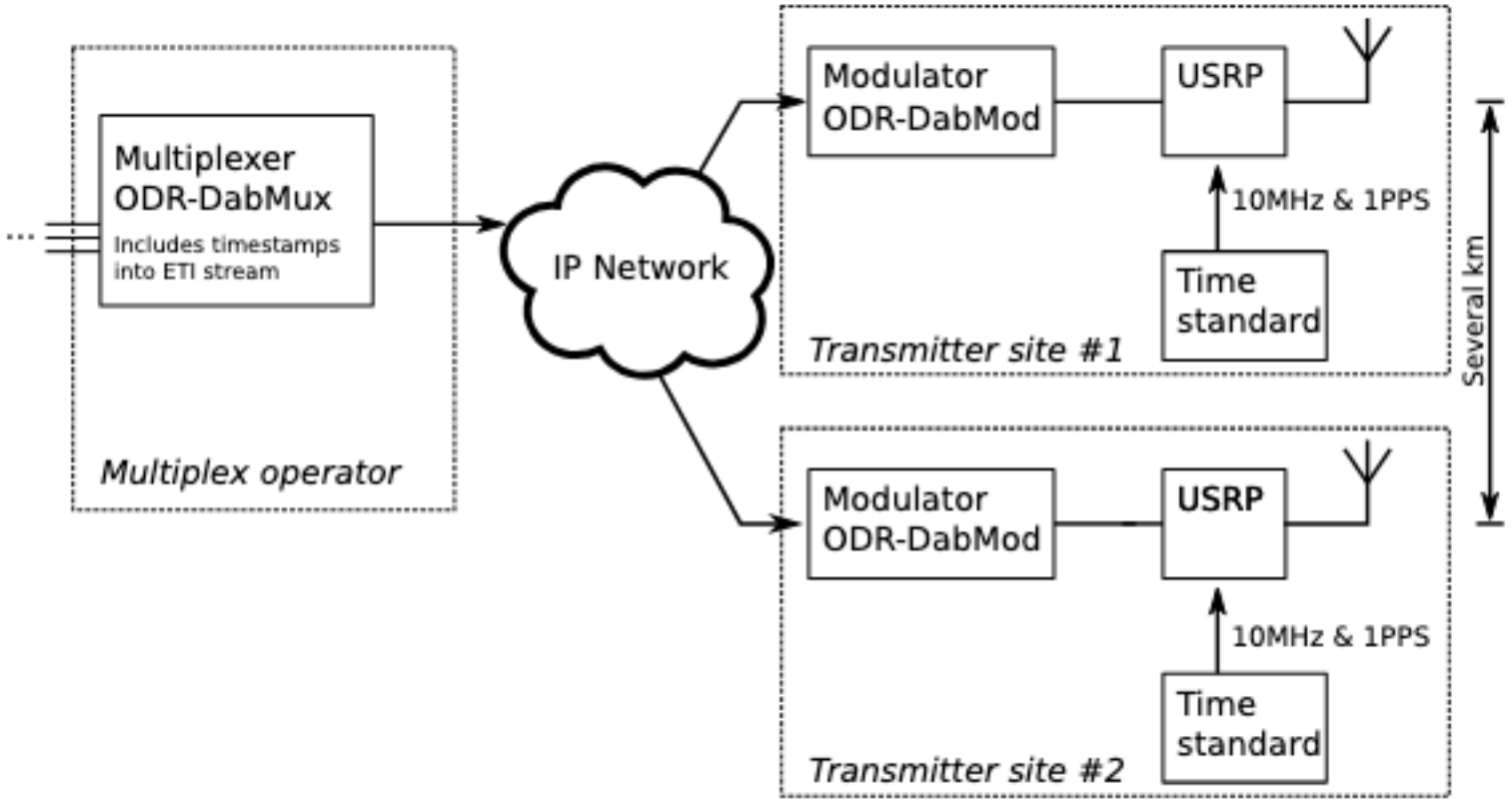
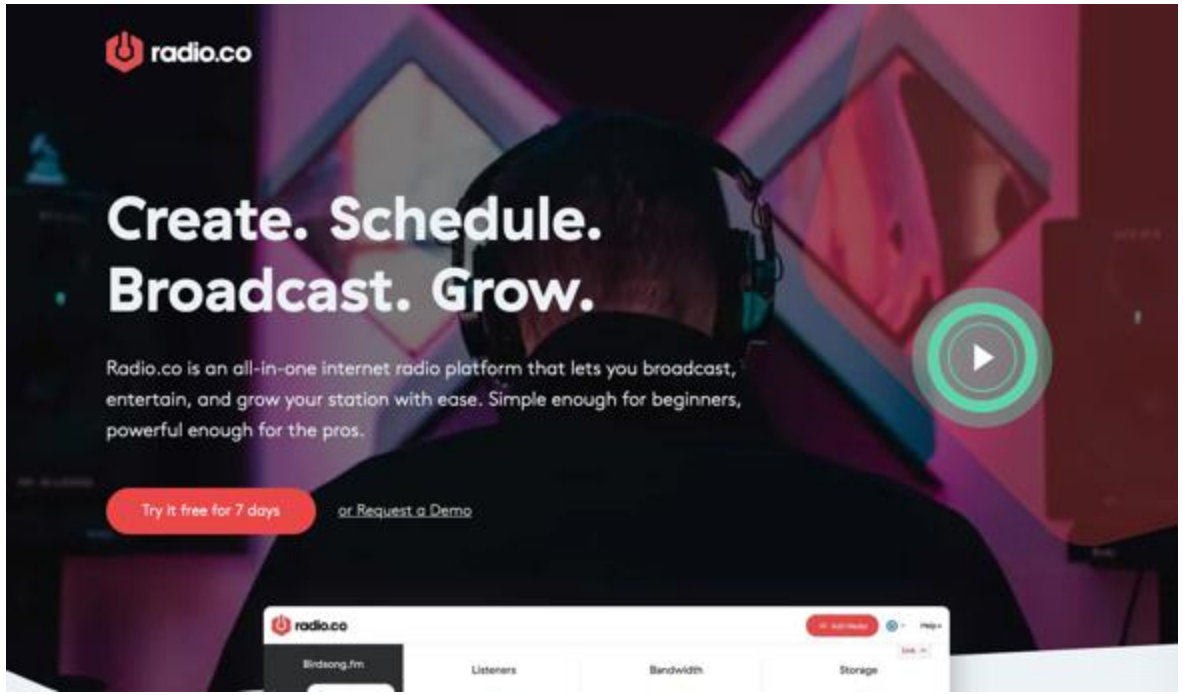


