Autumn Airshows
Where to get your end of season aviation fix

All the Latest Products
The top manufacturers' radios and accessories

RadioUser

October 2021 £4.99

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REVIEW

GET ON THE NETWORK

The new Inrico T-310 network radio which reaches the world with wi-fi and mobile connection

Win an Inrico T-310 (Worth £130)

New Forest Find
High frequency DF station remnants

Airspace Changes
The impact of the pandemic in the UK

CLIMATE

Meteorological Radio
How enthusiasts can receive regular weather forecasts and climate data from their radio

HISTORY

Radiolympia Exhibition
How the 1936 event was used to herald the arrival of television to the masses by the BBC hierachy

Latest Aerials • Digital Radio • RAF Conningsby • Push to Talk • QSL Cards

PRICE PLEDGE – we aim to be competitive – seen it cheaper then let us know

AOR AR-5700D
Digital Communications Receiver

- 10 digital modes - TETRA, P25(Phase 1), DMR, Mototrbo, dPMR, NXDN, D-CR, D-STAR, Alinco, Yaesu.
- Covers 9kHz - 3,700MHz
- 900kHz wide IQ output

£4595

AOR AR-DV1
100kHz-1300MHz Wide band reception

New Firmware - gives TETRA decoding and more! Decodes virtually ALL popular digital modes: DMR, D-STAR, Yaesu Fusion and lots more!

Supplied with: 4GB SD Card

£1299.95

Icom IC-R8600
Professional Communications Receiver

- 10kHz-3.0GHz Super Wideband
- P25, NXDN™, dPMR ™, D -STAR Mode
- Real-time Spectrum Scope with Waterfall
- Software Demodulation by FPGA Processing
- Large 4.3 inch TFT colour touch screen display

£2499.99

BEARCAT

UBC-125XLT
500 Channel AM/FM scanner

Easy to use scanner - our most popular for Civil/Military Airband

- 25-960MHz (w/gaps)
- Includes civil/Military Airbands
- Close call RF capture
- Alpha tagging
- CTCSS & DCS squelch modes

£129.95

UBC-75XLT
Popular 'Airshow' scanner

- 25-512MHz (with gaps)
- Modes: AM/FM
- 300 channels
- Close Call

£99.95

EZI-33XLT
Compact handheld - easy to use!

- Covers: 78 MHz-512MHz (w/gaps)
- PMR, Marine, Aircraft, FM, etc.

£64.95

UBC-370CLT
500 channel AM/FM scanner

- Includes VHF FM broadcast radio
- Covers: 25 - 960MHz (w/gaps)
- Listen to PMR, Marine, Air, CB, Amateur

£119.95

HEADPHONES

Yaesu STA77
Lightweight Stereo headphones - as used by our boss!

£79.95

JIM M75

Wide Band pre-amp
Low noise pre-amp with 3 band pass filters

- 24-2150MHz
- Variable gain
- 12V DC or PP3 battery (not supplied)

£89.95

ANTENNAS

Create Log Periodic Antennas - Japan
as used by the 'Professionals'

CLP-5130-1N
21 Element LPA

- 50-1300MHz
- Gain: 10-12dBi

£379.95

CLP-5130-2N
17 Element LPA

- 105-1300MHz
- Gain: 11dBi

£299.95

DIAMOND D-777 Airband Antenna

Fibreglass 1.7m long, this antenna gives High Gain coverage of VHF/UHF Airband

£69.95

Scanmaster HFA
Active Receive Antenna
Covers: 1.8-30MHz

8" long c/w all leads - just needs 12V DC!

£44.95

Sirio SD-3000N Discone
High quality stainless steel, chromed brass & anodised aluminium construction

- 300 MHz-3GHz

£69.95

Scanmaster Desktop
Indoor Discone antenna
25-1300MHz complete with cable and BNC plug

£49.95

Tecsun Receive Loops
AN200
MW passive loop..... **£39.95**

AN48X NEW!
Covers: SW, MW, LW
Active wire loop..... **£39.95**

AOR LA-400
Low Noise - hear weak signals in the LW, MW and SW Bands

- Receives 10kHz-500MHz
- 30.5cm diameter Loop
- 20dB built-in Pre-amp

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High quality receive antenna c/w mounting hardware and 8 metres of coax w/ PL259 plug

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- Kevlar Mil spec. wire
- Length: 20m

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- Pre-selectors
- 9kHz - 13MHz
- 60MHz - 260MHz
- Use over internet
- 60 x 45 x 10 mm

£199.95

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VHF/UHF/SHF Receiver

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- 10MHz panoramic spectrum
- 3.5 dB NF (42-1002)MHz
- Tracking RF filters

£209.95

AIRSPY Mini

- SDR Dongle
- 24 – 1,800MHz

£119.95

SIRIO Antennas

Quality Antennas from Italy!

WY108-3N
Airband
3 element Beam

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- Boom: 1.4m

£89.95

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CX440	(440 – 455)MHz pmr 4.15 dBi	**£39.95**
CX455	(455 – 470)MHz pmr 4.15 dBi	**£39.95**
TORNADO 50-60	(50 – 60)MHz 6m 3.5dBi	**£59.95**

HF/VHF/UHF Beams

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SY4	3 el (26-28)MHz 13.15 dBi	**£119.95**
SY50-3	3 el 50MHz 8.5 dBi	**£99.95**
SY50-5	5 el 50MHz 10.5dBi	**£129.95**
SY68-3	3 el 70MHz 7.0 dBi	**£79.95**
WY108-3n	3 el 108-137MHz 3 el. Air Band	**£89.95**
WY140-6n	6 el 144MHz (wide band) 10.5 dBi	**£99.95**
WY400-6n	6 el 432MHz (wide band) 11.0dBi	**£79.95**
WY400-10n	10 el 432MHz (wide band) 14.0dBi	**£119.00**

ICOM

Icom AH-8000
Professional Discone Antenna Suitable for both Transmit and Receive

- Rx: 100-3,300MHz
- Tx: 144, 430, 1200, 2400MHz
- Height: 936mm
- Supplied c/w 15m cable + N connector & Mounting hardware

£240

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Fibreglass Telescopic Poles

7 metre Mini Pole	£59.95
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10 metre Standard	£299.95
10 metre Heavy Duty	£325.00
12.5 metre Standard	£329.95
14.5 metre Heavy Duty	£425.00
15 metre standard (2m retracted)	£399.95

SDRplay

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SDR in metal case
Covers: 1kHz-2GHz

Now with Improved:

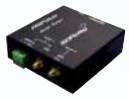
- Performance below 2MHz
- Plus more!

£194.95

RSP 1A
Wideband Budget SDR

- Covers: 1 kHz - 2GHz
- Software upgradable
- Good dynamic range

£99.95



RSP DUO Dual Tuner SDR

- Covers: 1 kHz - 2GHz
- Software upgradable

£239.95

NEVADA Power Supplies

Quality Power Supplies 2 YEAR WARRANTY!

PSW-30
Switch Mode

- 25-30A supply
- Low noise

2 YEAR WARRANTY

£79.95

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Linear

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- 1.5-15V DC
- Cigar adaptor output

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PSW-50	Switch mode 50A (max) 9-15V DC	**£129.95**
PSW-30	Switch mode 30A (max) 9-15V DC	**£79.95**
PSW-30H	Switch mode 30A (max) 9-15V DC	**£69.95**
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per metre	£3.79	price per 102m drum **£359**
PL259 connector (part: 7378)		**£5.95**
N type connector (part: 7367)		**£6.50**
Aircell 7		
per metre	£2.99	price per 102m drum **£269**
PL259 connector (part: 7390)		**£2.65**
N type connector (part: 7392)		**£5.25**
Aircell 5		
per metre	£2.75	price per 102m drum **£259**
Other 100M Coax Drums		
Westflex 103.. Semi Air-spaced low loss		**£179.95**
RG-213 (Cabnex)..... Low loss good quality		**£99.95**
RG-Mini 8..... Super XX		**£69.95**
RG58/CU..... Mil spec		**£39.95**
Twin Feeders		
450 Ohm..... Twin feeder		**£89.00**
300 Ohm..... Twin feeder		**£76.50**
Nevada Antenna Wire		
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World Radios

Tecsun PL-330
SSB Shortwave Radio

- FM stereo, LW/MW/FM/SW
- 650 memories
- DSP technology
- Multi-function display
- Lots more info on our web site
- USB - Rechargeable battery

£89.95

Tecsun S-2000
LW/MW/FM-Stereo/SW (with SSB) and Airband

- 1000 station memories
- Signal Attenuator
- Dual timer alarm
- Wide/narrow filters
- 1000 station memories
- Dual alarm clock function
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- Rotary Antenna: MW/LW

£299.95

NEW

Tecsun H-501x
FLAGSHIP RADIO with Bluetooth

- Covers: LW, MW, Shortwave, FM (64-108 MHz)
- All mode reception incl. SSB
- Local, medium, DX selector
- ATS: Auto search and storage
- SD slot with 16Gb card supplied
- 3150 memories in 25 pages.
- USB sound card function
- Two channel Stereo speakers
- Batteries:
  Uses 2 x 18650 batteries, charging one as a spare, whilst running on the other

£329.95

Tecsun S8800 GM
SSB Shortwave Radio

- FM, SW, MW, LW • SSB with LSB/USB
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- Deluxe Gun Metal Tuning knob
- Remote control, Alarm & sleep/timer
- DX/Local antenna gain control
- Built-in battery charging feature
- Supplied with batteries & remote control

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NEW

Tecsun PL-990x
Top Of the range Portable radio

- Covers: LW, MW, FM, SW (1.711-29.999)MHz
- MP3 player via SD port
- Memories: 3150
- Synchronous detector
- Local, Medium, DX input selector
- Powered by 18650 Lithium battery
- Bluetooth connectivity
- Optional USB mains supply.....£9.95

£259.95

AOR

AR-DV10
Digital Handheld Scanning Receiver

- 100kHz-1300MHz analogue and digital modes
- TETRA, P25 (Phase 1+2), DMR, Mototrbo, dPMR
- Latest Firmware!

