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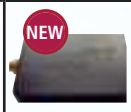

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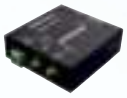

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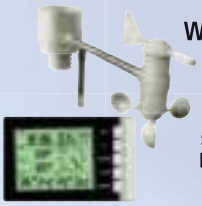

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Cover Story

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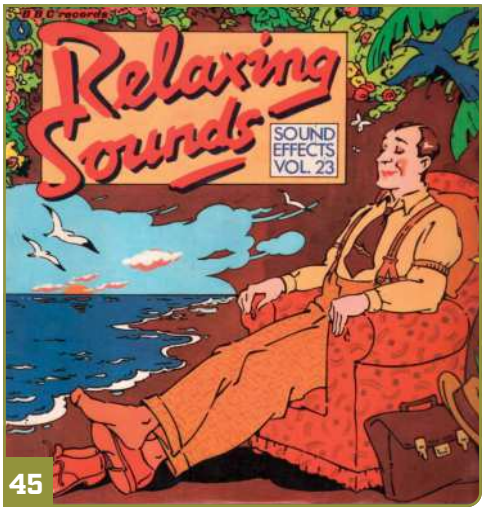
Welcome



Autumnal Radio Splendour

Georg Wiessala
wiessala@hotmail.com

Hello and a warm welcome to the October edition of *RadioUser*.

First things first: I would like, on behalf of the *RadioUser* team here and at Warners, to extend our deepest sympathies to the Royal Family and the Nation, on the occasion of the passing of **HM Queen Elizabeth II**.

The seasons are passing too, and as the foliage here in the Ribble Valley has unmistakably taken on a rustier shade; we are approaching Keats' *Season of Mists and Yellow Fruitfulness*. As we do, we have, once again a magazine brimfull with radio features, reviews and stories for you to peruse and enjoy.

In our main features this month, Martín Butera highlights a most unusual communications and DF facility in Germany, whose aerial array has been called '*The Elephant Cage*'; it is not difficult to see why, but is there new life in it?

For those of you with a systematic mind, you might want to read this in conjunction with Scott Caldwell's probe into the Marconi sites in Cornwall – then, move on with a look at our book review about a lesser-known Bletchley cryptanalyst.

There is certainly life left in the LF to HF listening hobby, and, in the first of my two offerings this month, I am testing the latest BALUNs, which our colleague Keith Rawlings is making for this purpose. Keith is back later, by the way, with his *Aerials Now* column taking up a new thread on verticals.

Furthermore, I am offering Part Two of my musings on how time has been measured by radio, following up on last month's historical introduction with some timely remarks on practical reception.

Many thanks to all who have contacted me about this subject, I will get around to replying to all.

Our regular columns this month are like an autumnal forest floor; endlessly variegated, in many shapes, colourful and interesting. Reading through them, you might wish to learn more about Education via DRM Radio, SDR-assisted NDB DXing, Radio and Community Events, or SELCAL and Aircraft Tracking.

What is more, Chrissy Brand offers Part Two of her now much-talked-about exploration of the achievements of the innovative *BBC Radiophonic Workshop*; and Tim Kirby guides you through the bewildering variety of contemporary amateur radio handhelds.

Last but not least, our TV & Radio pilots Keith Hamer and Garry Smith fly over the varied landscape that is the BBC from 2010 to 2019 and examine its hills and troughs.

Add to this our sections on this autumn's Radio *Rallies and Events*, our carefully chosen listings of *Frequencies* on Medium and Short Wave, the *Feedback* and Bookstore pages and our latest selection of New Products and radio insider stories, and you have – so I hope – an autumnal ploughman's of radio enthusiasm.

Savour it slowly and never hesitate to get back to me with any comments and suggestions. They are always more than welcome.

Enjoy this issue of *RadioUser*.

Georg Wiessala
Editor, *Radio User* Magazine
www.radioenthusiast.co.uk

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Radio Currents

Have you got something new to tell our readers about? If so, then drop a line to **wiessala@hotmail.com**

Panorama Aerials at Moonraker

RadioUser STOP PRESS!

The Panorama BSV-H4 - VHF Base Station Antenna (141-151MHz) is a 2dBi-gain discreet, 'ruggedised', product and is suitable for temporary field use or permanent installation. The antenna has a black plated brass centre hub, which is mounted on a nylon stub mast and is supplied with mounting hardware. The hub has an N socket terminal which allows the use of coaxial cable of different types and diameters, depending on the cable length required. The plastic-coated ¼ wave radiating element is fitted to the centre of the hub and three helical elements provide the ground plane. The price is £164.99. At the time of writing, Moonraker advertised the following technical specifications: VHF Operating Frequency Band: 141-151-162MHz • Connector: N-Jack • VHF (30-220MHz): 132-174MHz - (Banded) • Typical VSWR: <2:1 • Peak Gain (dBi): 2 • Max Input Power: 100 W • HCM Code (H / V): 000ND00 046DE00 • Omni-directional • Ground • Type: Wall or Mast Mount using U-bolt.
(SOURCE: Moonraker)
https://moonrakeronline.com/panorama-bsv-h4

WRTH: 'Global Radio Cartographers'

The next edition of the *"world's most comprehensive and up-to-date guide to broadcasting"* will be published in December 2022 in a printed and digital version. The "Directory of Global Broadcasting" was published by WRTH Publications Limited until 2022. The rights have now been transferred to Radio Data Center GmbH (RDC), based in Freising, Germany. After seven decades as a book, the World Radio TV Handbook (WRTH), the *"Directory of Global Broadcasting, will now also be available as a web app. "The directory is an indispensable reference for interested radio listeners, avid DXers and all those who move professionally in the world of radio,"* said Günter Lorenz, founder and CEO of Radio Data Center GmbH, on September 08, 2022. *"We are pleased that it will also be available online as a web app from December 2022."* Radio Data Center GmbH (RDC) was created in 2012 to provide professional data delivery and services for broadcast radio-related businesses and industries. Günter Lorenz founded FMLIST, the world's most comprehensive and up-to-date database of FM broadcasting, already in 1986. It went online in 2005 at fmlist.org and was soon followed by MWLIST, its counterpart for mediumwave and shortwave broadcasting. Oliver Schmidt is CEO of RDC and Chairman of the Board of UKW/TV-Arbeitskreis e.V., the organisation that owns FMLIST, and publisher of the *Sender-Tabelle* and *European Radio Guide* books. The worldwide RDC team defines their work, which extends the community-supported databases to a professional level, as *"being cartographers of the global radio landscape"*.
(SOURCES: WRTH | Industry Press)
www.wrth.org
www.radiodatacenter.com
wrth@wrth.org

Starwaves W2401 DRM Radio

The *DRM Consortium* recently gave an extensive update on DRM developments in various countries and included information on the new Starwaves receiver designed for the DRM Schools project. This is a new receiver design with a 'retro' look but only a two-line text display. The *Starwaves W2401* has two versions: ordinary use priced at €79 and the schools' version at €99, which includes a Wi-Fi hotspot to deliver web pages to mobile devices. This will be the most useful version. The specification is minimal at the moment but indicates that the W2401 will receive AM and FM including DRM modes for that those bands. Other receiver modules are now available but they all require integration into physical devices. Nevertheless, this update confirms that DRM is very much alive and being embraced by countries around the world. The Starwaves W2401 receiver will be available to pre-order from *Alibaba* and *TradeIndia*, which are usually aimed at bulk purchases. The receiver will also be available to order on Amazon although it is not specified which countries that might be. Delivery is from February 2023 in two batches. This is very exciting news especially if individual DRM enthusiasts can order a receiver. However, seasoned DRM supporters will be ready for disappointment because we have been here before. This time there is a defined project that needs this type of receiver. Others like Trans World Radio (TWR) will be very keen for it to be mass produced. The number of organisations involved in the DRM Schools or Distance Learning project has grown and now includes TDF, which invented the *DRMCast* technology that uses DRM to send audio and data to ships at Sea. Recently TDF encrypted the data element of the broadcast and, hopefully, the data will be unencrypted for the remote learning transmissions (see Kevin's column).
(SOURCE: Kevin Ryan)
https://tinyurl.com/4nvdx7hf

Moonraker: FireSpot

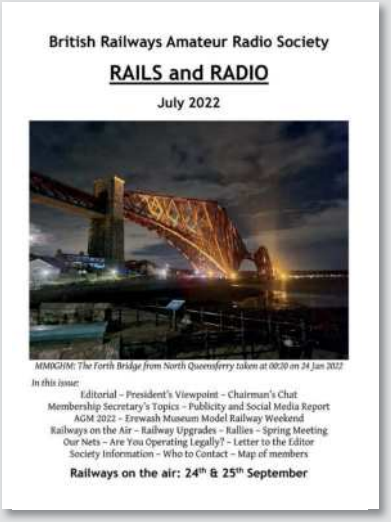
The *FireSpot* is a fantastic and affordable way to get access to digital radio covering the most common modes like D-Star, DMR, Fusion, and so on. What is great about the *FireSpot*, is that it can be used wirelessly, but also can be plugged directly into your router via ethernet cable giving it a very reliable and stable connection to the digital platform. The faster quad-core processor gives a quicker boot-up time compared to the common range of hot spots available. It comes complete in a sturdy 3d printed box and is powered via a micro-USB cable. The *FireSpot* comes preinstalled, just hook it up to your router (preferred option) for the first setup, enter your details wireless SSID and password, reboot and away you go. The price is £129.95. (SOURCE: Moonraker).

https://moonrakeronline.com/moonraker-firespot?___store=default

British Smartphones from Bullitt

A British smartphone maker hopes to steal a march on Apple and Tesla boss Elon Musk with a new satellite-connected handset. If there is no wi-fi or mobile network signal, the idea is the Bullitt phone will automatically link to one of two global satellite networks. Bullitt's service is due to launch in February 2023 and will initially enable users to send and receive text messages only. (Source: BBC Radio 4 | via Bob Houlston, RU Voluntary Correspondent).

https://www.bbc.co.uk/news/technology-62796363


British Railways Amateur Radio Society

RAILS and RADIO

July 2022

MM0GHM: The Forth Bridge from North Queensferry taken at 00:30 on 24 Jun 2022

In this issue:

Editorial – President's Viewpoint – Chairman's Chat
Membership Secretary's Topics – Publicity and Social Media Report
AGM 2022 – Erewash Museum Model Railway Weekend
Railways on the Air – Railway Upgrades – Rallies – Spring Meeting
Our Nets – Are You Operating Legally? – Letter to the Editor
Society Information – Who to Contact – Map of members

Railways on the air: 24th & 25th September

New Issue of Rails and Radio

BRARS (the British Railways Amateur Radio Society) is delighted to report that the July 2022 issue of its R*ails and Radio* magazine has now been published and posted to every BRARS member. BRARS stated: "We regret that it was delayed due to unforeseen circumstances. In this issue, our Membership Secretary welcomes eight new members and is pleased to announce that BRARS membership is the highest it has been for several years. Some of these new members heard of BRARS through 'mentions', such as this one, so we are grateful to the editor for finding space on the page for us. Elsewhere in this issue, our chairman Barry G4DBS tells of his railway journey to Blackpool to join our president Geoff G4GNQ and wife Coral on our stand at the NARSA rally, we have a cautionary article entitled "Are You Operating Legally?" and we have regular columns from our committee members. The cover photo is MM0GHM's splendid night-time photo of the Forth Railway Bridge. Our editorial team (Ian G4EAN and Richard G4KRW) always welcomes articles on amateur radio or railway topics that would be suitable for Rails and Radio. The team can be contacted at editor@brars.info. Membership of BRARS is open to anyone interested in any aspect of amateur radio (whether licensed or listener) and in any aspect of railways (by which we mean any rail transport including trams, miniature railways, model railways and such like)". (SOURCE: BRARS)

www.BRARS.info

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The New Sangean Utility 40 at ML & S

The Utility 40 is a DAB+/FM radio designed to withstand all job site conditions with IP64 water and dust resistance. Built with a protective roll cage, this radio is shock resistant and ready for any job site. The Utility 40 has the latest Bluetooth technology allowing you to stream your favourite music or programs. Simply touch to pair your device with NFC technology. The Utility 40 features a Smart battery charger that ensures optimal charging of each battery! The Utility 40 has the option to use wireless audio streaming via built-in Bluetooth with an indicator. Furthermore, it supports aptX® decoding for high fidelity music and low latency. Other great features are auto scan stations, equipped with an easy-to-read LCD with backlight, a rain/dust/shock resistant radio with a sleep timer and 2 alarms and a snooze function. The price is £162,30.

- 10 station presets (5 DAB+, 5 FM)
- Built-in Bluetooth wireless audio streaming with indicator
- Simply touch to pair with NFC technology
- Information display for service data
- Manual / Search tuning
- Menu - selection of major functions
- Auto scan stations
- Easy-to-read LCD with backlight
- Adjustable sleep timer
- Snooze function
- Normal, jazz, rock, classic, pop and speech sound effects
- Bass and treble controls
- Profile support: A2DP, AVRCP
- Easy cable storage
- Roll-cage protection
- IP65 certified for dustproof and waterproof
- Auxiliary input for additional audio sources
- Plays on rechargeable and dry-cell batteries
- Rechargeable with charging LED indicator
- USB 5V / 1A for charging mobile phone
- I/O Jacks: DC In, Aux-in, USB-A type (DC-OUT), USB B type socket for software update

(*** BATTERIES NOT INCLUDED ***)

(Source: ML&S)

https://tinyurl.com/43htfcxw

For the latest news and product reviews, visit www.radioenthusiast.co.uk

RadioUser STOP PRESS!

Icom Transceiver and Linear Amplifier Showcased at Tokyo Fair

Icom announced an exciting industry-first at the *Tokyo Hamfair*, which opened on 20th August 2022. Based on its SHF project, the IC-905 VHF/UHF/SHF SDR transceiver will not only cover 144, 430, 1,200, 2,400 and 5,600MHz, but 10 GHz* as well. (*Optional CX-10G transverter is required). Icom published a video and pre-release document to coincide with the launch during the show. Also showcased at the *Hamfair* was the IC-PW2 HF/50MHz 1kW linear amplifier.

ICOM said, *"as to the launch date and pricing, we don't have those details but rest assured we will publish them on our website and social media channels when we have them. ICOM will be showing these new products later this year at the National Hamfest; so make a note in your diary to come along and see them for yourself on the Icom UK stand at Newark".*

(SOURCE: ICOM UK | Ian Lockyer)

https://icomuk.co.uk

Power Meter from Moonraker

The SWR-300 is designed to measure the transmission power and the standing-wave ratio of radios that operate in the frequency range of 120-500MHz. The Moonraker SWR-300 is a compact dual-function test meter to indicate the condition of any antenna system and transmitter with an impedance of 50Ω. At the time of going to press, the main features and specifications of the SWR300 are:

Connector: 2 x SO239 • Frequency: 120 - 500MHz • Power: 0.5 - 150W • Impedance: 50 Ω • Weight: 248g • Dimensions: 130mm x 60mm x 35mm.

(SOURCE: Moonraker)

https://tinyurl.com/y6xaxuxv

AMT-MW207 Mini AM Radio Transmitter Kit USA

Below is a link to a video demonstrating the AMT-MW207. This is a tiny US$25 Medium Wave (MW) transmitter kit. It is described as follows: *"The AMT-MW207 medium wave transmitter is a simple AM signal source suitable for amateur electronics enthusiasts and radio enthusiasts. It uses a magnetic rod to transmit electromagnetic waves without an external antenna. It can be used to test ordinary medium wave radios in places where the radio signal is insufficient. As well as for radios, it can be used as an instrument for debugging medium wave radios […]."* It may be purchased on *AliExpress*:

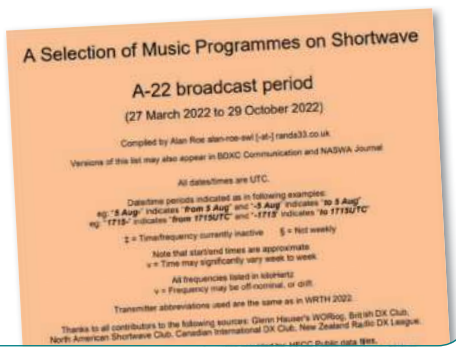
(SOURCE: *SWLing Post* | Frans Goddijn)

https://www.aliexpress.com/

Alan Roe's A22 Season Guide to Short Wave Music

The very latest incarnation of Alan's useful guide to enjoyable short wave music can be found at this URL:

https://tinyurl.com/vvx8r9tb


A Selection of Music Programmes on Shortwave

A-22 broadcast period

(27 March 2022 to 29 October 2022)

Compiled by Alan Roe alan-roe-ewl [-at-] randa33.co.uk

Versions of this list may also appear in BDXC Communication and NASWA Journal

All dates/times are UTC.

Datetime periods indicated as in following examples:
eg: "5 Aug" indicates "from 5 Aug" and "-5 Aug" indicates "to 5 Aug"
eg: "1715-" indicates "from 1715UTC" and "-1715" indicates "to 1715UTC"

‡ = Time/frequency currently inactive § = Not weekly

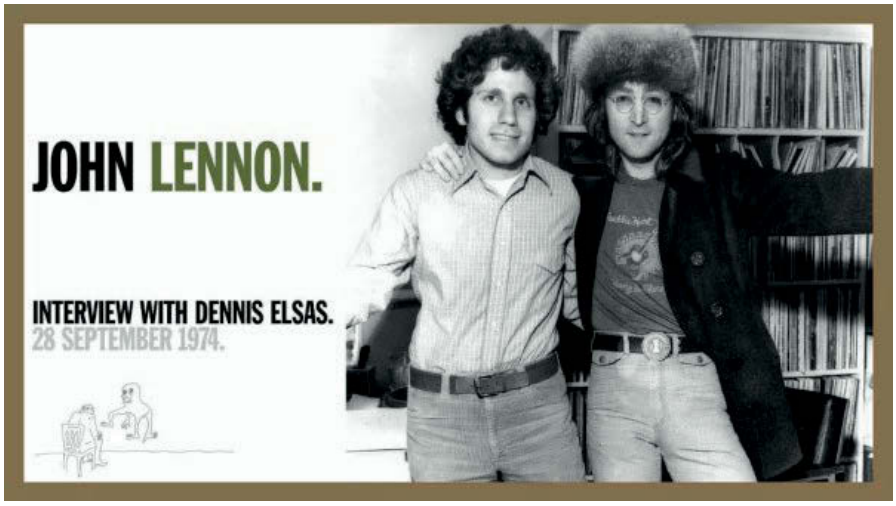
Note that start/end times are approximate
v = Time may significantly vary week to week

All frequencies listed in kilohertz
v = Frequency may be off-nominal, or drift

Transmitter abbreviations used are the same as in WRTH 2022.

Thanks to all contributors to the following sources: Glenn Hauser's WORdog, British DX Club, North American Shortwave Club, Canadian International DX Club, New Zealand Radio DX League.

THE DAY JOHN LENNON BECAME A DISC JOCKEY: It's not every day that you hear a former member of The Beatles read the weather forecast. But on September 28, 1974, John Lennon did just that, during his now-legendary two-hour stint as a DJ on New York City's premiere rock station *WNEW-FM*. Of course, Lennon brought his own whimsical take to the weather. *"Mostly cloudy with periods,"* he began, pausing a beat. *"Of rain this afternoon, tonight and tomorrow. High times - oh no, wish it was. High this afternoon and tomorrow in the 70s, low tonight in the mid-60s. Monday's outlook, fair and cool, man"* […]. This is a wonderful story you may wish to read in full on the *Classic Rock* website.
(SOURCES: Classic Rock | RADIOWORLD SmartBrief 16th August 2022)
https://tinyurl.com/yc84nrbn



WEEKEND PROGRAMME SCHEDULE CHANGES AT LBC AS NEW VOICES JOIN: LBC is introducing a new weekend schedule with many new voices joining the Global station. Here's what's new: David Lammy – Shadow Foreign Secretary and Labour MP for Tottenham – moves to launch a new Sunday morning show, from 10 am to 1 pm. Lewis Goodall will be hosting a new Friday evening show, from 6 pm to 9 pm. Sangita Myska is set to host her own Saturday and Sunday afternoon show, from 1 pm to 4 pm. LBC's Westminster Editor Ben Kentish gets a brand-new show on Sunday afternoons from 4 pm to 7 pm. And as previously reported, Tom Swarbrick is the new host of LBC's *Drivetime* programme every weekday from 4 pm. Elsewhere in the schedule, Ian Payne hosts LBC's late-night show, Monday to Thursday from 10 pm to 1 pm, and Richard Spurr presents the weekend overnight programme on Saturday and Sunday from 4 am to 7 am. Tom Cheal, LBC's managing editor, said: *"As the country begins a new chapter, LBC is delighted to welcome these exciting and compelling voices onto our new-look weekend schedule. Joining our stellar line-up of broadcasters and journalists, they will all bring fresh perspective and analysis to the big stories of the day and most importantly, continue to put our listeners centre stage and debate the issues that matter directly to them."*
(SOURCE: LBC | Industry Press | RadioToday)
https://tinyurl.com/msx4e5tv

OPERATOR TO HONOUR BROADCAST ENGINEERS LOST : Broadcast engineers killed in the 9/11 attacks on the World Trade Center were remembered during a special ham radio dedication and memorial this year. Andrew Denoncour, an amateur radio enthusiast (Callsign – N1MYY) who works in tech support at *Comrex*, expected to sign on the new ham radio repeater at 1 pm (USA EDT) on Sept. 11th, to honour the six broadcast engineers: Bob Pattison, Don DiFranco, Steve Jacobson, Bill Steckman, Rod Coppola and Isaias Rivera. *"I plan to read a brief statement and cite the names of the six fallen broadcast engineers. And I want to dedicate the installation to them"* Denoncour said: *"It just worked out because of the timing of it all."* The new site being dedicated as a memorial to the six broadcast engineers wason 146.460MHz and became part of the New England Emergency Communications Network (NEDECN), which is a digital network of approximately 90 amateur radio service repeaters covering the New England states. The new repeater has its antenna mounted 300 feet up on the tower of WXRV(FM) in Haverhill, Mass., Denoncour told Radio World. *"For me at least, it's something that we all should remember. This amateur radio community shares a lot in common with the six broadcast engineers we lost. I've just always remembered them,"* Denoncour stated. *"And it's not just the six broadcast engineers we need to remember, but all of those who were taken away."* Amateur radio resources were mobilized in New York City and neighbouring New Jersey on 9/11 after commercial telecommunications wired and wireless systems were severely compromised, according to various media reports.
(Source: Radioworld [USA])
yankeeradio@hotmail.com
https://tinyurl.com/2z7v3y9b

RADIO STATIONS ACROSS THE UK ENTER OBIT MODE FOR QUEEN ELIZABETH II: Almost every radio station in the UK suspended normal programming around 6.30 pm on Thursday, 8th September 2022 to announce the sad death of Her Majesty Queen Elizabeth II. The Queen died peacefully at Balmoral on Thursday afternoon. The King and The Queen Consort remained at Balmoral on that Thursday evening and will return to London on Friday. Radio stations had been on standby for 'obituary mode', following news of the Queen's medical condition was announced at 12.34 pm by Buckingham Palace on the day. Confirmation of her death came via Twitter and the news wires at exactly 6.30 pm. The UK's largest commercial radio groups followed well-rehearsed procedures to break the news to listeners. Global brought all their stations together to rebroadcast LBC after each brand announced the news separately. Each Bauer brand joined for a networked breaking news bulletin followed by a toned-down playlist and presenters looking back at the life of the Queen. All BBC radio stations joined up for a networked *BBC News Special* on a clock starting at 18.36, with BBC Radio 4 and 5 Live breaking the news individually at 18.32. Other radio groups including Nation and Wireless, independent stations, community, hospital, student and online services broadcast the news and paid their respects by playing more laid-back music mixed with occasional news announcements. Emotional announcements were made by Vanessa Feltz on TalkRadio and Andrew Marr on LBC. The first national radio station to break the news, according to research provided to RadioToday, was *Times Radio* at 18.31.
(SOURCES: National News | RadioToday)
https://tinyurl.com/7stmcz7h

MICHELLE DONELAN MP APPOINTED NEW CULTURE SECRETARY: The Department for Digital, Culture, Media and Sport has a new minister in charge, as Michelle Donelan MP replaces Nadine Dorries MP in the cabinet reshuffle. The change, announced on Tuesday evening, makes Michelle the 12th Culture Secretary in the last 12 years.
Michelle was previously appointed Secretary of State for Education from 5 July 2022 to 7 July 2022. Before that, she was Minister of State for Higher and Further Education, Minister for Universities at the Department for Education and was previously Government Whip (Lord Commissioner of HM Treasury) from 29 July 2019 to 13 February 2020.
She also represents the Chippenham constituency as its Conservative Member of Parliament. Before going into politics, Michelle worked in Australia for Pacific Magazines and then went on to work for The History Channel. She later worked for WWE as an International Marketing Communications Manager.
(Source: RadioToday)
https://tinyurl.com/2p8eds8x

BBC RADIO 1'S CHRISTMAS PRESENTER TAKEOVER: Radio 1's Christmas Takeover is back for 2022 and the station is now asking for demos and applications via its website.
Launched in 2019 as an initiative created by Head of BBC Radio 1, Aled Haydn Jones, it provides a springboard for emerging presenters working to carve out careers in national radio, with many of the guest presenters going on to achieve major successes across the industry.
To date, eight of the former guest presenters have landed permanent slots on Radio 1, most recently with Dean McCullough and Vicky Hawkesworth – from the 2020 search – being announced as the new presenters of the afternoon 1 pm – 3.30 pm show. Applications for this year close at midnight on Thursday 22 September.
Radio 1 wants to hear from DJs and presenters with previous radio experience, be it in community-, hospital-, student- or local radio. As in previous years, budding presenters can apply by uploading a demo for review. Aled Haydn Jones, Head of Radio 1, said: *"Since its launch in 2019, Radio 1's Christmas Takeover has provided a platform for some of the UK's most exciting, undiscovered radio presenters and has enabled huge successes both within Radio 1 and elsewhere in national radio, which is testament to the importance and power of this initiative. We're proud to have discovered some incredible talent within the past three years and look forward to seeing what this next round brings."*
(Sources: Radio 1 | RadioToday)
https://www.bbc.co.uk/upandcoming
https://tinyurl.com/ckvnuj48

THE PASSING OF A LEGEND: Bill Turnbull: Broadcaster Bill Turnbull has died aged 66 following a long battle with prostate cancer, his family have said. They confirmed he passed away peacefully at home in Suffolk surrounded by his family after a "challenging" fight with advanced prostate cancer.
Bill went public with the diagnosis in 2018, having been diagnosed the previous year. Bill began his career in radio in 1978, when he joined Radio Clyde in Glasgow. He joined the BBC as a reporter for Radio 4's Today programme in 1986 and Breakfast Time as a reporter in 1988.
He's probably best known for his time at BBC Breakfast, which he joined in 2001 until 2016 when he joined Classic FM to host two (weekend) programmes, on Saturday and Sunday from 10 am to 1 pm.
Bill also launched and presented Pet Classics, Classic FM's programmes to help keep pets and their owners relaxed and calm during the fireworks season. In October 2021, Bill announced that he would take a leave of absence from his weekend show. He returned to Classic FM in August this year, to host Saturday mornings. Philip Noyce – Managing Editor, Classic FM said: *"I'm deeply saddened by this news. Bill was an absolute treasure of Classic FM whose presence on and off the air will forever be missed. He was a very gifted journalist and presenter, and he loved radio and understood its ability to connect with people on a personal level – something he did with ease and aplomb. As well as being an outstanding broadcaster, Bill was a family man, a devoted father and husband, who loved the company of friends (including the four-legged variety), and was passionate about music, football, nature and his beloved bees.*
We have lost an exceptionally talented broadcaster, but most of all we've said goodbye to a fine man who will be dearly missed by us all at Classic FM, as well as his many listeners."
Tim Davie, BBC Director-General also paid tribute: *"Bill was a much loved and respected broadcaster and journalist – not just by viewers but by all those lucky enough to have worked with him. He always struck the right tone, no matter what the story. Warm, wise, professional and caring, he will be much missed by us all. Our thoughts go out to his family and many friends."*
(SOURCES: Classic FM | RadioToday)
https://tinyurl.com/78wv8saw
https://tinyurl.com/2s3ak4ja

A RADIO ASTRONOMER'S LEGACY: *Astronomy Magazine* carried a picture of the radio telescope built in 1937 by radio amateur Grote Reber W9GFZ. Grote Reber was a Chicago-area engineer and ham radio operator who sought, unsuccessfully, to land a job with Karl Jansky after the pioneering radio astronomer's discovery of radio emission from the Milky Way. In 1937, Reber decided to build his own radio telescope.
He used the resulting 9.6-meter dish to confirm Jansky's discovery and published radio-sky surveys in the following years. In the early 1960s, he donated the telescope to the National Radio Astronomy Observatory in Green Bank, West Virginia, where it sits now as a historic monument. This shot is a 14-second exposure taken with a Canon DSLR at ISO 3200 and a 14mm lens at f/4.
(SOURCE: ICQ Amateur| via Colin Butler M6BOY)
https://tinyurl.com/45m3fhvu

RADIOWORLD (USA): In the latest issue of this magazine, award-winning broadcast technologist Wayne Pecena begins a series of articles to help you understand common IT terms, definitions and applications:
(SOURCE: RADIOWORLD Magazine)
https://tinyurl.com/ypj5zuak

Enter our competitions at www.radioenthusiast.co.uk/competitions

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- Two separate mono inputs or one stereo input
- Use with passive speakers or headphones
- Basic EQ units EQ20, EQ20B* (use with your Dual In-Line, Compact In-Line or In-Line Module)
- DSP noise cancelling versions EQ20-DSP, EQ20B*-DSP
*Denotes Bluetooth on input

EQ20B-DSP *QST Dec 2019* review *"easy-to-use device that improves the audio clarity of amateur signals"*

Dual In-Line

Fully featured flexible dual channel DSP noise cancelling unit
- 8 Filter levels 9 to 40dB
- 3.5mm mono or stereo inputs
- Speaker level and line level inputs
- 7W mono speaker output and line level output
- Headphone socket - Suitable for all types of radio incl' SDR
- Easy to use controls for quick and easy operation
- Enjoy clear "noise-free"speech

New In-Line Module

- 8 noise cancelling levels 8 to 40dB - Tone reduction up to 65dB - Bespoke **5W audio amplifier with latest bhi DSP noise cancellation - Audio bypass** feature - 3.5mm mono inputs and outputs - Headphone socket - Audio input overload feature - DC power 10 to 16V DC - Compact unit, 135mm x 65mm x 46mm - Replacement for ANEM MKII and NEIM1031MKII

Compact In-Line

- Powerful audio processor
- Unique DSP noise cancelling technology
- Low latency of 32mS
- Remove noise and interference
- Hear weak signals clearly
- Rotary encoders perform all functions
- Easy to use with "real time" adjustment
- Use with headphones or a loudspeaker
- 3.5mm line level and speaker level inputs

NES10-2MK4

- 5W amplified DSP noise cancelling speaker
- 8 to 40dB noise cancelling and up to 65dB tone reduction
- Includes latest bhi DSP noise cancelling
- Single switch switch for off (audio bypass), power on and DSP filter on
- LEDs for Power, filter on and audio overload
- Headphone socket

DESKTOP MKII

Includes the latest bhi DSP noise cancelling technology for even better receive audio!

10W Amplified DSP noise cancelling base station speaker
- Easy to use controls
- **8 DSP filter levels**
- "Real time" adjustment
- Suitable for all radios incl' SDR
- Headphone socket
- Speaker level and line level input sockets

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An Officer, a Diplomat and a Codebreaker

David Harris
mydogisfinn@gmail.com

David Harris reviews a captivating biography of Brigadier John Tiltman, a largely self-taught and successful 20th Century cryptanalyst, who played a role in both code-breaking and post-war UK-USA diplomacy.

The 'forgotten giant' of the title is Brigadier John Tiltman, CMG, CBE, MC (1894-1982). Tiltman was an army officer who became a senior cryptanalyst at the code-breaking centre in Bletchley Park during the Second World War (1939-1945).

The book is by Harold Liberty, a former teacher who now volunteers at Bletchley Park and had access to its archives in writing this book. The author's main thesis is that Tiltman was more than just a codebreaker: Liberty stresses that Tiltman, through his diplomatic skills, played a key part in forging the special relationship between the UK and the USA. This began before the USA entered World War Two. Many strong links were constructed by Tiltman who visited the USA and also hosted visits to Bletchley Park by major US cryptanalysts.

After the war was over, Tiltman ensured that the UK and USA cooperated over the breaking of Russian codes and the sharing of key military technology at the beginning of the Cold War.

Tiltman was born into a prosperous family; his father was an architect, and he went to Charterhouse public school and was expected to go to university. However, the sudden death of his father left his family with financial problems. Tiltman left school and worked as a teacher until the outbreak of the First World War (1914-1918) when he was commissioned as an officer in the *King's Own Scottish Borderers*. He was wounded in action and awarded the *Military Cross*. He remained in the army after the end of the war and was posted to Russia where the UK was supporting the White Russians who were fighting Lenin's revolutionary forces.

In 1920, he had a short posting to the Government Code and Cypher School (GCCS) where his aptitude in code-breaking became apparent. Tiltman, who never studied higher mathematics, had a natural ability to understand codes; this was to serve him well for the rest of his working life.