Radio.co



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Radio.co (c.$50-200 per month)

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Simple enough for beginners. Powerful enough for the pros.

Every aspect of Radio.co has been fine tuned by our dedicated team of professional radio experts. So say goodbye to configuring hard-to-use desktop software as you manage everything in the cloud anywhere, anytime.

Try it free for 7 days or Request a Demo

Professional grade programming for everyone.

Events, Live DJs, Auto playlists, talk shows, news bulletins and more - all in your browser.

- Drag and drop media uploading and playlist creation
- Scheduling as simple as your favourite calendar app
- Tools for professional content creation & editing

Broadcast anywhere, anytime.

Access, manage and broadcast from anywhere without the need for expensive hardware or technical know-how.

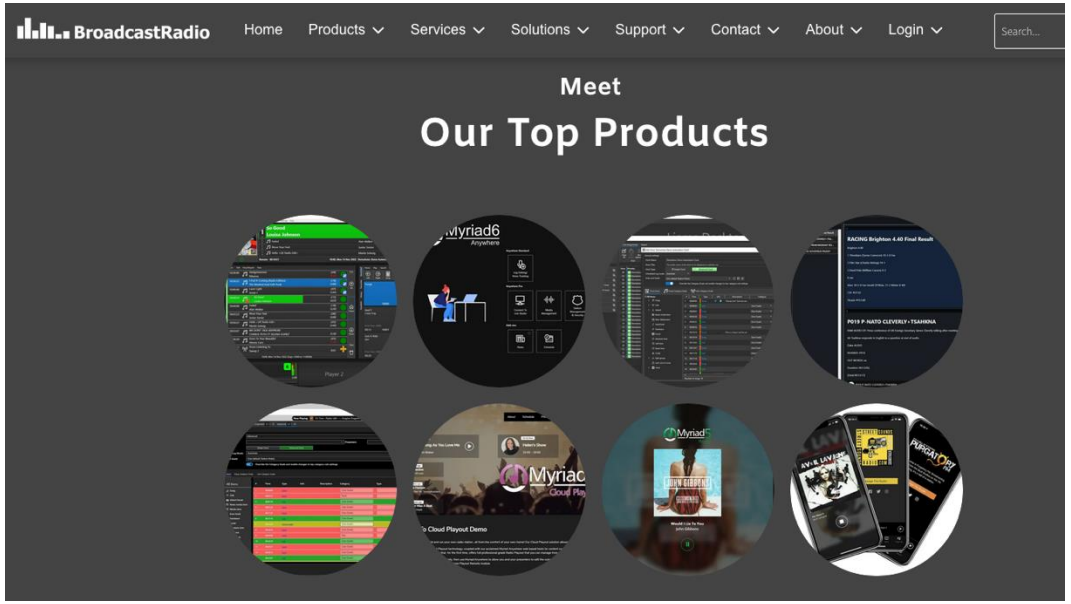
- Listen on web, mobile and home device
- Go live. Anywhere, anytime
- No studio equipment needed

Effortless station management.

Whether you are an individual or part of a team, we provide simple user management and effortless reporting.

- Realtime overview of who's tuning in
- Add team members and assign roles
- Listener insights and effortless reporting