~~£999.95~~
£939.95

ICOM

NEW

R-30
Digital & Analogue Multi Mode Scanner

- With dual watch and dual band recording
- Listen to two signals (analogue + analogue or analogue + digital)
- Decode D-STAR, P25, NXDN and dPMR digital (conventional) modes

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ICOM

IC-R6E
Pocket sized Wideband Scanner

- Freq: 100kHz-1309.995MHz
- Modes: AM, FM, WFM
- 1300 memories
- High Speed Scan 100 channels/second
- 15 hours receive capability

Optional BC-194
Drop-in charger stand
.....£22.95

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ALINCO

SAVE £50!

DJ-X11E
All Mode 1200 Channel

- Frequency: 0.1-1300MHz
- AM/FM/WFM/ SSB/CW
- 1200 memories
- Twin VFO feature
- IQ output for SDR use
- 1800mAh Li-ion inc

SPECIAL PRICE ~~£349.95~~ **£299.95**

BEARCAT

BCT-15X
Latest Base Mobile Scanner with 'Close Call'

- 25-1300MHz (with gaps)
- 9000 memories
- AM/FM/WFM
- Band scope
- CTCSS/DCS decoding
- Alpha-numeric tagging feature
- GPS enabled

Supplied with:
- Mains adaptor
- DC Car Power Plug
- Telescopic Antenna
- Mounting Bracket and Hardware

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BEARCAT

NEW

SDS-100E
Advanced Digital & Analogue Scanner

- Frequency: 25-1300MHz (w/gaps)
- Weather Resistant IPX4

Standard Version
(licence required to activate DMR, NXDN)
£599.95

Activated Version
(DMR, NXDN already activated)
£649.95

BEARCAT

NEW

Bearcat SDS-200E
Digital Scanning Receiver

- With DMR, NXDN, and ProVoice monitoring modes
- Covers: 25 - 512MHz, 806 - 960MHz, 1240 - 1300MHz
- Too many features to list here - visit our web site for more details!

£779.99

BEARCAT

UBCD-3600XLT
Digital Scanner with 'Close Call' and Analogue AM/FM

- Receives: 25-1300MHz
- SD card slot

£425

UBCD-3600XLT - NXDN
Same specs as above but with NXDN activated NXDN digital protocol is used by Kenwood & Icom

£479.95

ALBRECHT

Albrecht AE255M
Wideband Base Scanner

- Covers 25-960MHz (w/gaps)
- Step sizes: 5/6.25/8.33/10/12.5/20kHz
- Turbo search (180 steps/sec)
- 300 memories, Clock Display, Skip feature, c/w Mains adaptor, Car adaptor, Antenna, Mounting bracket

£99.95

ALBRECHT

Albrecht AE125H
500 Channel AM/FM Scanner

- 5-960MHz (w/gaps)
- Civil/Military Air bands
- Close Call feature
- Hyper search -300/sec
- CTCSS & DCS
- Supplied c/w: Mini USB lead, 2 x AA 2,300 mAh NiMH Batteries

£129.95

WHISTLER

Whistler Digital Scanners

Whistler TRX-1
£419.95

- Receives 25-1300MHz (with gaps)
- Covers DMR, MotoTRBO - and more!
- Upgradable CPU, DSP, and library
- Store Scan lists
- EZ Scan PC software
- IF/discriminator output
- Record & save to Windows
- Clock & Calendar function
- Spectrum Sweeper

Whistler TRX-2
£479.95

POWEREX

NEW

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Battery Charger Analyser

Advanced unit suitable for all your batteries

- Charge from: 1 to 4 AA or AAA niMH/NicD
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- Fitzherbert Spur
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- Portsmouth
- Hampshire
- PO6 1TT

50 YEARS nevada

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Welcome

New Interests and Future Directions

Georg Wiessala
wiessala@hotmail.com

Hello and welcome to the October issue of *RadioUser*. The nights are definitely drawing in, and the DXer is sitting poised in his or her shack, in order to begin netting that elusive DX-catch on medium and short wave, or in the beacon band.

To paraphrase Arkwright in *Open All Hours*, *"It's been a funny year"*; fewer shows and air displays, but lots and lots of new radio hobbyists and, thankfully, readers. Welcome to you all, and I hope that all of you will, once again, find a stimulating variety of radio reading in these pages.

Our features this time reflect some new, or newly-emerging, interests, for example, in science, measurement and radio. Therefore, our South American friend Martín Butera introduces an important utility (time signal) station in Brazil, while our *Airband News* contributor David Harris unearths – almost literally – an intriguing wartime direction-finding post, in a national park.

Moreover, I have put together what I hope is a reasonably comprehensive overview of weather observation by radio – write to me if you are into similar things.

Our key product review this month covers the Inrico T-310 network radio, and we have one of these to give away to one lucky winner in our competition.

There are several exciting radios arriving before Christmas, for example, the long-awaited Tecsun H-501x; make sure you read our *News and Products* section and the previews I have sneaked in.

In our regular columns this month, you can learn more about Radio 1, UK spaceports and communications at RAF Coningsby or explore Chrissy Brand's latest selection of international radio broadcasts and podcasts. Enjoy her report of her visit to Radio Caroline.

Our international radio coverage, by the way, is undergoing some change over the next few months, with 'non-linear', online radio and new media more clearly separated out, and long, medium and short wave embarking on a 'refresh' - *"Back to the Future"*, I hear you say. Well, HF DXers and programme-listeners alike, watch this space.

Our history strand this time covers such events as the *1936 Radiolympia Exhibition*, foreshadowing a planned 2022 focus on TV anniversaries and the great radio exhibitions of the past. Meanwhile, Scott Caldwell completes his fascinatingly complex personal portrait of Oliver Heaviside.

Last, but certainly not least, take a look at our coverage of an interesting Anglo-German digital radio joint venture and the NAVTEX narrow-band printing mode. To round things off, we have listings of *Open-Source Radio Publications*, this year's remaining *Airshows* and *Radio Rallies* and the offerings of both new and established *Private European Short Wave Broadcasters*.

Enjoy the magazine, stay safe, and do not forget to let me know what you would like to see covered in this magazine in 2022. And now is also the time to let me know whether you would like to write for us.

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

What's New

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

The Tecsun H-501x (Europe) at Nevada

The **Tecsun H-501x Deluxe Short Wave Radio** is the newest addition to the Tecsun radio range. It is the culmination of years of research and development by Tecsun's engineering department and feedback from short wave radio listeners. With the Bluetooth function, you can play music from your smartphone, tablet or any other Bluetooth device over the speaker of your Tecsun H-501x. The 'x' version is the only European CE (RED)-approved version with the correct European frequencies and with 9/10kHz step for USA frequencies. The Tecsun H-501x is designed to be a hybrid desktop portable radio that does not compromise on performance for size.

The first reviews of this radio have been very positive. A reviewer for the *SWLing Post*, for example, commented, *"What Tecsun has done with [what we have to assume maybe] the final group of DSP receivers it produces is come up with small (PL-330), medium (PL-990x), and large (H-501) radios that combine extremely attractive features and excellent audio. The H-501x, in effect, is a Grundig Satellit 700 re-born for the 21st century and the path to it was paved by the PL-880."* As an old *Grundig* fan, I think I would agree.

The radio can receive Longwave (LW), Medium Wave (MW or AM), Short wave (SW) and FM frequency bands, and it is capable of resolving Single Side Band (SSB) transmissions. Its large LCD screen makes the Tecsun H-501x easy to use under all light conditions. The new receiver features user-selectable bandwidths for both AM and SSB modes, ensuring the best possible reception under all conditions.

Moreover, this portable features twin speakers for high-quality audio reproduction or your favourite station, no matter what band it is on. Most early reviewers agree on the excellent audio quality of the set. And you can simply press and hold the RADIO/MP3 button in 'radio off' mode to activate the Bluetooth (BT) functionality.

The radio is available from UK Distributors **Nevada** and other selected dealers. **Package Includes**: 1 x Tecsun H-501x Full Band Radio; 2 x 18650 Lithium Battery; 1 x Hi-Fi Stereo Earphone; 1 x 16GB Memory Card; 1 x Protective Leatherette Case; 1 x USB Charging Cable (Micro USB Type B); 1 x USB charger.

Features include: Wideband RF Coverage: Long wave (LW), Medium Wave (MW), Short wave (SW), FM; Direct Entry from Keypad • Large LCD-display • SSB capable – Upper Side Band (USB) & Lower Side Band (LSB) with BFO Control • Uses multiple frequency conversion and modern DSP digital demodulation technology, which greatly improves the receiving sensitivity, selectivity and image rejection • FM receiving range 64-108MHz, suitable for receiving global FM broadcasting, and much more.

https://tinyurl.com/48m2apzz
www.nevadaradio.co.uk

RadioUser will, naturally, carry an in-depth review of this new flagship portable in the very near future. Watch this space.

CCrane CC Wi-Fi 3

Check out the following (preliminary) reviews of the new *CCrane CC Wi-Fi 3* portable internet radio from this established radio trader in the United States. Many CCrane portables have also found a loving home in UK radio shacks.

https://tinyurl.com/4xxbezfy
https://tinyurl.com/9cjknays

Radioddity Raddy WF-100C Wireless Weather Station

There are a few hobbies and activities that always seem to tie radio enthusiasts together: topics like aviation, astronomy, trains, languages/travel, and the weather. The weather is a big one for amateur radio operators because it's often one of the ice-breakers used while connecting with a fellow operator over the air. I suppose it's for this reason, I can't remember a single *Hamvention* that didn't include at least one vendor exclusively selling personal weather stations. A few weeks ago, *SWLing Post* sponsor *Radioddity* reached out to the *SWLing Post* and asked if it would be interested in reviewing and evaluating a new weather station they've started selling. The resulting review is here:
(Sources: Radioddity | *SWLing Post*)

https://tinyurl.com/y59p73bw
https://www.radioddity.com/products/raddy-

RadioUser STOP PRESS!