From 1921 -1929 he served in India, monitoring Russian diplomatic traffic. He became familiar with all aspects of signals intelligence, from interception and traffic analysis to code-breaking. In 1930, Tiltman was appointed to head up the military section of GCCS. He was involved in training army officers in cryptography and studying foreign military codes. His main focus was monitoring communications between Moscow and the *Comintern* (the *Third International* or *Communist International*). This was an association of communist parties with offices in Berlin. In 1932, Tiltman broke the Japanese military code – not a bad achievement for a man who left school at 17 and had not formally studied languages beyond school level.

He also cracked several Russian, German and Italian codes during this period.

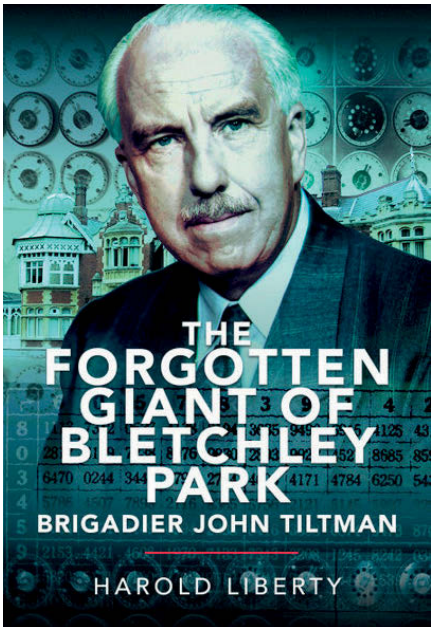
The book contains a lengthy chapter on codebreaking. Here, the author examines 14 different Russian, Japanese, German and Italian codes, all of which use different forms of encoding, such as transposition and additives. What is particularly impressive is the fact that Tiltman did his codebreaking with little more than pencil and paper. He worked from his own principles of cryptography, which could be summarised as follows:

- A compromise between security and practicality.
- The security of a system should be taken out of the hands of the operator.
- The system is only as strong as its weakest link, and:
- Transpositions are dangerous.

In 1939, World War Two commenced, and Tiltman re-joined the army, based at Bletchley Park. The author discusses the important role Tiltman played in coordinating the sharing of intelligence between the Army, Royal Navy and Royal Airforce. In 1942, shortly after the US entered the war, Tiltman visited the USA to begin a process of information exchange on codebreaking and technology. He developed a very good relationship with the Americans. In 1943, the formal BRUSA agreement ('Britain-USA') was drawn up, and this led to the formation of the famous 'Special Relationship' between the UK and USA regarding defence matters.

Harold Liberty describes Tiltman as not just a brilliant codebreaker but also as a warm and generous person who had a casual attitude to military protocol. After the war, Tiltman studied Russian codes; and from 1950 to 1954, he was based at the British Embassy in Washington. He officially retired in 1954 but stayed on as a 'civilian consultant' until 1964. He then moved to the USA where he continued to work as an advisor to the National Security Agency (NSA), which is a part of the US Department of Defense. In 1980, he finally retired from the NSA after a successful 60-year career in codebreaking.

In my view, the author more than proves his point that Tiltman was one of the 'giants' of codebreaking and that his name deserves to be recognised, along with that of Alan Turing (1912-1954) and Dilly Knox (1884-1943). I would recommend this book to anyone with an interest in codebreaking, Bletchley Park and the secret history of World War Two.



The Forgotten Giant of Bletchley Park
by Harold Liberty.
Pen & Sword. 2022.
215 pp. Hbk. £20. ISBN 9781399089616
www.pen-and-sword.co.uk

ALL PICTURES: PUBLIC DOMAIN

1

The Poldhu Wireless Telegraphy Station (1900-1933)

Scott Caldwell discusses the history and operation of the wireless station at Poldhu and evaluates its role in facilitating the pioneering trans-Atlantic communications of the era.

Scott Caldwell
Scottandrew.caldwell@yahoo.co.uk

On December 12th, 1901, signals from over 2,000 miles away were heard by Guglielmo Marconi (1874-1937) and his assistant George Stephen Kemp (1857-1933). This one singular event would change the course of human history. These weak signals were transmitted from a Poldhu a site that would soon become the Voice of the Empire (Fig. 1). The wireless operators at Poldhu had been issued with strict instructions to transmit signals repeatedly at designated times until they were detected.

In order to network the far reaches of the British Empire, Marconi devised a two-way wireless communication system that would systematically bridge the vast Atlantic Ocean. This would facilitate a commercial alternative to the established service provided by the *Anglo-American Telegraph Company*. To fulfil this business plan Marconi had no option but to erect two super wireless stations on each side of the Atlantic Ocean, bridging the continents with a two-way wireless network.

Poldhu Wireless Station

In the summer of 1900, the company undertook an extensive search to find the ideal location for its new wireless station. In August 1900, both Samuel Flood-Page (Managing Director, 1833-1915) and Marconi found a suitable location at Poldhu Cove, near the village of Mullion on the Lizard Peninsula in Cornwall (Fig. 1).

There was even a small hotel nearby that could accommodate the project participants and their equipment and resources. Flood-Page wrote to the hotel owner, Viscount Clifden, requesting a long-term lease.

The information contained in the agreement went against Marconi's standing instruction to maintain absolute secrecy as it included the following information: *"We shall endeavour to communicate with Cape Finisterre, perhaps with the Azores and with Newfoundland or America"* (Fig. 2).

One can only imagine Marconi's response to this breach of security: Marconi had become concerned about rumours that Nikola Tesla was preparing similar research on long-distance wireless communications. He expressed his feelings in a letter to his girlfriend Josephine Holman: "*I think the long-distance experiment will be a success, but I am afraid Mr Tesla is very visionary about his messages from Mars. I think it is necessary to learn how to send messages over distances in this little world of ours before*

Fig. 1: The Poldhu Wireless Station.
Fig. 2: Poldhu was ideally located to receive and transmit Atlantic wireless signals.
Fig. 3: The Marconi Centre.
Fig. 4: A plaque dedicated to Marconi and his team of engineers (from October 1985).

thinking of sending them across millions and millions of miles which separate us from the other planets."

Harsh But Charming

In 1919, Marconi's ghost-written memoir recalled the harsh, yet charming, environment at Poldhu: "*In those early days, there was little or nothing beyond the landscape which, despite its hardness and bleakness, possessed an inexpressible charm because of the soft airs, pungent with salt, which blew over it and because of the block rocks jutting far out into the ocean and lashed by sea foam of dazzling whiteness.*"

Marconi also leased a second piece of land from Clifden in a wheat field. This was for a proposed test station that would become universally known as *The Lizard.* The hotel at the Lizard was far more comfortable than the one at Poldhu, Marconi and his entourage stayed there whenever they could, subject to the demands of the experimental project.

The Poldhu station had an immense land footprint that equated to 50 acres (200,000m²). Construction work was a relatively short process that ran from October 1900 to January 1901. The main considerations that were made before selecting Poldhu as the prime site included the following points:

- The site: There was a requirement for an acre of land with the capacity for a solid-storied electrical plant surrounded by a huge field of masts and poles. The site had to have access to a regular water supply.
- It was close to a busy shipping line, and ships from around the world frequently passed this point.
- The peninsula had a high elevation with a jagged rock coastline, with no structures and few local residents to generate electrical interference.
- Its proximity to the sea reduced the risk of interference from structures outwards toward the sea.
- The geologic structure of the area surrounding the Poldhu wireless station consists of serpentine rock which is perfect for wireless communications. This rock contains very little iron or other elements with magnetic properties, forming an excellent 'natural earth'.

The aerial systems consisted of 20 masts that were 61 metres high. They formed a circle which had a diameter of 61 metres. The ring of masts supported a vast network of 400 wires that were insulated both at the top and the bottom, forming a bespoke inverted cone.

However, before testing commenced disaster struck when the Poldhu aerial collapsed during a storm on September 17th, 1901. Marconi worked frantically and erected two masts to support a total of 54 wires that were spaced 1 metre apart.

Marconi was young and full of energy during the construction phase at Poldhu. He travelled constantly between London, Dorsetshire, and Cornwall – a harsh journey given the site's remote location. But he frequently combined a journey to Poldhu with a stop at the Haven Hotel near Poole, Dorset for a quick business meeting with his technical staff before leaving the next morning for Poldhu.

From the Haven Hotel to Poole railway station was 2 miles, followed by a long train journey that required three changes before reaching the end of the line at Helston. The final leg of the journey was seven miles by a horse-drawn carriage across uncomfortable roads.

Surprisingly, little notice was taken by the local people of Mullion. However, they were not ignorant of industrial developments, having witnessed the growth and decline of the tin and copper mines. Some locals were employed at the site during its construction. The visit of Italian King Victor Emmanuel (1869-1947) to the Poldhu wireless station was also taken as a routine event by the locals who preferred the quiet life.

The visit of the Prince of Wales (King George V) in July 1903, was a more noticeable event. The Poldhu Hotel was decked out with flags, as were the masts of the wireless station. The Royal party even managed to climb one of the four transmission towers to take in the unprecedented views of the Lizard Peninsula.

On Signal Hill

In December 1901, an anxious Marconi set sail for St Johns, Newfoundland. His equip-

ment was limited to a small stock of kites and balloons that were necessary to keep a single wire aloft in the notorious stormy and wintry weather that hit Newfoundland.

On December 12th, a kite was launched into a stormy night sky with a 155 m wire tailing behind. A second kite was subsequently launched with a 152.4m wire attached. The kites bobbed and weaved erratically in the night sky, making it very difficult for Marconi to adjust his new syntonic receiver.

Then, on December 15th, 1901, the *New York Times* reported the following:

'Wireless Signals Across The Atlantic – Marconi Says He Has Received Them From England: St Johns Newfoundland, December 14th – Guglielmo Marconi announced tonight the most wonderful scientific development of recent times. He stated that he had received electric signals across the Atlantic Ocean from his station in Cornwall'.

The Poldhu station was designed as a double-transformation system that employed two oscillation (high-frequency) transformers. The first oscillation transformer had been designed by the Physicist John Ambrose Fleming (1849-1945). The design required a primary coil of 20 turns and a secondary coil of 40 turns. The second oscillation transformer was connected to an antenna. It was universally known as a 'Jigger', and Marconi had designed it in 1898.

Marconi was initially evasive when discussing the operating frequency of his transmitter at Poldhu. Fleming was less guarded and suggested in a 1903 lecture that the wavelength was 308.4m (984kHz). Finally, in 1908 at a Royal Institution lecture, Marconi relented and suggested that the wavelength was 365.8m (820kHz).

However, a lecture recorded in the early 1930s has a different frequency mentioned: 1,800m (166 kHz) and an output power of 15KW. The total cost of the experiments at Poldhu into the feasibility of trans-Atlantic communication would eventually reach the sum of £50,000.

The Merchant Fleet and War

In 1906, a powerful low-frequency station was built near Clifden on the west coast of Ireland, it was designed to increase the reliability of communications with North America. Poldhu focused on communications with Britain's vast merchant fleet under the code name MPD.

A highlight for merchant wireless operators was the nightly *Current Affairs Morse Code Bulletin*, transmitted under its own call sign ZZ. The most prestigious steamship companies printed newspapers and sold them to their passengers detailing the contents of the nightly bulletins.

On August 4th, 1914, Poldhu sent out the following urgent message. It was the first official announcement that hostilities had broken out between the British and German Empires:

"To all British merchant vessels. War has broken out between England and Germany. You must not go to German Ports. Admiralty London."

Poldhu was ideally equipped to transmit this warning to the vast expanses of the Atlantic Ocean, which would become the supply chain of the British war effort. This prompted the Admiralty to take over its daily operations for the duration of the war (1914-1918).

Members of the Poldhu Amateur Radio Club commemorated the end of the First World War by operating a special station from the Marconi Centre at Poldhu, under the call sign GB100MPD, for a limited period (November 9th - November 13th, 2018).

The official message from Marshal Foch in Paris confirming that all hostilities on the Western Front had ended was relayed to all British ships from Poldhu – a unique postscript to history that Poldhu was both a voice of war and for peace.

A Vital Research Station

After the armistice, Marconi exclusively utilised Poldhu as a purpose-built experimental station. In 1923, the station was under the jurisdiction of the Marconi Independent Research Department. Several long-distance transmissions were made by Charles Samuel Franklin (1879-1964) to Marconi on his yacht named *Elettra*. The vessel was stationed on Cape Verde in 1923 and then near Beirut in 1924. The results obtained from these experiments accelerated the development of the *Beam Wireless Service* for the British General Post Office.

The Marconi Centre and Poldhu Monuments

In our own time, the Marconi Centre (Fig. 3) is now owned and maintained by the National Trust, and it is run by volunteers at Poldhu Radio Amateur Club (Callsign GB2GM). Visitors may watch a short video presentation that details the significance of Poldhu to Marconi's work.

The Marconi Poldhu Monument was unveiled by R.N Vyvyan on November 22nd, 1937, just days after the Marconi Company donated the land to the National Trust. Its four weathered plaques (Fig. 4) tell the unique story of Marconi: *"One hundred yards northeast of this column stood, from 1900 to 1933, the famous Poldhu Wireless Station, designed by John Ambrose Fleming and erected by the Marconi Company of London, from which were transmitted the first signals ever conveyed across the Atlantic by wireless telegraphy. The signals consisted of a repetition of the Morse letter 'S' and were received at St John's, Newfoundland, by Guglielmo Marconi and his British associates on 12.12.1901.*

"The Poldhu Wireless Station was used by the Marconi Company for the first transoceanic service of wireless telegraphy which was opened with a second Marconi station at Glace Bay in Canada in 1902. When the Poldhu station was erected in 1900, wireless was in its infancy; when it was demolished in 1933, it was established for communication on land, at sea and in the air, for direction finding, broadcasting, and television.

"From the Marconi Company's Poldhu station in 1923 and 1924, Charles Samuel Franklin, inventor of the Franklin Beam Aerial, directed his short wave wireless beam transmission to Guglielmo Marconi on his yacht Electra, cruising in the South Atlantic. The epoch-making results of these experiments laid the foundation of modern high-speed radiotelegraphic communication to and from all quarters of the globe.

"To commemorate the pioneering work done by Guglielmo Marconi and the research experts and radio engineers at the Poldhu Wireless Station between 1900 and 1933, the Marconi Company presented this historic land to the National Trust. Some six acres of cliff land were given in 1937, and forty-four acres behind the cliffs on which stood the station and masts were given in 1960".

Further Reading

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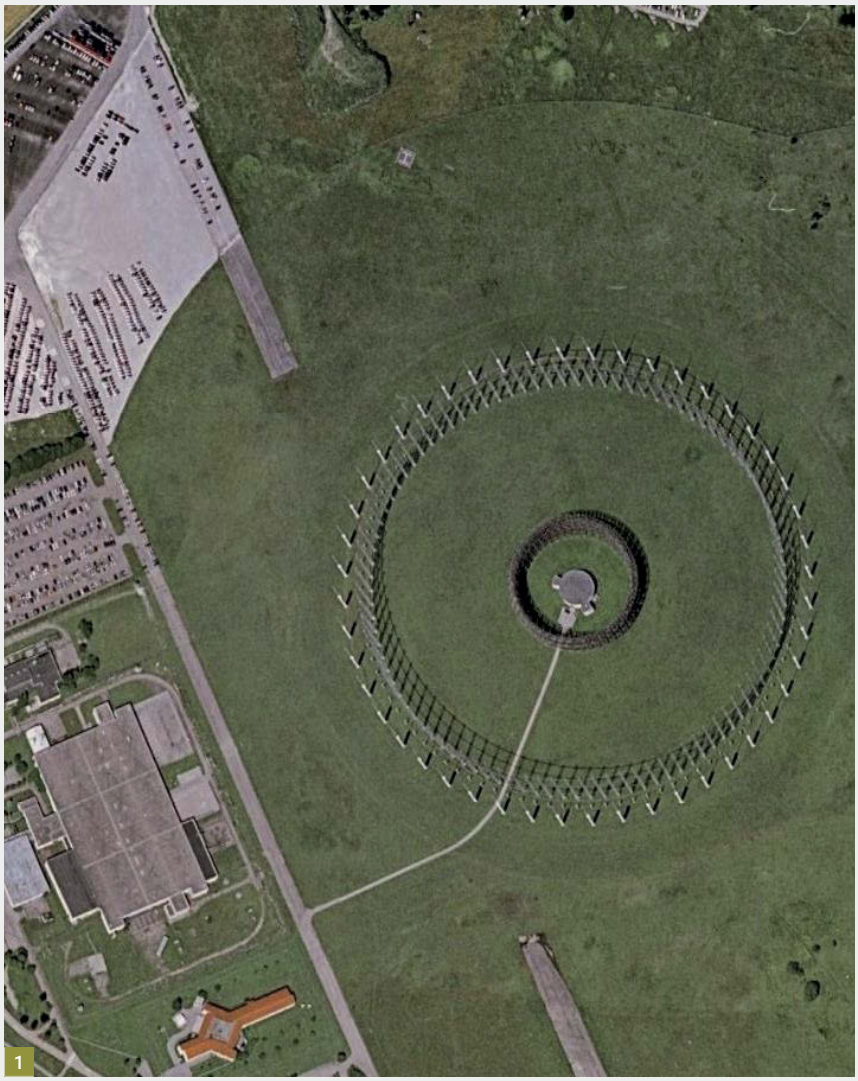
Radio News

SIMON RIMMER JOINS SCALA RADIO: Sunday Brunch host Simon Rimmer is joining Scala Radio to host a series where he looks at the unique pairing of food and music. *Across the Table with Simon Rimmer* launches on Sunday 4 September with the further three episodes on air each Sunday from 6 pm – 8 pm. The show will include the best pieces from the classical world and discovering lesser-known tracks that have a connection with food and drink. Simon will be joined by his favourite foodie friends such as Tom Kerridge, Clodagh McKenna, Paul Ainsworth and more. The series will also include conversations around the dinner table, ranging from kitchen hacks and food trends to budgeting and sustainability. On joining Scala Radio, Simon said: *"I am excited to be joining Scala Radio for my very own show. Food and music are probably the two most important things in my life (apart from sleep, coffee and football) so I'm looking forward to learning more about the link between classical music and the world of food. It has also been fun to discover composers who had interesting eating habits – Rossini, Satie, Mozart… I've heard they had some weird foodie quirks that I'm going to share with the listeners."*
(SOURCES: Scala Radio | RadioToday)
https://tinyurl.com/mtjrxmmj
https://tinyurl.com/2xpba7ps

THE 'SWINGING' STRENGTH OF EARTH'S MAGNETIC FIELD: Life as we know it (Jim!) requires an atmosphere. It is the air we breathe, our shield from harmful ultraviolet rays, and our defence against extreme temperature swings, like those on Mars. But Earth's atmosphere owes its persistence to the geomagnetic field, which thwarts the Sun's rays from dispelling this gaseous veneer. And this protective geomagnetic field owes its existence to Earth's core. As the liquid part of the core (the outer core) swirls, the combination of molten iron alloys and Earth's rotation results in a self-sustaining magnetic field called the geo-dynamo. As they archive evidence of the billions of years of the geodynamo, rocks can transcribe where north was (direction) and how strong the field was (intensity) at the time of formation. That transcription is possible as long as the rocks remain relatively untouched by high temperatures, fluids, or other traumas of tectonics. Because the strength of Earth's magnetic field relies on the vigour with which the liquid core churns, understanding how paleomagnetic intensity has changed at the surface can help scientists address when the core transitioned from a single ball of sloshing melt to a solid inner core wrapped in a liquid outer core. In other words, paleomagnetic intensity might tell scientists when the inner core began to form, with some suggesting that the answer is a little more than half a billion years ago (i.e., only in the last ~10% of Earth's history). In a new study published in the *Proceedings of the National Academy of Sciences* of the United States of America, paleomagnetism expert Yiming Zhang and his co-authors collected and studied rocks from the (failed) North American Midcontinent Rift—a region where 1.1 billion years ago there was voluminous volcanism. The rocks that Zhang targeted are unique aggregations of crystals known as *anorthosite xenoliths* that formed deep in Earth's crust but were brought close to the surface with magma that fed lava eruptions into the rift. The team found surprisingly high paleo-intensity values that signal a turbulent core—more spirited than might be expected for a liquid core lacking a solid centre and stronger than Earth's magnetic field today. Read the full story on the website, below:
(SOURCE: *EoS Science News 103*; AGU | Alka Tripathy-Lang | Citation: Tripathy-Lang, A. (2022), 'Swinging Strength of Earth's Magnetic Field Could Signal Inner Core Formation')
https://doi.org/10.1029/2022EO220398)
https://tinyurl.com/f3rajyt7

LONEWOLF: For Decades, Lonewolf (see also p. 12) has Supported ***The Voice of the Arctic.*** Pierre Lonewolf's career journey that led him to Kotzebue, Alaska in the early 1980s included a stop in a very large California metropolis, where he realized big-city living just wasn't for him. You can't get much farther away from major population bases than northern Alaska. Kotzebue, population 3,283, sits on a sand spit of Alaska's Arctic west coast just across the Chukchi and Bering Seas and several hundred miles from the Russian eastern frontier. It's a scenic, but scarcely populated, place, which features abundant wildlife like caribou and moose and bear. Against that backdrop, Lonewolf (CSRE, CNT) manages engineering services at KOTZ (AM) *[you couldn't make it up! - Ed.]* and KINU (FM) plus a network of FM translators and low-power FMs serving tiny villages. That service includes seven translators and three LPFMs, added beginning in the mid-1980s to serve small river communities around Kotzebue […].
(SOURCE: RADIOWORLD | Brandi Stine)
https://tinyurl.com/2p8ekbwa
https://tinyurl.com/2c9n5wdj



1

Breaking Out Of the Elephant Cage: Augsburg Listening Station

Martín Butera looks at how interest in a former Cold War signals intelligence facility has both gained new traction – and fed the 'rumour mill' – following the Russian invasion of Ukraine in February 2022.

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At the time of writing it is now 6 months since Russia's invasion of Ukraine took place (24th February 2022). The Moscow government still wants this to be called: a 'Special Military Operation'.

Irrespective of the propaganda war, since the invasion of Ukraine radio, has come to new prominence, especially in terms of Short Wave broadcasts (the BBC and others) and utility transmissions.

In recent months, a most intriguing story has been released: allegedly, the German Foreign Intelligence Service (BND – *Bundesnachrichtendienst*) claims to have intercepted radio communications in which Russian soldiers talk about carrying out indiscriminate killings in Ukraine.

The sources of this information were the German *Der Spiegel* and the *Washington Post*, both reputable organisations. From there, the news began to be replicated by many of the news media currently covering the war.

The *Spiegel* article in question claimed that German intelligence officials had been able to intercept Russian communications, concerning indiscriminate killings, and that they were very confident in the findings, although the report never specified how and where those communications were obtained by radio.

Famous Elephant Cages

Against the background of the US and international political strategies, and ongoing war crimes investigations in Ukraine, some observers soon speculated that the recordings were captured from an old military installation near Augsburg, Germany, using the AN/FLR-9 antenna system.

This arrangement was popularly known as the 'Elephant Cages' (Figs. 1 to 7).

More recently, several communication specialists insisted on the theory that the installation has been 'reactivated' by the *Bundesnachrichtendienst* (The Federal Intelligence Service) of the German Government).

https://tinyurl.com/262d23b2

However, many, including myself, are finding this unlikely, since – with the end of the Cold War – this particular station has lost much of its value, both technical and strategic.

PICTURES 1-4, 6 & 7: STOCK PHOTOGRAPHY US ARMY; PUBLIC/ DECLASSIFIED

Fig. 1: An Aerial photograph of the Augsburg station, said to be one of only two intact 'Iron-Curtain' sites left in the world (the other one is in Elmendorf, Alaska, cf. Fig. 6). Fig. 2: The 'Elephant Cage' from the air. Fig. 3: This installation, with a diameter of 440 m and a height of about 40 m, was installed at the *Misawa* air base in Japan. Fig. 4: Officers and technical personnel of the *Misawa* take a photo symbolising the 'burial of the past' before destroying the great antenna for good (October 2014). Fig. 5: The strategic location of Augsburg. Fig. 6: The AN/FLR-9 Antenna in Elmendorf (Alaska) in 1964 (See also Fig. 1 and: https://youtu.be/uh88Y2_33GI). Fig. 7: The Augsburg facility in a photograph from the 1970s. Much historical interest is surrounding it today.

In any case, and whatever the veracity of this, this story is, perhaps, a good excuse to immerse ourselves a little more in the history of this type of radio station and aerial setup.

A Cold War Infrastructure

In the 1960s and 1970s, the US military spread its intelligence gathering and listening stations all over the planet, to encircle the entire perimeter of the former Soviet Union.

These stations were located in different strategic locations, from Alaska to Japan. Many of these old stations had different listening systems and kinds of equipment, although the reception gear most preferred by the US Army was the so-called *Wullenweber AN/FLR -9 CDDA (Circularly-Disposed Dipole Array)*, better known as the 'Elephant Cage'.

https://www.navy-radio.com/frd10.htm
https://tinyurl.com/mtt4zz9p

The first Wullenweber (alt.: *Wullenwever*) AN/FLR-9 CDDA antennas are said to have been installed in Chicksands, England and San Vito, Italy in 1962.

Finally, in 1970, it became known that the last two listening centres with these particular specifications had been built, one in Thailand, and one in Gablingen, located in a former German air base from the First World War near Augsburg.

However, it is the Augsburg facility I would like to focus on a bit more in this article.

American forces arrived in Augsburg near the end of World War II (1939-1945), a few days before the Germans surrendered on 7th May 7, 1945.

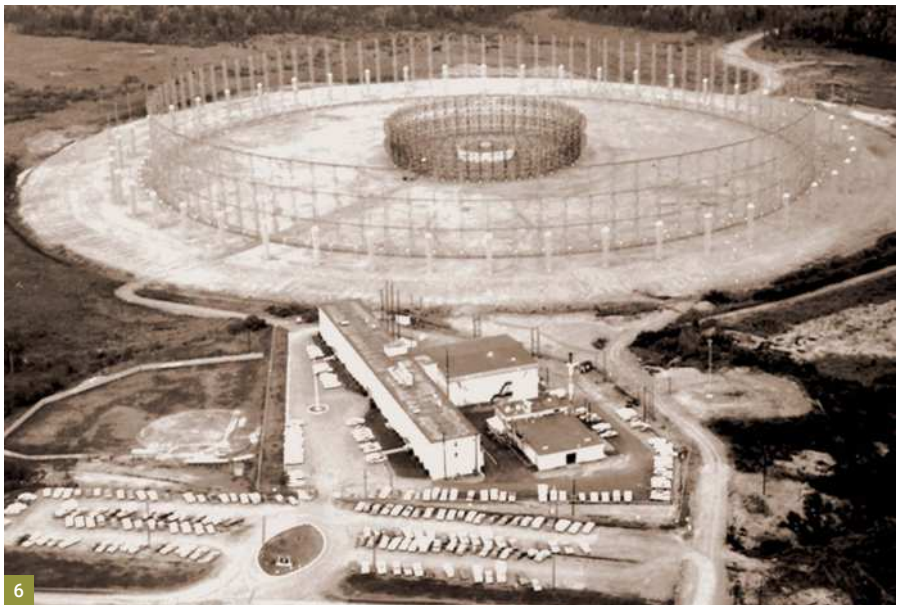
Several (now declassified) reports indicate the start date of operations of the Gablingen Listening Centre on January 12, 1972. It later officially received the authorised designation 'USASAFS' (*US Army Security Agency Field Station*).

For its part, the former Soviet Union (SU) already had similar technology a decade earlier, in 1950. It is known that numerous antennas called 'Krug' (circle), were erected throughout the Eastern Bloc and in the former Soviet Republics (Figs. 2 and 3).

The Augsburg Location: 48°27'5" N 10°51'43"OE

The Augsburg Listening Station (Figs. 4 and 5) had some excellent logistical and topographical features of great advantage. Augsburg is located in the German Federal State of Bavaria, about 30 km from Munich. The location of the station was characterized by excellent logistics, as it was situated midway between the two 'neighbouring' listening stations in England and Italy.

Topographically speaking, the airfield where the listening centre was erected was ideal for the construction of such a large antenna system. Being built on an air base, there was no other higher construction in the area, which could interfere with the reception of the antenna. The base was bordered on two sides by railway tracks and on the other side by a busy federal highway, access was difficult for the public and therefore also for 'unwanted' visitors (espionage from the then Soviet Union).



6

7

The Wullenweber AN/FLR-9 Aerials

Wullenweber technology was developed by the German Navy Communications Research Command and Telefunken during the early years of World War II. The key inventor was Dr Hans Rindfleisch.

The story goes that the first Wullenweber antenna system was built during World War II, northeast of the city of Hjørring in Denmark. This first system was somewhat rustic and was composed of about 40 vertical antennas, placed in a circle, using a structure of wooden poles.

At the end of the Second World War, it is said that different parts of the allied army extensively studied the antenna located at Hjørring and then destroyed it. Later, the Americans took care to improve the system and arrived at what is now known as the technical standard 'AN/FLR-9'.

An excellent and complete technical manual, declassified by the US Army Security Command, and with more than 280 pages, can be found online. Here, the assembly and design of this system are detailed point-by-point:

https://tinyurl.com/tu3munw7

The AN/FLR-9 antennas are made up of three concentric rings of antenna elements: Each circle of elements receives RF signals for an allocated portion of the radio spectrum, from 1.5 to 30MHz.

The outer ring typically covers 2 to 6MHz, referred to as 'Band A'. The central ring covers the range from 6 to 18MHz ('Band B'). And the inner ring covers the range from 18 to 30MHz ('Band C').

Band A consists of 48 beam monopole elements separated by 78.4 feet (7.5 degrees). Band B contains 96 beam monopole elements separated by 37.5 feet (11.43 m) (3.75 degrees), and Band C has 48 antenna elements, mounted on wooden structures and placed in a circle around the central building.

The elements of bands A and B are vertically polarized. The Band C components consist of two horizontally polarized dipole antenna sub-elements electrically bonded and placed one above the other.

It is said that the most important part of the antenna is not visible and is underground since this system has a large set of mass to the ground.

This arrangement makes it possible to find the precise direction of signals up to 4,000 nm (7,408 km) away.

The Ravages of History

This listening station north of Augsburg, Germany, was one of nearly 20 such stations strategically located around the world during the Cold War.

On 9th November 1989, the German population peacefully, without shedding blood or using a firearm, demolished the Berlin Wall, which had divided the German capital for almost three decades, leading to the reunification of Germany and the end of the Cold War.

A couple of years later, the Augsburg Listening Station was deactivated. To be more precise, the declassified records cite September 1993 as the final closure of activities on the site.

Finally, in 1999, 10 years after the fall of the Berlin Wall, the facility was handed over to the German Intelligence Services. Thus the US Army Intelligence and Security Command (INSCOM) and the US Army in Europe (USAEUR) officially returned the Augsburg base to German hands.

Some sources are still adamant, however, that the station is still used formally by the German Armed Forces (*Bundeswehr*) and the German Federal Intelligence Service (BND). Is this feasible?

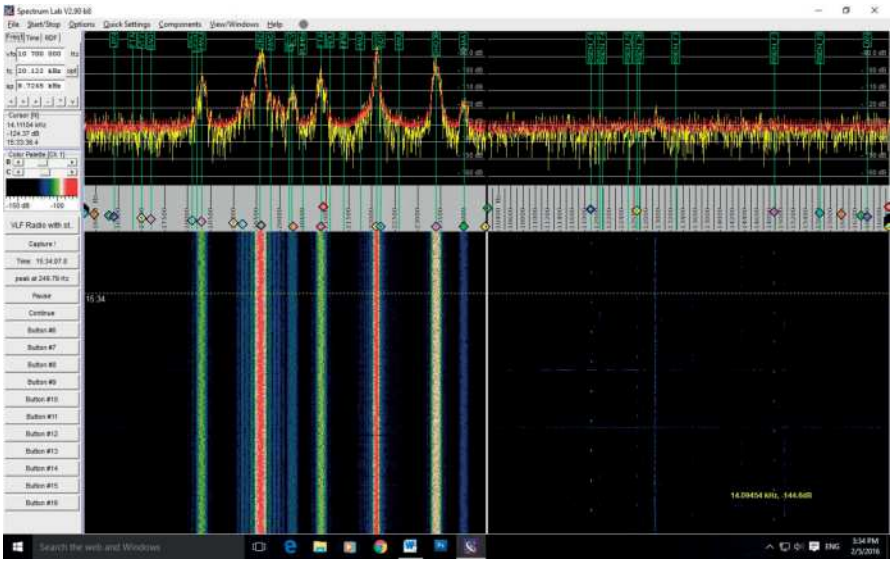
Of course, the use of this type of antenna seems to be somewhat obsolete today, although it can still be seen in perfect condition at the site.

Is it being used today to intercept Russian comms? I doubt it.

In my view, in the current scenario of the invasion, these are, arguably, obsolete 1970s technologies. The 'real' communications now take place elsewhere ...

[This article is based on public information and declassified documents from the Army Public Affairs Media Relations Division at the Pentagon – MB].