BroadcastRadio



“Myriad” software and services

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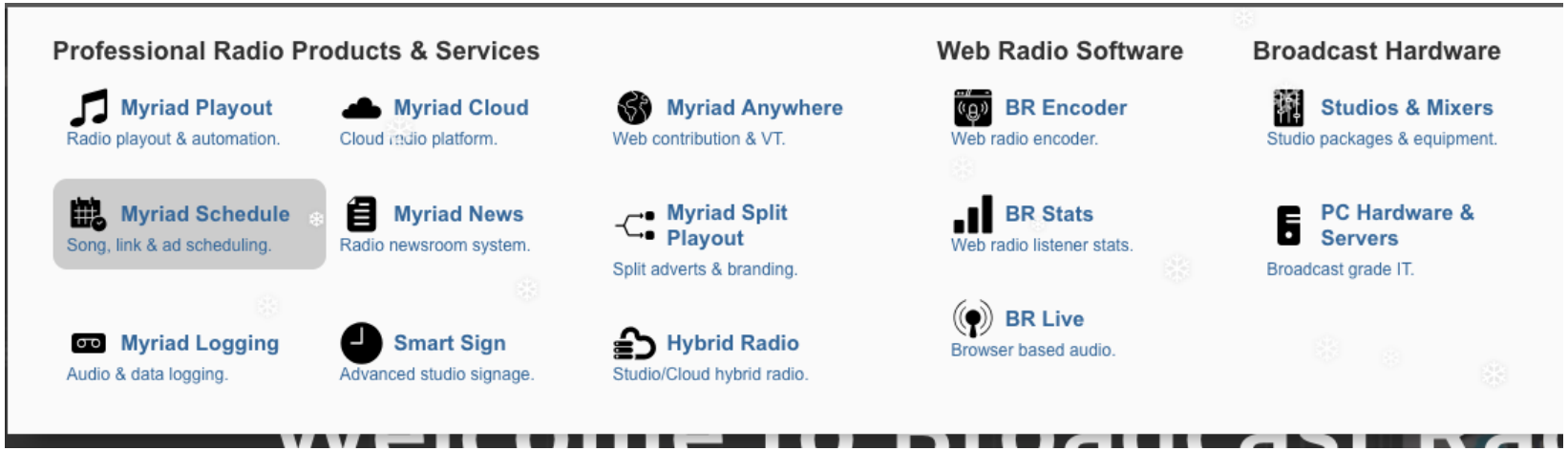