The ICOM IC-M510 Marine Radio with Smartphone Control

The IC-M510 is a stylish new advanced VHF/DSC marine radio from Icom that gives smartphone control of your radio using the *RS-M500 app* (iOS™/Android™). Up to three smartphones can act as remote controllers via the radio's WLAN. It is even possible to have an intercom function between your smartphone and the radio. The introduction of the IC-M510, together with the recently launched IC-M94DE, marks a new generation of marine radios. It also is an indication that Icom is a leader in marine electronics with its cutting edge technology and stylish, ergonomic, design. The IC-M510's all-new sleek design is suitable for either panel or trunnion mounting. The radio has a depth of just 71.2 mm (2.8 inches), making it an easy install for your boat. The stunning colour TFT LCD provides a near-180-degree viewing angle. The wide display has high-resolution characters and function icons. The night mode screen ensures good readability in low light conditions. The IC-M510 has impressive audio, and its internal speaker enhances the received audio. The waterproof speaker provides superior sound quality with a wide frequency range for powerful, clear audio. The introduction of the standalone IC-M510 will be followed later in the year with an optional CT-M500 wireless interface box that provides NMEA 2000 connectivity and Hailer/PA feature. The CT-M500 and the radio can be connected through WLAN. The IC-M510 will be available from Icom Marine Dealers from October with a suggested retail price of £575.00 (Inc. VAT). For further information, and to view a video introduction to this new product, click on these URLs:

https://tinyurl.com/57k3r75m
https://tinyurl.com/vvx7tb58

Network Radio News by Moonraker

The AnyTone AT-D878UVII PLUS DMR handheld is available at Moonraker now.

The device is a commercial transceiver with a 1.77-inch colour TFT display and GPS. The AT-D878UVII Plus model includes DMR Roaming, a faster processor and larger memory for future enhancements.

Ideal for Fire, Search & Rescue, Police, Forestry, and other security operations. Frequency coverage is from 140-174 and 400-480MHz.

https://tinyurl.com/y2597kbx

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

RNIB: Accessible FM and DAB+ Digital Radio

The *Royal National Institute of Blind People* has launched a brand new accessible radio set designed for blind and partially sighted people. The DAB+ and FM radio is simple and easy to use with tactile buttons and clear voice prompts to guide users through some of the main functions, such as tuning. Users also receive an audible confirmation when buttons are pressed. Useful for people with low vision, the radio's features include a large, high-contrast, LED display, making text easier to read, and it can also record memos to playback at a set time. Additionally, the portable radio has a dual alarm with a snooze function, sleep timer and supports USBs, making it compatible with RNIB's *Talking Book Service*. RNIB Senior Retail Products Manager, Jennie Mather, said: *"We are thrilled to launch the new RNIB digital radio. It is important to RNIB that blind and partially sighted people can purchase accessible products without having to break the bank, which is why we are pleased to launch this affordable model. We continually review customer feedback to help us improve our products and strive to make a difference. Customers can book demos of our products at our* Products for Life *stores in London, Edinburgh, and Belfast. These demos are via appointment only and can be in-store, by phone or video call. To book a slot, please visit rnib.org.uk/stores or call our Helpline on 0303 123 9999."* RNIB's digital radio (product code HD13), is available to buy for £118 inc. VAT.

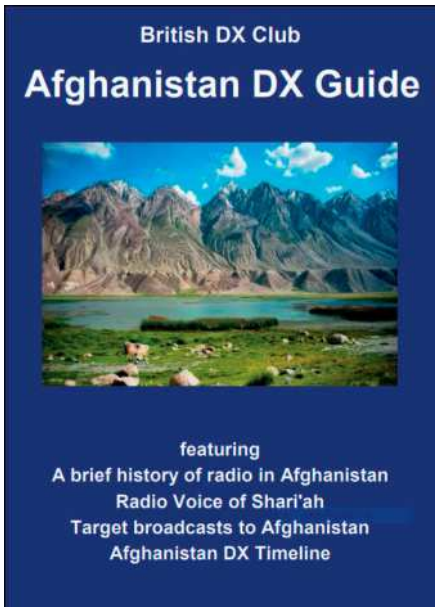
https://tinyurl.com/ydzyzs7p
https://shop.rnib.org.uk/rnib-digital-radio-89822?HD13

Radio News

CHANNEL ISLANDS DAB: The new local DAB+ radio stations in the Channel Islands have been powered by software from *Factum Radioscape*. The software hosts all 22 of the radio services via a single interface designed for ease of use by the multiplex operator. *Factum Radioscape* completed the installation of the ENMUXA DAB system in two days at *Les Platons*. The software provides a secure management platform for the multiplex, and the OBSERVA Monitoring allows the operator to supervise the transmitted signal on the air. *Factum Radioscape* Sales Manager James Waterson explains more: *"We're very pleased with how well the project came together. With careful technical planning and co-operation with all parties involved in the launch, we have successfully delivered our DAB+ system to a new listenership who are delighted with the service. ENMUXA and OBSERVA are the ideal software for local and national DAB Multiplex operators worldwide."* The new multiplex has community radio stations, Nation Radio, Global, Wireless and the BBC on, with capacity for more services to be added. James Keen, Pan-island Station Director at Tindle Radio added: *"We've been thrilled by the reaction to Soleil Radio – from the feedback we've received it's clear that thousands of islanders have already made Soleil their new place to relax on DAB+ after just four weeks. The extra benefits of DAB+, in terms of slideshow, 'now-playing' information and digital-quality reception across Jersey and Guernsey, have been welcomed by new listeners to Soleil as well as fans of our existing stations Channel 103 and Island FM."*

https://tinyurl.com/2fw2zbxm
https://factumradioscape.com

AFGHANISTAN DX GUIDE: The *Afghanistan DX Timeline* on the website of the BDXC has now been incorporated into an *Afghanistan DX Guide*. Compiled by Tony Rogers, the guide also includes broadcasters targeting Afghanistan, as well as stations inside the country on SW and MW, plus a brief history of radio in Afghanistan. In respect of short wave target broadcasts from *Afghanistan International TV* on 7600 kHz, Chris Greenway posted on Twitter: *"'Afghanistan International TV' is a new London-based satellite channel beaming to Afghanistan, launched on 15 Aug (the day the Taliban took Kabul). Its audio is relayed 24/7 on short waves (7600 kHz). The new station is a sister operation to London-based Iranian International TV. Afghanistan International TV explained that it was due to launch on 21 September, but this was brought forward to 15 August because of the situation on the ground. The TV is currently on air 9 hours a day, but its radio broadcasts on 7600 kHz are 24/7. Radio enthusiasts claim that they have tracked down Afghanistan International's radio broadcasts as coming from hired short wave transmitters in Armenia [Gavar] and Uzbekistan [Tashkent]."* One frequency in use was reported to have been **7600kHz**.



(SOURCES: Chris Greenway)

http://bdxc.org.uk/afghan.pdf
https://tinyurl.com/2m982hcb

Rallies & Events

Due to the Coronavirus situation, the Rallies calendar remains dynamic at the moment, and there will be more cancellations and postponements. All information published here reflects the situation up to and including 20th September 2021. Readers are advised to check carefully with the organisers of any rally or event, before setting out for a visit. The Radio Enthusiast website will have updates, please check here regularly: www.radioenthusiast.co.uk To get your rally or event onto this list, please, e-mail full details as early as possible, to: wiessala@hotmail.com

25 and 26 September
RAILWAYS ON THE AIR (BARAC): As an additional activity, we propose to camp on DMR talk group 23560 for the duration so that stations can talk with BARAC and other special event stations to check on activity on the bands. That Talk Group is the one for North East England, which is appropriate given the history of our railways.
https://rota.barac.org.uk

26 September
BRITISH VINTAGE WIRELESS SOCIETY (BVWS): RetrotechUK 2021 will take place at the Warwickshire Event Centre. RetrotechUK is the new name and image for the National Vintage Communications Fair, (NVCF) established in 1992. Since then, the event has evolved and outgrown its previous title!
https://www.retrotechuk.com

26 September
WESTON-SUPER-MARE RADIO SOCIETY 6TH RADIO & ELECTRONICS RALLY : The Campus Community Centre, Worle, Weston-super-Mare BS24 7DX. Opens 10 am (visitors [D: 9.30]) and 7 am (traders).
Dave G4CXQ Tel: 07871 034 206.
g4cxq@btinternet.com

9 October
RSGB ONLINE CONVENTION : The event will be streamed live on the Society's YouTube channel. You can find more information at this URL:
www.rsgb.org/convention

16 October
BATC CONVENTION FOR AMATEUR TV 2021 (CAT 21) PART 2 (ONLINE): CAT 21 (Part 2) will be a day of free on-line talks about Amateur Television, using a similar format to the very successful (Online Zoom event). More details will be available nearer the event, but we would like to hear from anyone who would like to present to an audience of nearly 500 'ATVers'.
https://batc.org.uk/events
https://tinyurl.com/4v55p35r

16 October
ESSEX CW BOOT CAMP: 3rd Witham Scout & Guide HQ, at the rear of Spring Lodge Community Centre, Powers Hall End, Witham, Essex CM8 2HE. Open 8.30 am (registration). 9 am (public). Finishes at 4.30 pm. Admission is £10, with free soup/ drinks/ cakes. (CR | FP)
Tel: 0745 342 6087.
g0ibn1@yahoo.com

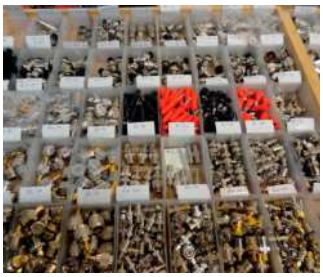
17 October
HACK GREEN RADIO SURPLUS HANGAR SALE: Hack Green Secret Nuclear Bunker, Nantwich, Cheshire CW5 8AL. Government Covid Regulations Permitting. Fully Covid-compliant. From 10 am to 3 pm. Any last-minute cancellation will appear on our Facebook Page
https://tinyurl.com/2b7ayfbv
http://www.hackgreen.co.uk
https://www.hackgreen.co.uk/events

17 October
HORNSEA AMATEUR RADIO RALLY: Driffield Show Ground, Driffield YO25 3AE. Open 10 am. Admission: £2 (under 14s free). There will be a raffle (BB | CR | CBS | FP)
Tel: 01377 252 393
lbjpinkney1@hotmail.com

7 November
HOLSWORTHY RADIO RALLY: Holsworthy Leisure Centre, Well Park, Western Road, Holsworthy, Devon, EX22 6DH.
Open 10 am. Traders. (BB | CR | D)
m0omc@m0omc.co.uk