Radio News



HOW TO COMMUNICATE WITH A SUBMARINE: The (US) Navy uses Very Low-Frequency (VLF) radio waves that penetrate the ocean to talk to submarines. Prof Simon Holland explores the subject in this video (cf. URL below) *[See picture, right, and some of our previous articles on VLF matters in* RadioUser *2020-2022 – **Ed**.].* (SOURCE: Bob Houlston G4PVB, Volunteer Correspondent).
www.tinyurl.com/4r2kcvsu

IBC TO PRESENT BBC WITH INTERNATIONAL HONOUR FOR EXCELLENCE: To mark its centenary, the International Broadcasting Convention (IBC) has presented the BBC with its *International Honour for Excellence* during this year's show: *"Our industry, of course, has been driven forward by innovators and creators from all around the world,"* said Michael Crimp, CEO of IBC; *"but all of us trace the source back to those cramped rooms in Savoy Hill in London in 1922. We are pleased to present the accolade to BBC 100, but […] this award is for all of us that care about the creativity, technology and business that surrounds every practitioner in the world of media."* IBC has also announced the winners of two exceptional awards for 2022. The *IBC Special Award* recipients are Sonya Chakarova at PlayBox Neo and Daniella Weigner of *Cinegy*, with consultant Phillip Covell, who brought together more than 400 broadcast and media companies and individuals via *LinkedIn* to provide resources, solutions and hardware to Ukrainian TV channels and media outlets to ensure they could stay on air amid ongoing conflict. The group also supported refugees in finding media roles across Europe. Clinton Jones, better known to his million-plus social media following as *Pwnisher* [sic - Ed.] is a motion-graphics 'guru'. During the lockdown, he challenged 3D artists everywhere to design their own scenes under the title Infinite Journeys. 2448 artists responded, devoting a collective of more than eighteen years of work and delivering stunning, magical, visionary scenes. The judging panel for the IBC Innovation Awards were so impressed by his efforts that they awarded him their *Judges' Prize*. The Technical Papers Committee have also chosen the paper that, on peer review, they feel is both the most stimulating and the clearest. For their work on a practical, deliverable project for live extended reality experiences using 5G and cloud GPU computing, engineers from *Salsa Sound, Condense and The GRID Factory*, led by Andrew Gower, head of interactive and immersive content research at BT, will receive the Best Technical Paper award. Each of this year's Technical Papers were presented as part of the IBC Conference (9th & 10th September 2022). All IBC Awards will be showcased in a unique, digital-first, ceremony to be streamed online at 4 pm BST on Monday 5th September. This will include the announcement of the winners of the *IBC Innovation Awards* and *Social Impact Awards*. The trophies were presented to award winners during an on-site reception at IBC 2022 at the RAI Amsterdam on Sunday 11th September.
(SOURCE: Jenny Priestley | RADIOWORLD)
https://www.ibc.org
https://tinyurl.com/mwh659et
https://tinyurl.com/4bt6jrdw

NEW CRUNCH & ROLL PODCAST ABOUT THE RADIO INDUSTRY: A new podcast about radio has launched today called *Crunch & Roll* presented by BBC WM presenter and producer John Fox. Midlands-based production company 969media has created the podcast, which will tell stories from radio professionals that are rarely heard outside of the studio. Producer Simon Borszowski said: *"There's plenty of podcasts out there that discuss jingles or take a deep dive into radio history, but Crunch & Roll set out to be something different. We're interested in the funny, absurd and untold stories from real characters of the radio industry."* Episode one features former Atlantic 252 and Kiss 100 presenter Robin Banks. He rarely speaks about his early career but reveals all to *Crunch & Roll*. He also tells the story behind his name; taking advice from a former programme director's 11-year-old son live on air; and how he ended up in rehab. Crunch & Roll presenter John Fox said *"Robin is an inspiration for loads of people in the radio industry – me included. Chatting to him about his early career was a real eye-opener. His stories are top-tier. I can't wait for people to hear them."* Future guests include Simon Monk (BFBS, Hallam FM, Rock FM), Jonathan Miles (Capital, Piccadilly, Luxembourg) and Emma Louise Jones (Viking FM, Signal 1). *"Crunch & Roll is a real peek behind the scenes of the radio industry and very different to anything else out there. We don't take ourselves seriously, and neither do our guests. There are some really big laughs in there, along with stories you can never 'un-hear', oh, and a fair bit of swearing!"* said John Fox.
(SOURCE: RadioToday)
admin@radiotoday.co.uk
https://tinyurl.com/mrybrfd8

SIEBEL VERLAG.

11

Time, Measurement and Radio (Pt II)

In Part Two of his mini-series on time and radio, the editor finds active time signal stations, explains what you can get from receiving those signals and recommends suitable radios, accessories and aerials.

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In Part One of this article (*RadioUser,* September 2022: 24-29; *The Spectrum Monitor*, June and July 2022), I began my exploration of the fascination of Standard Frequency and Time Signal (SFTS) stations, looking at how radio and time-measurement (*Metrology*) are closely connected. I also explored some of the histories of time signal transmissions, be it through human agency, telegraphy, telephone, and – most importantly to us –radio.

I also surveyed some of the science behind these stations, their links to much more than time measurement, and their central role in navigation (Hyperbolic and GPS), astronomy, and electronics.

I found that SFTS signals occur throughout the bands, from Very Low Frequency (VLF) to HF, and beyond.

To finish off last month's part, I briefly looked at some special radio-time technology, such as the *Northern California DX Foundation (NCDXF) / IARU International Beacon Project*, Non-Directional Beacons (NDB) and the use of some brilliant software, such as *Faros* and other, similar, packages.

Why Do They Matter?

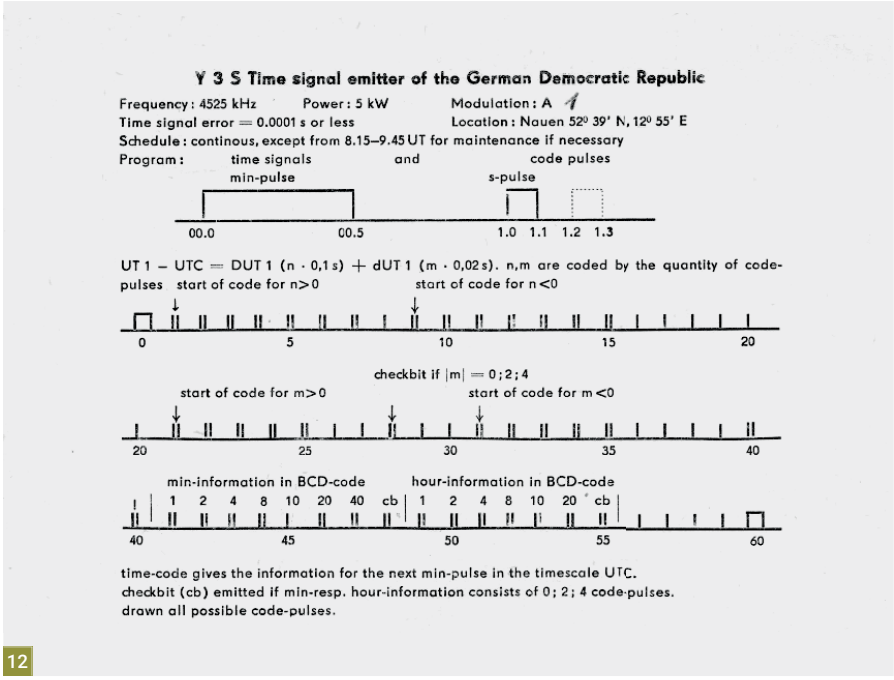
But why do stations like WWV, WWVH, PPE, DCF77 or GBR still count in our, supposedly-advanced, Internet-Age? Well, the World Wide Web is, of course, an unreliable resource; it gets easily manipulated and can be turned off by repressive regimes.

More significantly, in terms of time, the combination of electronic circuits in internet distribution causes delays, where you least need them. Careless is right in pointing out (2020) that, *"For a lack of delay, nothing beats terrestrial radio – It is held back only by that pesky speed of light"*.

The (temporary, as it turned out) uncertainty over the future of some US stations (WWV/ WWVH) a year or two ago has certainly brought the question about the use of SFTS stations into sharper focus.

I have already hinted at why we still require them in Part One of this article. Simply put, automated time broadcasts, especially on Short Wave (2,500, 5,000, 10,000, 15,000, and 20,000kHz) allow us

WIKIPEDIA



12

Fig.11: This book used to be a standard reference publication for SFTS DXers in Europe.
Fig. 12: Y30: The former East German SFTS station is now just history – much like the old GDR herself. Fig. 13: RWM (Taldom/ Russia) is shown here on three separate frequencies (NS).

to draw much wider conclusions about the world we live in.

By measuring period, frequency, time interval and related values, for example, we can derive significant information about (radio) wave propagation, atmospheric and ionospheric physics, space weather, solar conditions, geophysics, and much more.

This, in turn, helps our engineers and technicians to calibrate equipment and run atomic clocks, and millions of ordinary citizens synchronise their watches.

SFTS stations, therefore, are of major importance for global communications and national infrastructures.

Some have argued – not always convincingly – that SFTS stations can also be an example of state control over the citizen.

Careless (2020) also points out something I had not considered before – defence against 'fake news'. Stations like WWV and WWVH, for instance, work as valuable transmitters of more reliable emergency information, simply because they are more difficult to interfere with than a website.

So, for cookie-free, fake-free reliable, data on a wealth of topics from the natural world and the worlds of radio and electronics, which cannot be switched off, listen to SFTS stations – what's not to like?

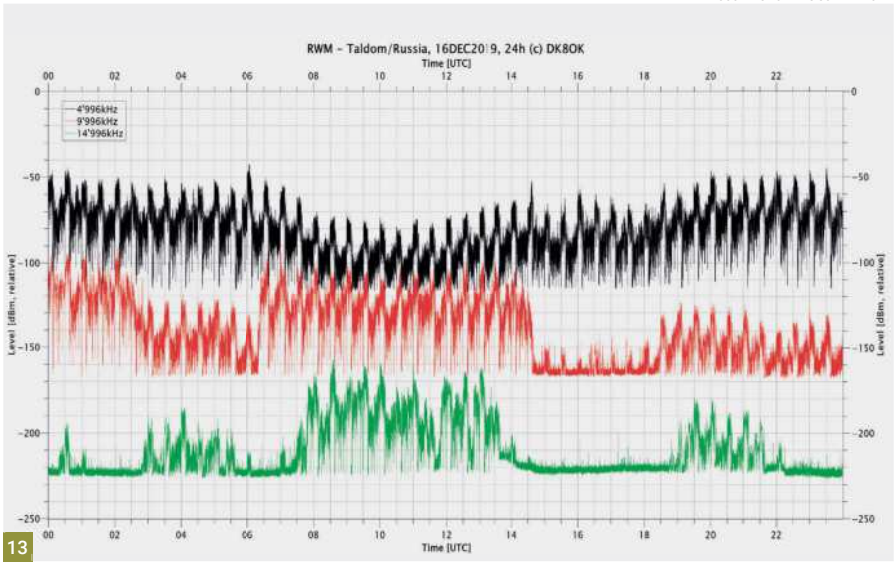
SFTS Stations Today

But where exactly are those time signals to be found? Well, a handful of time beacons from Russia, Belarus and Kyrgyzstan are still using the VLF band of the spectrum (around ca. 25kHz) to send time information to submarines around the globe. Maybe they will be more active after the Russian invasion of Ukraine.

By contrast, Swiss station **HGB** (75kHz, in Prangins) closed in 2011, following an *über-accurate* time delivery since 1966. More generally too, several time signal services – and the publications about them – are now of purely historical interest, as the example in Fig. 11 shows (*'Zeit & Frequenz' = 'Time & Frequency'*).

Another very interesting example of this is the station **Y3S**, the time signal transmitter of the former German Democratic Republic (GDR, East Germany; Fig. 12).

COURTESY OF NILS SCHIFFHAUER



13

These are, nevertheless, no less interesting, though, for the citizen-scientist and radio hobbyist.

However, in the Long Wave (LW) spectrum (N.B.: 9kHz steps in Europe, 10kHz in the USA), you will still find – apart from some amazing 'experimental' ham transmissions (<9kHz, 137 & 472kHz) – two of the most famous time signal stations ever – in the Universe: **TDF** in Allouis (France) on 162kHz and **BBC** Radio 4 from Droitwich (UK) on 198kHz.

Italy too still sends a time signal (an FSK time-telegram) before the hour on 900kHz.

TDF and the BBC have coded time-related information *embedded* in their signals. This is achieved via phase-modulating the carrier at a very low data rate (BBC: 25bps; Schiffhauer [NS] 2018: 41).

However, the normal listener does not notice this at all.

The UK, the USA, and Beyond

In the case of the famous Droitwich transmitter in the UK, however, the proverbial *Sword of Damocles* is hanging over the station as we speak: sadly, engineers are fast running out of spare parts, especially valves.

On HF, 2,500, 5,000, 10,000, 15,000, 20,000, and 25,000kHz are the frequencies of choice for many time signal station operators. Many engineers use these

indicators as a kind of electronic litmus paper to assess propagation and other conditions in the natural world (see above).

WWV is, of course, the oldest continually transmitting SFTS station in the USA and recently celebrated its 100th birthday, which the editor of this fine publication celebrated in style (Reitz, 2019: 59/60)!

Signals from the East are rare: the image in Fig. 13 shows a good recording of **RWM** (Taldom/ Russia) on three separate frequencies, courtesy of my colleague and regular *RadioUser* contributor Nils Schiffhauer.

Occasionally, there is a 'new kid on the block', such as **MIKES** (Finland, 100W) on 25,000kHz, or the USB transmissions from the *Associazione Amici di ITALcable* from Italy around 10,000/15,000kHz (Schiffhauer, 2018: 41). And **PPE** Observatório Nacional in Rio – which Einstein visited in 1925 to help with work on his *Theory of Relativity* – still serves the time from and around South America (Butera, 2021a: 14-18).

For a selection of my favourite time signal transmitters, please take a look at Part One of this article.

Table 4 is a (non-comprehensive) list of lists: a compilation of websites which itemize SFTS stations, active (for at least some of the time) at the time of writing. Furthermore, Figs. 14 and 15 contain excerpts of the latest *Klingenfuss Guide to Utility Radio Stations*, showing which SFTS stations can be reliably heard here in Europe and elsewhere at present (courtesy of Jörg Klingenfuss, 2022).

https://www.klingenfuss.org/utility.htm

Time Signals from Rugby

In 1926/7, what became, arguably, the most famous time signal station in Europe – Rugby Radio – began transmitting time signals for synchronization (Rooney, 2002: 144-146; Hancock, 2017). The first transmitter used had the callsign **GBR** (16kHz), transmitting from 19th December 1927 onwards.

The actual time signals for it came from the Greenwich Observatory via landline telephone. Short wave signals were added later (on 2,500, 5,000, and 10,000kHz). The service was much improved at a later stage, using cold-cathode electronic clocks, and an *Essen Ring 100kHz Quartz Oscillator*, designed by physicists Louis Essen (1908-1997) and Jack Parry of the UK National Physical Laboratory (NPL; *Nature*, Vol. 176, p 280).

https://tinyurl.com/3kd6wk43

COURTESY OF KLINGENFUSS PUBLICATIONS

9.0 - 148.5		VARIOUS SERVICES	
20.0	RDL	CISN Vilyeyka, BLR	CW
40.0	JJY	Tokyo TS, JAP	CW
50.0	RTZ	Irkutsk TS, SE, RUS	CW
60.0	JJY	Tokyo TS, JAP	CW
	MSF	Anthorn TS, GBR	CW
	WWVB	Fort Collins TS, CO, USA	CW
68.5	BPC	Shangqiu TS, CHN	CW
77.5	DCF 77	Mainflingen TS, GER	CW
100.0	BPL	Pucheng TS, CHN	CW
129.1	**DCF 49**	**EFR München, GER**	**IRA 200 Bd: 24 h tfc**
135.6	**HGA 22**	**EFR Budapest, HNG**	**IRA 200 Bd: 24 h tfc**
139.0	**DCF 39**	**EFR München, GER**	**IRA 200 Bd: 24 h tfc**
147.3	**DDH 47**	**Hamburg Meteo, GER**	**ITA2 50 Bd: 0613-2134 ry or wx**

14

COURTESY OF KLINGENFUSS PUBLICATIONS

9995.0 - 10003.0		STANDARD FREQUENCY AND TIME SIGNAL	
9996.0	RWM	Moscow TS, RUS	CW
10000.0	ATA	Delhi TS, IND	SSB
	BPM	Xi'an TS, CHN	CW/SSB
	PPE	Rio de Janeiro TS, BRA	CW/SSB
	RTA	Novosibirsk TS, SW, RUS	CW
	WWV	Fort Collins TS, CO, USA	COMB
	WWVH	Kihei TS, Maui Island, HWA	COMB
10001.8		**NATO digital data station**	**STANAG 4285: 1016+1531-1757 encrypted tfc**

10003.0 - 10005.0		STANDARD FREQUENCY AND TIME SIGNAL + Space Research	
10003.0	WORLDWIDE	MSV SAR OPERATIONS FREQ.	SSB

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In the Time of the NPL

The NPL fully took over the service in 1967, using *Rubidium* atomic frequency standards and astronomical measurement tools. GBR was in service until 1986 (Hancock, 2017: 130; 136).

The **MSF** Time and Frequency Standard began in 1950, and the A1A-modulated (CW, Morse code) signals on 60kHz are still available 24/7 today. Until 31st March 2007, they came from Rugby. After 57 years in that location, they were transferred to Anthorn in Cumbria, UK. *Babcock International* now operate the transmitter, under contract to the National Physical Laboratory (NPL) in Teddington, UK.

Malcolm Hancock's book, *The History of Rugby Radio Station*, makes for a fascinating read, looking as it does, at the many – perhaps unexpected – political and diplomatic pressures inherent in having an 'official' time signal.

http://rugbyradiostation.co.uk
https://www.npl.co.uk

Anthorn also has a VLF submarine transmitter (**GBZ** on 19.6kHz) and an enhanced long-range navigation (*e-Loran*) transmitter (*Chain Lessay*, GRI 6731; Wiessala, 2012; 2022a &b). The MSF time signal represents a 1.295 per cent share in International Atomic Time (TAI), whereas DCF77 (see next section) contributes 2.764 per cent (Klawitter, 2009: 30-32).

Fig. 16 shows the detail of the current time coding scheme for the MSF time beacon.

https://www.npl.co.uk/msf-signal

The DCF77 Transmitter

The German equivalent of NPL is **DCF77**, at the *Physikalisch-Technische Bundesanstalt (PTB)* on 77.5kHz (a wavelength of ca. 3,868.3 metres). This traditional station at the PTB (Fig. 17) has a 50kW Long Wave transmitter in Mainflingen near Frankfurt and ranges over some 1,300 miles (2,100 kilometres, Fig. 18).

It is run by *T-Systems Media Broadcast*, on behalf of the PTB.

With Germany being Germany, the availability of the service is, naturally, guaranteed by a piece of legislation, the 'Time-Law' (*Zeitgesetz*).

The Mainflingen site also hosts **DCF49**

(100kW) on 129.1kHz, for the remote control of energy meters, as is also done by Droitwich, via 198kHz LW in the UK.

The (free) software *sodiraSDR Software Radio* (v. 0.100) has a decoder for DCF77, which analyses the phase modulation of the signal. Furthermore, the widely-used *Spectrum Lab* program also includes a decoder for 77.5kHz (go to: *'Components'* – *'Time Signal Decoder'*).

https://tinyurl.com/2py7hyf9

Why and How to Receive SFTS

So what is the attraction of receiving these stations? As stated above, SFTS-DXing can be useful for propagation forecasting, weather reporting and ionospheric monitoring. For the latter, in particular, WWVB has been used by radio amateurs. To be precise, SFTS stations can be an 'electronic litmus paper' for the radio hobbyist or citizen-scientist, who seeks more detail about the following:

- Interval measurement
- Synchronicity
- Frequency drift and detail, and
- Geographical information.

Some SFTS transmissions make devices flash, such as the *MFJ Beacon Clock* (see Part One). Others are just thin traces on a waterfall diagram; many are *hidden inside other transmissions*, such as radio and TV ones; and some are used to synchronise machines via the process of comparative signal path analysis.

What is more, time information transmissions can *contain other signals*, like meteorological data (DCF77), or in the case of the ERF (*Europäische Funkrundsteuerung*) system used Europe-wide by **DCF49**, for ripple-control of all our smart energy meters.

However, for many of us radio users, time signal sources by radio are strongly indicative of the overall propagation conditions (see above). Others find it helpful to be able to analyse them in the context of hunting co-channel interference (e.g. on BPM, PPE, WWV [2,500, 5,000, 10,000, and 15,000kHz] WWVH [10,000kHz] or examine detailed 'time-of-flight' signal data and signal paths.

You can, of course, make use of software, such as *VOACAP*, to do this.

https://www.voacap.com

The image in Fig. 19 shows a high-quality, 24-hour, recording (in Europe) of some key global time signal transmitters, from 60 to 198kHz, kindly supplied by Nils Schiffhauer.

Fig. 14: VLF SFTS listings in the *2022 Klingenfuss Guide to Utility Radio Stations*. Fig. 15: HF SFTS listings in the 2022 *Klingenfuss Guide to Utility Radio Stations*. Fig. 16: The current time coding schematic for the MSF time beacon. Fig. 17: The cover of a commemorative leaflet from the PTB.

Working with SFTS Stations

You can, of course, you can decode SFTS signals and adjust your PC clock with them, such as in the case of *RadioClock* by COAA, or the *Software Clock* programme within *MultiPSK*. These days, of course, you can go one step further and use remote SDRs to monitor far-flung SFTS stations (Schiffhauer, 2018: 44).

If you do live within reach of a local SFTS station, the likelihood is that you will be able to receive signals easily and with a minimum of effort. This makes for an excellent weekend project, by the way, as it did for me. I live in the Northwest of the UK, and MSF at 60kHz transmits just from the next county up (Cumbria).

I am on the operator's mailing list, the National Physical Laboratory (NPL), and I am always interested in maintenance outages, technical issues and scientific research projects.

With both the 60 and 77.5kHz frequencies in mind, I used several different permutations of aerials and receivers, and I soon homed in on the transmissions. In my view, this 'experimental' use of different pieces of equipment, both indoors and outdoors, and the attempts I can make to draw the best possible results out of my aerials, feedlines, PCs and receivers are what renders this aspect of the radio hobby so attractive to me.

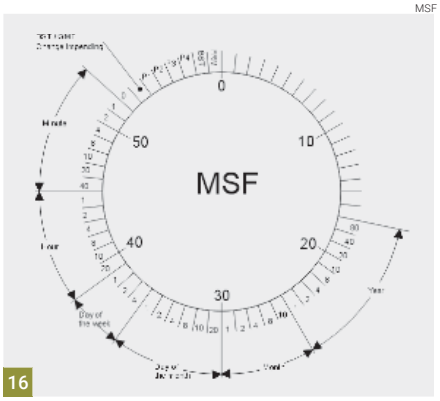
Therefore, here are some really simple ways in which you can listen to time signals:

The Beauty of Physical Receivers

First off – as it almost invariably is – I pressed my vintage HF hardware back into service. Not many physical HF receivers were ever made to go into the area of Very Low Frequency (VLF) signals.

As many of you will know, the British firm AOR (*'Authority on Radio'*) manufactured the design-marvel *AR7030* (in the 'Normal' and the 'PLUS' versions (Fig. 20, with the old ERA BP34 Audio Filter and a bhi External Speaker). This radio goes down to 0kHz. The *Lowe HF 150* receiver is another radio you can use in this part of the band, down o 60kHz. I have operated both radios, but I have rarely ever tuned in to time signal stations in the basement bands. When I

MSF



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PTB

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did, quite recently, I went on to connect a variety of aerials to these rock-solid-stable receivers, learning a lot and having enormous fun in the process (see below).

Using SDR Technology

Many hobbyists are enjoying the technology that comes with Software-Defined Receivers (SDRs) these days. Among the most frequently mentioned advantages of these radios is their ability to record large chunks of the spectrum unattended as well as the innovative waterfall display features.

The latter makes signals easily visible and facilitates the search for new ones.

In this way, you can get a good night's sleep and analyse whatever signals you have received later.

On account of my work editing *RadioUser*, I have had the pleasure of seeing and operating some new, state-of-the-art SDRs, such as the *ELAD FDM S-3* and the brand-new *WiNRADIO Excelsior Ultra* (Fig. 21; *RadioUser*, May 2022: 21).

These are radios which truly push the boundaries of what is currently possible and will challenge your PC.

Amongst my own (more affordable)

- Betke, K. (DL4BBL): List of Standard Frequency and Time Signal Stations **https://tinyurl.com/2p8z3e6r**
- DX Info Centre **https://www.dxinfocentre.com/time.htm**
- Funkuhr **https://www.heret.de/funkuhr/liste.htm**
- Low-Frequency Radio Time Signals **https://tinyurl.com/2p89tur5** (M. Kuhn)
- Meinberg SFTS List **https://tinyurl.com/2uh83pc3**
- Signals ID Guide (SIGIDWIKI.com) **https://www.sigidwiki.com/wiki/Category:Time**
- S-Meter **https://tinyurl.com/43ejmp82**
- TDP Time Signal Short Wave Radio Stations (List) **www.shortwave.be/tim.html**
- UDXF **http://www.udxf.nl/TSS.pdf**
- William Hepburn's List of Time Signal Stations **www.dxinfocentre.com/time.htm**

Table 4: SFTS Stations Around The World – A List of Lists *(N.B.: Not all of those are updated regularly)*.

'shack-workhorses', however, in terms of SDRs, is the SDRplay range of receivers, especially my favourites, the SDRplay RSPduo and RSPdx.

Importantly, these can resolve and visualise VLF (time) signals too.

In the next and final part of this article, next month, I will be looking at the use of your PC as a time signal receiver, at suitable aerials for the reception of SFTS stations, and a number of very 'special' time signals, you have likely never heard of.

I will also include more background information and a full list of resources.

PTB

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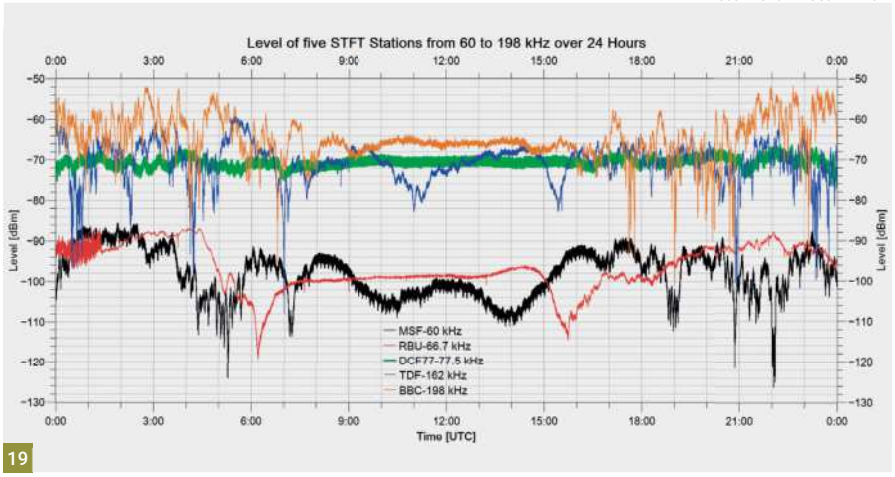
COURTESY OF NILS SCHIFFHAUER



19

GEORG WIESSALA

20

WINRADIO

21

Fig. 18: The Europe-wide range of the DCF77 signals. Fig. 19: Times and levels: a 24-hour, recording of some key time signal transmitters, from 60 to 198kHz (NS). Fig. 20: My AOR AR7030, with an old ERA BP34 Audio Filter and a bhi External Speaker. Fig. 21: The *WiNRADIO Excelsior Ultra* (Review: *RadioUser*, May 2022: p. 21).

European Private Shortwave Stations

September 1st 2022

Only **legal** stations are included. Most stations use low power, but a few use several kW. Note that UTC is used here, not CET, nor CEST! Abbreviations used: D = Germany, DNK = Denmark, FIN = Finland, NL = Netherlands, NOR = Norway F.pl.: future plan, Int'l = International, Irr. = irregular, LT = Local time, 24/7 = twenty-four hours a day, seven days a week Mo = Monday, Tu = Tuesday, We = Wednesday, Th = Thursday, Fr = Friday, Sa = Saturday, Su = Sunday.

kHz	Country	Name	Transmitter site	Schedule (UTC)
3955	D	Radio Channel 292	Rohrbach Waal	Daily 0600-2000 & 2100-0500
3975	D	Shortwave Radio	Winsen	
3985	D	Shortwaveservice	Kall-Krekel	Daily 1400-1930 ('Radio Popexpress' a.o.)
3995	D	HCJB	Weenermoor	24/7
5920	D	HCJB	Weenermoor	24/7
5930	DNK	World Music Radio	Bramming	Sa-Su 0600-2100
5940	NL	Radio Piepzender	Zwolle	Irr.
5955	NL	Sunlite	Westdorpe	Daily 0400-1800. From Oct 1st 0400-1500
5970	DNK	Radio208	Hvidovre	24/7
5980	DNK	Radio OZ-Viola	Hillerød	We 2100-2200
5980	FIN	Scandinavian Weekend Radio	Virrat	1st Sa of the month (not in September)
6005	D	Shortwaveservice	Kall-Krekel	Daily 0800-1600
6005	NL	Radio Delta International	Elburg	Irr. (Fr or Sa 2100-0300)
6020	NL	Radio Delta International	Elburg	Irr. (Su 0600-1500)
6055	DNK	Radio OZ-Viola	Hillerød	Sa-Su 1100-1300
6070	D	Radio Channel 292	Rohrbach Waal	24/7
6085	D	Shortwaveservice	Kall-Krekel	Daily 0700-1700 ('Radio MiAmigo Int'l')
6115	D	Radio SE-TA 2	Gera	Irr. (Sa or Su 1000-1200)
6130	NL	Radio Europe	Alphen a/d Rijn	24/7
6140	NL	Radio Onda, Belgium	Borculo, NL	Irr. (weekends only)
6150	D	Europa 24	Datteln	
6160	D	Shortwave Radio	Winsen	
6170	FIN	Scandinavian Weekend Radio	Virrat	1st Sa of the month (not in September)
6185	NL	Radio Piepzender	Zwolle	Irr.
7260	NL	RockPower	Nijmegen	Irr. mornings (approx. 0800-1200)
7270	NL	RockPower	Nijmegen	Irr. afternoons (approx. 1200-1600)
7365	D	HCJB	Weenermoor	24/7
7425	NL	Radio Piepzender	Zwolle	Irr.
7445	NL	Radio Piepzender	Zwolle	Irr. (0800-1800)
9670	D	Radio Channel 292	Rohrbach Waal	24/7
11690	FIN	Scandinavian Weekend Radio	Virrat	1st Sa of the month (not in September)
11720	FIN	Scandinavian Weekend Radio	Virrat	1st Sa of the month (not in September)
15700	DNK	World Music Radio	Randers	Sa-Su 0700-2000
15785	D	BitExpress	Erlangen	24/7 DRM-modulation ('Funklust')
25800	DNK	World Music Radio	Mårslet, Aarhus	24/7

Radio News

NEW DAYTIME PROGRAMMES AND PRESENTERS FOR GB NEWS RADIO: GB News Radio is changing some of its programmes for the first time since it launched 15 months ago. Journalist and former Labour politician Gloria De Piero will team up with former Sky News presenter Mark Longhurst to co-present a new weekday show, *GB Newsday*. Gloria will expand her two series:
The Real Me, talking to politicians about their non-political lives, and Life and Times, in which political heavyweights reflect on their careers.
Patrick Christys will move to late afternoons as host of a new programme, GB News Live. He will continue to host *Friday Night Feast*.
At weekends, GB News commentator Calvin Robinson will present a new show, *Calvin's Common-Sense Crusade*, on Sundays. GB News' coverage of the cost-of-living crisis will be expanded with On the Money hosted by Economics Editor Liam Halligan becoming a channel-wide feature across the schedule.
Conservative MPs and married couple Esther McVey and Philip Davies will co-present another programme on Fridays, in addition to their Saturday morning show.
And journalist Olivia Utley will join in October from her role as Assistant Comment Editor at *The Telegraph*. Editorial Director Michael Booker said the announcements were the first of a raft of developments planned for this autumn: *"Our strength as a small start-up is our ability to innovate and move quickly to stay ahead, keep growing and keep listening to our audience,"* he said. *"Our new programming also leverages our growing investment in news gathering across England, Scotland, Wales and Northern Ireland."*
(SOURCE: GB News Radio | RadioToday)
https://tinyurl.com/ymtynnbk

NATIONAL HOSPITAL RADIO AWARDS 2022: All the winners have been announced for the *National Hospital Radio Awards 2022* organised by the Hospital Broadcasting Association (HBA). An online event took place on Monday evening and was watched across the stations. *Radio Ysbyty Gwynedd* was named *Station of the Year*, whilst Winchester Radio's Paul Blitz was honoured with the *John Whitney Outstanding Contribution Award*. The *Best Female Presenter* is Jo Hobbis from Torbay Hospital Radio, and *Best Male Presenter* is Connor Morgans from Bridgend's Hospital Radio. For the full set of results, and additional info, you can head over to the website below:
(SOURCES: HBA | RadioToday | Industry Press)
https://tinyurl.com/2rnyec27

Readers' Feedback

The editor offers a selection of e-mails, letters and posts received from our readers.