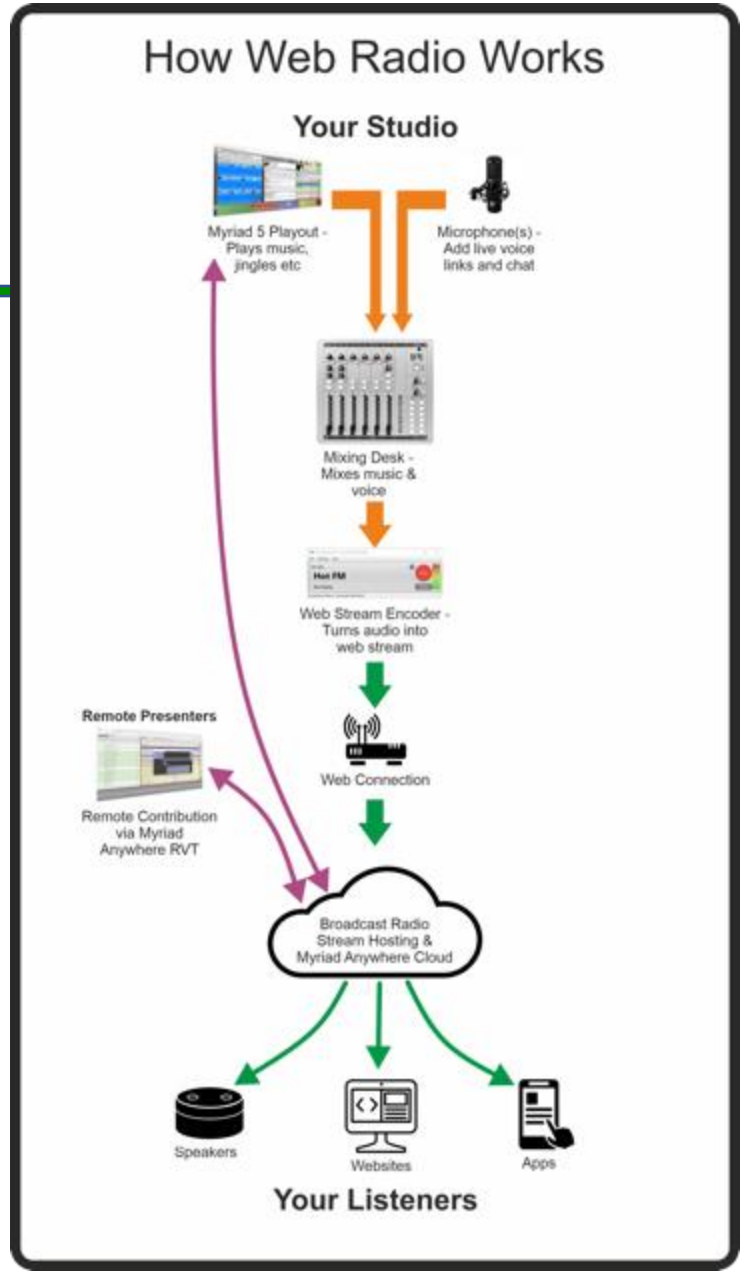
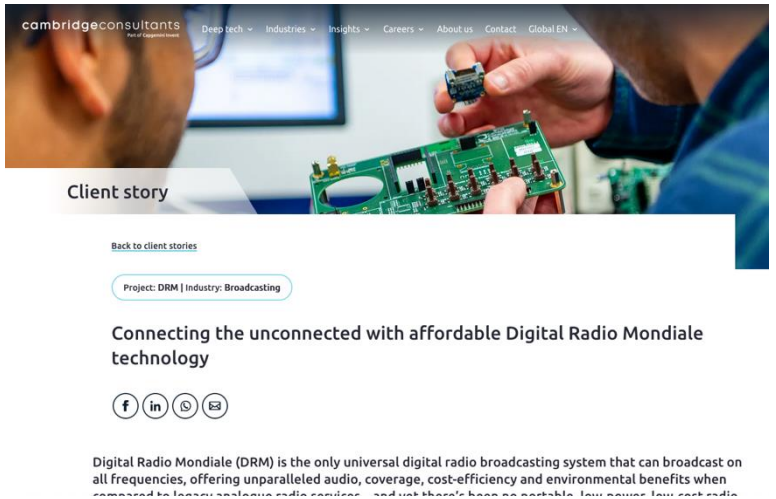
https://ict4d.org.uk