2 January 2022
SPARKFORD WIRELESS GROUP RALLY: Davis Hall, Howell Hill, West Camel, nr Yeovil BA22 7QX. Open 9.30 am to 1 pm, entry is £2. (FP | CR)
wjh069@gmail.com

BB Bring & Buy **CBS** Card Boot Sale
CR Catering /Refreshments **TS** Trade Stalls
D Disabled visitors **TI** Talk-In (Channel)
RSGB (RSGB) Book Stall **FP** Free Parking
SIG Special-Interest Groups **L** Lectures



DAVID SMITH

Autumn Air Shows

David Smith
dj.daviator@btinternet.com

September 10th to 12th (Friday to Sunday)
1940S WARTIME WEEKEND: Quorn & Woodhouse Station, Leicestershire. LE12 8AG. Commemorating wartime England, with a little flying.
www.gcrailway.co.uk/wartime/

September 11th (Saturday)
AIR AND COUNTRY SHOW: Abingdon Airfield, Oxfordshire OX13 6JG. The organisers expect at least 70 different types of aircraft, old and new.
www.abingdonairandcountry.co.uk

September 11th (Saturday)
CORNWALL STRUT FLY-IN: Bodmin Airfield, Cornwall PL30 4BU. Not an air show as such, buts lots of visiting light aircraft. Spectators welcome.
https://tinyurl.com/5jv9dz8d

September 17th to 19th (Friday to Sunday)
GOODWOOD REVIVAL: Goodwood, West Sussex PO18 0PH. Mainly a motor racing commemoration, but there are some air displays.
www.goodwood.com/

September 18th (Saturday)
FLY-IN: Cotswold Airport, Cirencester, Glos GL7 6BA. Not an airshow as such but there may be a good selection of vintage types flying in.
www.cotswoldairport.com

September 25th and 26th (Saturday and Sunday)
SYWELL CLASSIC PISTONS AND PROPS: Sywell Aerodrome, Northants NN6 0BN. Not an air show as such but includes many classic aircraft, cars and bikes, plus family entertainment.

October 2nd (Saturday)
SHUTTLEWORTH RACE DAY: Old Warden, Biggleswade, Bedfordshire SG18 9EP. The usual excellent air display, which includes a mock air race.
https://tinyurl.com/jsuyvnfk
01767 627927

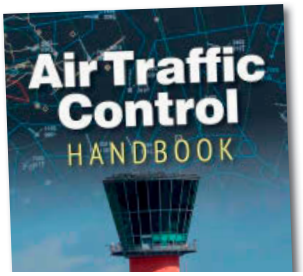
October 9th (Saturday)
FLYING DAYS- BEST OF 2021: Duxford, Cambs CB22 4QR. Highlights from the season hand-picked by the Flying Display Director and Air Show Team.
www.iwm.org/airshows
01223 835000

A dense crowd inspecting a line up of aircraft at the 'Daks over Duxford' event in June 2019. The Cambridgeshire airfield acted as the main rendezvous for an amazing collection of Douglas DC-3 variants. In association with the 'Daks Over Normandy' project, this was the build-up to a commemoration of the mass parachute drops on the night before D-Day, 75 years before. Aircraft came from Denmark, Finland, France, Hungary, Norway, Sweden, and Switzerland, as well the USA and UK.

Air Traffic Control Handbook

by David J Smith

OUT ON 29th OCTOBER 2021



First published in 1986 as *Air Band Radio Handbook*, David J Smith's *Air Traffic Control Handbook* is now into its 11th edition. From its original publication, the book was acknowledged as the essential reference for ground-based airband listeners, as well as student and private pilots and those with an interest in Air Traffic Control (ATC). This new edition has been fully updated with changes in procedure, radio frequencies and call signs, and is illustrated in colour, making the book an incredible source of information for all those interested in the subject and all those contemplating a career in ATC. Retired Air Traffic controller David J Smith's accessible and comprehensive text explains the intricacies of air traffic control and its jargon, enabling the reader to locate and interpret what is going on in the airways overhead. This fully revised new edition is a book that no one with an interest in the subject can afford not to have on his or her shelves.
http://www.crecy.co.uk/air-traffic-control-handbook-11th-edition

The Radio 1 Story: Building a Collective Narrative

David Harris
mydogisfinn@gmail.com

David Harris takes a closer look at a remarkable book about Radio 1, which fills a gap in the relevant radio literature and presents a skilfully-articulated portrait of this popular radio station.

BBC Radio 1 burst onto the UK airwaves at 0700 on Saturday 30 September 1967. The first programme was hosted by Tony Blackburn who played *Flowers in the Rain* by The Move.

I remember it well, as a 13-year-old who was mad about pop music. The station was the BBC's effort to provide a pop music station to fill the gap left by the demise of offshore radio stations which had broadcast pop between 1964 and 1967. It was also a belated attempt to fill the demand from the nation's youth for pop music which had taken off in the UK from 1963, led by The Beatles and a host of other British pop groups.

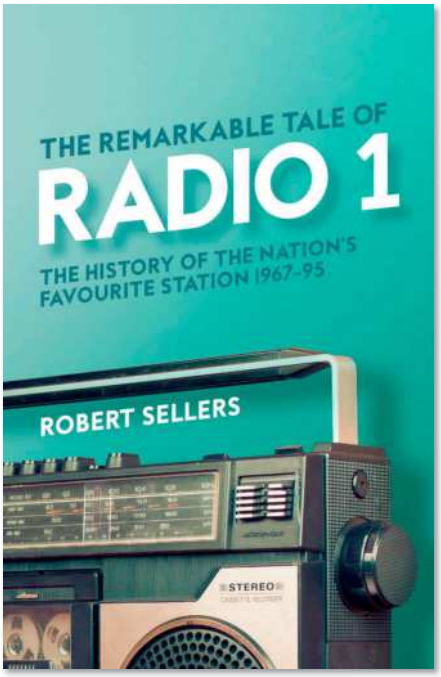
Radio 1 has not previously been well served in the literature of radio. Former controller Johnny Beerling wrote, *Radio 1: The Inside Scene* in 2008. This book focussed mainly on the fun they had at the *Radio 1 Roadshows*, which toured the UK each summer and featured Radio 1 DJs and bands. A few Radio 1 presenters, such as Tony Blackburn, Bob Harris, Johnnie Walker and John Peel have written biographies and generally speaking these are, arguably, not always particularly insightful books. The one exception is *The Golden Days of Radio One* by David Hamilton (reviewed in *Radio User*, October 2017: 27).

The problem in writing a history of a station is that radio is ephemeral. If one were writing about a book, play or a piece of music, then one would go back to the original, study it, form one's own opinion and read the secondary material before writing a further account.

The methodology adopted by Robert Sellers (b. 1965) is to interview 38 people who worked on Radio 1 (presenters, producers, and so on) The author then uses their recollections to build a narrative account of the station. He also draws upon some of the secondary material above.

Robert has written many books on film stars and television programmes.

The book presents a detailed chronology of the station, from its planning stage in early 1967 to the major re-branding accomplished in 1995 by Matthew Bannister. He let go most of the 'old-guard' presenters and re-positioned the station as a 'youth-broadcaster', focusing on new music; in particular, dance music.



Sellers, Robert (2021)
The Remarkable Tale of Radio 1 The History of the Nation's Favourite Station 1967 - 1995
Omnibus Publishers; 337 pp.
Hbk. £20.
ISBN 9781913172121
www.omnibuspress.com

Radio 1 had a promising start as it was staffed mainly by well-known ex-offshore radio presenters and had a nationwide AM network. The old 'pirate' stations were very popular but most of them were based in the Thames Estuary and could not be received well by people outside of London/SE England.

Radio 1 was fatally flawed in its early years, due to three major issues which took many years to resolve. First, 'needle-time' restrictions imposed by the Musicians' Union severely limited the number of records that could be played each day. This led to the peculiar situation of prime time radio shows being padded out with 'easy-listening' versions of chart hits recorded by BBC orchestras. Second, Radio 1 was only on the air for a few hours each day with some airtime shared with easy-listening station Radio 2. It was not until 1990 that Radio 1 became a 24-hour station.

Third, Radio 1 was to remain an AM-only station until 1989. In its early days, FM radios were not widely available, but to have a music station playing on AM only was an anachronism even in the 1970s.

Robert Sellers skilfully articulates the tensions within Radio 1, especially between the daytime (pop music- playing, personality-led) presenters and the more 'serious' evening rock music advocates who put the music first. This is best contrasted by comparing Tony Blackburn (primarily a light entertainer) with John Peel (a staunch advocate of rock music and new emerging genres such as punk).

Radio 1 attracted huge listener figures and many presenters became household names with some like Noel Edmonds becoming TV stars.

This book does exactly what it says on the cover and is, in my opinion, the definitive history of the station, taking us through all of the changes of prime-time presenters and produces, and offering some insight into the politics of the BBC and the 'apartness' enjoined by Radio 1.

Overall, what I felt was missing here was the voice of the author. Robert must have been a listener to the station from the mid-1970s onwards but he never puts forward any of his own views. At times, the book does read a bit like a more 'official' history.

I did ask the publishers if a second volume covering 1996 – 2021 was likely to appear, but no such book has been commissioned as yet. Who wants to take up the challenge?
https://tinyurl.com/a7fkzx9y

PHOTOGRAPHS: MARK MELZI, CAMERA SUPPORT: LIGIA KATZE

1

Martín Butera
martin_butera@yahoo.com.ar

PPE Observatório Nacional: History, Function & Future

South American correspondent **Martin Butera** reports on a unique visit to the most important short wave time signal station in South America and looks at the future of time and frequency measurement.

Monitoring time signal stations is a fascinating aspect of both amateur radio science and DXing (*RadioUser*, April 2020: 28-31; June 2020: 51-55). Many may not know that these stations are in operation in different parts of the world and have been since the early days of the radio.

The purpose of these stations is to cover various branches of science, such as seismology, meteorology, astronomy, geodesy, and many other fields. Between the different stations worldwide, a constant effort is made to coordinate time internationally, so that in the future they can all maintain and supply a world time standard.