Philips D2999

Jim Gordon wrote in with the following informative comment: *"In the September issue of* Radio User *(pp. 60-62) you featured the above vintage radio* [The Philips D2999, pictured – **Ed**.] *and you mentioned that you thought that " It was Phillip's only foray into world band radio ". In fact, there was another smaller but popular model the D 2935 Synthesized World Receiver D2935 PLL Radio Philips; Eindhoven (**radiomuseum.org**). It had a plastic membrane keypad that tended to crack, and replacements are available from several sources. Thank you and your colleagues for your work on* Radio User. *I too have a collection of vintage shortwave radios. My top three are the Sony ICF 2001D and the Panasonic RF2200 and RF B65. I have featured these and others from my collection on the* YouTube *channel in my name Jim Gordon."*

*[Thank you very much, Jim – I'd completely forgotten about that one! I find collecting vintage radios fascinating, but what an addictive, hobby, indeed! Thanks also for your kind words on the magazine, and all the very best – **Ed.**].*

Satellite Radio Memories

David Miller contacted our Digital Radio expert, **Kevin Ryan**, with the following comments: *"Hi Kevin, It was interesting to read your column in the August 2022 RadioUser magazine (pp. 38-40 – Ed.) and has brought back some memories with a look at direct-to-home satellite broadcasts. (If I were to mention these to 'day-to-day people', they would probably say "eh what?!") - I've had an interest in satellite TV since 1999 when I was given a Sky analogue box and 60cm dish. Following a bit of expansion to a larger dish and going digital, for several years now I've used a Wave Frontier 90cm dish fed into 2* Technomate *receivers via a 10-way DiSEqC switch* [Digital Satellite Equipment Control – **Ed**.] *and also have a second 60cm dish that can be beamed onto whatever I decide. Note that these switches are VHF (very hard to find)! The main dish can only see eastern birds and the second one anywhere across the sky within the range including the westerly satellites. For your information, currently I have 5° west and to the east 5° / 9° / 13° / 16° / 19° / 23.5° / 28.2-5° / 39° / 42° ! Also, I have Sky Q on the same main dish... a bit more difficult but doable with a bit more expense! I listen to radio from overseas on this system regularly with much higher quality in my opinion and often more reliable than streaming across the Internet. My favourite programmes mostly come from Germany as far as radio is concerned. I think I have grown up to enjoy satellite radio (and TV for that matter) and will continue to enjoy it until in years to come it's all turned off and only available online! Sorry to hear about your reception problems due to trees in the way!"*

Kevin replied as follows: *Hi David, It's great to hear from you and I'm very impressed with your satellite setup and with your coverage arc. I have an old Sky dish on the chimney that I very occasionally use for radio but I am unsure if it could be re-purposed to pick up Hotbird. Forum posts on the internet encourage people to try saying it should work but I don't think I've seen a reply that it did. I would think it better to get a new dish dedicated to a particular satellite. Something to dream about! [...] I agree that there is 'something' about listening to radio that is broadcast, rather than streamed from a computer.*

Goonhilly Earth Station

David Williams wrote to our *Signals from Space* columnist **Tim Kirby's** article in *RadioUser*, July 2022: 565-58): *"Hello Georg, I would just like to add a couple of things to the story about Goonhilly Earth Station, in the July 2022 issue: (1) The article mentions that the French Earth Station Pleumeur-Bodou was the first to*

receive television from Telstar. *The reason for this is that* Telstar, *like many of the early Intelsat satellites, used circular polarization for the signal from the spacecraft to the Earth Station, known as the Downlink. Now the wrinkle with circular polarization is how it is defined. Do you define it as from the transmitter or the receiver's point of view? If you think about the transmitter sending a clockwise circular signal then the receiver will see an anti-clockwise signal. (Think about a corkscrew). In the case of* Telstar, *the French interpreted the specification correctly, but Goonhilly was set up for the wrong polarization. I understand they had fixed the error by the next day. (2) Regarding undersea cables travelling through the site, this was done to allow rapid restoration of priority traffic via a satellite link if the cable failed or was damaged by anchors or underwater earthquakes. International traffic was routed via the Post Office Tower in London via a microwave link to Goonhilly. There the traffic could be sent onwards by cable, with rapid patching to satellite if the cable went down."*
*[Many kind thanks for your observations, David, I shall pass this on to Tim, in case he has any other observations. Do any of our readers want to comment on this? – **Ed**.].*

Shanwick Frequency Riddle

Desmond Walsh contacted our Airband News columnist, **David Smith**, writing as follows: You might be able to help me with a strange Shanwick frequency I heard recently on VHF. There was a high-pressure system across N W Europe at the weekend, i.e. August 19th to 20th. Here, near the south coast of Ireland, I heard the usual enhanced signals from Wales and Southwest England across the VHF bands but was amazed to hear Shanwick on 142,225 MHz (AM). The Signal was weak and next to impossible to understand due to continuous lightning static discharges. There was a 10-second loop of audio, a female voice but all I could make out was "Shanwick" in the repeated messages. I have searched numerous internet sites but found no reference to a 142.225MHz transmission. I guess the transmission might have originated in Northern England or Scotland. Do you have any information about it? It has now gone, with the drop-off of tropospheric propagation. I wish you continued success with your *Airband News* column – very informative!

…To which David replied: *"Hello Des, Thanks for your kind comments about my column. That 142.225MHz is a mystery to me. That 140s sub-band seems to be used mainly by the military, USAF especially, but 'Googling' around, I see that there are French Mil and civilian airfields that have 142.225MHz allocated. Maybe it was one of these ducting in the high pressure? However, the Shanwick reference would seem to destroy this theory. Most odd. Sorry, I can't be of help on this one […]."*
*[The editor too, has drawn a blank on this one – can anyone enlighten us, please? **Ed**.].*

Birkett's: A Great Shop

*And last but not least, some great 'feedback' from our designer, Mike Edwards, regarding a traditional radio shop in Lincoln (Birkett's). The owners first advertised (in PW) in the 1950s, no less! It seems the business is now being run by a new generation – something that does not always go without saying these days. Enjoy Mike's photographs of the wonderfully-designed shopfront and the goodies on display inside – **Ed**.].*

Radio News

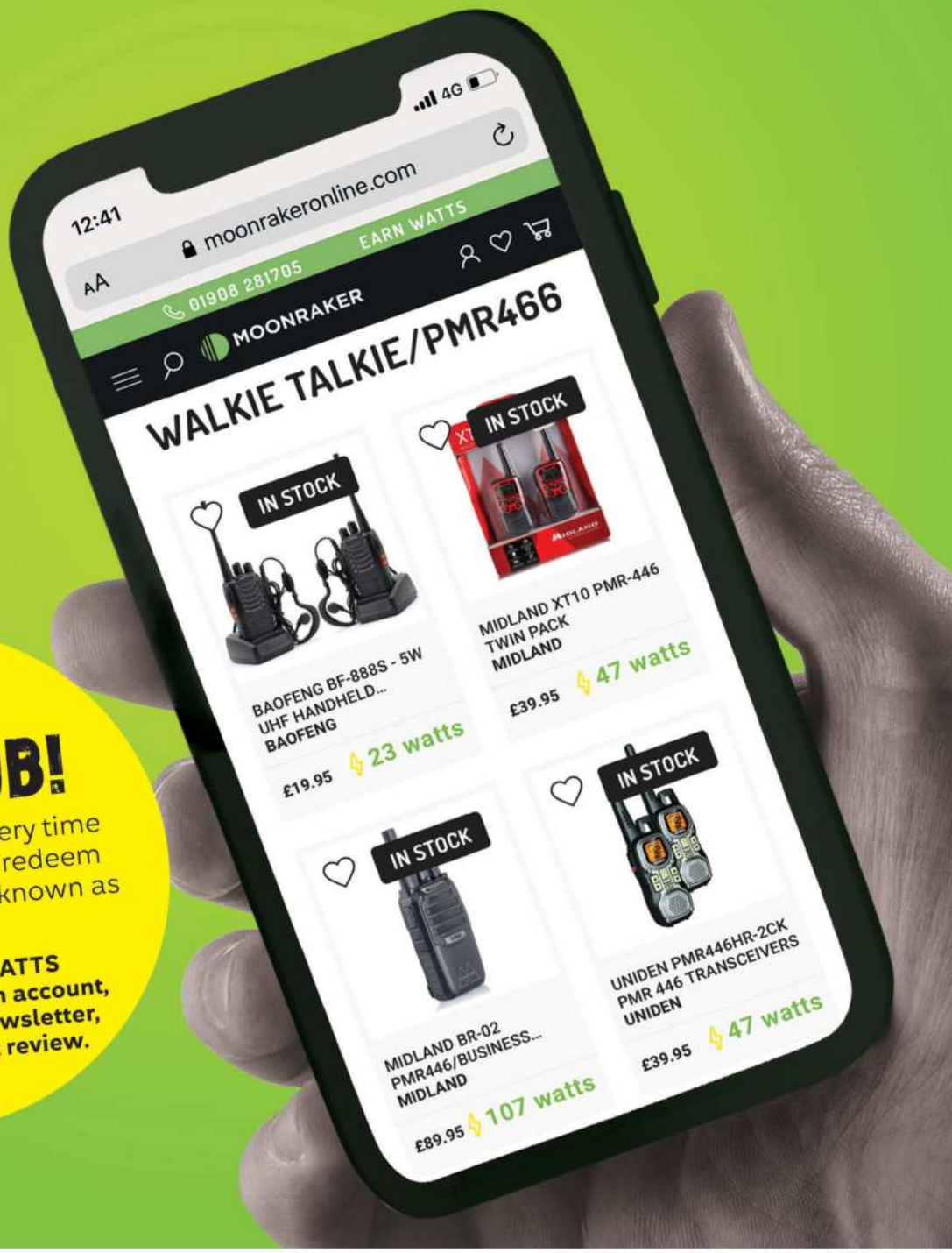
RADIO PULSARS: Some 30 years ago, some astronomers discovered the first 'exoplanets', a trio of small rocky planets orbiting a dead star acting as a 'cosmic lighthouse'. Now, a new survey of hundreds of these lighthouses, or pulsars, revealed that the existence of those planets is the exception rather than the rule. Fewer than 0.5% of pulsars are likely to host Earth-sized or larger exoplanets, which deepens the mystery of how any planets exist in those systems at all. *"One of the main things about pulsar planets is we don't know how to get a planet around a pulsar,"* said Iuliana Nițu, a doctoral student at the University of Manchester in the United Kingdom and lead researcher on the new survey. *"It's circular: You need to study the population to learn more about and constrain your models, which then tell you more about populations."* [...] Full story at the URL, below: (SOURCE: *EoS Science News* | AGU Kimberly M. S. Cartier |agu@agu.org)
https://tinyurl.com/2pknfyww

HEAT LAUNCHES NEW ENTERTAINMENT PODCAST: Bauer's *heat* brand has partnered with the daily news podcast *The Smart 7* to launch its own podcast, *The heat 7*. *The Smart 7* is created by production house Daft Doris and includes big news and sports stories delivered each day in under seven minutes and broadcast at 7 am. Launching on 5th September with new episodes every Monday-Saturday at 7 am, *The heat 7* podcast will follow a similar format with seven stories from the world of entertainment, showbiz, reality and social that day, in under seven minutes. The team behind *heat*, including presenter [...] Lucie Cave and Deputy Editor of *heat digital* Eden-Olivia Lord, will run the podcast using the magazine's tone of voice and include audio excerpts from exclusive interviews and events. Commenting on the launch, Lucie Cave said: *"This is super exciting and a natural evolution for the heat brand in the digital audio space. It's going to be the must-listen podcast for pop culture lovers everywhere and the beauty of it is that it will be delivered to your ears by 7 am all in seven minutes! There will be nothing you don't know about the biggest goings-on in the world of entertainment with exclusives from Love Island and The Kardashians to Stranger Things and the Royals. The heat 7 will update listeners on everything they need to get up to speed before they've even decided between a cornflake and an egg muffin. It's a caffeine shot of pure entertainment for the ears!"* Jamie East, broadcaster and Co-Founder of The Smart 7 added: *"Having started my career in the nutso* [sic - Ed.] *world of UK celebrity journalism I'm delighted to finally be working with the greatest celebrity and entertainment destination on the planet. This has been a long time coming, and it feels great to be dusting off my showbiz hat. The union of The Smart 7 and heat made perfect sense, and we just know people are going to love what we've created. We're also looking forward to carrying the conversation across to* Twitter Spaces, *where we can get under the skin of the heat stories that matter to the nation. We will be a vital public service, a bit like the NHS if the NHS cared about* The Masked Singer." *The heat 7* will be available from Monday 5th September on *Planet Radio, Amazon Music, Spotify, Apple Podcasts, Google Podcasts* and all mainstream podcast providers.
(SOURCE: *RadioToday*)
https://tinyurl.com/n5a5vw78
https://www.bauermedia.co.uk/brands/heat

BOYCOTT OF THE NEW DAB MULTIPLEX IN BRADFORD: A Group of radio stations in Bradford says it has decided to boycott the launch of Bradford Digital Media's small-scale DAB multiplex in the city. *Bradford Multiplex Broadcasting Corporation*, which was unsuccessful in its application for the licence, included support from 10 local radio stations which wanted to broadcast on DAB but have decided not to. A statement by the *Asian Broadcasters & Journalists Association UK*, representing the services, says Ofcom awarded the multiplex licence, *"to the group with the weakest local support and ignored the group with the most comprehensive local support, and was the "most controversial and influential licensing award decision"* ever. It also said: *"We believe that there is no fairness and internal check and balance in the Regulatory body."* In response, Bradford DAB told RadioToday: *"Ofcom considered how each applicant for the Bradford Small-scale DAB multiplex met a number of licence application award criteria. They decided to award the licence to Bradford Digital Media. We are pleased with Ofcom's decision and are on air operating a fully compliant synchronised single frequency transmission network and we are open for business." RadioToday* asked Ofcom for a comment on the above accusation, to which a spokesperson replied: *"When awarding radio licences, including the small-scale radio multiplex licence for Bradford, we follow robust, transparent and fair processes, which comply with the relevant statutory requirements. Our rollout of small-scale DAB will enable the launch of around 200 multiplexes, covering all four UK nations. Each multiplex will allow several stations to take to the digital airwaves, including grass-roots community services, specialist music stations, and services aimed at minority groups and other under-served audiences."*
(SOURCE: RadioToday ! Bradford DAB)
https://tinyurl.com/ycxsw5hs

MOONRAKER

THE ONLINE HOBBY RADIO SUPERSTORE



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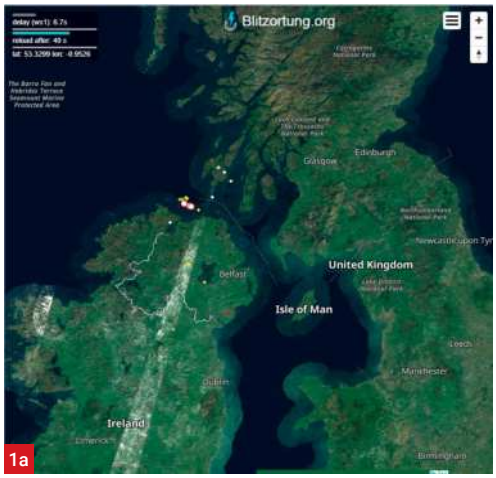
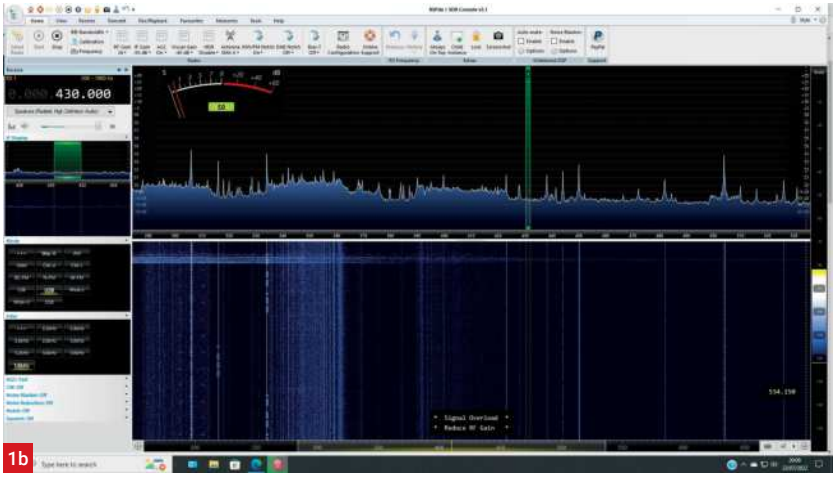


1a



1b

Robert Connolly
gi7ivx@btinternet.com

NDB Reception over the Summer

Robert Connolly cautions against the dangers of lightning strikes for your radio equipment, reports on current NDB DXing conditions and appreciates the significant advantages of using an SDR for NDB-hunting purposes.

Summer DXing of MF/HF frequencies can be challenging due to high levels of static, especially when trying to listen to weak signals. Coupled with this, seasonal propagation conditions can be variable resulting in difficult listening conditions and poor loggings if you are listening by ear. Often this QRN is associated with thunderstorms, and especially lightning.

Unfortunately, these storms do not need to be in your locality but can be many miles away (Fig. 1).

Fig. 1a shows lightning strikes about 100 nm from my location during a thunderstorm one night in late July. In Fig. 1b, the effect this has on MF/HF radio reception can be observed. You can see that it just wipes out the complete band for a brief period. If you were listening to the audio, you would hear noise 'blanking' everything else out; when using an SDR receiver you, thankfully, get a visual trace (see below).

Destructive Lightning

Lightning strikes caused during thunderstorms in your local area can seriously harm radio, TV and computer equipment, and so on; especially if your mains power supply is obtained from overhead powerlines. Lightning will hit the tallest object in its surroundings. Therefore, if your radio antennas are above the roof of your house, there is a serious risk of damage during thunderstorms as the lightning could strike the top of the antenna and the very high voltage it contains will travel down your coax cable to find a path to earth. Lightning can also hit overhead power and telephone lines and again travel down the cables to an earth connection.

Therefore, I strongly recommend that you disconnect all your equipment during a thunderstorm in your area to prevent damage. Several years ago, lightning struck the power lines feeding my local electric substation late one night. Thankfully, all my radio and computer equipment had just been shut down; however, an electric fan heater lifted off the ground for a few seconds, due to a power surge caused by the lightning strike.

Avoiding Damage

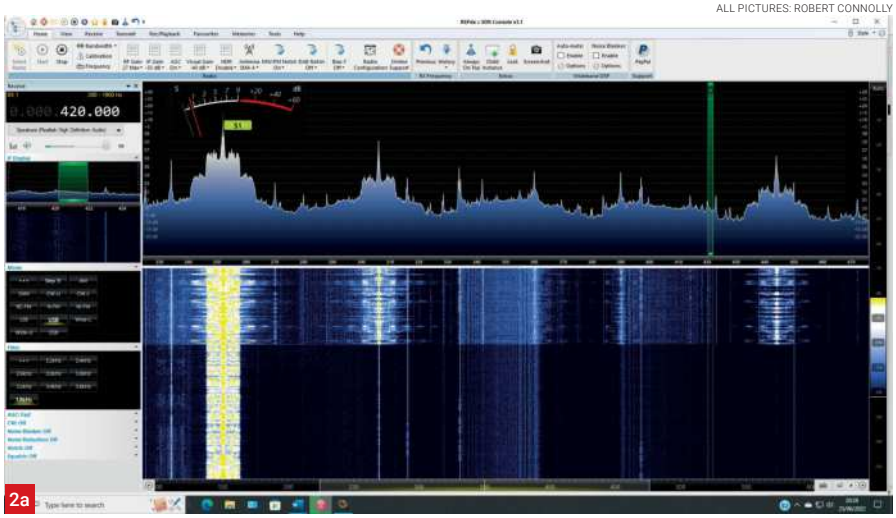
Even if you live in an area where all power cables are underground you are still at risk; a lightning strike on the equipment above ground, which supplies your electricity, still has the potential to cause a surge along the lines to domestic properties. Your radio equipment is expensive, even if you are on a low income and purchased it second-hand. If it is damaged you have to replace it or give up your radio hobby.

If you are on a low income, you may not be able to afford insurance on the equipment, or even the other item you have in your household. Therefore, it is important to play safe and when you hear thunderstorms in your locality; do not only switch off your equipment but unplug it as well. Also, disconnect your antenna from your radio equipment. I would suggest using surge-protected electric plugs on your most valuable equipment. These are more expensive to purchase but cheaper than having to replace your radio equipment.

If you have not yet checked your outdoor antennas then I suggest that you do so now to prepare them for the winter storms. Check brackets, bolts, and wall mountings (if you use them) and also check your coaxial cable for any damage along with your antenna connections for possible damp ingress. It is much easier to carry out these checks now than finding out during a winter storm resulting in your antennas crashing to the ground or even causing damage to your property.

If you live in a coastal area, you may have additional potential problems caused by corrosion due to the salt in the atmosphere. Always be safe when checking your antennas, especially if it involves you climbing ladders. Have somebody to not only help you with the job but also to check you do not fall from the ladder; do not 'overstretch' at the top of the ladder.

ALL PICTURES: ROBERT CONNOLLY



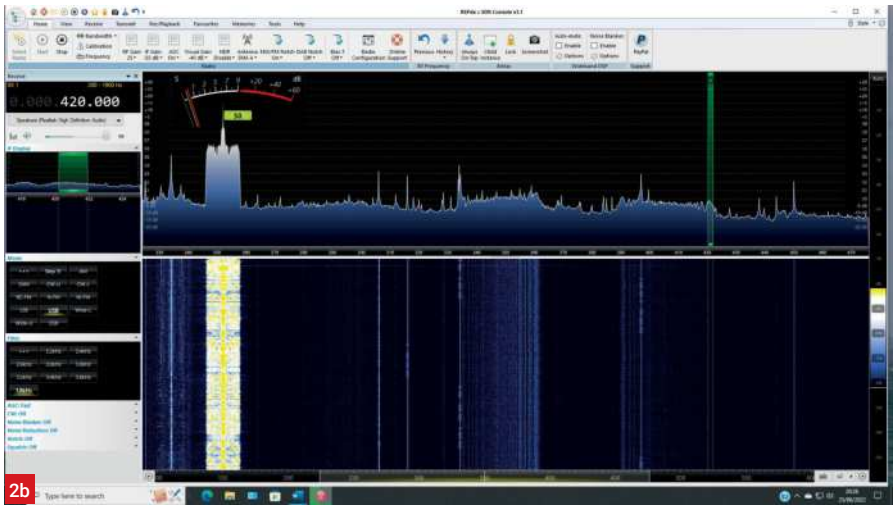


Fig. 1a: Lightning strikes about 100 nm from my location during a thunderstorm one night in late July 2022. Fig. 1b: The consequences of lightning strikes for MF/HF radio reception. Fig. 2a: *SDR Console*: Overload generated using the *maximum RF gain*. Fig. 2b: *SDR Console*: The same frequency segment (see Fig. 2a) with the RF gain reduced. Fig. 3a: My record-breaking NDB DXing period (sea-level pressure during my session). Fig. 3b: My record-breaking NDB DXing period (sea-level pressure forecast). Fig. 4a: My NDB monitoring session on 20th July 2022 (sea level pressure). Fig. 4b: NDB monitoring session on 20th July 2022 (pressure forecast).

Summer 2022 NDB DX and SDR Operation

Looking back over the summer period for NDB DXing, I am now using SDR receivers, rather than my trusty JRC NRD 525 receiver. This allows me to record a 500kHz section of the band, covering the NDB frequencies. I can then study these later, usually the following day. During the winter, I would normally record such a 12-minute session around 0100 UTC. I now mainly use *PskovNDB* software for decoding the recorded file and set its spectrum builder to 'DX Viewing' and to a Frequency Coverage between 260 and 520 kHz, with the file saved to the *PskovNDB* folder. I have this folder within my *SDR* folder.

This combination saves my ears, allows me to have a normal night's sleep and keeps my wife happy as I am not spending late nights in front of my receiver. Using *PskovNDB* to view NDB reception does not eliminate the usual summer crashes and bangs. However, it does make it easier to dig out weaker NDB signals if you use recordings of 10 minutes duration and longer. Scanning down the display produced by the software's *Spectrum Builder*, you can detect the received weak signals much easier, compared to spending that time physically listening to that frequency.

Over the summer period, I ordinarily set recording sessions for every second or third night. Although I have *SDRuno* available I prefer using *SDR Console* because I believe it produces a stronger signal for weaker NDB frequencies. If you are new to NDB DXing, you may feel you should use maximum RF gain, to pull in those weak signals. However, this can produce overload from other strong signals, for example, broadcast stations. Certainly, in my location, I have to reduce the RF gain due to overload from the RTE 1 Long Wave transmission on 252kHz, as its transmitter is only about 40 miles away from my location, as the proverbial maritime crow flies.

Reception Examples

For *SDR Console*, this means instead of selecting the maximum RF gain (level 27 in my 64-bit version), I reduce it by a couple of points, down to 25 or 26 (Fig. 2).

Fig. 2a shows the overload generated using the maximum RF gain.

Fig. 2b shows the same frequency segment with the RF gain reduced.

This second image was grabbed within a minute of the first image to minimise propagation changes. If you are physically listening to signals on the NDB band, you will sometimes come across two, or more, beacons transmitting on the same frequency, often with one signal more dominant. NDB signals *on the same frequency within the same country* may not be geographically separated. You might find that the frequency of one is a few Hz different to the other. However, the NDB signal *from a different country* may be exactly on top of the other signal. It is then a case of careful listening for a while because NDB transmission timings can be slightly divergent. By listening for, at least, several minutes, you can slowly build up the identification of the other NDB.

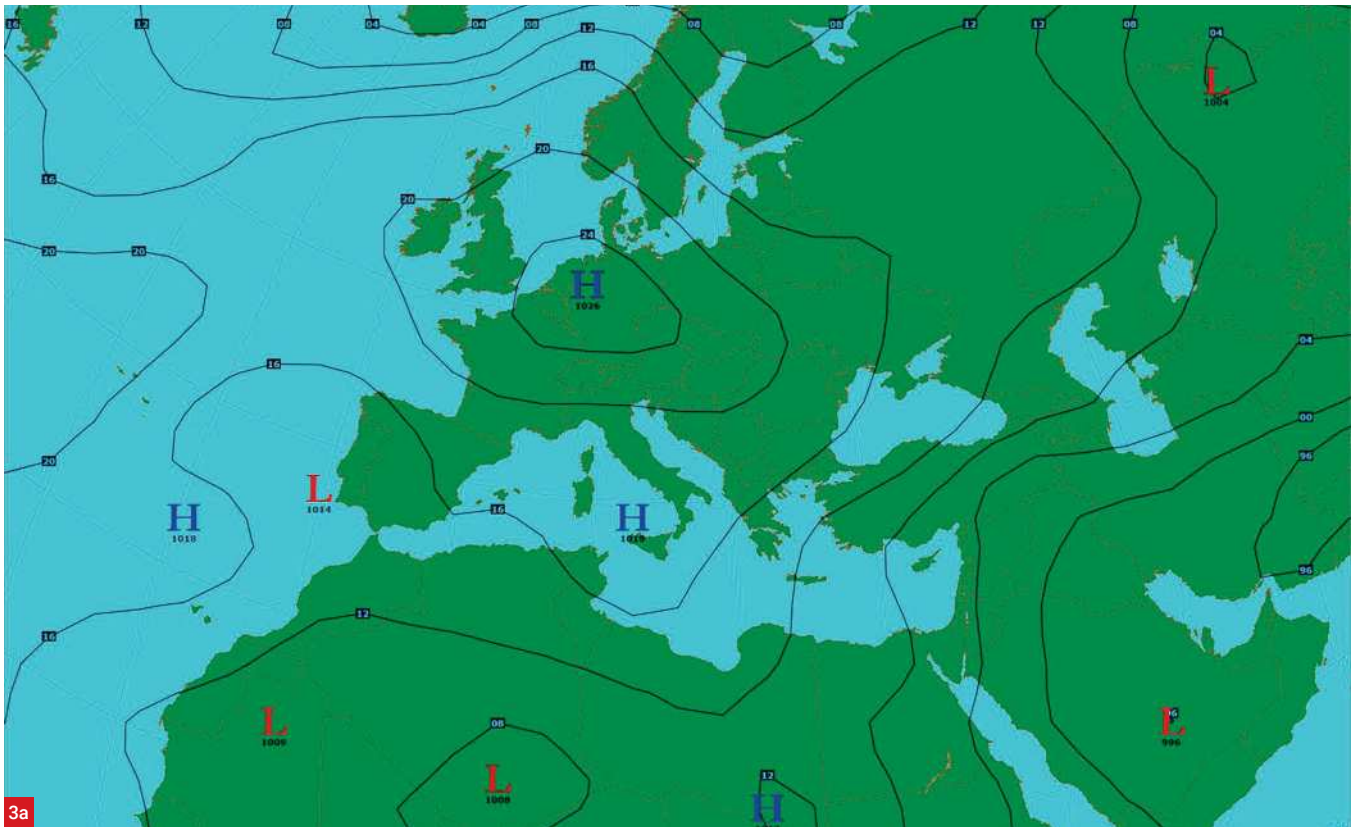
Moreover, using *PskovNDB*, you can see the two beacons if they are separated by a few Hz.

If they *are* exactly on top of each other, slowly build up the identification *by scrolling through the complete recording of that frequency*. There are two pairs of NDBs that I have to try to do this with, OE Dublin and BRR Scotland, both on 316kHz; also GMN Gormanstown and KER Kerry, both on 334kHz have exactly the same frequency offsets.

Some NDB Closure News

Now for some NDB closure news: ENS 352kHz Ennis, Ireland has closed, as has 352 kHz OY Belfast Aldergrove, Northern Ireland. Furthermore, 338kHz FNY Doncaster, England may close in November if the airport closes its doors due to financial losses.

As I prepare this column in early August, both Andy Thomsett and I managed to catch



3a

263kHz QY Sydney, Nova Scotia, Canada. It is unusual to catch North American beacons in Europe this early, and this raises hopes for a decent winter DX season. Although many North American NDBs have closed, and so pickings will be lower than in previous years, it may still leave those frequencies open to reception to other NDBs that are not normally received.

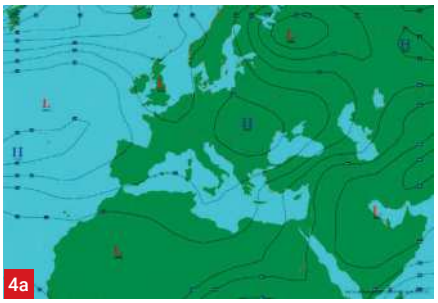
OZN 372kHz, Prins Christian Sund Greenland has again been a regular here over the summer months. This is not too surprising, given that its transmitter output power is approximately 1KW.

On the subject of reception, I would normally log between 120 and 150 NDBS per session. In the early hours of 17 July, I smashed my personal record for the number of NDBs received in a session (158).

I managed to catch 254 NDBs in the session (Fig. 3):

- The image in Fig. 3a reveals *sea level pressure* for that time.
- The map in Fig. 3b shows the *pressure tendency* at the time.
- Now take a look at Fig. 4, for a comparison:
- The map in Fig. 4a shows *sea level pressure* for my session on 20 July.
- The screenshot in Fig. 4b displays the *pressure tendency* for that date when 113 NDBs were received.


3b


4a


4b

I used just added newly received beacons to my master log. However, while I could see the number of NDBs received per session, I had no total monthly total of different NDBs received. Back in the Spring, therefore, I began logging *beacons per session* in a monthly log file.

I record a session every second or third night, always about 0200 local, and I go through them the following day. Entering them into a monthly log, I quickly realised that I was receiving many more beacons over the month than I had thought. Since March 2022, I have, consequently, entered my monthly NDB logs on my website in pdf format – normally a few days after the end of the month.

www.kilkeel.org.uk/ndbsrxd.htm

I plan to have a full 12 months' worth of data available before overwriting the oldest files, and, as per usual, the NDB logs are available on the *Radio Enthusiast* website now:

www.radioenthusiasts.co.uk

Next month it is back to my normal *Maritime Matters* column. I will be looking at how ships that do not transmit their AIS information can be tracked and at a form of sound communication between ships that pre-dates maritime MF/HF/VHF radio and is still in use today.

Until next time "*Fair Winds*".