BroadcastRadio
Home
Products
Services
Solutions
Support
Contact
About
Login
Search...
Myriad 6 Playout
Professional, next generation radio studio software for broadcasters of all types and sizes.
• Powerful playout for live & automated shows
• Advanced local and web voice tracking
• Professional music, jingle & advert scheduling
• Auto-generated content with AI Voice Links
• Optional web interface for remote, live shows
• Scaleable, robust and built for presenters!
Learn More
0:25
10:49:15


Professional Radio Products & Services
Myriad Playout
Radio playout & automation.
Myriad Cloud
Cloud radio platform.
Myriad Anywhere
Web contribution & VT.
Myriad Schedule
Song, link & ad scheduling.
Myriad News
Radio newsroom system.
Myriad Split Playout
Split adverts & branding.
Myriad Logging
Audio & data logging.
Smart Sign
Advanced studio signage.
Hybrid Radio
Studio/Cloud hybrid radio.
Web Radio Software
BR Encoder
Web radio encoder.
BR Stats
Web radio listener stats.
BR Live
Browser based audio.
Broadcast Hardware
Studios & Mixers
Studio packages & equipment.
PC Hardware & Servers
Broadcast grade IT.


How Web Radio Works
Your Studio
Myriad 5 Playout - Plays music, jingles etc
Microphone(s) - Add live voice links and chat
Mixing Desk - Mixes music & voice
Web Stream Encoder - Turns audio into web stream
Web Connection
Remote Presenters
Remote Contribution via Myriad Anywhere RVT
Broadcast Radio Stream Hosting & Myriad Anywhere Cloud
Speakers
Websites
Apps
Your Listeners

Capgemini/Cambridge Consultants: DRM



“Affordable DRM”

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https://ict4d.org.uk

Affordable DRM

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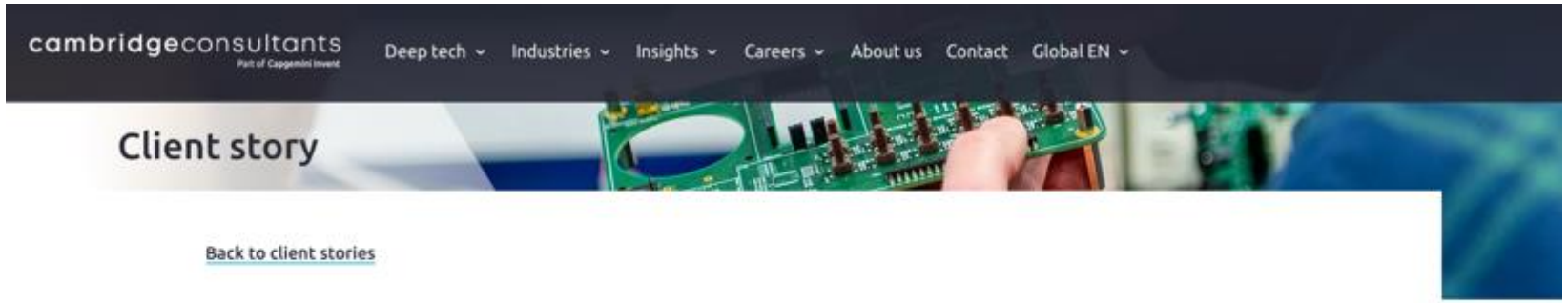