There used to be a large number of active FSTS (Frequency-Standard and Time Signal) stations on the South American Continent. For example, Gerd Klawitter's key text from 33 years ago listed the following services: Argentina (LOL, LRA, LRA31), Brazil (PPE), Chile (CBV), Ecuador (HD21OA), Peru (OBC), and Venezuela (YVTO). A 2009 update still mentioned LOL (Argentina, 0.173%) and YVTO (Venezuela, 0.00%).

In our October 2018 issue, Nils Schiffhauer still found Argentina and Brazil to be active (*RadioUser*, October 2018: 40-44) – the figures in brackets denote the percentage the stations contribute to the International Atomic Time standard (TAI, see below).

https://tinyurl.com/y8a4y5kr
https://tinyurl.com/yc72sxce

Time Signals from Brazil

I recently had the extremely rare opportunity to visit a very special FSTS station: *PPE Observatório Nacional* is the official time signal station of the National Observatory of Rio de Janeiro, Brazil (TS BRA, CW/ SSB; Klingenfuss 2021/22: 327). This was the first time a group of DXers and radio enthusiasts had been welcomed by the *Divisâo Serviço da Hora* (DSHO, Time Services Division/ Department) at the National Observatory (*Observatório Nacional*) of Brazil (Fig. 1).

The short wave transmitter of the DSHO keeps accurate time, by broadcasting Brazil's official short wave time signal on the frequency of 10MHz. The service is generated from a set of twelve atomic clocks that also contribute to the official world time scale.

http://pcdsh01.on.br

The transmitter is located in a beautiful, well-kept park outside the main station building. It sits in a small, climate-controlled building, which was specially designed to accommodate it (Fig. 2).

Table 1 summarises the main technical specifications of this transmitter.

On the day of our visit, we were invited by engineer Ozenildo de Farias Dantas, who is in charge of the maintenance and operation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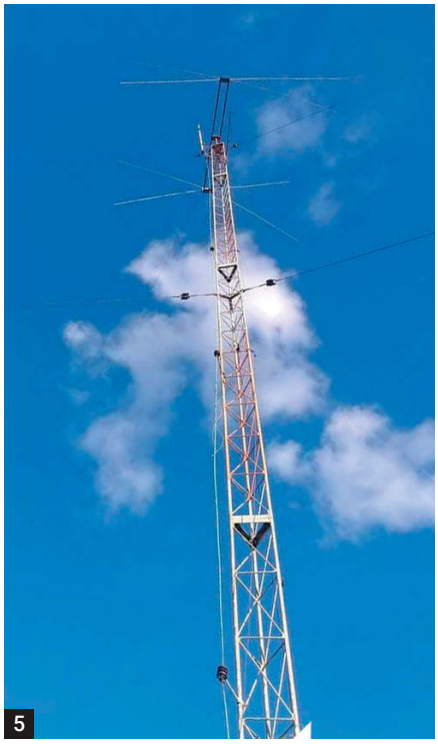
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of the transmitter, to take a thorough look around the site.

Signal Transmission and Aerials

The PPE transmission consists of the official time of Brazil (= UTC – 3 hours) announced by a female voice that begins in Portuguese with the phrase *"National Observatory"*. This is followed by the current time (HH | MM | SS) every 10 seconds, and with a short beep every second (with modulation of 1kHz for 5 ms) and a long beep (with modulation of 1kHz for 200 ms) for seconds 58, 59, and 60.

The Time Service Department (DSHO) also transmits Brazil's official time to two local VHF broadcasters in the city of Rio de Janeiro, on 166.53 and 171.13MHz.

The 10MHz transmission of the DSHO time signal began in November 2008. Since then, the signal has been picked up by radio listeners in different parts of the world; reports are confirmed by QSL cards (Fig. 3).

The aerial in use is a robust dipole, perfectly cut and calibrated for the frequency of 10MHz. It has delivered excellent results to this day. One of its sections is supported by the historic tower of the observatory (Fig. 4).

The observatory also has a second tower (Fig. 5) with different aerials to receive different world time signals.

Fig. 1: The entrance to the National Observatory, Museum and Astronomy Museum in Rio de Janeiro. Fig. 2: The small short wave transmitter building (see also: Fig. 13). Fig. 3: A QSL card from the station (Thanks to Mr Ricardo Carvalho). Fig. 4: The old tower of the National Observatory. Fig. 5: The new tower with aerials to receive different world time signals. Fig. 6: The National Observatory Building at the beginning of the 20th Century. Fig. 7: Albert Einstein (centre) visited in 1925.

A Historical Sketch, and a famous Visit

The National Observatory has more than 192 years of history behind it (Barbosa, 2016). To remain as a scientific institution of recognized standing for such a long period is almost impossible in Latin America.

The need for an Astronomical Observatory in Brazil began to surface in the colonial period. Its creation became necessary, due to the increase in commercial activities and the rapid growth of ships arriving and departing from the port of Rio de Janeiro since the beginning of the 19th century. The Observatory was founded in 1827 by Emperor Dom Pedro I.

Today's institution has a proud background as a military school and was later dedicated to providing research and service activities in meteorology, astronomy, geophysics, and time measurement (metrology). Its location was transferred to the Hill of San Januário (Morro de São Januário) at the beginning of the 20th Century, where it still operates today (Fig. 6).

The tasks and functions of the observatory were remodelled over time, according to the politics of the day, and the increase in its tasks and activities led to the publication of a *Yearbook* from 1885, which gave continuity to

the astronomical ephemerides, published between 1853 and 1870.

In 1909, it became the *Observatório Nacional*, and the Brazilian Official Time Division (DSHO) became established by Law in 1913. Initially, the institution began to provide weather forecasts, but, since 1917, has been limited to studies on astronomy, geophysics, and time and frequency.

In 1919, the National Observatory coordinated the English expedition that observed the total eclipse of the Sun, in the Brazilian city of Sobral, in the state of Ceará.

Famously, Albert Einstein visited in 1925 (Fig. 7) working on his *Theory of Relativity* and touring the prestigious Brazilian institution. Remember his first job was to synchronise the clocks of Berne in Switzerland.

https://tinyurl.com/pbfwxerw

Later, in line with changing socio-economic developments and different views on the role of science in Brazil, the observatory came under the jurisdiction of the newly created Ministry of Education and Culture (Ministério da Educação) in 1930, the National Council for Scientific and Technological Development (*Conselho Nacional de Desenvolvimento Científico e Tecnológico*) in 1976; and, most recently, the Ministry of Science and Technology (*Ministério da Ciência, Tecnologia e Inovações*) in 1999.

https://www.gov.br/cnpq/pt-br

The Time in Brazil

To understand the importance of creating a specific Time Department (DSHO), within the National Observatory of Rio de Janeiro, just remember that Brazil extends to 8,547,403 km^2.

It is the fifth-largest country in the world, and it stretches over four different time zones.

Therefore, the measurement and distribution of time across Brazil's vast regions and states have a character of its own. However, it closely parallels the development of the National Observatory, from a royal patrimony and military school to a contemporary scientific institution, which today also encompasses a role as a Time Laboratory and Primary Frequency (LPTF) standard.

The Official Time Service Department inaugurated its new facilities in 2004. Its modern building is named after Carlos Lacombe, in honour of its former director (1963 to 1977), who participated, along with Henrique Morize and Roquete Pinto, in the creation of the first radio station in Brazil, the *Rádio Sociedade do Rio de Janeiro*.

The building is large and modern, and I visited, in turn, its museum, generator room, time dissemination laboratory and short wave transmitter.


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Secrets of the Museum

First off, Ricardo José Carvalho took me to a small but very interesting museum of clocks and measuring instruments. These pieces are fundamental to understand the process of evolution in the measurement of time.

https://youtu.be/v6MXia6NY5Q

Notable amongst the exhibits were different models of chronographs by the manufacturer Édouard Belin (Fig. 8) used in the mid-1950s. Next to these, I was fascinated by a time signal generator from the manufacturer James Muirhead, the British manufacturer (Fig. 9).

Plus, there was the first spoken time-recording machine, on a complex system of records made in Brazil. I also admired a classic *Collins Radio Company* receiver (Fig. 10).

This was used in the mid-1950s to tune in to other global short wave time signals.

One of the most interesting pieces here was the first Brazilian caesium atomic clock (HP5061A) of 1970.

Generation, Conservation and Dissemination of Time

Leaving behind the small museum, we continued with our tour with Ricardo José Carvalho, Head of Division, and we entered the room where the equipment for the generation, conservation and dissemination of time was located on a variety of 'time-racks' (Fig. 11, see below).

https://youtu.be/OxBIoRIAoOU

The *generation* of time of the Official Time


11


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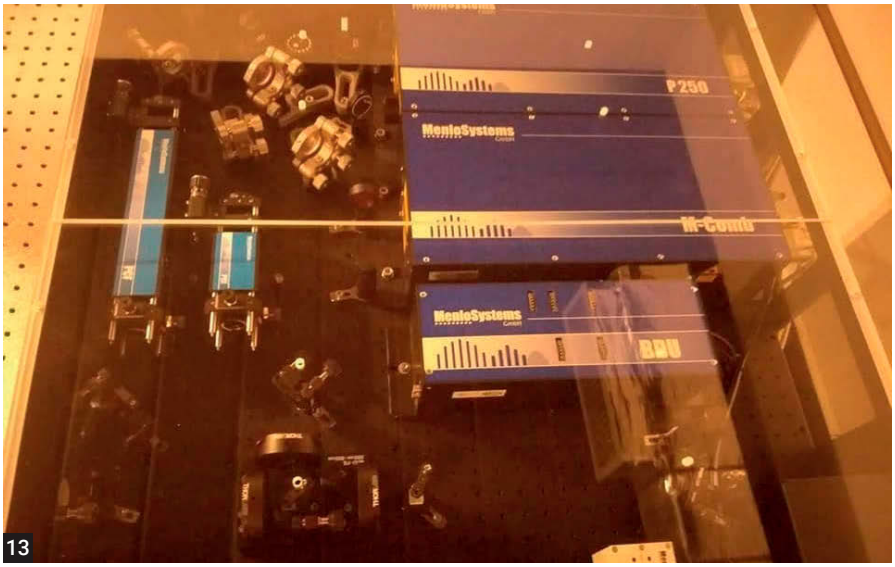

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Fig. 8: The *Belin Chronograph* in the Museum. Fig. 9: A *Muirhead* Time Signal Transmitter in the Museum. Fig. 10: A classic *Collins* Radio Company receiver from the 1950s (bottom). Fig.11: The equipment racks for time generation, conservation and dissemination. Fig. 12: The *Redifon* SW Time Signal Transmitter, plus Bird Wattmeter, on top. Fig. 13: Top view of the quantum optics / optical frequency measuring apparatus.