Rallies & Events

All information published here reflects the situation up to and including 15th August 2022. Readers are advised to check with the organisers of any rally or event before setting out for a visit. The Radio Enthusiast website **www.radioenthusiast.co.uk** has the latest updates, please check it regularly. To get your event on this list, e-mail full details as early as possible: **wiessala@hotmail.com**

25 September
WESTON SUPER MARE RS 7TH RADIO & ELECTRONICS RALLY: The Campus Community Centre BS24 7DX; 10 am to 2 pm.
https://tinyurl.com/2p986v6t

25-30 September
EUROPEAN MICROWAVE WEEK 2022 (MILAN)
https://tinyurl.com/y49mv8j6
https://www.micomilano.it/en

2 October
WELSH RADIO RALLY NEW VENUE: Llanwern High School, Farm Rd, Newport, South Wales NP18 2YE. Doors open at 10 am. (BB | TS).
www.gw6gw.co.uk

7-9 October (Friday to Sunday)
THE RSGB CONVENTION
https://tinyurl.com/265yh44r

14-15 October
THE NATIONAL HAMFEST: George Stephenson Pavilion, Newark & Nottingham Showground, Lincoln Rd, Winthorpe, Newark, Notts. RG24 2NY Local and international traders; B&B | Books | CBS | Clubs | RSGB | SIG).Tickets can now be purchased online.
http://nationalhamfest.org.uk

16 October
HORNSEA ARC RALLY: Driffield Show Ground, Driffield, East Yorkshire YO25 9DW.
www.hornseaarc.co.uk

22 October
ESSEX CW BOOT CAMP/ CW CONVENTION: 3rd Witham Scout & Guide HQ Rear of Spring Lodge Community Centre Powers Hall End Witham Essex CM8 2HE. Doors open at 08:30 for registration.
Begin 09:00. Finish approx 16:30. Entry is £10, with free drinks; Pre-register with G0IBN as places are limited
(CR | FP).
Tel: 0745 342 60 87
g0ibn1@yahoo.com

30 October
GALASHIELS RADIO RALLY : Volunteer Hall, St Johns Street, Galashiels, TD1 3JX. Open from 11 am.
(BB | CR | TS)
http://galaradioclub.co.uk/?cat=7

30 October
HACK GREEN RADIO SURPLUS HANGAR SALE: Hack Green Secret Nuclear Bunker, Nantwich, Cheshire CW5 8AL. Sale of electronic equipment, amateur gear, components, military radio items, and vehicle spares. The doors are open at 10 am.
Tel: 01270 623 353
www.hackgreen.co.uk
coldwar@hackgreen.co.uk

6 November
BUSHVALLEY ARC RALLY: Limavady Football Club. Doors open at 11 am; entry is £3 with a door prize ticket.

6 November
HOLSWORTHY RADIO RALLY (HARC) : Holsworthy Leisure Centre, Well Park, Western Road, Holsworthy, Devon EX22 6DH. Traders from 8:00 am; doors open to the public at 10 am. (BB | CR | D | TS) Traders & General Enquiries, Contact the Secretary via email:
m0omc@m0omc.co.uk
https://tinyurl.com/yckypn5v

19 November
THE ROCHDALE & DISTRICT AMATEUR RADIO WINTER RALLY: The Rochdale & District Amateur Radio Winter Rally will take place in St Vincent de Paul's Hall, Norden, Rochdale, OL12 7QR.
Doors will be open at 10 am with the entry fee still only £3 (CR | FP | TS).
Roz Worrall: rozallin@gmail.com
Dave Carden G3RIK:
dave@cardens.me.uk
Tel: 01706 633 400
Mob: 0781 367 1296

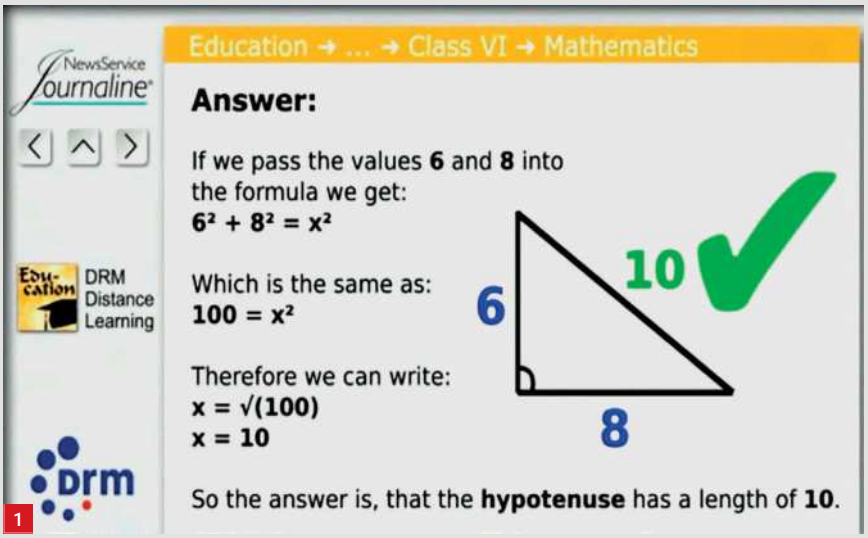
19 November
WILTSHIRE WINTER INDOOR RADIO RALLY: Kington Langley Village Hall & Fields, Church Road, Chippenham, Wiltshire SN15 5NJ. Doors are open from 9 am to 1.30 pm. £2 entry for buyers (under 16s free). £10 per table for sellers (CR | D). To reserve tables contact Brian G6HUI via e-mail:
rally@chippenhamradio.club
Chairman@g3vre.org.uk
https://tinyurl.com/ykyhf7nc

20 November
CATS 43RD RADIO AND ELECTRONICS BAZAAR: Oasis Academy Coulsdon, Homefield Road, Coulsdon, Surrey CR5 1ES. Doors open from 10 am to 1 pm.
Andy G0KZT: 07729 866 600
bazaar@catsradio.org.uk

27 November
BISHOP AUCKLAND RAC RALLY : Spennymoor Leisure Centre, High St, Spennymoor DL16 6DB: Radio, old and new, computers & electronics. The rally takes place in a large ground-floor hall. Doors open at 10.30 am (10 am for disabled visitors). Admission is £2 - under 14s free of charge with an adult. (BB | CR | D | FP | TS).
Bob Dingle, G0OCB: 07710 023 916

BA Buildathon **BB** Bring-and-Buy **CBS** Car Boot Sale **CR** Catering /Refreshments **D** Disabled visitors **FM** Flea Market **FP** Free Parking **LB** Licensed Bar **L** Lectures **MS** Meeting Spaces **RF** Raffle **RSGB** (RSGB) Book Stall **RU/PW** RadioUser/ PW in attendance **SIG** Special-Interest Groups **TI** Talk-In (Channel) **TS** Trade Stalls **Wi-Fi** (Free) Wi-Fi.

Kevin Ryan
kevin@radio-digital.co.uk



1

Remote Education and Free DRM Radio Schooling

Kevin Ryan examines the developing capabilities of the DRM format, such as remote education, looks at some BBC Test Transmissions and explains some of the main digital radio technology terms and functions.

The digital radio standard Digital Radio Mondiale (DRM) can be used in broadcast bands up to 240MHz. It overlaps with Band III (used by DAB worldwide) but tends to confine its activities to the AM and FM bands.

Both DRM and Digital Audio Broadcasting (DAB) are versatile digital radio systems but they have never been used to their full potential. Many tests were carried out but broadcasters on DAB opted to 'squeeze in' as many stations as possible onto a multiplex, and radio manufacturers built minimum-specification receivers.

I guess DRM has explored more of the features built into that system because of the lower adoption rate of the technology. DRM had a positive start in Europe but faded somewhat as SW and MW broadcasting declined. At its peak, the BBC World Service (BBC WS) provided an extensive DRM service, jointly with Deutsche Welle. This included an Electronic Programme Guide (EPG) and a broadcast schedule of frequencies for AFS (Alternate Frequency Switching).

Today, the BBC WS includes *Journaline* data (Table 1) in regular broadcasts; the service provides headline news in English for Europe and Asia, and also in Arabic, even though there isn't a corresponding DRM transmission in that language. The *Funklust* transmissions from Germany on 15785kHz also carry *Journaline* data as have several other DRM tests from Brazil and the Voice of America relay at Greenville.

Trans World Radio (TWR) thinks that DRM has a future and includes a range of data services in its regular transmissions to India, China and Japan using their Short Wave transmitter in Guam (KTWR). KTWR includes, at least, a slideshow, and sometimes a 'mini-website' (cf. Table 2).

The station also experimented with documents or files for their missionaries in the field, expecting that the Titus II combined tablet/SDR was going to become one of their standard pieces of equipment. However, this was not to be. WINB, a commercial Short Wave station in the USA, has been transmitting a 5kHz DRM signal, with the other 5 kHz carrying an unknown audio signal.

The DRM Format in Practical Use

The DRM format has proved itself reliable, and well capable of delivering services to remote or isolated locations, like the ships of the German and French navies operating where there is no signal from a military satellite, US Coastguard vessels operating in the Arctic Sea, and yachts needing weather information to compete in the *Transat Boat Race* in the middle of the Atlantic.

Other countries are evaluating DRM as a way to get data to scientific outposts in remote regions inside the Arctic Circle. These initiatives often faltered because of the costs involved in acquiring or modifying transmitters and also manufacturing receivers in the numbers needed for an operating system.

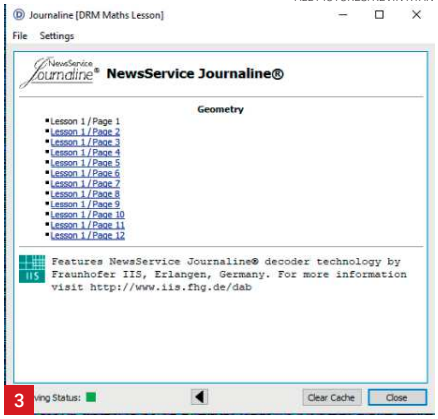
However, the DRM people are not deterred and they keep producing new ideas.

DRM and Distance Education

Last but not least, another possible use for DRM is gathering pace, and it may have a reasonable chance of delivering a workable system. The *DRM Consortium* introduced this idea a couple of years ago at one of its seminars. It has gone by various names since then but *DRM Radio Schooling* seems to be in fashion at the moment. It uses a regular DRM transmission to deliver a classroom over the air to places without any internet access. A very short video from 2020 of the DRM Radio School in action is available on the internet.
https://tinyurl.com/5ydu2xak

A DRM broadcast can have a maximum of four channels carrying either audio or data. I have seen tests from All India Radio (AIR) that have three audio services and one data service, and that seems to be an optimal configuration for AM broadcasts. According to the *DRM Consortium* (cf.

ALL PICTURES: KEVIN RYAN



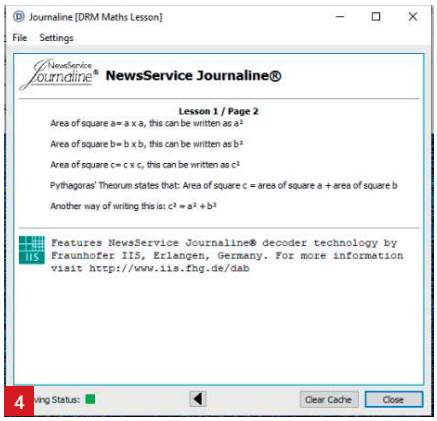


Fig. 1: This example from the Fraunhofer DRM app is made to look like a real textbook.
Fig. 2: The *DReaM* DRM receiver displaying the two-channel configuration of the *DRM Maths Lesson* transmission in xHE-AAC format. Note that the *Journaline* information is contained in the same channel as the audio.
Fig. 3: The 12-page textbook, carried via the *Journaline* (multimedia) data.
Fig. 4: A sample page explaining the *Pythagoras Theorem*, rendered in a simple text format; this is probably a shortcoming of *DReaM*.
Fig. 5: The *Starwave Radio App* attempting to decode a BBCWS DRM transmission.
Fig. 6: *Version 1.3.2* contains no new settings for *Journaline*. The enhancements include upscaling images, and a range of 'themes' for different broadcasters and SDR manufacturers.

above), the audio channels deliver a teacher's lesson for a given subject, language and class to the students. Up to three lessons can be transmitted in parallel at any time. The accompanying textbook information for all three lessons is created in the form of chapters and topics in the interactive text application *Journaline* (cf. above and Fig. 1).

This allows the textbook information to be accessed by students at any time and easily through a simple menu structure, and for students' self-study after the lessons by accessing the cached material in the DRM receiver. Take a look at this very interesting pdf file, which has recently been made available by the *DRM Consortium* on the topic of free education: https://tinyurl.com/cmfz449u

Technologies and Transmissions

The idea of distributing materials in this way revolves around persuading the few manufacturers of DRM radios to modify their designs to include a new function to cache the *Journaline* pages and make them available as web pages. The DRM receiver also needs a local Wi-Fi hotspot so that any personal device with a web browser will be able to access the full *DRM Radio Schooling* content.

In the July 2022 DRM Newsletter *Starwaves*, one of the leading developers of the *DRM Consortium* announced a new DRM radio model equipped with a web server capable of processing HTML5 commands (used to create and style web pages) and including a Wi-Fi hotspot. This may be a completely new receiver or an upgrade to the low-cost W293-BT. It may be possible to access the audio channels on which the teacher delivers the lessons to the students at a later time.

Other receiver manufacturers have provided a 'record' option to store DRM recordings on an SD card, so future functionalities are still evolving. Three of my DRM receivers have a record feature. The *Morphy Richards 20724* supported both DAB and DRM recordings, and the EPG could be used to schedule them.

You probably guessed that the lessons will be sent to the remote classroom using Short Wave frequencies. DRM works best when the radio signal bounces just once ('one hop') off the Ionosphere to the target zone. Propagation conditions tend to vary making a secondary frequency desirable, either as a permanent broadcast or a short-notice alternative the receiver switches to if the primary frequency is not available.

BBCWS Test Transmissions

Out of the blue, the BBC has recently made the radio listener community aware of some test transmissions from the BBC WS transmitter site at Woofferton in the UK. I picked up both transmissions using KiwiSDR receivers and the *DReaM* (*xHE-AAC* version) DRM decoder (Fig. 2). For the record, the transmissions were on the 28th and 29th June at 0630-0700 UTC on 6195 kHz, and from 0830-0900 UTC on 9410 kHz; both of these are well-known BBC frequencies.

The transmissions used the *xHE-AAC* standard splitting the data capacity almost equally between the audio and the multimedia (MM) content. The *Journaline* display behaved a bit oddly on *DReaM*. The data rate was quite high and nothing was displayed for some time, which is unusual. Eventually, the top-level index popped up (Fig. 3) but only for a few seconds before disappearing again. I also captured one of the textbook pages (Fig. 4) that *DReaM* displayed in a very basic format.

Later it occurred to me that the bizarre behaviour was caused by the frequent updating of portions of the text. A part of the lesson includes worked examples, problems and quizzes for which the answers appear after a pause.

Pictures, images and diagrams would normally be sent as a slideshow, either on a separate channel or within the data packets for an audio channel.

There is a way *Journaline* can send diagrams to the receiver in a few image formats. Any PEG or PNG images are too large to send 'raw'; instead, they must be converted into a text-encoded replica, which can be easily sent with other *Journaline* text.
https://tinyurl.com/t89napv6

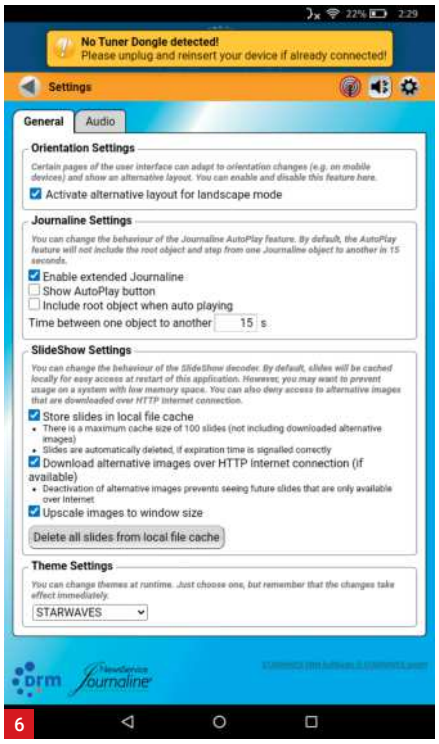
A Customer Awaits

From some information I saw on the web, it appears the transmissions are the first on-air trial of a remote learning solution that will eventually be deployed to The Gambia. Equipment shipped to The Gambia will include an Android device with an SDR and loop antenna. The *StarWaves* DRM SoftRadio app (Fig. 5) will handle everything from demodulation to presenting the audio and Journaline services.

Journaline

Journaline is a text-based information service for digital radio, optimised to be highly efficient for the low data rates available in DRM transmissions. The BBC WS typically uses 0.54kbps in its transmissions, and it takes a while for the actual items to appear. It supports the widest range of receiver types, from low-cost solutions with a small text display up to high-end receivers with graphical user interfaces and optional text-to-speech playback. Setting up speech-to-text means a lot more configuration information has to be sent to the receiver, and the speech output could end up being quite 'robotic'. The radio user can instantly access all information provided by the radio station; this is comparable to Teletext for TV. The core information is provided in simple textual form with the option for richer graphical representation including a future extension to multimedia elements like images or video sequences. The information is hierarchically organized and based on menus. Every menu contains a list of sub-menus and/or messages. Messages carry one piece of information each (e.g. a list of football scores, a news item, a cooking recipe, a traffic message, and so on).

Table 1: The *Journaline* service.



Digital Radio Features

Broadcast Website Enables the transmission of complete websites for offline use in a digital radio receiver. The receiver needs to be equipped with web browser software. Besides linked HTML pages, multimedia elements like images, animated graphics, mp3 files or videos can be offered. Broadcast Websites can link to resources on the Internet (such as e-mail, social networking, and streaming video/audio) when the radio has an IP connection.

Dynamic Label (DL) Text information such as news headlines, artist information, and so on. DL+ is an advanced DL function that lets the user filter information.

Electronic Programme Guide (EPG) is an on-screen guide to scheduled radio programmes that can be searched and ordered. There are both basic and advanced versions. If the receiver has an SD card (e.g. the brilliant *PURE Evoke 3*), the EPG can schedule recordings, and, at the advanced level, it has the same functions as the DTT EPG.

Intellitext lets the broadcaster classify DL messages by category so that they can be sorted and stored on the radio for later browsing. talkSPORT used this for the 2006 World Cup.

Service Following (Alternative Frequency Switching, AFS) This allows cross-referencing to other modes of reception of the same programme, such as FM, DRM, AM, and other DAB ensembles. Receivers allowing this function will automatically switch to other modes of reception if the current one becomes unavailable (e.g. when leaving the coverage area). This functionality could be important for mobile products like hand-held receivers.

Slideshow adds synchronized visuals to radio broadcasts and they typically require 10-15% of the channel data capacity.

Table 2: Some of the major digital radio features.

I could not pick up the transmissions locally because I was in the middle of re-routing the feed from the multi-band antenna in the loft to avoid sources of interference. Other monitors failed to get a decent signal in the UK so it was unlikely that I would have had any success with an SDR and the *Starwaves* app.

Possibly as a result of the tests, the *Starwaves* app received an update (V1.3.2) to its *Journaline* system (Fig. 6). This appeared on the Google Play Store and later on Amazon. Unfortunately, the app cannot read a saved raw I/Q file. My support question on this topic goes unanswered, after a month it is still waiting in the queue for moderation.

I think we might have to wait for the B22 HFCC schedules issued this month and check if the BBC registers any additional frequencies for DRM services beyond the current three. These are DRM-Europe, DRM-Asia and DRM-Burma; they have never been monitored.

I expect that the BBC WS will continue delivering this DRM service to West Africa, possibly switching from Woofferton to Ascension. However, Radio France International (RFI) also has the capability and experience to do this.

In addition to this, I think the Android-based solution will need more work to add a Wi-Fi hotspot and a modern web server and might very well be overtaken by the Starwaves receiver development.

Radio News

SMALL-SCALE DAB RADIO RETURNS TO GLASGOW WITH NEW *LIKE* MULTIPLEX: The new small-scale DAB multiplex for Glasgow has been launched carrying an initial 18 services, with more to follow in the coming weeks. Nation Broadcasting closed down the Trial Glasgow multiplex last year after winning the full-time licence but sold it to the Like Media Group before it was launched. The multiplex is now operating under the Like DAB name. The services being carried are listed at the URL (below). The multiplex is currently using one transmission site at Dundasvale Court, with the second site at Cathcart going online shortly. Managing Director of Like DAB, Ryan Davies said: *"We are delighted to launch the new multiplex across Glasgow today. We have a great diversity of services, from local and national broadcasters. During the small-scale DAB trials, Glasgow suffered many challenges; however, thanks to the help of UK DAB Networks and Commtronix, we have started from scratch at the site to ensure long-term reliability which all broadcasters and listeners deserve."* (SOURCE: RadioToday)
Roy.martin@radiotoday.co.uk
https://tinyurl.com/ynsz84m5

PAUL O'GRADY LEAVES RADIO 2: Paul O'Grady signed off from his BBC Radio 2 show for the final time yesterday afternoon following his decision to leave the station. After 14 years at Radio 2, he said that it was time to *"hang up his headphones and run free"*. Paul joined the station to fill in for Elaine Paige and in 2009 was given his own Sunday afternoon show. Last February Paul's show was changed to run 13 weeks each year in a change to schedules. At the time, he posted on Instagram: *"There's a new regime now, I do 13 weeks on and then 13 off which is nothing to do with me as it's a management decision."* Ahead of his show yesterday, O'Grady suggested that the change to his programme was one of the reasons why he decided to quit. In a video on Instagram, he said: *"The reason I'm leaving, because everybody's asking me this, is because I wasn't really happy with the 13 weeks on, 13 weeks off business. So, I did the honourable thing, honoured my contract, gave me notice in, and now I'm off."* He also thanked his producer Malcolm Prince, saying that he'd worked with some smashing

producers over the years and Malcolm is "way up there". Malcolm is also leaving Radio 2 after 22 years with the station. Paul ended by thanking his listeners, wishing good luck to everyone at Radio 2, adding *"long may you continue"*.
SOURCE: ontheradio
https://tinyurl.com/5x35x2za

TOMORROW'S ASTRONAUTS TODAY: An eight-year-old girl from Kent used her father's amateur radio equipment to chat with an astronaut aboard the International Space Station (ISS). The links below are for the BBC website report, followed by a *YouTube* video:
(SOURCE: Bob Houlston G4PVB | Volunteer Correspondent)
www.tinyurl.com/2753hsxz
www.tinyurl.com/474cejvh

ALAN DAVEY TO STEP DOWN AS CONTROLLER OF BBC RADIO 3: Alan Davey says: "There is nothing like the combination of Radio 3, the Proms and the BBC Orchestras and Choirs anywhere else. Choosing when to move on is always tricky, but now is the time for me to hand over the role to someone else. They will inherit – to borrow a phrase – *on a bad day the best job in Britain, and on a good day the best job in the world. "Since Radio 3's first day of broadcasting, it has known that the key to securing the future of music is in finding new talent and offering ways into new audiences, and it's the quality and expertise involved that makes the station so unique. Radio 3 endures because of its audience who live their lives by its rhythms and because of its staff and musicians who are endlessly inventive, committed and fun. On Radio 3 we play over whole 17,000 pieces of music a year and explore thousands more. We believe the greatest public service is found in showing, not just telling, of the riches of the arts. It has been an honour and a delight to*

lead this mission." Charlotte Moore, the BBC's Chief Content Officer, said: *"Alan has brought an extraordinary vision to Radio 3. Under his watch over the past eight years, Radio 3's editorial ambition has flourished and Alan has skilfully, and with passion, led our classical activities in an ever-changing world – constantly exploring new opportunities to reach the widest possible audience for our classical music output. It's been such a pleasure to work with Alan and I wish him all the best in his roles going forward and his continuing academic work."* Before his time at the BBC, Alan served as Chief Executive Officer at Arts Council England (2008-2014) after an extensive career in the Civil Service where his roles included Head of Arts and Director of Arts and Culture at the DCMS. In the *2015 New Year Honours*, Alan was awarded a CBE for his services to the Arts. He holds honorary doctorates from the Universities of Birmingham and Teesside. He serves as Chair of Governors at Trinity Laban, Vice Chair of the *English Folk Dance and Song Society* and a Board member of the Hall for Cornwall. Alan Davey will continue as Controller of Radio 3 and the Proms until next spring. The BBC says it will appoint his replacement in due course.
(SOURCES: BBC Radio 3 | Radio Today)
https://tinyurl.com/3rpuymky

CHRISSY BRAND

Chrissy Brand
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1

Radio Comes in So Many Flavours

Chrissy Brand endorses a wealth of contemporary and historical radio programmes and podcasts from around the world, visits radio stations at country shows and community events and shares her top listening tips for this month.

The BBC World Service series, *Witness History,* has long been a favourite of mine. It consists of a 10-minute burst every weekday that revisits significant, and often lesser-known, global events from the past. Then, each Sunday evening, the five segments are threaded together in an omnibus edition, which is titled *The History Hour*. Over 3,000 individual programmes are available on the *BBC World Service* website and *BBC Sounds*.

The programmes are often grouped in themes, for example, around topics such as disability, black history, war, and space. During the penultimate week of July, *Witness History* focused on television programmes, with some enjoyable interviews with presenters and viewers, alongside insights into five very different television programmes. The week started in 1987 in Mexico City when broadcaster *Televisa* set up the *Centro de Educación Artística* to train actors in '*Telenovelas*' – Mexican soap operas.

A BBC Indian cookery show took the UK by storm in the 1980s and its presenter Madhur Jaffrey reminisced about the programme. I well recall selling hundreds of copies of the book of the series (*Madhur Jaffrey's Indian Cookery*), in hardback and paperback, when I worked at the *BBC Information Centre and Shop* in the 1980s (more about that in the December issue of *RadioUser*, when I will look at the BBC World Service's 90th Anniversary).

Television soap *Dallas* also had a slot on *Witness History,* with Claire Bowes speaking to the show's star, Larry Hagman, in 2010. Back in the USSR, in 1973, *Seventeen Moments of Spring* was a popular spy series that was set in World War Two (1939-1945). Streets were deserted and people rushed home from work to watch each episode. 50 to 80 million viewers tuned into each episode, including British secret agent, Kim Philby. BBC World Service's Dina Newman spoke to Eleonora Shashkova who played the agent's wife.

The last Nigerian sitcom *Papa Ajasco* started in 1996 and became one of the most successful television shows in the country's history. Creator Wale Adenuga looked back at the programme.

www.bbc.co.uk/programmes/p004t1hd
www.bbc.co.uk/programmes/p016tmg1
www.bbc.co.uk/sounds/play/w3ct3c17

Floral Radio

I was among the thousands to attend the *Royal Horticultural Flower Show* at Tatton Park in Cheshire, which was held in late July. It is far more than a flower show, with innovative and sustainable gardens on display, giant prize vegetables, sculptures and garden-related items that may enhance your lifestyle: from water features to a 'shoffice' (a combination of the shed and a home office).

Television and radio broadcasters were out in force too. BBC Two's *Gardeners' World* covered the show, as did BBC local radio stations BBC Lancashire, BBC Merseyside and BBC Manchester.

The RHS and BBC local radio ran a competition where entrants were invited

CHRISSY BRAND

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FLORAL RADIO

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CHRISSY BRAND

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KPOV

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Fig. 1: *Lockside* was one of the gardens in the 2022 BBC local radio and RHS competition. Fig. 2: Lymm Radio presenters interview Barbara Wilkinson of the *Herb Society* at the *RHS Tatton Show*. Fig. 3: Like most community radio stations, Lymm Radio in Cheshire is looking for volunteers. Fig. 4: 'TRUK' Radio had a presence in Brighton this summer. Fig. 5: Say "*Hi*" to the High Desert in KPOV's *Sasquatch Hideaway*.

to design a planet-friendly garden. In this great example of a partnership working between three local radio stations and an august national horticultural organisation, the finalists' gardens were on show at Tatton Park.

Paradise Found was the title of one garden, inspired by Paradise Park in Leyland. Another garden was inspired by the canal basin in Chester and was named *Lockside* (Fig. 1). A third one was called *Literally Littoral*, inspired by the west coast of the Wirral Peninsula in Merseyside.

BBC Radio 2 and BBC One's *The One Show* also united to help design a '*Sow, Grow and Show*' garden, with vegetables and flowers.

Lymm Radio is a local community station that also broadcast live from the RHS show (Fig. 2). Barbara Wilkinson was one of the guests interviewed in the four-day Lymm Radio Outside Broadcast. She is a trustee of the Herb Society and was also interviewed on episode 86 of the *Roots and All* horticultural podcast.

https://tinyurl.com/5d6pu6vd
https://tinyurl.com/bauv37ar
https://tinyurl.com/34f73xsh

Lymm is a small town near Altrincham and the radio station states that it is, *"The Sound of Cheshire"*. Certainly, its promotional material looks like the station is aimed at a young, attractive and diverse audience (Fig. 3). The station also has a resident personal trainer, Thomas James PT, who runs a *"Get Fit Wednesday"* slot.

Lymm Radio is looking for new volunteers, whether budding radio presenters, producers, editors, or to help with events and outside broadcasts. The station asks, *"Are you interested in a career in broadcasting and the media? What interests you? is it sport, music, events or helping others? Gain amazing on-air experience with us."*

I appreciate the difficulties in recruiting volunteers with enough time and commitment to present a regular radio show or help in the backroom. With many young people needing to work more than one job to make ends meet, it is the time-rich, older generation, who can more easily sign up to make a community radio station operate.

If you have time on your hands and an interest in radio, contact your local community station, as I am sure they will be grateful for any new volunteers.

Lymm Radio states how the village, *"encompasses everything about true community spirit"*; this includes events like *Dickensian Day, Food Festival, Lymm Festival, a Charity Beer Festival* and *Transport Day*.

The Outside Broadcasts this past summer also included setting up and transmitting from the Cheshire County Show and the Cheshire Steam Fair. At the latter, Lymm Radio was asked by Ambulance service North West 4x4 Response if they could use the station's gazebo as a temporary hospital, due to the number of people being treated for heat exhaustion. There is also a drive to raise funds for Lymm Radio to get onto DAB+. The Rotary Club of Lymm is amongst the organisations that have helped, donating £500 towards the planned digital radio rollout.

https://lymmradio.co.uk

Proud Radio

As an ally of the alphabet soup of sexuality and gender identities in the LGBTQIA+ communities, I have been impressed with the increase of specific radio stations and programmes in recent years. Major commercial broadcasters are amongst those who have taken to the air with Virgin Pride Radio and Hits Radio Pride. The content tends to be upbeat music in the form of dance classics and anthems.

The stations could do more in spoken word content, although a Hits Radio Pride investigation into conversion therapy was excellent, if harrowing. Virgin Radio Pride this year included programmes on LGBTQIA+ football fan groups.

Gaydio in Manchester and Brighton has led the way in this format of radio since 2006 and still is a great listen. Although primarily a feel-good music station, podcasts are covering important areas, such as adoption.

https://tinyurl.com/2jmyj9t6
https://tinyurl.com/3mbd3b6k
https://tinyurl.com/mreu289w

Further afield, there are hundreds of podcast series from all over the world, covering all areas and topics concerning the LGBTQIA+ communities, for members and allies. Take a dip into them and become better informed about

Date	Time (UTC)	Station	Programme	Podcast	URL/ Stream/ Frequency
Daily	1300 to 1400	Radio Optimum	Séga music from the islands of Réunion and Mauritius	Only available live	FM locally, https://tinyurl.com/3x2x9e4p https://tinyurl.com/42czhp37
Daily	0530 to 2200	VBTC, Radio Vanuatu	Misc. programmes in English and Bislama	www.vbtc.vu/en/listen-online-2	3945, 5040, 7290 kHz, SDRs, online
Daily	24/7	3CR, Melbourne	Diverse programmes for all of society	www.3cr.org.au/podcasts	Online, 855 kHz in Melbourne www.3cr.org.au
Monday	0132 to 0200 0806 to 0830 1232 to 1300	BBC World Service	The Climate Question	https://tinyurl.com/2w3vmb6u	DAB, short wave, online, www.bbc.co.uk/programmes/w13xtvb6
Friday	1530 to 1600	CBC Radio One	The Debaters	www.cbc.ca/radio/thedebaters	FM and SiriusXM in Canada, online
Friday	1900 to 2100	Penistone FM	Best of Brass with Bob Eastwood	www.penistonefm.co.uk/listen-again	95.7 MHz, www.penistonefm.co.uk
Saturday	0000 to 0000	Mom's Spaghetti	Mom's Weekender, Hip hop, House and happiness	Only available live	DAB+, www.momsspaghetti.co.uk
Saturday	0700 to 1100	This is the Coast, East Yorkshire	Kevin Roberts, music, chat, culture	Only available live	www.thisisthecoast.co.uk
Sunday	1100 to 1700	Strawberry Radio	Souled Out Sundae	https://strawberryradio.co.uk	App, DAB+, Smartspeaker https://strawberryradio.co.uk
Sunday	1300 to 1500	Carousel FM	Steve Riddle Sunday Show, comedy and music	Only available live	www.carouselfm.com, Alexa, My Tuner, Radio Garden

Table 1: Chrissy's Top Summertime Listening Tips for the Month Ahead.

significant sectors of our society that are still oppressed.

TRUK Radio (Fig. 4) stands for 'Trans Radio UK'; this is an online station for the transgender and non-binary communities and their allies. It is mostly musicbased but plays everything from the classical music of the 1900s to today's sounds. There are listeners in more than 100 countries, and Trans Radio UK, *"actively engages with LGBTQIA+ individuals and communities by the power of music and entertainment using radio shows with community presenters, featuring community artists and musicians."* However, it should not be confused with Truk Radio in Akron, Ohio, which plays the, "hottest Hip-Hop and R&B music".

www.transradiouk.com
www.trukradio.com

North America, as you would expect, has many radio stations and programmes for LGBTQIA+ communities. One is called *Queer FM* (on CITR in Vancouver). It is one of the longest-running programmes of its kind. Co-Hosts DJ Denise and Barb Snelgrove present a two-hour show every Tuesday, which can be heard online as well as on FM in Canada.

www.citr.ca/radio/queer-fm

Down in Australia, *Gaywaves* is a programme which was inducted into the National Film and Sound Archive's *Sounds of Australia* last year. It commenced in Sydney in 1979, when homosexuality was still illegal in Australia and ran until 2005. Today, community station 3CR, in Melbourne, Australia provides programmes for most of the countries' marginalised communities. *In Ya Face* offers music, commentary and interviews around LGBTQIA+ issues. *Jailbreak* gives a voice to prison inmates, friends and families. *Latin American Update* does what you would expect, while *Nile Show* gives a platform to Sudanese women. Dig a little deeper and you will find more diversity and interesting, lesser-heard viewpoints than you could imagine. 3CR, in my view, is easily one of the best stations in Australia, if not the planet. Check out their website and list of podcasts.

https://tinyurl.com/5n63mvj4
www.3cr.org.au/program_list
www.3cr.org.au

Other Programmes

Penistone FM in South Yorkshire is a community radio station, with the usual types of programmes but also some lesser-heard genres of music, such as brass bands, disco, acoustic and Motown. There is also a drama hour on Mondays at 1700 and Thursdays at noon. A series of short radio plays and other features are available to listen to again on the Penistone FM website. These include five programmes called *Still Alive*, which looks at trades including a record cutter, a knife sharpener, a clog maker and a stone carver (See also Table 1).

www.penistonefm.co.uk/radio-plays

Coastal Stories is now in its fourth series. Charlie Connolly (author of *Attention All Shipping, a Journey Round the Shipping Forecast*) explores all manner of coastal life. The new series includes beach huts in Bexhill and a 1595 attack by Spaniards on the Cornish coast.

https://tinyurl.com/2vw6chuv

It is said that art reflects life and life can reflect art. One example is the shape of KJMC, which was a fictional radio station in an episode of the sitcom *Frasier*, called *Frasier's Curse*. In real life, KJMC is a radio station based in Des Moines, Iowa. Also known as 'K-Jam', the station offers R&B, Old School, classic Hip Hop, Smooth Jazz, Urban Music, Gospel Music, and community and educational programmes. The website offers the latest African American Breaking News & Entertainment.

www.kjmcfm.org

Meanwhile, KPOV is a fictional TV station in the *Frasier's Curse* episode. In reality, KPOV is based in the High Desert area of central Oregon. When you first visit the website, you are invited to sign up for email updates, which is always a shrewd move by an organisation. Beyond that, the last Tuesday of each month is when you can hear *Bend Roots Radio Show*. The programme also has a *YouTube* channel, which includes wonderful footage of some live outdoor concerts recorded this past summer.