Back to client stories

Project: **DRM** | Industry: **Broadcasting**

Connecting the unconnected with affordable Digital Radio Mondiale technology

Digital Radio Mondiale (DRM) is the only universal digital radio broadcasting system that can broadcast on all frequencies, offering unparalleled audio, coverage, cost-efficiency and environmental benefits when compared to legacy analogue radio services – and yet there's been no portable, low-power, low-cost radio available to bring these benefits to life. Until now.

With this groundbreaking development from Cambridge Consultants (CC) and CML Micro, millions of listeners in previously unconnected communities will at last have access to a world of entertainment and information through digital radio, igniting a fresh wave of innovation for both broadcasters and manufacturers around the globe.

UK OFCOM experience with small-scale DAB

Report published 22 October 2024

Ofcom (2024) findings: Small-Scale DAB

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Small-scale DAB is a method of transmitting digital radio that uses advances in software and low-cost computer technology to provide a flexible and inexpensive approach to the terrestrial broadcast of digital radio services to relatively small geographic areas.

An important part of the policy rationale for the introduction of small-scale DAB was to enable a pathway to DAB for existing analogue (FM or AM) community radio stations

…because small-scale DAB will ultimately offer audiences more stations, more efficiently, and in more locations, than FM ever could, we believe our focus should continue to be on small-scale DAB licensing

Multiplex operators in less densely populated areas have generally found it harder to deliver financially viable multiplexes than operators in urban areas

UK small-scale DAB experiences – some more details

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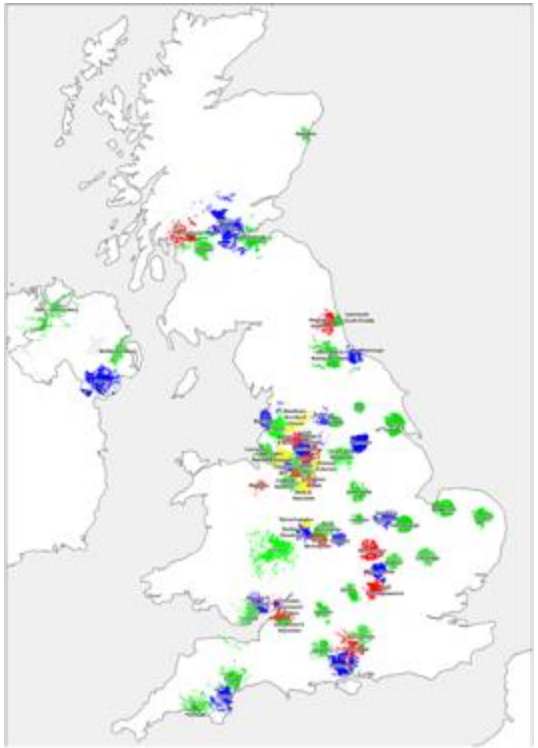
- Parliament's approval of the Small-scale Radio Multiplex and Community Digital Radio Order 2019
  - Ofcom made its first small-scale multiplex licence awards in March 2021, having consulted on approach to small-scale DAB licensing during 2019/20.
- By 2024 completed five rounds of multiplex licensing, and currently assessing 33 new applications for Round Six
  - Good level of demand
  - 12% of licence awardees unable to launch within the 18-month statutory launch deadline (various reasons)
    - Only a minority of licensees have been able to launch their services on the basis of their original transmission plans submitted at the licence application stage.
- On average, the launched multiplexes are carrying one or two C-DSP services and seven or eight DSP services
- Conclusions:
  - the roll- out of small-scale DAB across the UK has been successful in providing access to digital terrestrial radio for programme service providers (including analogue community radio stations) unable to secure or afford carriage on local DAB multiplexes.
  - This has provided opportunities for new entrants to the radio industry and has increased choice for listeners on the DAB platform