Division of Brazil is a process employing Caesium commercial clocks and hydrogen maser clocks. Remember that the *SI unit* of time – the *second* – is defined as, *"the duration of 9,192,631,770 cycles of radiation corresponding to the transition between two hyperfine levels of the ground state of the Caesium-133 atom."* (Holford-Strevens, 2005: 15; see URLs, below)

Time, defined in this way is known as the TAI (Temps Atomique International).

https://tinyurl.com/tahjr5k

Conservation of time – here as elsewhere – stands for the *uninterrupted* operation of the atomic clocks and the evaluation of their stability through measurements of time and frequency differences between them.

In terms of *dissemination*, these measurements are then sent to the divisional laboratory, where they are checked against other standard time signals and via the official time synchronization network.

https://tinyurl.com/ucb23k45

In the room where the 'time-racks' (Fig. 11) are situated, there is a multitude of equipment, from generators and secondary clocks to temperature monitors, an internet talk time monitor, various distributors and amplifiers, Caesium registers, audio and GPS distributors, and much more besides.

In the video below, Ricardo Carvalho, Head of Division, explains several of these items (in Portuguese):

https://youtu.be/OivtFjm7MRU

Into the Laboratory

On we went, to the laboratory. Here, we found equipment for measuring, calibrating and adjusting the time, a Faraday Cage and the famous – and jealously-guarded – atomic clocks. Check out our videos, below, to see more about my visit here:

https://youtu.be/OivtFjm7MRU
https://youtu.be/1Oj9jNzqbuw

Currently, the service of the official Brazilian time (DSHO) has 2 atomic clocks of the *Symmetricon* MHM hydrogen maser variety (valued at approximately US$250,000 each) and 12 Caesium standard clocks (approximately US$80,000 each).

In addition to these, there are three HP 5071A clocks, three Agilent 5071A clocks, four Symmetricon 5071A clocks, one CS4000 clock, one Datum 4310A, one Rubidio HP5065A standard clock, and two GPS-GLONASS-GALILEO-TTs-4 receivers.

Having a laboratory is essential to keep the national standards of time and frequency calibrated exactly; some of these parameters form the basis of the *Brazilian Metrological Traceability of Time and Frequency* standard. At the international level, the traceability of national standards and the Brazilian official time is established with the *Bureau International des Poids and Mesures (BIPM)* in France.

Significantly, the PPE *Redifon* Transmitter

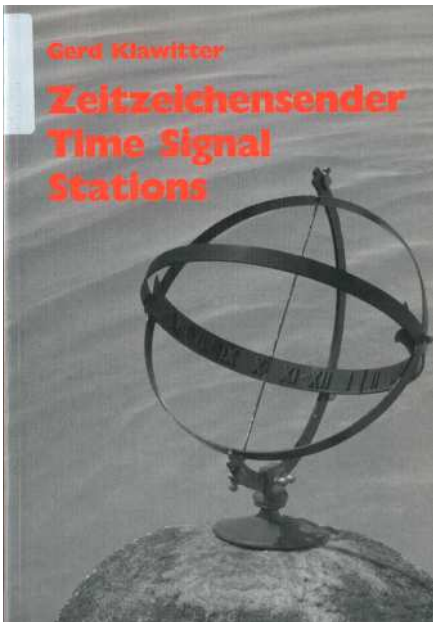

Fig. 14: Books on Time Signal Stations are few and far between, in any language.

(Fig. 12) participates in the generation of the TAI (*Temps Atomique International*, International Atomic Time). The TAI represents a weighted average of the time kept by currently more than 400 atomic clocks in around 50 national laboratories and metrology institutes worldwide.

https://www.bipm.org/en/home

Furthermore, Brazilian official time is compared internationally, in real-time, through the Inter-American Metrology System (SIM), which is accessed through the *GPS Common-View Time Transfer Protocol*.

https://tinyurl.com/ykam9cmc
https://tinyurl.com/3pej36xu

The Faraday Cage

On one side of the laboratory, there is an example of the famous Faraday cage, an item we did not expect to see here. But, perhaps, we should have anticipated it: As Ricardo Carvalho explained, it is a fundamental requirement for the measurement of atomic clocks, since no unknown entity can be present during the calibration process.

Faraday's Cage was an experiment to demonstrate that an electrified conductive surface has a zero electric field inside it since the charges are distributed evenly on the outermost part of the conductive surface.

In Faraday's experiment, a metal cage was used. Insulation and a wooden chair were placed inside, on which Faraday sat. An electric shock was given to him, and nothing happened to him, which shows that a body inside the Cage could remain there, isolated as the electrons are distributed on the outer surface.

Brazil's Most Accurate Clock

The Clock Maser of Hidrogenio Symmetricon MHM is the most accurate timepiece in Brazil and South America. It is located here, in the basement of the Time Service Division of the National Observatory in Rio de Janeiro. The device is kept in a special room, with constant temperature and humidity.

To access it, you have to go through three sophisticated alarm controls. The clock was made in the USA, and its approximate cost was US$250,000. It is expected to delay or advance only one second in 10 million years, and it runs using hydrogen.

The clock took six months to manufacture, and the export process went through the Department of Defense of the US government.

The search for the most accurate clock possible is an extreme challenge, and Brazil does not want to be left out. The country is now researching Quantum Optics for future time measurement accuracy. Quantum optics utilises quantum measurements through a laser system. In another sector of the division, there is a sophisticated optical frequency measurement device (Fig. 13), obtained from a company named *Menlo Systems*, a spin-off of the renowned Max-Planck Institute for Quantum Optics.

It is a revolutionary technique for measuring the frequency of light. This invention has been called, *"[…] the greatest advance in precision electromagnetic measurements since people started measuring frequencies*".

The time division of the National Observatory of Rio de Janeiro has already begun to perform experiments with optical measurements of extremely high precision in various applications such as optical clocks, cold atoms and molecules, metrology, distance measurements, Fourier spectroscopy, and LIDAR measurements.

They know that the world is increasingly ultra-precise and ultra-fast and are committed to delivering measurements made in Brazil that meet the highest standards of quality and reliability worldwide.

[Martin Butera is a radio amateur and DXer with more than 30 years of experience. He is also a journalist, documentary filmmaker and founding member of *Radio Atomika* 106.1MHz in Buenos Aires (Argentina).
He currently lives in Brasilia - **Ed.**].

www.radioatomika.com.ar

Manufacturer:	Redifon Telecommunications Limited, London (Fig. 14)
Model:	HF Transmitter Redifon G453
Power:	1kW
QRG:	10MHz
Type of modulation:	A3H
Type of antenna:	horizontal dipole – ½ wavelength
QRA:	PPE
Site Co-ordinates (WGS84):	X = 4283641.45m Length = 43 13 27.5 W; Y = – 4026026.11 m Latitude = 22 53 44.6 S; Z = – 2466098.27 m Height = 37 m.

Table 1: PPE Some Technical Details.

Further Reading and Resources

- *Admiralty List of Radio Signals* (NP282; see: *RadioUser*, February 2012: 46-49)
- American Radio Relay League (ARRL, 1998) […] *International Beacon Project*: **http://ncdxf.org/beacon/QSTpart3.pdf**
- Barboza, H. (2016) *20th Century Astronomical Heritage: The Case of the Brazilian National Observatory (CUP; DOI)*: **https://doi.org/10.1017/S1743921316002519**
- Blakemore, E. (2020): *'These Radio Stations Don't Play News* […]'; Washington Post, 25/0120: **https://tinyurl.com/ugkkwl3**
- *Brazilian Time & Frequency Atomic Standards Program*: **https://tinyurl.com/4nehrrea**
- *Bureau International des Poids et Mesures (BIPM)*: **https://www.bipm.org/en/home**
- Butera, M. (2021) *'PPE: Observatório Nacional'*; *Radio Kurier* 8/2021 (in German)
- Butera, M. (2021) **https://tinyurl.com/4d783nu8**
- Crocco, A. et al.: *'Estaciones Horarias'* […]: **https://tinyurl.com/3y7anhat**
- De Carvalho, R.J., Fittipaldi, M.N. (2013) *'Time and Frequency Activities* […]': **https://tinyurl.com/a2k52xds**
- Franklin, J. & M. (2015) *The Global Transformation of Time, 1870-1950* (Harvard UP)
- Hancock, M. (2017) *The History of Rugby Radio Station* (Urban & Civic).

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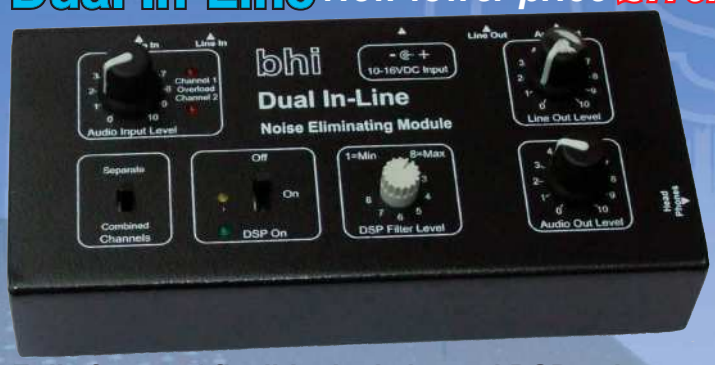
- Use with passive speakers or headphones
- Basic EQ units EQ20 £159.95, EQ20B* £199.95 (use with your Dual In-Line, Compact In-Line or In-Line Module)
- DSP noise cancelling versions EQ20-DSP £259.95, EQ20B*-DSP £299.95 *Denotes Bluetooth on input

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

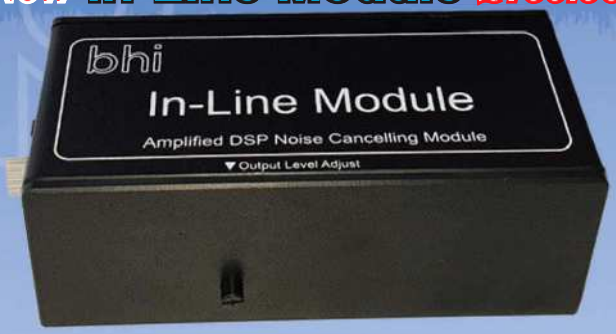
High-performance audio processing...
...with first-class DSP noise cancelling...
...for a great listening experience

Dual In-Line *New lower price* £179.95



Fully featured flexible dual channel DSP noise cancelling unit - 8 Filter levels 9 to 40dB - 3.5mm mono or stereo inputs - Line level input/output - 7 watts mono speaker output - Headphone socket - Suitable for all types of radio incl' SDR - Easy to use controls for quick and easy operation - Enjoy clear intelligble "noise-free"speech from your radio - Replacement for bhi NEIM1031

New In-Line Module £159.95



- 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

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NES10-2MK4 - Updated with the latest bhi DSP noise cancelling (8 to 40dB) - 5W audio power - Up to 65dB tone reduction -Three position switch for off/audio bypass, power on and DSP filter on - LEDs for Power on, filter on and audio overload - Headphone socket

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NATS

Decarbonised Aviation and a UK Spaceport

David Smith looks at the transformation of the UK airspace, post-pandemic, investigates the spaceport scene from an ATC handling aspect & presents a communications profile of RAF Coningsby ATC.