The KPOV podcast page has a decent selection of shows to listen to as well. From cosmic astrology to gardening, which is a very different pastime in the Oregon desert than it is in the lush Cheshire landscape of the RHS Flower Show!

In *Sasquatch Hideaway,* Ranger Randy of Newberry National Monument, shares information about forests and grasslands (Fig. 5). The *Open Air* podcast offers, *"An eclectic mix of people, personalities, issues, celebrations. You name it, we talk about it!"* Topics covered include interviews with authors on stopping mass shootings, John Hope Bryant's book, *How the Poor Can Save Capitalism, and Poisoned Water, How the Citizens of Flint, Michigan, Fought for Their Lives and Warned a Nation.*

https://kpov.org
https://tinyurl.com/BendRootsRadio
https://kpov.org/podcasts

STEVEN WEEKS ON *UNSPLASH*

1

The BBC Radiophonic Workshop (Part Two)

In the conclusion of her two-part mini-series, **Chrissy Brand** further examines the BBC Radiophonic Workshop, introducing some of its employees and their own compositions.

Chrissy Brand
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In Part One of this article (*RadioUser*, September 2022: 46-48), I investigated how the *BBC Radiophonic Workshop* contributed to a whole *new genre of audio*, by combining music with natural and human-made sounds. Based in the BBC's rented Maida Vale Studio complex from 1958 to 1998, it is remembered with affection by those that worked there and also by many who enjoyed its output.

During its working life, other departments of the BBC were also proud of the workshop's role, often producing features and programmes about it. There are many online, on the *BBC iPlayer* and on *BBC Sounds*, as well as on *YouTube*.

One particularly fascinating BBC Radio 4 documentary, aired in 2010, neatly encapsulated the workshop, along with one of its key exponents of electronica eccentricity. It was titled *Sculptress of Sound, The Lost Works of Delia Derbyshire*.

Another very good overview of the workshop and its legacy can be heard in a 2014 BBC Radio 3 episode of the series, *Free Thinking*.

Several books have been written about the workshop, as well as biographies and autobiographies of some of its key members (Fig. 2). I have drawn on some of these, along with the many web articles and other resources, to give some highlights and observations, in this two-part feature.

For an informative read about the equipment used and other technical aspects, I recommend Ray White's *An Engineering Perspective.* This online work is a comprehensive history of the workshop's forty years, Ray noted that, "*In its early work, under the direction of Desmond Briscoe, the only available materials were real sounds that were recorded and manipulated using tape machines and other devices.*

"The process was similar to modern sampling, using reverse playback, speed or pitch change, equalisation and reverberation, accompanied by endless skilful editing. Many sources of sound were familiar to drama studios, such as pebbles in boxes, mutilated musical instruments or even an old copper water tank!"

"The voltage-controlled synthesiser of the late sixties caused [some] significant change. Sound and music could now be created immediately, although often only one note could be played at a time! The arrival of multitrack tape recorders in the following decade enabled composers to build up complex layers of material that could be modified as work progressed."

"By the Eighties, computer control of digital musical instruments via the Musical Instrument Digital Interface (MIDI), using Macintosh computers, was a reality. This was complemented in the last decade by recording systems based on more ad-

vanced computers. The all-digital studio had arrived. However, by the Nineties, this technology was available to all and the Workshop was forced to close."

https://whitefiles.org/rws/index.htm

The Workshop's Wide Workings

In 2003, a BBC Four documentary titled *Alchemists of Sound* was broadcast. It is currently unavailable on either the BBC website or *BBC iPlayer*. However, an earlier BBC Two documentary, which marked the *Radiophonic Workshop's* 30th Anniversary, can be found on *YouTube*. Called *The Electric Music Machine*, *Five Days at the BBC Radiophonic Workshop*, it illustrates the breadth of the workshop's musical content. For four decades, it played a valuable role in creating 'atmospheres' and 'moods' for a complete range of programmes across BBC television and radio, from news features to entertainment and education to nature documentaries.

In *The Electric Music Machine*, *Five Days at the BBC Radiophonic Workshop,* three soundtracks are followed as case studies and offer a fascinating glimpse into some of the work in progress through to its final versions. Keyboards are used to represent musical instruments, from bass guitar to trombone, as well as to generate otherworldly or everyday sounds. Vocals and computers are utilised alongside what was high-tech gadgetry of the era, in order to build 'sonic soundscapes'.

The programme showcases composer Elizabeth Parker working with producer Angela Tilby on a feminist, Christian, documentary programme, *God is She*; another workshop composer, Peter Howell, discusses working with a graphic designer in producing a soundtrack for a BBC 2 Newsnight programme, *D-Day to Berlin*. The *BBC Schools* department used the *Radiophonic Workshop* for many of its programmes. The creation of a piece for a *Schools Radio* programme called *Popalong* is shown, with a composer partnering with a choreographer to come up with the desired, 'danceable', end result.

When listening to compositions of the *Radiophonic Workshop*, it is interesting to note that some remain timeless, such as the soundtracks to the two Michael Palin travel series, *Pole to Pole* and *Full Circle.* Other pieces of music reflect the tastes and trends of their time. A case in point is much of the science fiction sound effects of doors opening and weaponry firing, used in *Doctor Who, Blake's Seven* and *The Hitchhikers' Guide to the Galaxy*, to name but three.

The slap bass guitar sounds in pieces produced for *Popalong* and others were popular in the 1980s and 1990s, reflecting the playing style of Level 42's bassist Mark King, and also dominating the soundtrack of globally popular sitcoms such as *Seinfeld*.

The problems of creating a theme tune for a 1985 BBC TV cookery series starring Tom Vernon, called *Fat Man in the Kitchen*, fell to composer Roger Limb. The series covered recipes from six countries, each with its own distinctive brand of culinary: Australia, Germany, Hungary, Japan, Portugal, and Sweden.

Roger Limb ingeniously captured the sounds of a pepper grinder; knives being sharpened and liquid glugging its way from a bottle. These were added to more conventional musical sounds to create a theme tune, which was tweaked late on, with the last few bars played on a tuba, which aimed to reflect the jollity of the programme host.

The *BBC World Service* programme about developments in radio broadcasting, *Waveguide*, had its short but jaunty theme tune created by the workshop. Episodes of the programme, from 1988 to 2001, can be found on the BBC Sounds app. The edition of 18th September 1988 interviewed Roger Limb, who was also a former BBC World Service producer and announcer.

Many of the incidental music and theme tunes produced were credited to the 'BBC Radiophonic Workshop', rather than to the individual, or individuals, responsible (Fig. 1). However, if you dig a little deeper, then you can often discover the composer who was behind the tune. A case in point occurred recently for me when I was listening to the Simon Brett radio comedy drama *No Commitments* (1992 to 2007).

The credits state the memorable theme music to be, *"by Elizabeth Parker of the BBC Radiophonic Workshop."*

The above examples amply illustrate the versatility and innovators that made the *Radiophonic Workshop* such a key part of the BBC. Part of its legacy can be heard in radio and television soundtracks today, in the BBC and beyond, and in popular music. The *Workshop* took the art of creating evocative soundscapes, be they sinister or witty, to a whole new level.

Workshop People

Daphne Oram (1925 to 2003) and Desmond Briscoe (1925 to 2006) co-founded the *BBC Radiophonic Workshop*. Daphne left a short time afterwards but went on to forge her own career in sound. The *Oramics Machine* was a prototype that she developed,

OBVERSE BOOKS

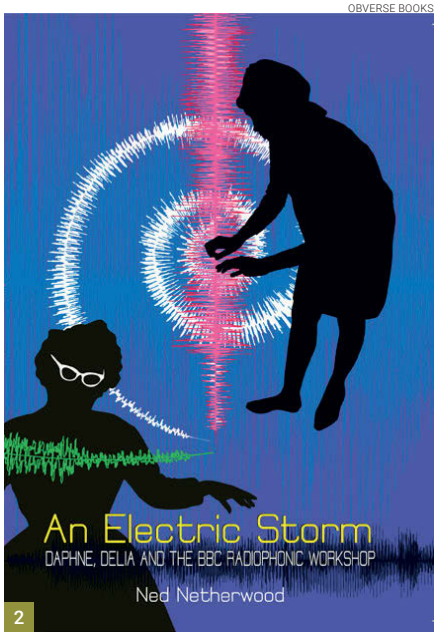


Fig. 1: Analogue tape manipulation was a speciality of the *Workshop*.
Fig. 2: This contains the *Daphne Oram and Delia Derbyshire Archives* and a discography of the *Radiophonic Workshop*.
Fig. 3: BBC *Relaxing Sounds* was a successful early 'ambient' album.
Fig. 4: Of its time: The chart-topping *Death and Horror Sound Effects* album.

in the 1960s, which now resides in the Science Museum in London. The *Daphne Oram Trust* states that it is, *"an electro-mechanical and opto-electronic musical interface conceived, co-designed and commissioned by Daphne Oram between 1962 and 1969. It used optical scanning technologies to read and interpret hand-drawn waveforms (timbres) and sequences of control information for musical pitch and dynamics. It can be seen as a forerunner of MIDI sequencing and the digital audio workstation."*

More can be read on this remarkable woman and the *Daphne Oram Trust*, which safeguards her archive, a lifetime of recordings, papers and more, and supports electronic music makers in the UK.

In 2017, Holly Williams, writing for *BBC Culture*, described her as a woman who could 'draw' music. She also noted a play that toured that year. It was written by Isobel McArthur and Paul Brotherston and was called *Daphne Oram's Wonderful World of Sound*. An extract can be viewed on the *Vimeo* channel of Tron Theatre.

https://vimeo.com/141655590
www.daphneoram.org/oramicsmachine
https://tinyurl.com/5fy49x3c

Delia Derbyshire attained cult status long ago. She observed that most of the BBC programmes that she created soundscapes for were set in the far distant future, the far distant past or in the mind. One piece she created, for *The World About Us* TV programme, was her imagined sound of a mirage, Other ambient soundtracks included one of people talking about ageing, which sounded to many like a precursor to Pink Floyd's *Dark Side of the Moon*.

The band did visit the workshop in late 1967, and there are photos of them, along with photos of dozens of composers, other staff, and some equipment at former employee Ray White's *White Files* website. **https://whitefiles.org/rwg**

Delia was also involved in organising a happening in Trafalgar Square with Yoko Ono, while a 1969 album, *An Electric Storm* by White Noise, where Delia collaborated with dramatist Barry Bermange, is considered to have cultural significance.

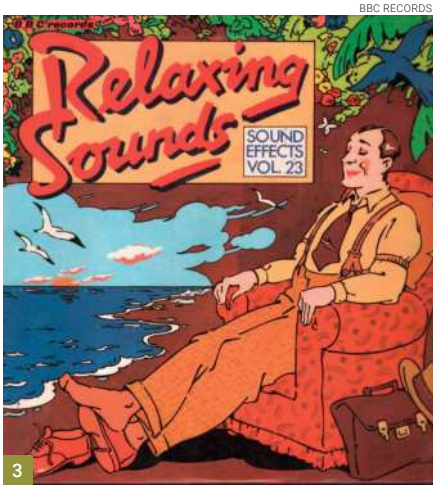
Today, a charity, called Delia Derbyshire Day (DDD), celebrates her life and work, including a piece that honoured the 50th Anniversary of the album in 2019 (cf. the '*DD-Day*' *YouTube* channel). DDD has now extended to several events throughout each year. In July of this year, DDD was at the family-focused Deershed Festival in Yorkshire. They ran electronic music-making workshops, alongside fellow music and science organisations, *"to inspire the next generations of sound and music adventurers."*

The work of Delia Derbyshire has been catalogued after 300 reels of recordings were found at her home after her death in 2001. This is thanks to the work of Dr David Butler at the University of Manchester, whose team have created an archive. There is also an interactive game on the DDD website; further afield, many independent creatives have produced merchandise, in the form of prints, posters, dioramas and other ephemera. These are mostly available on *Etsy*.

Paddy Kingsland joined the workshop in 1970 and was best known for his incidental music for BBC Radio 4's *The Hitchhiker's Guide to the Galaxy*, as well as BBC TV's Michael Palin's travel programmes. He has released several albums and toured with the current incarnation of the *Radiophonic Workshop*.

Burials, a collaboration with Martyn Ware and Steve Dub was released in 2018. A new album with Nick Gomm is called *Listen For the Light* and combines sitar with electronics. In addition, Paddy is currently the author of a couple of poetry books and working on a childhood memoir. **https://whitefiles.org/rwp/index.htm** **https://paddykingsland.com**

BBC RECORDS



3

Maddalena Fagandini (1929 to 2012) joined the Radiophonic Workshop in 1960 from the *BBC Italian Service*. Jo Hutton interviewed her in 2006 for an article for Sonic Arts, which captures the tone of the era.

Maddalena stated, "*There was a tradition of using women as engineers and technical people in radio. This happened during the war when all the gentlemen went off to fight the war. There was quite a cutback after the war when the surviving gentlemen came back and wanted their jobs, of course, naturally, but it was still thought that women had done well. The 1950s was a time when radio really flowered like crazy. It was wonderful being in radio at the time. You could see things happening around you which had never been considered before or since.*"

Phil Young and Maddalena Fagandini also collaborated to create the signature tune for a *BBC World Service* programme, *Science and Industry*. It was credited as being the first completely electronic signature tune in radio. I first heard it in the 1970s and remember being fixated on it but have been unable to trace a recording of it online. **https://tinyurl.com/yc3ywuhb**

BBC Records' Sound Effects

The *BBC Records and Tapes* label was founded in 1967 and included many sound effects records by the *BBC Radiophonic Workshop*. These were used by amateur dramatic groups and home movie buffs, amongst others. They became an eccentric niche part of the BBC Records catalogue when compared to soundtracks of historic events, sitcoms and plays.

BBC RECORDS

4

Further Reading

40 years with the Radiophonic Workshop, In the Studio and on the Road, by Peter Howell, Obverse Books, 2021
https://tinyurl.com/2sjhpkv2

An Electric Storm: Daphne, Delia and the BBC Radiophonic Workshop (2nd Edition), By Ned Netherwood, Obverse Books, 2014
https://tinyurl.com/vuhdw964

The one I recall best was No. 23 in the series, titled *Relaxing Sounds* (Fig. 3). In the 1980s, I used to drift off to sleep to tracks like *A Garden in Spring* and *Forest Adagio*.

A 1976 release was titled *Out of This World*, which covered science-fiction sounds and atmospheres. Perhaps the most ambitious and notorious, however, was Sound Effects Number 13, *Death and Horror* (Fig. 4). Wikipedia describes how it was, *"pressed onto a black vinyl that changed to a translucent blood red colour when held up to strong light. Upon release, the album drew controversy regarding its violent content, especially from anti-obscenity campaigner Mary Whitehouse, who criticised what she felt was an 'utter lack of responsibility' on behalf of the BBC. While this meant the album was briefly pulled from sale, it soon returned to stock, and the controversy encouraged it to sell some 20,000 extra copies, making it the first sound effects album to chart within the Top 100 of the UK Albums Chart. The album has been described as one of BBC Records' most memorable releases and writers have described its sounds as sounding authentic."*

Today, many of the BBC Sound Effects are available online, with a choice of over 33,000! **https://sound-effects.bbcrewind.co.uk**

David Smith
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ALL PHOTOGRAPHS: DAVID SMITH

1

Blocked Aircraft and SELCAL Updates

David Smith investigates 'blocked flights' on tracking sites, SELCAL updates and the latest plans for handling future aviation. This month's ATC Profile spotlights the Army Air Corps airfield at Middle Wallop.

One of the major benefits of Automatic Dependent Surveillance-Broadcast (ADS-B) is that it provides radar-like coverage where real radar is unavailable – and often impossible – to provide. Aircraft can be tracked accurately and in real-time. The biggest benefit is over the North Atlantic where it allows controllers to 'see' aircraft. This enables the previous very large separations to be drastically reduced, thus freeing up space for ever-increasing volumes of traffic.

The 'B' stands for 'Broadcast': The aircraft continually transmits its precise GPS position, along with other information through a Mode S transponder, to any receiver tuned to it. All very neat, but the big problem in the eyes of many private and commercial aircraft operators is that their aircraft are trackable by just about anyone.

An aircraft's ADS-B broadcast also contains a unique ICAO 24-bit aircraft address - a hex code - specific to every aircraft and directly linked to the registration, or tail number in American parlance. This means that people can not only track an aircraft but see a lot of information about it that the operator might not want to be made public.

The reasons for this are unlikely to be hiding anything illegal, it is more about privacy and security. Military flights, politicians and heads of state, and wealthy or famous people could be targeted. The aircraft are still visible, but data on where they are going to and from, and who owns them, can be better protected.

The US Federal Aviation Agency (FAA) has a system known as LADD. This stands for 'Limiting Aircraft Data Displayed'. In 2018, this replaced the old BARR ('Block Aircraft Registry Request') system.

The FAA also operates the Privacy ICAO aircraft address program known as PIA, where an alternate, temporary hex code is assigned to an aircraft when requested by the owner. This is no longer linked to the aircraft registration and although the aircraft can still be tracked, its identity is not available to the general public. The big problem is that LADD and PIA only work in US domestic airspace. The FAA has no control over what is or isn't available outside these limits.

Some flight tracking sites, *FlightRadar24* for example, have agreed to respect LADD beyond the USA. Others, notably *ADS-B Exchange*, ignore any filters, both military and civilian. So far, the UK CAA has not adopted any blocking system, but it may only be a matter of time!

SELCAL System Upgrade

ICAO (the International Civil Aviation Organisation) is upgrading the SELCAL system to allow for new codes. There is only a finite number of them available, and duplicate assignments are becoming a problem. The potential for more than one aircraft to receive the same call in the same airspace is cause for concern.

Listening out on HF with its atmospheric noises and chatter soon becomes fatiguing. The answer is SELCAL, short for Selective Calling, a signalling system first used in 1957. It alerts flight crews when ATC wants to contact them, and there is no need to constantly monitor the frequency.

The wake-up call is the 'bing-bong' sound familiar to those of us who listen on the designated aviation HF frequencies. On the ground, a SELCAL encoder transmits four audio tones at a time. Each tone is assigned a letter. When the four tones correspond to an aircraft's four-letter code, a decoder in its avionics hears it and triggers a SELCAL, employing both a sound and a flashing light. This is the cue to call ATC back.

However, there is a problem. Until now, only 16 letters (and therefore tones) have been available. This means there are slightly less than 11,000 codes for aircraft to use. So far, 35,000 have been allocated by Aviation Spectrum Resources Inc (ASRI), an American company that acts as registrar and agent to ICAO to perform this function. Where possible, duplicate codes are assigned to aircraft operating in widely separated areas of the world, and usually do not have the same HF radio frequency assignment.

Unfortunately, with commercial aircraft having increasingly more long-range capability, there are occasions when

Fig. 1: A SAAB Viggen (RIAT 2022).
Fig. 2: A Spanish Air Force F/A-18 Hornet (RIAT 2022).

multiple aircraft with the same SELCAL code may be operating in the same control area, and may respond to the same SELCAL, with the potential for some dangerous confusion.

ICAO has now solved this problem by adding 16 new tones (comprised of letters and numbers). That will bring the total to 32. This '32-tone SELCAL' will create almost a quarter of a million unique code options.

However, herein also lies a problem for North Atlantic traffic. Three of the five Air Navigation Service Providers covering the NAT region (*Gander, Shanwick* and *Santa Maria*) have already indicated that, despite the 30 November deadline, they won't be ready with the encoder upgrade until at least next spring. In the interim, they won't be able to issue SELCALs to aircraft featuring the new codes (ones that contain 'T-Z' or '1-9'). This means if an aircraft has one of the new codes, for up to six months it will not have SELCAL when crossing the Big Pond. Not a happy situation!

https://www.icao.int/Pages/default.aspx

Planning Next Generation Aviation

Future Flight Challenge is the name of a government-run programme that funds projects to explore inventive new ways to achieve greener flight, improve connectivity, alleviate congestion, and ultimately create new ways to travel by air. To help bring these technologies into service, the UK Government has established this four-year programme. The £125M challenge aims to demonstrate how a fully integrated aviation system could exist in 2024.

NATS has been involved in four different projects, each of which focused on subtly different areas but all aiming to take a step closer to an uncrewed, modernised, digitised future for aviation. *Project DBAS*, or 'Distributed Beyond Visual Line of Sight Aviation System', has designed a control room concept that can be used to coordinate airspace users, including new and novel aircraft like electric air taxis, drones, and commercial space operators. It is known that integrating, rather than segregating new users is the most efficient way of ensuring all types of aircraft can operate safely.

The prototype control room demonstrates how the operator could automatically authorise flight plans, provide deconfliction advice and instructions, monitor notifications related to airspace restrictions and specific missions, and maintain oversight to ensure safe and efficient operations for all those wishing to use the airspace. While only theoretical, the work of this project has provided an extremely valuable insight into how uncrewed and conventional operations could be integrated and managed soon.

This month's photographs show a *SAAB Viggen* (Fig. 1), both at RIAT 2022 and a Spanish Air Force *F/A-18 Hornet* (Fig. 2).

Military ATC Profiles No 15: Middle Wallop

ICAO Code: EGVP

Frequencies	**(MHz)**
Wallop Approach	233.375; 123.300*
Wallop Radar	233.575; 375.700
Wallop Talkdown	253.475; 123.300*
Wallop Tower	118.600; 345.175
Wallop Radio	397.475
(Advisory for 'start' and 'complete' calls).	

*NATO Common Frequency available on request only.

ATIS	
Wallop Information	240.800
Navaids	None
Runways (grass)	08 (1096 x 45m)
	26 (1096 x 45m)
	17 (1181 x 45m)
	36 (1181 x 45m)
HALS Hardened Aircraft	04 (298 x 25m)
Landing Strip (Attack-Helicopters only)	22 (298 x 25m)

Notes (A-Z)

Ground Movement
As directed by ATC. A possible laser hazard exists on the apron when Apache helicopters are running. Avoidance area 10m arc from the nose. The airfield is very undulating.

Helicopter Operations
Helicopters may be carrying out Engine Off Landing (EOL) training to the EOL Area, with a southern circuit on Runway 08/26, and an eastern circuit on runways 17 and 35. The EOL Area is south of 08/26 and east of 17/35. Aircraft are not to cross the fixed-wing runway or extended centreline within 2nm of the airfield unless specifically cleared by ATC. Crews should position for a gate approach to the appropriate Heli-Arrival Point.

Local Regulations
24 hrs PPR (Prior Permission Required) for both military and civil aircraft. No rotors running refuelling are permitted at night. No flying below 2,000ft in area. Intensive helicopter & fixed wing operations. All MATZ crossings: Not below 500ft above aerodrome level. Combined MATZ crossing traffic to contact Boscombe Down on 126.7 or 256.5.

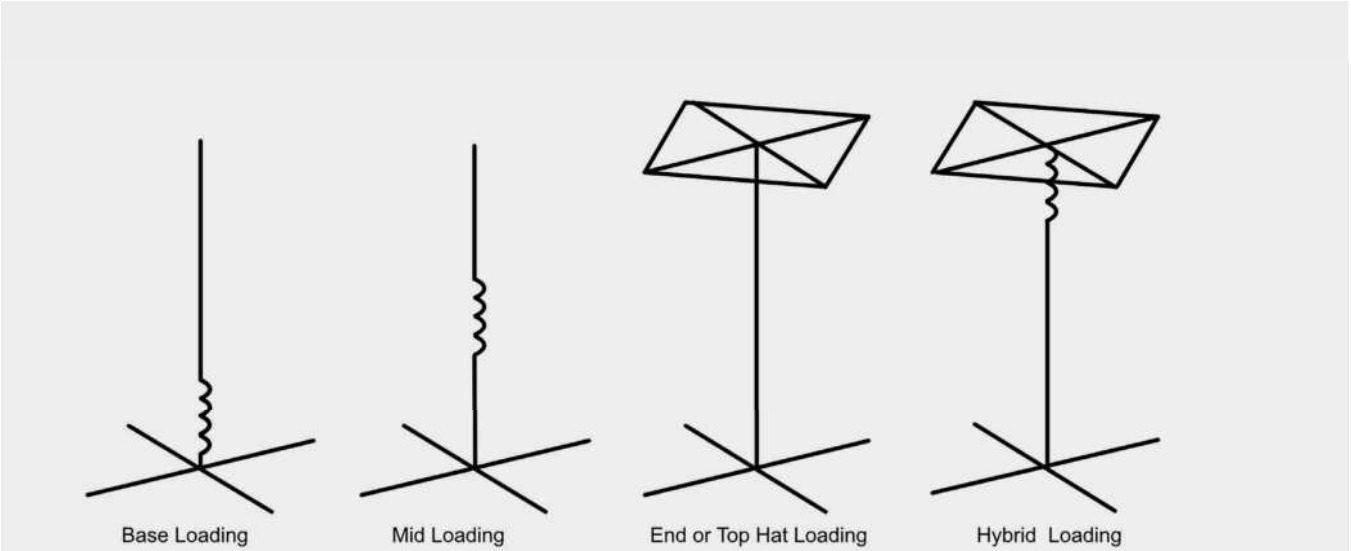
Military Aerodrome Traffic Zone
Standard. 5nm radius with stub 3nm-long aligned slightly offset from Runway 26, 4nm in width, from surface up to 3,110ft above aerodrome level.

Operational Hours
0800-0200 Mon-Thu 0800-1700 Fri.

Use of Runways
Caution: Circuit traffic (LHC/RHC) on either side of extended radar centre-line.

Warnings
Instrument Approach Procedures for this aerodrome are established outside controlled airspace. Middle Wallop-based helicopters are normally in RT contact with, but not under the positive control of Middle Wallop ATC. Full bird control measures are not implemented. Model aircraft flying up to 500ft AGL weekends and bank holidays. Helicopters arriving or departing the airfield on Runway 08/26 will pass beneath the fixed wing circuit. Fixed wing and intensive rotary operations up to 2,000ft. Non-scheduled flying may take place Sat & Sun. Caution: Danebury Hill (565ft AMSL) is 1.1nm SE of the airfield [N.B. 'AMSL' = Above Mean Sea Level – Ed.].

ALL PICTURES: KEITH RAWLINGS G4MIU



1

Let's Go Vertical

In his introduction to various types of aerials, **Keith Rawlings** moves on to verticals, looking at the principal technical aspects and construction requirements, as well as stressing the importance of good grounding.

Keith Rawlings
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Verticals have several very attractive attributes that make them popular for listeners and radio amateurs alike. They are often essential for broadcasters, and their vertical radiation pattern has many proven benefits when using the LW and MW bands.

Verticals are generally, but not always, omnidirectional. This means that they can be cheap and easy to make, relatively simple to put up, and you do not always need a lot of space for one either. For HF, going 'up' can be easier than 'going' out, and designs for listeners can be simple and practical, such as, hanging a wire down the side wall of a house or hidden in a tree. Any λ/4 verticals, from around the 40m band upwards, are quite feasible, in terms of their implementation.

Gain, Loading and Dimensions

For lower frequencies, where the physical length/height of the vertical increases, it is possible to use 'loading' to bring the height of the vertical into more manageable dimensions albeit at the cost of a reduction in resonance bandwidth (Fig. 1). As frequencies get higher the vertical's physical dimensions get shorter (especially at V/UHF). This may be exploited in several ways:

First, by increasing the length of the vertical to obtain more 'Gain'. For example, the vertical section of a 2m band λ/4 ground plane would have a length of some 500mm (Fig. 6).

However, increasing the wavelength to 5λ8 only increases the overall physical length to some 1.25 meters, still a manageable length; but this modest increase in physical length alters the verticals radiation pattern, bringing the lobes lower towards the horizon and thereby increasing the 'Gain' as it does so.

Another benefit is that as the dimensions of a vertical get smaller it becomes much easier to find places to mount one. Many enthusiasts have mounted VHF/UHF verticals on chimneys and the sides of houses, and many a CB operator has taken advantage of the small size of 11 m band aerial to mount them similarly or, as seen quite often, on a short pole down the garden.

Moreover, by going 'up', higher frequency verticals can be less obtrusive and need less space around them, which may be useful when mounting near other objects or alongside property boundaries.

Verticals are convenient for vehicle mounting as they rise vertically away from the body reducing interaction and the vehicle can be used to create a 'Ground Plane' in some circumstances. They are also omnidirectional, which is generally an advantage for vehicles on the move. Not only cars and motorcycles benefit from vertical radiators but also boats, aircraft and practically 'anything that moves'.

Verticals are capable of returning good results but like most things, there are good points with verticals and then quite naturally there are drawbacks; these I will discuss over the coming months

A Monopole

The most basic vertical aerial is a λ/4 (quarter wave) long. It is often called a Monopole, the word 'mono' hinting that it is, in fact, half of a dipole (Fig. 2). At 'A', you can see the layout of a conventional λ/2 dipole mounted vertically. It is fed at its centre point. At 'B', the diagram shows the λ/4 vertical mounted at ground level with the second half of the dipole depicted here as an image in the ground (the 'missing part' of the dipole). At point 'C', the same λ/4 element is mounted at ground level, but here a physical ground plane is depicted which forms the second part of the dipole.

For an HF aerial this 'ground plane' could take the form of many wires or 'ground radials' travelling out from below the

Fig. 1: Different methods of 'loading' a Vertical.
Fig. 2: A depiction of a vertical Monopole.
Fig. 3: An illustration of 'feeding' a Monopole.
Fig. 4: An *AN-SOF* CAD drawing of a Medium Wave (MW) Broadcast Tower.
Fig. 5: An *EZNEC* Overlay of a 145MHz Ground Plane, demonstrating the effects of Ground.
Fig. 6: An AN-SOF CAD drawing of a 145MHz Ground Plane.

vertical element, the oft-quoted length is approximately λ/4. These may be buried just below or, rest on, the surface. At higher frequencies, especially at V/UHF, the ground plane may well take the form of three or four short rods which will, more often than not, be screwed into the base of the aerial and slope downwards at some 45°.

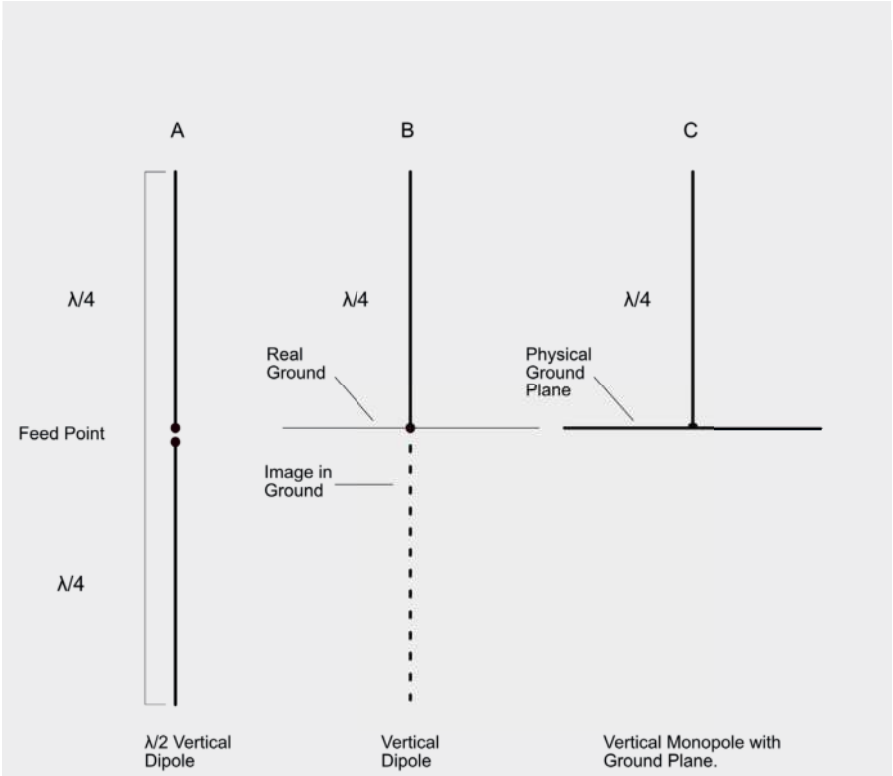
The Significance of Ground

A monopole always has to be adjacent to a ground of some form or another; how well it works will be related to this ground. It is vital to recognise that there are two 'grounds' involved when we relate to monopoles. First of these, is an artificial ground or radial system. The centre conductor of a coaxial cable feeder needs to be connected to the monopole element and the outer screen connected to ground (Fig. 3). The ground connection will carry all of the current the monopole element does, so this ground needs to be efficient.