Community Radio in emergency scenarios

Source: ACORAB/CIN

A critical point of leverage in places subject to “disasters”

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Emergency contexts

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- UK government recommending wind-up FM radio as part of everyone's emergency pack (2024)
- Many examples of value of community radio
  - Health
    - COVID
    - IFRC (2024): Kenya, Cameroon, DRC
  - Environmental
    - Nepal 2015 earthquake (BBC Media Action, UNICEF)
  - Political instability and war
- But need for resilient community radio to enable it to broadcast in emergency scenarios
- And not always positive
  - Note use of radio in Rwandan genocide to promote inter-communal violence

Source: IFRC

Source: IMS

Conclusions

Are the traditional values of community radio still important in the 2020s?

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Conclusion: returning to the purpose of Community Media

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- Community Radio is essentially a philosophy
  - Media “by the people, for the people”
  - Real social and cultural value at community level
- Alongside the fundamental importance of unbiased Public Service Broadcasting
- Fundamental challenge of how to pay for and support local community media
  - At a time when everything is becoming “globally individualized” through use of digital tech
- To sustain community media local partnerships are essential
  - How “commercial” do we need to be?
- Real importance of radio for communication when Internet is ”down” – increasingly likely in conflict situations and “disasters”

Discussions and feedback

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Suggested follow-up reading

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- Buckley, S., Hallett, L. and Best, B. (2022) *The Community DAB Handbook*, Sheffield: Community Media Association
- Coleman, J.F. (2021) *Digital Innovations and the Production of Local Content in Community Radio: Changing Practices in the UK*, London: Routledge.
- Digital Radio Insider (2018) DAB Radio Technical Problems
- Digital Radio Mondiale. DRM – The Digital Future of FM
- Fick, R. (2024) Digital Readiness in a Digital Revolution: How is community radio responding to digital transformation in the changing broadcast environment of South Africa?, in: Twinomurinzi, H., Msweli, N.T.M., Gumbo, S., Mawela, T., Mtsweni, E. and Mnkadia, E. (eds) *Proceedings of the NEMISA Digital Skills Summit and Colloquium*, vol.6, 149-63.
- Kanjilal, M. K., Malik, K. K. and Kapoor, P. (2024) Fostering resilience: Community radio and disaster communication in Odisha, India, *Media, Culture & Society*, 1-17, https://doi.org/10.1177/01634437241282243
- Localdab.org – quality information for small scale DAB projects
- Mmutle, T., Molale, T.B., Akinola, O.O and Selebi, O. (eds) (2024) *Strategic Communication Management for Development and Social Change: Perspectives from the African Region*, Springer Nature.
- Ofcom (UK), Small-scale DAB licensing – progress report 2024.
- Opendigitalradio.org – has developed ODR-mmbTools that can be used for free to transmit DAB and DAB+. Guide (2024) on *ODR-mmbTools Open-Source Software-Defined DAB+ Tools*
- Radio.co, Create. Schedule. Broadcast. Grow.
- R. Sreedher and Pooja O. Murada, (2019) *Community Radio in India,* Aakar Books.
- UNESCO (2001) *Community Radio Handbook*, Paris: UNESCO, written by Fraser, C. and Estrada S.P.

Abbreviations

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- AM: Amplitude Modulation
- DAB: Digital Audio Broadcasting
- DRM: Digital Radio Mondiale
- DSP: Digital Signal Processing
- ETI: Ensemble Transport Interface
- EDI: Encapsulation of DAB Interfaces
  - Is only one of the available transport methods under which ETI can be transported
- FM: Frequency Modulation
- USRP: Universal Software Radio Peripheral
- WRC: World Radiocommunication Conference (convened by ITU)
- ZMQ: ZeroMQ (also spelled ØMQ, 0MQ or ZMQ) is an asynchronous messaging library, aimed at use in distributed or concurrent applications.