By 2030, the aviation industry is targeting an overall reduction of at least 15% in net CO^2 emissions, relative to 2019, and a further 40% net reduction by 2040. These interim targets were set out in June by *Sustainable Aviation*, the coalition of leading UK airlines, airports, aerospace manufacturers, and air traffic management, as part of the *Decarbonisation Roadmap* to net-zero aviation by 2050.

https://www.sustainableaviation.co.uk

The greatest CO^2 savings will be made through advancements in aircraft and engine technology, but innovations such as electric and hybrid aircraft are still many years away, and even sustainable fuels are unlikely to be available this decade on a commercial scale.

Therefore, in the short term, managing our airspace more effectively, and flying more efficiently, can play a crucial role. Despite the challenges of the pandemic, National Air Traffic Services (NATS) is continuing with plans to modernise higher-level airspace, taking advantage of the lower levels of traffic to make some incremental changes that are not always possible when it is really busy.

https://www.nats.aero

Later this year will see the biggest domestic airspace change, with the deployment of Free Route Airspace (FRA) above 25,000ft over Scotland, Northern Ireland and a small portion of northern England. Following approval by the Civil Aviation Authority (CAA), the change will see the removal of all upper air routes in approximately one-third of UK airspace.

FRA makes the best use of the flight deck technology, allowing aircraft to fly where they prefer, rather than using established routes, reducing flight time, fuel burn and emissions. It is the first of three deployments of FRA across UK airspace through to 2026, with subsequent deployments being planned.

NATS is also seeking to modernise the airspace above 7,000ft in the West of the UK, which encompasses some of the busiest higher-level air intersections for international flights. Proposals will go to consultation later this year, along with proposals for the next deployment of FRA in the upper airspace in the same region.

It is hoped that these changes will simplify airspace and make it easier for modern aircraft to fly more direct routes, with a faster climb to energy-efficient cruising altitudes, and a later descent to help reduce emissions. This will eventually provide a template for modernising the rest of UK airspace.

In this context, a NATS spokesperson claimed, *"While the network airspace above 7,000ft is our main focus, to realise the full benefits of airspace modernisation we are also working with airports and other stakeholders to modernise low-level routes through a coordinated masterplan that will future-proof our skies and play a crucial role in helping to achieve net-zero"*. The relevant statements can be found at this URL:

https://tinyurl.com/w3zzkmep

Spaceports in the UK

The recent, rather self-indulgent, space tourism exploits of Sir Richard Branson and others are significant but are only a small part of the commercial spaceflight sector. The UK and its *Launch UK* programme aims to be at the forefront.

Prospective spaceports across the UK have been able to apply to the CAA for operating licences from the end of July 2021, with the first launches of commercial sub-orbital sounding rockets expected later this year, and orbital launches commencing from three spaceports in 2022.

Up to eight vertical and horizontal launch spaceports in the UK are currently

proposed. The vehicles launched from each of them will use airspace just as other aircraft already do. Therefore, as the custodians of UK airspace, the role of NATS is to integrate them safely and sustainably into its network.

A vertical launch is the traditional rocket launch, with an upright rocket that ignites and lifts off straight up. A horizontal launch means that an aircraft takes off from a runway, carrying a rocket with it.

Once the aircraft is in the air and a safe location, the rocket detaches, ignites, and heads towards space.

This alone is a massively complex challenge but comes alongside other new entrants, including drones, high altitude platforms for providing radio communications (aircraft or airships flying in the stratosphere 17-22km above the ground), as well as supersonic and hypersonic operations. NATS manages UK airspace on the principle of fair and equitable access to all, with a priority to keep the skies safe and provide the best service possible.

Integrating these new users, while causing minimal disruption to airlines and other airspace users, needs some serious planning, and much thought is being applied by NATS teams at the moment.

The UK vertical and horizontal spaceports, as well as balloon and sea launchers, will all require specially segregated airspace to safely manage their launches. The required volume of airspace for each launch is expected to be large to protect other airspace users, even for sub-orbital launches like Sir Richard's.

The exact impact on other airspace users of any given launch will vary depending on the size of the segregated airspace, duration of the launch, location, time of day, traffic levels, and the weather.

While the launch points are fixed for vertical spaceports, mobile launchers from horizontal spaceports or sea launches can choose locations that best suit their desired trajectory and launch weather. Spaceports are now applying for airspace through the CAA's *Airspace Change Proposal* process and NATS will implement any changes approved by CAA, as done for other airspace changes and users.

This month's aircraft photographs show a Czech Air Force MiG-21 at Kbely Air Museum, near Prague and the inside of London Stansted Tower.

https://tinyurl.com/4th5znds

RAF ATC Profiles 6: Coningsby

ICAO Code: EGXC IATA Code: QCY

Frequencies	**(MHz)**
Coningsby Approach (ICF)	234.675; ,362.300*
Coningsby Departure	255.95
Coningsby LARS/MATZ (see below)	119.200
Coningsby Director	379.95
Coningsby Talkdown	234.575; 276.775; 123.300*
Swanwick Mil CAC	259.600
Coningsby Tower	298.975; 124.675; 122.100*
Coningsby Ground	357.125; 121.850*
Coningsby Ops	379.35
HAVE QUICK timing available on	338.025

*NATO Common Frequency is available on request only.
CAC - Centralised Approach Control.
ICF - Initial Contact Frequency.

ATIS

Coningsby Information	279.800
Navaids	ILS/DME CAT I Runway 25 TACAN CGY 111.100MHz
Runways	07 (2744 x 57m) 25 (2744 x 57m)

NOTES (A-Z)

Ground Movements
Aircraft with a wingspan greater than 14m will be subject to special taxi instructions.

Helicopter Operations
Approaches are to be made to the active runway. Taxi instructions will be passed by ATC to a relevant parking area.

Military Aerodrome Traffic Zone (MATZ)
Circle radius 5nm up to 3,000ft above aerodrome level, aligned with Runway 25.

Standard Military Instrument Departures
MID 07 East. North and South. MID East and North.

Noise Abatement Procedures
Runway 07 - Nil. Runway 25 - Aircraft are to adopt minimum noise technique until above 3,000ft QFE. All helicopters are to recover and depart Coningsby at 500ft QFE. This is for Noise Abatement and to remain below the standard circuit to the south. Inbound helicopters must not descend below 500ft QFE until inside the aerodrome boundary. Departing helicopters must get airborne from Runways 07 and 25 and maintain runway track until reaching 500ft QFE (N.B.: 'QFE' is a Q-code used by pilots and air traffic controllers. It refers to atmospheric pressure and altimeter settings - **Ed**).

Operational Hours
0800-1700 Mon-Fri. Prior permission is required 24 hours.

Warnings
When Runway 07 Right Hand is in use, Acceptance of Practice Diversions will be limited, due to the complexity of integrating traffic in the Coningsby, Cranwell and Waddington instrument patterns. Instrument Approaches will be under a Traffic Service while transiting the Cranwell and Waddington MATZ. Aircraft will be procedurally separated from Cranwell IFR traffic. Visual Flight Rules (VFR) traffic will maintain its own separation. Instrument Approach Procedures (IAP) for this aerodrome are established outside controlled airspace.
Battle of Britain Memorial Flight historic aircraft operate to the north of the airfield between 500ft and 1500ft.

MOHAMMED EISSA ON UNSPLASH

1

Chrissy Brand
chrissyLB@hotmail.co.uk

Radio: Inspiring, Immersive and Innovative

From this month onwards, this column takes a slightly different approach, with more in-depth coverage of both traditional and non-linear radio, leading podcasts and programme recommendations.

We begin with *Darkfield Radio*, which is actually an app, and part of the *Darkfield Theatrical Company*. This UK-based organisation has created several seasons of strange and curious worlds for audiences to enjoy, through an immersive audio experience.

You buy a ticket, download the app and enter a code. Then, at a designated time, you, *"put on your headphones and your home becomes the setting for another world, blurring the lines between real and imagined."*

The shows that are available so far include four location-based experiences. They are named *Séance, Flight, Coma* and *The Invisible*. The latter is also a VR (virtual reality) experience. There are also two seasons of digitised experiences, called *Radio 1* and *Radio 2* (Fig. 2).

A *YouTube* trailer at the website provides more information but, amongst *Darkfield Radio's* many reviews and film festival plaudits this year, *The Metro* stated that its, *"binaural sound design manipulates you into believing in an entirely fabricated sensory reality."*

This is an innovative way to bring entertainment to individuals and friends at home. It is, perhaps, even more 'saleable' in a world where many people still feel uncomfortable entering indoor venues, and where lockdowns or restrictions to public spaces are a looming presence on the horizon.

The arts need financial aid, and *Darkfield* is one of many players, covering theatres, independent cinemas, music and drama. Many practitioners in these fields found new ways to interact with audiences during lockdowns and venue closures, with some performing for free or asking for donations.