Let us first consider the case of an HF Monopole: By just using a single earth rod, often placed in an imperfect ground, much of this current may be lost to ground. Therefore, a better option is to provide a form of 'earth-mat' to make our artificial earth; on HF, this may consist of a series of ground radials as mentioned above. There are many views on how many radials should be used and how long they should be.

From a practical point of view, at least, one should be provided at the very least (a counterpoise) but I would suggest four as a minimum. The more that is added the better but there is a case of diminishing returns for the amount of effort expended; 6 seems to be a popular choice for many amateurs.

Now is a good time to point out that Broadcast Stations do not usually stint here. They always use a lot of radials, and they do this to increase the efficiency of their aerial systems (Fig. 4). Radials may be buried. In that case, some recommend that the wire used is not insulated thereby making better contact with real ground.



2

As ground can be imperfect and poorly conductive it can be found beneficial to elevate the radial system.

To do this, the base of the monopole is raised to a height that safely puts it out of the reach of humans, often 8ft or more. Radials are fitted at this point and will now form an elevated artificial ground plane. It is advisable to use insulated wire. By raising the ground plane above real ground, efficiency can be improved. Quite often, using a smaller number of radial wires will yield results equal to a larger number of buried wires.

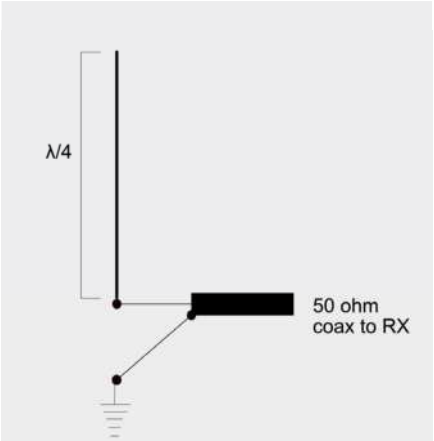
Real Ground

So this is our first ground, an artificial one, but there is a second one that affects how our monopole will work and this is the *real* ground beneath our feet. In many cases, this is something we can't do too much about.

Suffice it to say, the better the conductivity of the real ground is, the more efficient your aerial system will be.

As I have mentioned in the past, salt water makes for a good conductive ground so those with beach huts by the coast should have an advantage over the rest of us.

However, it is not only the *local* ground that affects us but also the ground out



3

towards the horizon. 'Lossy' ground can slow the wave, keeping it in contact with the ground. While this can be beneficial to MW broadcasters, it does tend to stop the wave from going more skywards which reduces the chances of long-distance communication.

A search on the net will bring up some verticals for HF where you will see that many do not use a *ground* radial system but more often than not, deploy either a counterpoise of some sort or incorporate radials. From memory, older multi-band verticals which come to mind are the Gap Titan, which has a counterpoise; the

Diamond CP-6 has shortened, trapped, radials. Both of these designs may be mounted, either close to the ground or in an elevated position. After owning a CP-6, I can confirm that this arrangement does work.

Another commercial vertical is the Hustler 5BTV. This is a multi-band λ/4 trapped vertical and seems to get good reviews. I have noted through some online reviews that many users do not admit to using radials of any sort but a design like this must surely benefit from them.

It is interesting to see that Nevada Radio sell the Hustler. The firm also offers some simple but sound advice on installing the 5BTV – no doubt from experience. Nevada staff advocate the use of a radial system and explain that earth rods may be used but at reduced efficiency, due to earth losses.

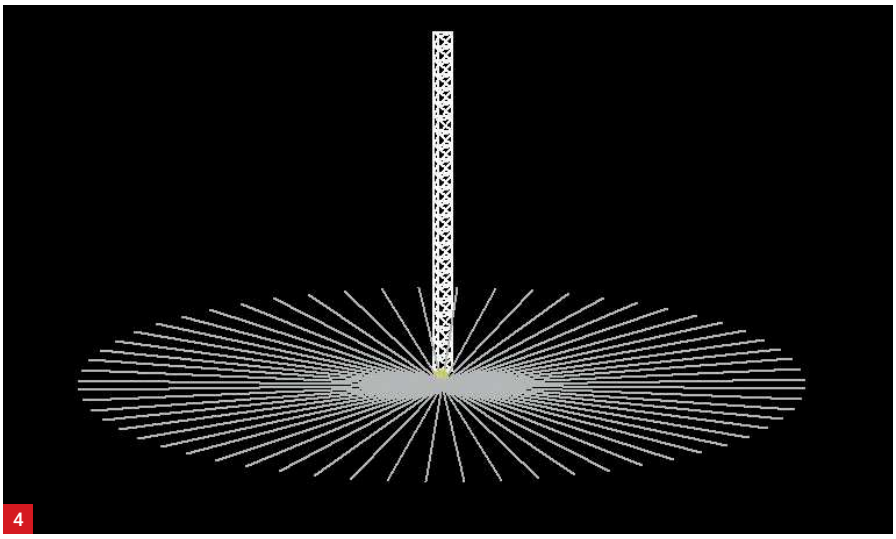
https://tinyurl.com/twjbz9tt

VHF - UHF

At V/UHF, it is easy to make a very effective ground plane with just three or four rods as already described above. If we did not have this arrangement, just relying on the ground connection of our aerial to a mast, we could not be certain of how this would work or how efficient it may be. The mast connection could be of any random length. It may or may not be grounded, which may affect the performance of the vertical's properties, its matching and its polar plot. Furthermore, we could have random currents on the outer of the coaxial feeder, which is undesirable. The mast may even be non-conducting, such as in the case of glass fibre or plastic poles.

In general, it is a simple matter to provide an effective and efficient ground plane to improve the performance of a Monopole at V/UHF, and it is usually the case that they are included. Some Monopole designs do not have any essential requirements for a ground plane or radials. These will be discussed in due course. It will be noted that real ground will also affect the radiation pattern of VHF & UHF aerials, even when mounted high above the ground (Fig. 5). In the illustration, I have superimposed three EZNEC modelled polar plots of a 145MHz vertical ground plane(GP), 7m above ground.

The blue trace is the theoretical free space plot showing the classic 'half-doughnut' form. The white trace is modelled over a perfectly-conducting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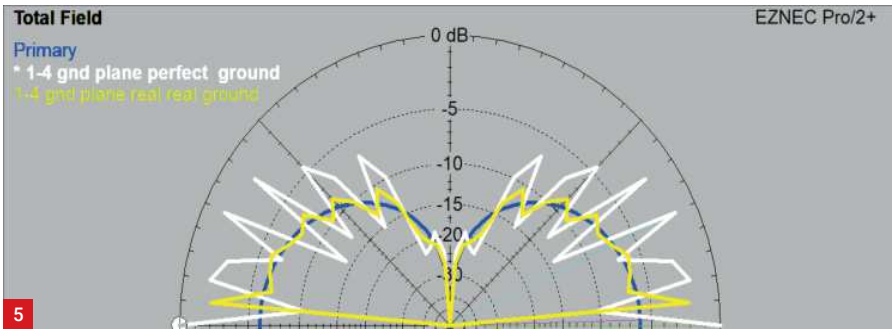

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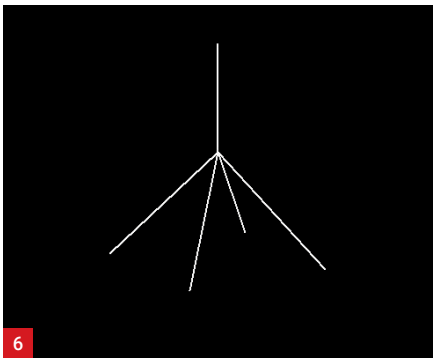
ground, and the yellow is over real ground. Note how the ground affects the behaviour of the VHF GP, even though it is over 3λ above ground.

The illustration in Fig. 6 shows an AN-SOF CAD drawing of a 145MHz Ground Plane.

Issues of Polarisation.

The electromagnetic wave leaving a vertical radiator does so in the vertical plane and it provides a low angle of radiation. This enhances good long-distance transmission and reception properties. Long and Medium Wave broadcasting stations usually use vertical polarisation due to the *ground wave* propagation over the Earth. It is considerably better when using vertical polarization. A vertically polarised radiator has the advantage that it goes out equally well in all directions parallel to the Earth. This is something which broadcasters find very advantageous for coverage.

At lower frequencies, the wave tends to remain vertically polarised in the ground wave. However, in cases where it is affected by the Ionosphere, especially at higher HF frequencies, the wave polarisation may well alter and arrive at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the receiver at any angle. On VHF and UHF, all things being equal, the wave remains vertically polarised. When things are not equal though, the wave angle can also vary considerably. On these frequencies, objects may be more prone to shadowing and diffraction as well as reflection. With the latter, due to wavelength at these frequencies, objects are more likely to have near resonant dimensions, and signals may be 'scattered' resulting in uncertainty of the polarisation.

When signals become 'cross polarised' there are losses, which can be considerable.

I will delve deeper into this next month; see you then.

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ALL PICTURES: THE KEITH HAMER+GARRY SMITH BBC COLLECTION

1

BBC 100 Years: 2010-2019

This month, **Keith Hamer and Garry Smith** present their penultimate exploration of the BBC's 100 years, as they continue rummaging through their archives.

The final edition of *Last Of The Summer Wine* was transmitted on Sunday, August 29th, **2010**. This was the 31st series of the very popular BBC-1 programme. The final line was spoken over the closing credits by Peter Sallis (playing Norman Clegg) who said, *"Did I lock the door?"*. The series had a peak audience figure in the mid-1980s of around 19 million viewers; the final episode had an estimated figure of 5 million. The first edition was transmitted on BBC-1 on January 4th, 1973. Each episode had a unique, 'tailor-made' rendition of the well-known theme tune, written by Ronnie Hazlehurst.

A lyric written by Bill Owen, who played Compo, was added later. Over the years, the series took on the appearance of a 'retirement home for well-known actors of a certain age.' Many well-known thespians joined the cast, including Thora Hird, Jean Alexander (Hilda Ogden, *Coronation Street*), Stephen Lewis (Blakey, *On The Buses*), Brian Murphy (*George & Mildred*), June Whitfield (*Terry and June*), and Frank Thornton (Captain Peacock from *Are You Being Served?*).

The main location for the series was Holmfirth in West Yorkshire. The well-trodden steps where Compo wooed Nora Batty can be seen in Fig. 1. The items on the bannister rail are flags, not Nora's famous tights! Incidentally, *Are You Being Served?* was written by David Croft and Jimmy Perry who were also responsible for *Hi-de-Hi!* - which was first shown on January 1st, 1980, not February 26th, 1981, as mentioned in our July column (*RadioUser*, July 2022: 53-55).

Wimbledon, Radio 4 Extra, and No Time Signals

Garry and Keith were featured on the BBC-1 documentary programme, *Inside Out*, with presenter Simon Hare, on January 24th, **2011**, talking about the forthcoming complete closure of analogue television and the subsequent demise of the BBC Ceefax Teletext service (Fig. 2). They were also invited to take part in several 'live' radio programmes. Three BBC World Service outlets were closed down on February 26th, due to government cutbacks in World Service funding: The *BBC Serbian Service,* the Spanish-language *Latin American Service*, and The *Portuguese For Africa Service*. *BBC Radio 4 Extra* was launched on April 9th, **2011** (Fig. 3) and replaced the *BBC Radio 7* digital station.

The BBC Time Signal, broadcast from equipment in the basement of Broadcasting House in London (Fig. 4) since 1990, was not transmitted on May 31st at 5.00 pm as planned due to a technical fault. This was the first time that the Time Signal system had failed! The Time Signal is generated from a grey box which is then passed to another grey box that converts the signal into an audible tone (the familiar six 'pips'). A backup system also failed to operate owing to a fault with the power supply to the backup equipment.

The Time Signal is generated every 15 minutes but is normally only broadcast to mark the hour. BBC protocol states that: *"The 'full' Time Signal, with the six 'pips', can **only** be transmitted to mark the exact time on the hour – it can **never** be transmitted in full during a normal programme (to illustrate archive news items, and so forth without special permission; to illustrate items where the Time Signal is required, normally only the first 3 or 4 'pips' are allowed to be transmitted."*

Moreover, in 2011, Wimbledon was broadcast in 3-D HD for the first time.

BBC-2 analogue transmissions from the transmitter at the Royal Town of Sutton Coldfield were discontinued at 00.20 on September 7th because of the switch-over to digital transmissions. BBC-2 analogue transmissions from Sutton Coldfield had begun in 1964. BBC-1 and all other analogue transmissions from the transmitter were finally discontinued at 01.50 on September 21st. An announcement about the closure of the BBC-1 analogue transmitter was made on BBC-2 at 11.20 pm. BBC-tv analogue transmissions from the Sutton Coldfield transmitter started on December 17th, 1949 (405 Lines, VHF). The station was opened by the announcer, Sylvia Peters, from a small temporary studio at the transmitter (Fig. 5).

Fig. 1: Nora Batty's house in *Last Of The Summer Wine*. It is located in Holmfirth, West Yorkshire. Fig. 2: A page from *Teletext*, announcing the closure of the *BBC Ceefax* service. Fig. 3: *BBC Radio 4 Extra* was launched on Saturday, April 9th, 2011. Fig. 4: The iconic BBC Television Centre in Shepherd's Bush, London, during construction. Fig. 5: Sylvia Peters at the Sutton Coldfield transmitter on December 17th, 1949, welcoming new viewers in the Midlands. Fig. 6: Adele Dixon singing the opening song, *Television*, at Alexandra Palace on November 2nd, 1936. Fig. 7: On February 6th, 2018, the BBC replaced the supply of data from the Meteorological Office with the one by *MeteoGroup*.

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Final Analogue Television and Ceefax Transmissions

BBC-2 analogue transmissions from Crystal Palace were discontinued shortly after midnight on April 4th, **2012**. BBC-1 and all other analogue transmissions from the transmitter were stopped on April 18th. Only a brief mention was made at the end of the BBC-1 London Regional news programme on Tuesday 17th at 1855.

BBC 405-Line VHF analogue transmissions from the Crystal Palace temporary television station had first been broadcast on March 28th, 1956, replacing the transmitter at Alexandra Palace. The main transmitter had come into service on December 18th, 1957. With the closure of analogue transmissions from Crystal Palace, 12 million viewers lost the BBC Ceefax Teletext service.

The final '*Pages From Ceefax*' sequence was transmitted on BBC-2 from 0445 until the start of programmes at 0600 on October 21st. The carefully timed music from 0445 was standard Ceefax music, but the very last piece to be used was the *BBC-1 Test Card Bart,* played by Ruby. *A special Ceefax Farewell Page* was shown at the end of the *Pages From CEEFAX* sequence. Ceefax had been introduced in September 1974, with *CEEFAX In Vision* going on air in 1980.

In January 1983, *CEEFAX AM* began with the start of the BBC's *Breakfast Television*. Subtitles via Ceefax, on Page 888, started on September 2nd, 1979. The final *Ceefax* transmission (received by the television's internal decoder) ended at 2330 on October 23rd, 2012, when the last remaining analogue transmitters were switched off, immediately after a special 'live' 1-hour programme called *The Magic Box* had ended. The programme was only shown in Northern Ireland. It was hosted by Eammon Holmes and began at 22.30. It was a unique simultaneous transmission by the BBC and UTV to mark the end of analogue television. Analogue transmissions from RTÉ-1 and RTÉ-2 in Éire were switched off with a 10-second countdown at 10.00 on October 24th.

On November 14th, the BBC celebrated its 90th anniversary. To mark the occasion, a special 3-minute collection of sound archives was commissioned, called *2LO Calling*, as part of an overall theme called *Radio Reunited*. It was intended to be a *"snapshot of the airwaves"*, featuring, *"iconic sounds from radio over the past 90 years"*. The composition began with the chimes of Big Ben and the original *"This is 2LO calling"* station identification. It ended with the BBC Time Signal. The broadcast was from the Science Museum in London. For the very first time in the BBC's history, the broadcast was transmitted simultaneously and globally 'live' on at least 55 BBC radio stations including the BBC World Service. The broadcast was heard by a potential audience of 120 million listeners.

BBC Television Centre Closes, New Broadcasting House Opens

The final 'live' programme from the BBC Television Centre in London was broadcast on March 25th, **2013**. This was a pop music concert performed by Madness from the car park (rather than from a Studio). It rained and snowed during the transmission. The doors of the iconic building were finally closed on March 31st. The first transmission from BBC Television Centre had been sent out on June 29th, 1960, from Studio 3.

An aerial view of the Television Centre during construction is shown in Fig. 5.

The Queen officially opened the new extension to Broadcasting House in London during a 'live' broadcast from the BBC Radio 4 Studio, S33, on June 7th. The new building took 10 years to construct and cost the licence fee payers £1 billion. It replaced all services previously provided by Bush House and Television Centre, including the adjoining Broadcasting Centre.

Local Radio Station DAB and BBC Ultra High-Definition Tests Begin

The first DAB broadcasts from BBC Radio Derby began from the Quarndon transmitter at 06.30 on July 23rd, **2014**. Also in 2014, the BBC announced their intention to trial the distribution of Ultra High-Definition (UHD) programmes via both Digital Terrestrial Television (DTT) and Internet Protocol (IP). Trials began at the 2014 World Cup event.

New High-Quality Video Codec

A high-quality video codec, known originally as *VC-2*, was devised by the BBC in **2015**. This later became *the subject of several SMPTE (Society of Motion Picture and Television Engineers) standards and eventually emerged as a royalty-free codec called Dirac. Development continued and the standard was updated to add new coding tools which offered improved support for UHD video formats.*

BBC Experiments with Visual Perceptive Media

BBC Television celebrated its 80th anniversary on November 2nd, **2016**, with a special programme called *In The Box*, which aimed to

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accurately reconstruct the first day of television in 1936. Unfortunately, the programme contained some factual errors. The actual first day of television in 1936 featured Adele Dixon singing the opening song, *Television* (Fig. 6). Furthermore in 2016, the BBC was experimenting with a system known as *Visual Perceptive Media* whereby the narrative, background music, colour grade, and 'feel' of a programme could be shaped in real-time to suit the viewer's personality.

BBC Develops Multi-Video Media Mixing System

Smartphone cameras and social media networks allow for the extremely rapid distribution of user-generated content (UGC) which is increasingly important in the coverage of news stories and 'live' events. In **2017,** the BBC devised a system to capture, process and distribute UGC from many different users, making it suitable for use on UHD services. A system called *Cognitus* was devised to coordinate the capture of footage from many different devices. The system up-converted various video sources within an interface that allowed producers to easily create programmes and packages from the material and then distribute them to audiences in ultra-high definition (UHD).

A Change In The Weather

After 95 years of the *Meteorological Office* supplying BBC Radio and Television with weather forecasts, the BBC ended the contract (worth £3 million to the Met Office) and changed to a new supplier, *MeteoGroup*, on February 6th, **2018**. The first broadcast using the new supplier's data was on BBC-1 at 1.30 pm (Fig. 7).

The only obvious differences were that the land masses were shown in green (rather than the previous sandy-desert format), and the weather charts remained relatively 'static', instead of moving around in a clockwise motion. The numerous on-screen Weather presenters, formerly employed by the Met Office, were offered contracts to transfer directly to the BBC.

New BBC Video Processing Techniques Evaluated

In **2019**, the BBC began a series of tests to evaluate new video processing techniques. Three programmes were produced by the BBC's *Natural History Unit*, using the Ultra High-Definition Hybrid Log-Gamma (HLG) High Dynamic Range (HDR) format.
The programmes (*Planet Earth II*, *Blue Planet II*, and *Dynasties*) were made available on-demand via the BBC iPlayer. The HLG technology was originally developed especially for 'live' television productions.

Conclusion

The decade was marked by a plethora of engineering and programme-production events including 3-D Television, the absent Time Signal, the special *2LO Calling* programme, Ultra High-Definition Television, changes to the weather, new video processing techniques, and the final closures of analogue television, the Ceefax Teletext service and the iconic BBC Television Centre.

DX-TV & FM News

The latest DX news, plus details of changes to broadcast television and radio services, is available online via the Radio Enthusiast website:
www.radioenthusiast.co.uk

Stay Tuned!

Please send archive photographs, information, news or suggestions for future topics via the E-mail addresses shown at the top of this column.
Please be advised that we cannot undertake to answer E-mails relating to technical issues or give advice on suitable equipment.

Tim Kirby
tim@livingland.wales

RIGPIX.COM

1

Handheld Amateur Radio Transceivers: Basic to Premium

This month, **Tim Kirby** looks at the world of handheld radio transceivers and finds that these radios can vary in price and features on offer, by a considerable margin. Read on to find out which one is right for you.

There is a wide variety of handheld radios available on the market these days. When I was on a video call the other day, someone spotted the array of handheld radios on the shelf behind me and wondered if I had enough! The trouble is, that many of them do something a little bit different and no one unit does it all! This month, I thought I would take a look at the various options that are available to you when buying a handheld, which is, after all, very often a first radio purchase when someone is getting into the hobby.

The VHF/UHF handheld market changed massively around 15 years ago when Chinese manufacturers started to make more units available. Before that, VHF/UHF handhelds had been produced by Yaesu, Icom and Kenwood and had commanded a reasonable price tag. My first 2m (single band) handheld in 1984 was an Icom IC-2E, which then cost £179 (Fig. 1). My first dual-band handheld (2m/70cm), a Yaesu FT-470 cost just under £400 (Fig. 3) – Actually, I quite regret selling both of those radios, but that's another story.

The first Chinese manufacturer to bring handhelds to the amateur market was Wouxun. This brought prices down massively compared to what we were used to, but the name which is, of course, synonymous with 'value' handhelds is Baofeng (Fig. 3). At one stage, you could get a simple single-band 70cm transceiver for under £10 and a dual-band 2/70cm transceiver for under £30. Prices have risen a little now, but not much.

Getting What You Pay For

What should you look for when you're buying a handheld radio? Is a £30 radio as good as a £400 radio? Like everywhere else, you get what you pay for, and things very much depend on what you are looking for from your handheld radio.

I tend to split handhelds into two categories, 'Basic' and 'Premium'. I view 'Basic' models as just that. They'll cover the 2m and 70cm bands with FM. They will have a reasonable number of memories, which you can program with repeaters, often used channels, and so on, and you'll be able to scan the channels you have set up. You'll be able to program the units either from the front panel of the handheld; or, perhaps, using programming software running on a computer, connected to the handheld through a USB programming cable (which sometimes seems to cost half the cost of the handheld!).

Added Features

Some 'basic' units may have added features you may enjoy – for example, some of the Senhaix models featured air-band receive as well as a decent torch! These types of features usually increase the price by a little but not much. And of course, the price you pay will depend on where you buy them from. The very cheapest option is to buy directly from China using a site such as eBay or Ali-Express. Of course, if you do that, you'll get no support should you need information about using the set.

As you become more experienced this may matter less to you. Dealers based in the UK generally offer more support and you'll probably receive your handheld a lot quicker than one which is coming from the Far East. At the time of writing, there's very little in it price-wise, but this does vary.

Spectral Purity and More

What are the ups and downs of these basic models? Something you will hear mentioned a lot is that the 'spectral purity' of some of the cheaper models is not good. What does this mean? As well as transmitting where you want the set to transmit (for instance, on 2m or 70cm), it may well have some other spurious signals. All sets have these, but the aim is to reduce these unwanted transmissions as much as possible.

This is important because you don't want to be interfering with other radio

Fig. 1: The Icom IC-2E was one of the first fully synthesized 2m handhelds in the early 1980s. The frequency was changed using the thumbwheels on the top of the radio.
Fig. 2: Perhaps one of the cheapest 70cm handhelds ever: The Baofeng BF-888. At times, it is available for under £10, and it works very well. The battery life is astonishing.

BAOFENG

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users, such as airband, marine, and so on. Some countries, such as Germany, have banned the import of radios like the Baofeng (Fig. 2) because these do not meet legislative standards on the suppression of unwanted transmitted signals.

[A bit like the beer, really! – Ed.].

Is this something that you need to worry about? There are some things that it would be a bad idea to do – using a Baofeng and an amplifier to increase the output power with a rooftop aerial, for example. Why? Because, not only will your wanted signals be amplified and can travel further, but so can the unwanted ones as well! But, if you're using the handheld on a rubber duck antenna (which is pretty inefficient) then the chances of causing a problem are very significantly reduced. In general, as long as you are not expecting to use the handheld in a very RF-sensitive environment, then it's pretty unlikely that you will cause any problems using a 'basic' handheld.

Performance and Quirks

What about receiver performance? A basic unit is unlikely to be as sensitive as a 'premium' one. Does that matter? You are probably not going to be listening for very weak signals on a handheld. What about strong signal handling? The cheaper models generally do a poorer job of rejecting nearby strong signals on other frequencies. This might be a problem for you if you have another radio amateur, a paging transmitter, marine, airband or similar transmitter close by.

My experience with the basic units is that they are not so well designed from a user point of view, compared to the premium units. I forget which set it was now, but one of the cheaper units was so difficult to program up a repeater channel from the front panel, I had to resort to doing it from a computer using a programming cable.

The menus may not be so easy to navigate and some of the menu items may be 'creatively named' and their real purpose not particularly apparent. All this having been said, this may be frustrating when you first pick up the set and start using it, but as long as you use it regularly, you quickly become used to the quirks and they are generally not a huge issue.

Build-quality is something else to be aware of. Though I wouldn't recommend dropping any of the sets, the more expensive ones are probably better made. On the other hand, if you drop the £30 handheld into a puddle of water and need to replace it, it's less stress on the pocket than a more expensive unit!

DMR Transceivers

Although I have talked about FM-only sets in the 'basic' category so far, there are some DMR handhelds which fit into this category too. The TYT MD-380, for example, (single band, either 70cm or 2m) sells for around £85 and works on both FM and DMR – and a very decent set it is too. You may see some other cheap DMR radios around. If you plan to use them on a local repeater (rather than a hotspot) make sure that they support DMR Tier II rather than Tier I.

A DMR Tier I set transmits the same signal on both timeslots. This is OK if you're using a hotspot, but not so if you are on a repeater as you'll be blocking the opposite timeslot from being used by other stations. You won't find any D-STAR or Fusion radios in the 'basic' price bracket.

If you are after a simple 2m/70cm FM only (maybe DMR) handheld to be used occasionally, in a non-RF-sensitive environment, then a low-cost handheld is probably for you. And if you haven't got one already, why don't you try one and see what you can hear locally or from your local hilltop? Some great contacts can be made and there is huge fun to be had.

Digital Voice and GPS: Premium Handhelds

What distinguishes a 'premium' handheld from a 'basic' handheld? Premium units, like the basic ones, will almost certainly cover 2m and 70cm FM. However, they will almost certainly do something different, like offering one of the digital voice modes, such as D-STAR, DMR or Fusion.

D-STAR and Fusion are not covered by any of the more basic units, although, as discussed above, there are some very low-cost DMR units available.

Of course, none of the premium units

Fig. 3: A Yaesu FT-470 2m/70cm dual-bander from the late 1980s. One of these was the author's first handheld. It worked very well; and when I lived in North America, I found that this receiver worked well on 220MHz.
Fig. 4: Perhaps the most sophisticated handheld transceiver on the market currently: The Icom ID-52E. It is a dual-band 2m/70cm D-STAR and FM and offers lots of features, including a built-in repeater directory, voice recording, and GPS.

covers more than one of the digital modes, so if you want a handheld to cover D-STAR, DMR and Fusion, you are out of luck! You'll need three, one for each mode! It is possible, using certain hotspots, to 'cross-mode' from one mode to another, for instance, D-STAR to Fusion or DMR. However, by and large, if you want to cover different digital modes, then you will need three different radios.

Some of the premium units also include GPS functionality. This can be quite nice as you can 'encode' your location into your digital transmission and other stations can see where you are, how far away and on what bearing. Both D-STAR and Fusion include this capability.

DMR doesn't really, at least not in an amateur radio context.

Some premium handhelds include packet radio (both 1200 and 9600 baud) which is most often used for sending location data on an analogue radio channel (generally 144.800MHz in the UK, 144.390MHz in North America). This functionality is known as the Automatic Packet Reporting System (APRS). APRS also supports simple text messaging between users which can work on a worldwide basis. I remember sending an APRS message using my smartphone from a train at Reading station. It was received, seconds later, on a mountain top summit in Colorado, USA. APRS functionality is not available on any of the 'basic' handhelds.

A much-desired facility for satellite users – and satellite QSOs can quite readily be made using handheld equipment – is the capability to transmit on one band whilst listening at the same time on the other band (full duplex). My very first 2m/70cm handheld, the FT-470, had this facility.

However – although several current models offer the ability to receive on two bands at once and simultaneously – none of the current models are full duplex. The last full duplex model to be widely available was the Kenwood TH-D72. Unfortunately, this is no longer in production. These transceivers can command a very good

YAESU

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second-hand price and are much sought after by satellite operators.

Another example of a premium handheld is a combination of an Android smartphone and a 2m/70cm FM/DMR Radio such as the RFinder B1 or B1+ devices. You can use these as a smartphone and run the Android apps of your choice, such as *Zello, Echolink, DroidStar, APRSDroid, E-mail*, and so on, as well as the *RFinder RF1* app which drives the 2m/70cm module, allowing you to operate FM and DMR.

As you can see, the Premium handhelds diverge massively in terms of functionality so it will depend hugely on what you want to do. Particularly with the digital modes – and APRS, to some extent – it is well worth finding out about the activity in your local area and making sure that you will have someone to talk to.

Other Handhelds

I have only covered (amateur radio bands) 2m and 70cm handhelds, but there are plenty more that you may enjoy having in a potentially burgeoning handheld collection! Of course, there are handhelds for PMR446, there are marine and air band

ICOM

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handhelds. Marine sets may be basic FM-only or may have DSC and even AIS built in (which tends to take them into the 'premium' band). Some Airband sets may be basic voice or may offer GPS and VOR functionality.

On the amateur bands, you can find handheld equipment for 28, 50, 70 and even 1296MHz. As you go lower in frequency, the challenge is to connect an aerial which works reasonably well as a handheld, without becoming too unwieldy. This is an issue too for many CB handhelds, and there are some interesting-looking sets which cover both multi-norm FM channels, as well as SSB. Some of these are supplied with relatively tiny rubber duck-type antennas, which almost certainly won't work very well. If you can manage to put a quarter wave whip, with a counterpoise on the set, it'll probably function much better.

There are some 'super handhelds' such as the Yaesu FT-817/FT-818 and Icom IC-705 (See also Fig. 4).

These cover HF and VHF bands with multi modes. These are rather beyond the scope of this article in terms of complexity and price. I hope you have enjoyed this look through the world of handheld radios.

There is something special about being able to make radio contacts from anywhere – at least, almost anywhere – and even now after many years of amateur radio, I still find great pleasure in making radio contacts with handheld equipment.

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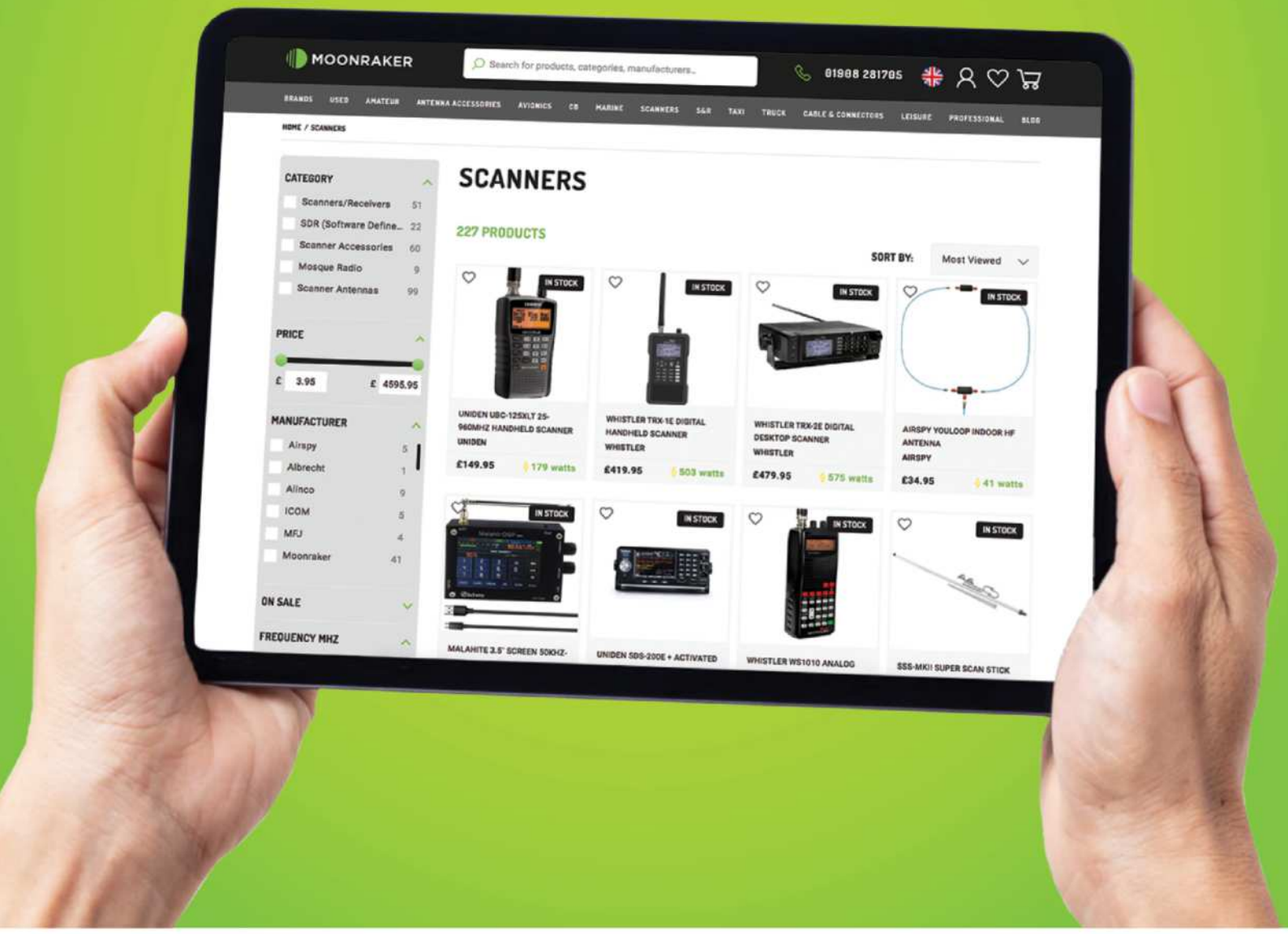

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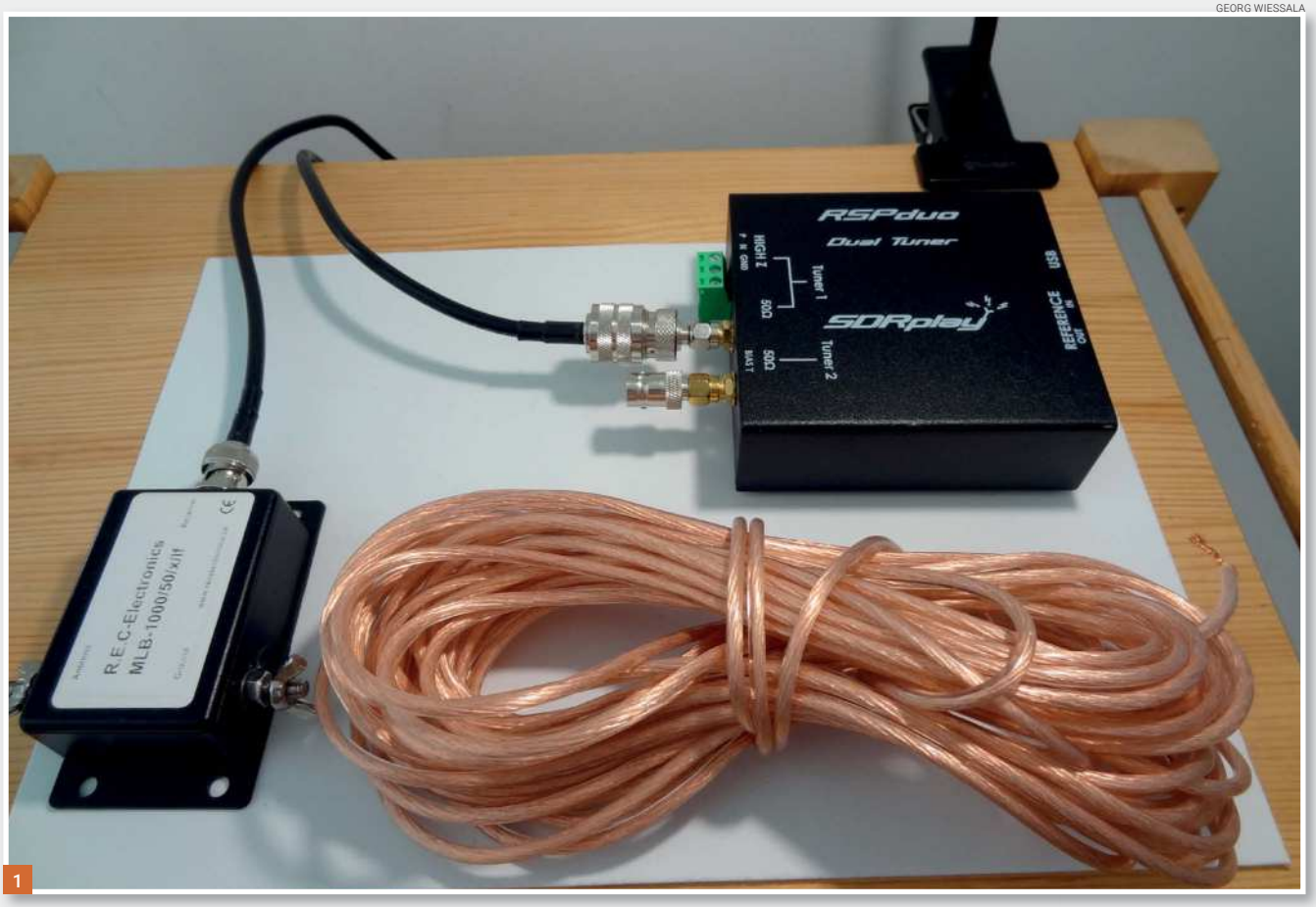

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From Design to Production: The R.E.C. Electronics BALUNs

The editor takes a look at the Magnetic Long Wire BALUNs (MLBs) made by R.E.C. Electronics and puts these very unobtrusive but powerful little devices to the test with his SDRplay RSPduo Receiver.

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Keith Rawlings
Keith.g4miu@gmail.com

Many of our regular *RadioUser* columnists are also engaged, to varying degrees, in making radios, PCBs, accessories and components. One great example of such activity is our *Aerials Now* columnist and reviewer Keith Rawlings, the driving force behind the company *R.E.C. Electronics*

Keith has written about Magnetic Long Wire BALUNs here before (e.g. in *RadioUser*, September 2016: 58-63).

Some of Keith's work has now taken a more concrete shape, and he recently sent me a pre-production model of a new BALUN (Balancing Transformer).

This was a cylindrical device (Fig. 2), built to accommodate a simple long-wire aerial.

The acronym 'BALUN' stands for 'Balanced-Unbalanced'. These are devices used to couple a *balanced impedance*, such as an aerial, to an *unbalanced transmission line*, like a coaxial cable.

A BALUN is thus needed to prevent asymmetrical loading of the balanced impedance and the induction of currents on the exterior of the unbalanced transmission line (*Oxford Dictionary of Electronics and Electrical Engineering*, 5th ed.: 36).

Keith said about his new device: *"This is an MLB [Magnetic Longwire BALUN] for a 'random wire' end-fed. It has been optimised for frequencies down to 50kHz with a nominal 1kΩ input impedance. It is useable over the entire High Frequency (HF) range, but the performance drops off above approximately 20MHz, as it is predominantly for LF use [...].*

"Attach 30ft or more of wire to it and let me know how you find it. I will be making another 'low-noise' LF version that has a ground connection – which should

KEITH RAWLINGS

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KEITH RAWLINGS

3

***KEITH (270422)**: "I will be making these commercially but I still have a few more tests to make electronically, and also physically, as I need to test how much strain can safely be placed on the BALUN without the ends pulling out! The cylindrical model you have has 3D-printed PLA ends. I am presently printing some PET-G ends to try, which should stand up more to being outside over long periods and I will also try parts turned on my lathe made from Acetal (time-consuming but best overall quality). The threaded stud will be made 5-6mm longer, and labels will be needed to be designed and printed as well. The REC Electronics stickers are leftovers from a long past product! There is also a second model I am developing and I will send you one to play with once I have the time to make it. I may also develop a version which is supplied with 66ft of lightweight wire and insulators."*

***KEITH (100622):** "I am glad to hear that you have found the BALUN works OK. It has been designed for improved performance on the lower frequencies, and it is based on the article I did in* RadioUser, *September 2016: 58-63. I still have the original sitting in front of me here. My 66ft end-fed, which I have used for several years now, has a BALUN based on this design but has been improved to reject local electrical noise on the low frequencies. A number were made for friends and they seemed happy with them. I am planning a version for general SW work. The one you have might be called a 'pre-production model' I think that's what the likes of Yaesu call review items that are not quite ready! I could make some 'to order' for readers if there was initial interest, by the way. By all means, go ahead with what you are planning. A couple of months for a 'full review' would be better for me in case people want some. The original design used lathe-turned parts throughout but I now have some PET-G 3D printed parts for the ends. These are slower to make on a 3D printer but they can at least be left running unattended! The slow, and rather tedious, bit is winding the special transformer core! When I get the SW version ready, and also an LF 'low-noise' version, I will send you a couple of those as well."*

***KEITH (250722)** "I have made one of my 'low noise' receiving-only BALUNs for you to try. This has pretty much the same performance as the one you already have but has the addition of a ground connection, which in many cases should go a long way to reducing electrical noise and static on the lower frequencies. This model is a lower frequency version of the design I presently use on my 66ft inverted L end-fed. One of the terminals needs to be grounded to an Earth stake with as short a lead as possible. It does not matter which one: Although they are marked 'Ground' and 'Antenna', they are, in fact, the same winding. This provides a grounded path for the wire element dumping static build-up to the ground. Naturally, to get the best results the BALUN end of the aerial needs to be at ground level. The wire could then take the form of an inverted L or could just run away from the BALUN increasing in height as it does so. Simulating a portable setup, I ran out 30 ft of wire up to a height of 10 ft and tests were made with the BALUN connected and with the wire just inserted into the RX input. The BALUN was connected to the RX via a run of coaxial cable.*

- *MSF on 60 kHz was -94 dBm on the wire and -77dBm with the BALUN.*
- *DDH47 -105 and -91 dBm*
- *BBC R4 198- 69 and -58 dBm*
- *BBC R5 909 -43 and -34dBm*
- *Local Radio 1539 kHz --53 and -49 dBm.*

"As you can see there was a worthy increase in signal strength but of course, for fixed-station use, there is the benefit that the BALUN and wire can be located outside of the house and away from QRM, with the signals being fed back to the RX via screened coaxial cable, thus further reducing noise pickup. Furthermore, the BALUN will provide a closer match to the RX input than would be the case with a 'bare' end fed, which will have a high impedance at this point. Another benefit is that, where an AMU is used, there may be cases where some AMUs have a job matching the wide impedance ranges that may be found on end-feds. In these cases, the BALUN will help bring these values down to a manageable level for the AMU. The actual performance will naturally vary on the location, type of local ground conditions wire length and height, and so on. The unit is 'weather resistant' and, if left mounted outside for extended periods, it will need a simple enclosure of some sort to keep the weather off.

Plastic drink bottles can be useful here.

Typical Specifications of this model are as follows:

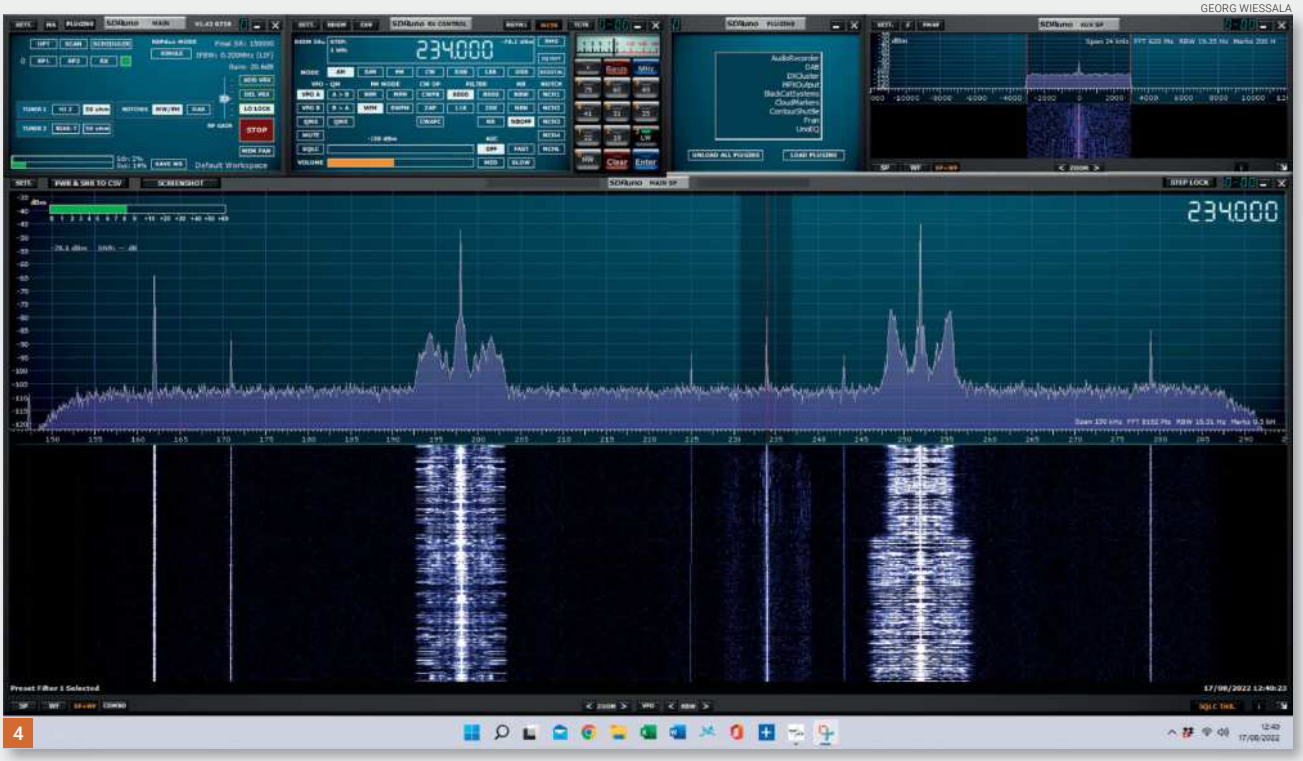
- *50kHz to 20MHz (with a slightly reduced performance up to 30MHz)*
- *Ratio 20:1 Nominal input 1000 Ω.*
- *Insertion loss:-*
- *< 0 .25dB up to 10MHz*
- *< 1.0dB @20Mhz*
- *3.0dB @30MHz.*

"It is recommended that the aerial wire be removed from the BALUN during periods of thunderstorms, as should be the case for any radio equipment. I will be making a model with a lower frequency of 500kHz, models with 450Ω impedance, a BALUN suitable for a EWE Aerial, plus anything else I can think of."

N.B.: EWE Antennas:
https://tinyurl.com/35vvk5xk

Radio Enthusiast: 13th June 2022:
https://tinyurl.com/bdh8w8ke

GEORG WIESSALA



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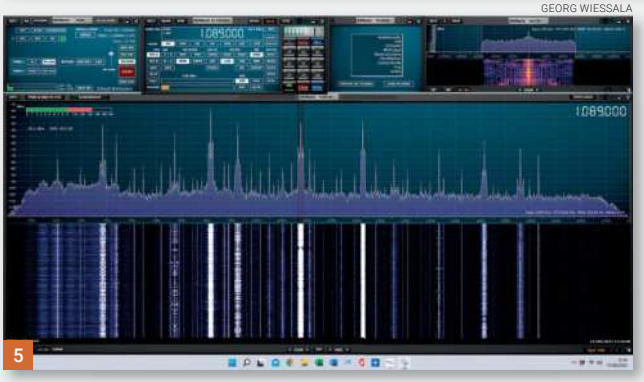

GEORG WIESSALA

minimise electrical noise below 2MHz.

Naturally, I took Keith at his word and dug out that aerial flex wire for a short test.

I was also sent the 'low noise' model of Keith's BALUN – the R.E.C. Electronics MLB-1000/50/x/lf (Fig. 3). This later model has identical specifications to the first but has included a terminal for a ground connection (see box, below).

I tried both BALUNs with a good-quality flex wire aerial (Fig. 1) in an electronically reasonably quiet location over a few weeks and took a few typical screenshots in mid-August.

The receiver used was the SDRplay RSPduo with SDRuno software. All screenshots are of daytime reception. Fig. 4 shows the Long Wave Band, centered on RTL (234kHz); Fig. 5 reveals an exceptionally lively Medium Wave scene, and Fig. 6 has details of transmissions on the 22-metre Band at around 1 pm.

Fig. 1: My test setup
Fig. 2: The R.E.C. Electronics cylindrical BALUN for a long wire.
Fig. 3: The R.E.C. Electronics MLB-1000/50/x/lf BALUN.
Fig. 4: Results on Long Wave.
Fig. 5: The Medium Wave band with the R.E.C. Electronics MLB-1000/50/x/lf BALUN.
Fig. 6: The 22-meter Short Wave Band on a typical day.

In the box below, I am including some of the further explanations of this device, which Keith has kindly shared with me from April 2022 onwards.

Apart from being highly interesting in themselves, I feel that these also reveal some of the design processes and development concepts behind these BALUNs, as well as Keith's plans.

I reproduce them here in a slightly edited and shortened version.

Now I am going to take everything down again – the next thunderstorm is fast approaching over the beautiful Ribble Valley. In the meantime, if you have any questions for Keith, please feel free to contact him at the e-mail address below:

keith.g4miu@gmail.com

*[N.B.: Prices: The low noise MLB-1000/50/x/lt will have an estimated price tag of £27, and the cylindrical MLB is £24 – **Ed**.].*

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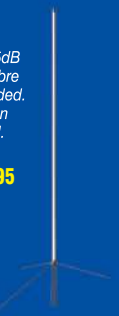

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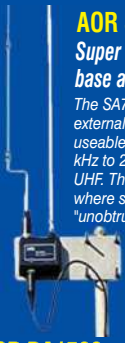

The SA7000 is an ultra-wide range external receiving aerial with a useable frequency coverage of 30 kHz to 2 GHz - short wave / VHF / UHF. The aerial is designed for areas where space is a problem or when an "unobtrusive" installation is essential.

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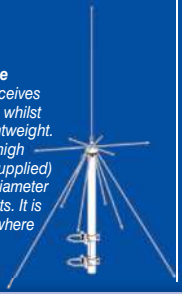

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THE BOMBING BLITZ 80 YEARS COMMEMORATIVE ISSUE

The story of Nazi Germany's failed bid to bomb Britain into submission during WWII

The Blitz IN COLOUR

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Welcome

The Blitz is an event in British military history which will forever remain embedded in the collective national consciousness. And, however doubtful the value or relevance of such a term might be in the 21st Century, the expression 'Blitz Spirit' has endured across the 80 years since the Blitz to suggest a spirit of resilience in the face of hardship and adversity. However inappropriate its application might have been to any event suffered nationally across subsequent decades, the fact that the expression is very much part of the English lexicon - and something which is universally understood – speaks volumes as to the impact that the events of the Blitz had upon the British psyche.

With the word's origins attached to the German word 'Blitzkrieg' (meaning Lightning War), the single term Blitz has evolved to be understood as the bombing of British cities by the Luftwaffe. Primarily, of course, the Blitz is associated with the German air assault on London between September 1940 and May 1941. However, it is important to recognise that the Blitz involved the majority of British cities: including Glasgow, Belfast, Southampton, Bristol, Coventry and Birmingham. That list, though, is not in any way exhaustive. It is also the case that a huge number of other towns and villages came in for attention by the Luftwaffe across almost the entire duration of the war, and not just the period of the September 1940 to May 1941 Blitz. Additionally, the nation was also attacked from the air and from the sea during the First World War, too.

In this publication, then, we have looked at the whole range and scope of attacks against the entirety of the British Isles (including the First World War) which largely targeted the civilian population and industrial or non-military objectives. During the Second World War, this also includes the devastating Tip and Run attacks against largely coastal towns as well as the fearsome V1 Flying Bomb and V2 rocket attacks.

Throughout the Second World War alone, a total of 60,595 civilians were killed as the result of air attacks. Putting this figure into perspective against Britain's total number of military fatalities during the war (376,239) it represents around 16% of that total.

While the very largest percentage of those civilian casualties were suffered in the big towns or cities, it is hard to find a single rural community across mainland Britain which did not suffer a fatality or casualty. Thus, the Blitz on Britain affected almost every single community. And the whole nation was on the front line. Or potentially so.

In this publication to mark the 80th anniversary of the main part of the Blitz, we have looked at a wide range of related topics, examined how Britain was defended, how it was attacked and how the civilian population withstood an extraordinary assault.

In compiling this record of the varied attacks on Britain, we have examined that period through a range of colour images, including photographs that have been colourised specifically for this publication.

We hope that you enjoy this unique look at one of the most dramatic periods in Britain's recent history.

This publication is dedicated to the memory of the 60,595 innocent civilian lives so cruelly taken during the nation's dreadful ordeal under fire.

Andy Saunders
Editor, The Blitz in Colour

The Blitz IN COLOUR

INSIDE THIS COMMEMORATIVE PUBLICATION

CONTRIBUTORS

Richard J Molloy

The colourisation artist for this project was Richard J Molloy who specialises in the digital colourisation of historic images. His particular interest is with military subjects and he is a regular art contributor to Iron Cross magazine, also by Warners Group Publications Plc.

Using research based on known colours, and sometimes using period colour charts, Richard constructs accurate representations of period images. His evaluation of those images often requires forensic research to properly represent the image being coloured.

This piece of work on the Blitz on Britain is Richard's second such project for Warners Group Publications Plc, his first being Battle of Britain in Colour published in 2020.

Samples of Richard J Molloy's work may be viewed by searching:- @colourbyRJM

Andy Godfrey

The aircraft colour profile artwork for this publication was by Andy Godfrey of the Teasel Studio.

Andy specialises in bespoke profile artworks for publication and commission.

Working from his studio near Hastings, East Sussex, his work draws on an extensive reference collection, gathered over five decades, a deep fascination with aircraft and specialist knowledge of colours and markings.

For enquiries:- teaselstudio@yahoo.co.uk

Acknowledgements

The editor wishes to thank Ian Castle, Austin J Ruddy and Steve Hunnisett for their individual and valuable contributions to this publication.

Cover Story Focke-Wulf 190 fighter-bombers streak away from Eastbourne on 4 June 1943 after one of the devastating tip-and-run attacks endured by the town. **Artwork by Piotr Forkasiewicz**

‘No Longer an Island’

At the dawn of the 20th century, Britons slept soundly in their beds, safe in the knowledge that the Royal Navy protected the coastline from enemy aggression. However, advances in aeronautics soon exposed the country to assault from the air.

In July 1900, a retired German Army officer, Count Ferdinand von Zeppelin, launched his first eponymous airship using lighter-than-air gas, hydrogen, to lift its great bulk into the sky. Over the next years, von Zeppelin continued to experiment and by 1910 Zeppelins were operating regular flights over Germany. It was a fact not underestimated by the German military.

Six years later, aeroplane development had progressed slowly in comparison to airships, and when an aviation pioneer claimed a prize for being the first to complete a flight of over 100 metres in 1906 there was little reaction. However, a newspaper baron, Lord Northcliffe, recognised its stark significance, remarking:

‘England is no longer an island.’

Despite this early warning, Britain had little in the way of air defence when the country declared war on Germany in August 1914.

HATRED FOR GERMANY

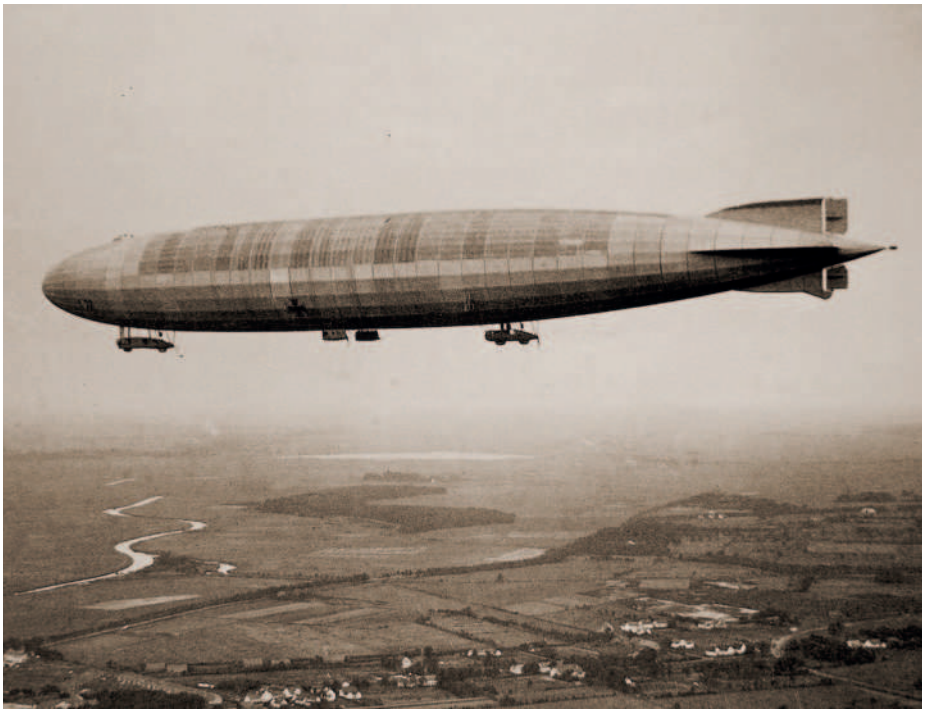
At that time, the Army and Royal Navy each had an air arm, the Royal Flying Corps (RFC) and the Royal Naval Air Service (RNAS). When the RFC accompanied the British Expeditionary Force to the battlefields of Europe, the RNAS accepted responsibility – temporarily – to defend Britain against aerial attack. Other than a diverse collection of 50 seaplanes and landplanes, there were just a handful of efficient anti-aircraft guns defending military installations. London only received its first guns – three ineffective one pounders – four days after the declaration of war.

There had never been a sustained aerial bombing campaign before and nobody could be sure what impact bombs falling amongst the civilian population would have on morale. In Germany, as early as August 1914, Paul Behncke, Deputy Chief of the Naval Staff, expressed his belief that attacks on London were likely:

‘...to cause panic in the population which may possibly render it doubtful that the war can be continued.’

Later, in October 1914, he warmed to his subject:

‘We dare not leave untried any means of forcing England to her knees, and successful air attacks on London, considering the well-known nervousness of the public, will be a valuable measure.’



Facing Page Ground personnel load 50kg bombs onto a Gotha G V, preparatory to an air raid against Britain.
Above Bomb damage in Great Yarmouth during the first Zeppelin raid on Britain. The bomb that wrecked this house in St. Peter's Plain also claimed the lives of the first two people in Britain killed by a bomb dropped from the air: Samuel Smith (aged 53) and Martha Taylor (72).

He was wrong. When bombs did start to fall across Britain there was no crumbling of morale but instead a hatred for Germany as its bombs killed innocent civilians as they lay asleep in their beds. And anger, too, that the British military appeared, initially at least, to have no effective means to oppose the raids.

AWE AND WONDER

The first significant raid took place in January 1915, when two Zeppelins bombed Great Yarmouth, King's Lynn and a number of Norfolk villages, claiming the lives of four and injuring 16 others. Something that seemed impossible just a few years earlier had become reality. And when those first bombs exploded, they opened-up a whole new theatre of war: The Home Front.

The experiences of those on the ground living through the raids varied enormously. Many people in Britain had not even seen an aeroplane before the war, and so when one of these huge airships passed over the blacked-out towns, cities and villages, illuminated by searchlights while moving serenely

on, they aroused widespread awe and wonder. Others, meanwhile, were simply – and understandably - terrified.

Air raid warnings were left to the discretion of local authorities and where such arrangements existed, they took the form of hooters or whistles sounded at factories or by the raising and lowering of gas pressure, which changed the brightness of lights in homes and workplaces. In London, though, there was no air raid warning system. Although debated, the government concluded

Top For residents of Britain du
World War, the Zeppelin wa
awe, wonder and fear.
Above Left In 1915
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READ THE FULL FEATURE HERE

Beachfront Broadside

German raids against Britain usually involved air attacks, but during the First World War the German Navy also shelled several British towns from the sea.

Although geographically the closest town to Germany, the residents of Lowestoft were not particularly concerned that war would come to them in any real way when it broke out in August 1914. However, on the night of 15/16 April 1915 that complacency was dispelled when the town was raided by a Zeppelin. Terrifying though it was, the attack resulted in relatively little damage although it was a portent of things to come. War would arrive in Lowestoft with a vengeance just over a year later.

Plans to bombard towns on the east coast at daybreak on 25 April 1916, from the cruisers and destroyers of a battlecruiser squadron, along with Zeppelin raids the night before, were intended to entice the Royal Navy to battle. If successful, the High Seas Fleet might destroy significant elements of the British Fleet, reducing or eliminating the Royal Navy's numerical superiority. In addition, it was timed to coincide with an expected Easter Rebellion by Irish Nationalists.

As targets, Lowestoft and Great Yarmouth were selected because the former was a minelaying and minesweeping base, while Great Yarmouth housed submarines disrupting German movements. The destruction of harbours and military establishments there would assist the war effort - even if it failed to bait the British.

In a well thought out plan, with eight Zeppelins dropping bombs and providing reconnaissance, the ships could assist if an airship was lost over water. Two U-boats were also sent ahead to Lowestoft, while others laid mines against vessels despatched south to engage the German force.

'BOMBS UNLAWFULLY DROPPED'

At noon on the 24th, operations began with the intention of putting the bombardment group off Lowestoft and Yarmouth by daybreak to bombard them for 30 minutes. But, at 16:00, disaster struck as the battlecruiser *Seydlitz*, in the vanguard of the force, hit a mine and was forced to turn back with a 50 ft gash in her hull.

The British, aware that the German ships had sailed, received information at 20:15 they were heading for Yarmouth and at 15:50 the fleet was put on two-hours-notice, finally ordered south from Scapa Flow at 19:05. Around midnight, the Harwich squadron of three light cruisers and 18 destroyers was ordered north.

Meanwhile, the airships had dropped their bombs while reporting visibility over land as poor, the winds unfavourable and the towns better defended than thought. However, whilst causing widespread terror, the bombs only resulted in one death: 79-year-old Fanny Gaze at Hall Farm, Horning, with the coroner later recording:

Facing Page A German painting by the artist Professor Hans Bohrdt of the bombardment of Lowestoft on 25 April 1916.
Right This imposing house on the Esplanade was cut in two by one of the German naval shells.
Below Left A series of commemorative postcards were produced to mark the bombardment of Lowestoft, this card showing damage at Cleveland Road.
Below Right Bombardment of another of Britain's coastal towns had taken place in Scarborough on 16 December 1915, the devastating assault being used as a tool to encourage enlistment.

'Heart failure from shock endured by the terrifying effect of explosions produced by bombs unlawfully dropped from a Zeppelin aircraft.'

Finally, at 03:50, one of the German ships sighted British ships to the WSW which turned south, attempting to draw the Germans away from Lowestoft. Instead, the four battlecruisers opened fire on the town at 04:10, the terrifying bombardment lasting for ten minutes before the ships moved their attention to Yarmouth. Here, fog made targeting difficult and only a few shells were fired before reports arrived that a British force had engaged the remainder of the German ships, the battlecruisers then breaking off to join them. Yarmouth had had a lucky escape.

Unable to draw the Germans away, the Royal Navy turned towards the Lowestoft attackers, engaging the light cruisers and escorts but broke-off when outgunned by the battlecruisers which had caused severe damage to the cruiser HMS *Conquest* and destroyer HMS *Laertes* and slightly damaged a light cruiser. The Germans then ceased fire, turned NW and hoped in vain that the British cruisers would follow.

During the bombardment, the German light cruiser *Frankfurt* sank one patrol steamer, while the leader of a torpedo-boat flotilla sank another, the crews being rescued and taken POW. However, while battle at sea continued, havoc had been wreaked ashore in Lowestoft.

DEATH, DESTRUCTION & FAILURE

Fortunately, casualties were remarkably light amidst large-scale destruction and only three civilians lost their lives, despite the intensity of the attack: siblings Herbert and Annie Davey and eight-month-old Robert Mumford were killed while Robert's mother, along with Herbert and Annie's parents and their

two other children, were injured when a shell collapsed the upper floor of their home at 20 Sandringham Road. In addition, there was one service death: Petty Officer William Hollis being killed at North End House, the RN Anti-Aircraft HQ on Yarmouth Road.

Light though casualties were, damage was estimated at the then considerable sum of £25,000. Captain Jasper Mayne, East Suffolk's Chief Constable, reported:

'Damage as follows:- Convalescent Home and Porter's Lodge considerably; Headquarters RNAAS wrecked and gutted by fire; Swimming baths, London Road South, extensively; Claremont Pier land end extensively; South Pier, Naval Base, damaged; 40 dwelling houses extensively; 200 dwelling houses slightly; the telephone wires and tramway wires with part of London Road South near Swimming Bath were demolished, four shells exploded in the enclosure round the wireless station at North Lowestoft...shells were 11-inch and generally made cavities of about 10ft diameter x 3ft deep.'

The destruction would likely have been worse had the battlecruisers carried high explosive shells rather than armour piercing ones. In many cases, these merely created large holes and left unexploded ordnance lying in the streets.

For the Germans, the operation was a dismal failure, sinking only two patrol craft and a submarine by U-boat and damaging one cruiser and a destroyer. Meanwhile, the U-boats found no targets with one sunk and another captured after running-aground at Harwich. The Germans also took serious damage to a battlecruiser, only inflicted light damage to naval establishments at Yarmouth and Lowestoft and failed to take advantage of superior numbers to engage the British.

British casualties were 21 servicemen killed at sea and four persons killed and 19 wounded in Lowestoft. While the raid angered the British, the bombardment of towns and the killing of civilians cost the Germans dearly in world opinion. ■

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