Streaming live drama and music, and paying for the privilege, is no different to paying for music streaming services (*Spotify, Apple Music*), subscription podcast networks (*Luminary* and others) and television such as the BBC or *Netflix*. It is another option on the way forward.
www.darkfield.org/radio

I noticed that the *Cold War Conversations* podcast (*RadioUser*, December 2020: 44-47) won an award at the *Quite the Podcast Awards*, which were held, virtually, on the last day of July. This independent podcast award is run by *Quite the Thing Media*.

Several podcasts are made by this company, with one being called *Quite The Music*. Former Stirling University Radio *Air3 1350 Breakfast Show* DJ Gary Morris is the host on the platform, where he chats with the stars of the pop scene.
https://tinyurl.com/3u8tma5c
https://air3radio.com

Cold War Conversations won in the category of *Best Arts and History Podcast*. Its premise is a straightforward interview format, exploring the cold war past, from a human angle but often with a militaristic point of view.

However, there is an element of innovation as well. In *Episode 186* of the podcast, a discount was offered for tickets to enjoy the *Original Theatre Company's* online spy drama *A Splinter of Ice*. In it, novelist Graham Greene travels into the heart of the Soviet Union to meet

DARKFIELD RADIO

2

SAM FELDT

3

EAST COAST FM

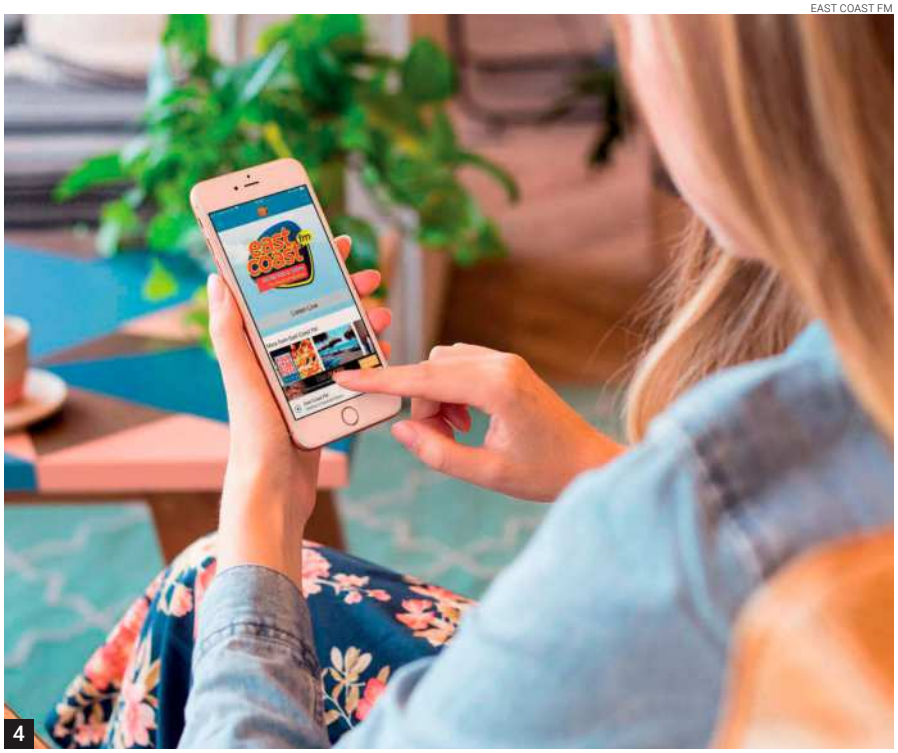
4

Fig. 1: A Sudan scene: *Radio Dabanga* broadcasts on developments in the country. Fig. 2: *Darkfield Radio* provides audiences with exciting new forms of audio experiences. Fig. 3: Sam Feldt of *Heartfeldt Radio* exudes calm with his *Sunday Sessions*. Fig. 4: As with so many radio stations, East Coast FM has its own app. Fig. 5: Dare you listen to *Ravenscourt*, a gothic horror drama...?

his old MI6 boss, Kim Philby. This was another good example of collaboration and promotion in the arts.

https://tinyurl.com/6hx9ya8h
https://coldwarconversations.com

On the Road, Again

I spent much of the summer on the road, travelling between parts of southern and northern England. I also made my annual trip to West Wales for a family holiday in the shadow of the Tywyn transmitter. Moreover, I reached Essex, to visit Radio Caroline – more of which in this month's *Emerging Issues in Radio* column, elsewhere in this issue.

Accompanying me on any solo drives are a big pile of CDs, a stash of downloaded podcasts and playlists on *Apple Music*, the latter that I have mostly assembled through hearing diverse songs on radio stations and in cafés around the world. In addition, of course, my ICE (in-car entertainment) system is a never-ending source of information, entertainment and surprise.

Medium wave stations signals drift in from Scotland to the Czech Republic and the Republic of Ireland to Italy. I would desperately miss a car radio that did not have FM or medium wave. It is bad enough that my current car radio (in a 2014 Škoda Citigo) does not have long wave, which always added an extra element of choice and excitement to long journeys. The coming generations of linear radio in the connected-car means most vehicles will soon, I fear, be DAB+ and FM only.

Although the 5G option of streaming stations will be welcomed, it is not the same as tuning along the dial and discovering unexpected, distant signals that can lead you down an exciting rabbit hole of intriguing music and languages.

I enjoyed Belgian station Top Radio on 94.0MHz on a Monday morning and used *Shazam* to identify the songs that I heard. I later checked the station website, where a playlist is given for each programme. I applaud all music radio stations that offer this facility!

The two songs I had heard (by *The Black Eyed Peas* and *Rufus du Sol*) were part of the *X-TOF* Monday lunchtime show. I would describe the station vibe as being as 'feelgood-pop', with a northwest European flavour, all rather pleasant and undemanding music to ease you into the week.

www.topradio.be/playlist

I may have heard a burst of iRadio NW from County Sligo on 104.4MHz, during a brief FM lift. This commercial station has a selection of music videos and interviews at the iRadio TV section of its website. It emphasises links with listeners, requesting feedback and choosing which hit music to play.

Perhaps the best time of the week to tune in or, for most of us, to stream iRadio NW, is Friday evenings. Three programmes offer a little more variety than most of the rest of the station's schedule.

Shelly Gray presents *First Play* at 2000 UTC and *The Martin Garrix Show* is at 2300 UTC.

Date	Time (UTC)	Station	Programme	Podcast	URL/ Stream/ Frequency
Daily	24/7	Polish Radio	English stream, including Around Poland, Balance Focus, Europe East	https://tinyurl.com/3ta9rzm4	www.polskieradio.pl/395 and 1386 kHz
Daily	1255 to 1300 1230 to 1235	Yle Radio 1 Yle Mondo	News in English from Finland	https://tinyurl.com/rnsytny	https://yle.fi and FM throughout Finland
Daily	0000 to 0530	Spirit FM, Republic of Ireland	Music Through the Night, features and music	https://tinyurl.com/3977e6br	www.spiritradio.ie and 549 kHz
Sunday to Thursday	2200 to 0200	Lite, Kuala Lumpur, Malaysia	The Lite Breakfast with Asha and JD. Inspiring stories, real lives.	https://tinyurl.com/kxms52sv	https://lite.my and on FM throughout Malaysia
Tuesday	Uploaded	Colombia Calling	English programme	Spotify	https://colombiacalling.co
Tuesday & Thursday	0740 (during the 0500 to 0900 slot)	East Coast FM, Republic of Ireland	Rob and Laura's Home Hacks, in the weekday Freshly Squeezed programme	https://tinyurl.com/x96hzs85	www.eastcoast.fm and FM throughout Wicklow
Thursday	0800 to 0900	Oldham Community Radio	Community Keyboards, organ and keyboard music and info with Ian Wolstenholme	https://tinyurl.com/5bkrpt37	www.oldhamcommunityradio.com and 99.7 MHz in Greater Manchester
Saturday	1700 to 1800	BBC Radio 3	J to Z, jazz, past present and future	BBC Sounds	www.bbc.co.uk/programmes/b09ymqm4 and FM, DAB throughout the UK
Saturday	1800 to 2000	Classic FM	Saturday Night at the Movies, soundtracks with Andrew Collins	https://tinyurl.com/4v5hsuub	www.classicfm.com and FM, DAB throughout the UK
Sunday	1700 to 1900	Channel 103, Jersey	Hartmann and Kelly, "serving the sass on your Sunday nights"	Not available	www.channel103.com and FM, DAB throughout Jersey

Table 1. Chrissy's top listening tips for the month ahead in international radio.

This is preceded by a syndicated show from Dutch DJ Sam Feldt, *Heartfeldt Radio,* at 2200 UTC. If you go to the *Heartfeldt* website, you will notice a paid membership scheme that operates for many of the radio shows. I understand the need for presenters and DJs to 'monetise' programme content, although you would probably be a die-hard fan to do so. However, there are free-to-hear mixtapes at the exclusive content part of the website. These are mostly of *Sam's Sunday Session* shows (Fig.3). He ran these during the initial Covid-19 lockdowns, with melodic deep house music to help you escape to a better place. I defy anyone to sit still or to feel too gloomy whilst listening to tracks such as *Wars* by Lakshmi and Tim van Werd.

www.iradio.ie
www.iradio.ie/podcasts
www.heartfeldt.me

Elsewhere in the Republic of Ireland, East Coast FM in Wicklow has produced high-quality documentary podcasts, alongside its daily fare of cheery pop and light entertainment. The five podcasts currently available include *Close Call*, a dramatic rescue on Wicklow's highest peak; *Oiled, A Portrait of Henrietta Moraes,* known as the 'Queen of Soho'; and *Don't Go Far!,* featuring two Dublin children who took a free ride on the DART (Dublin Area Rapid Transit system) and ended up in New York, in 1985.

Another programme offered by East Coast FM is *The Coast Channel* presenting chilled music and bands such as M People, Lady Antebellum and Daft Punk. This is available online, or on the station app (Fig. 4), smart speaker and the *Irish Radio Player* app.

The *Irish Radio Player* is a useful app that gives you access to 43 Irish radio stations: nine of these are RTÉ stations and the remaining 34 are from the IBI (Independent Broadcasters of Ireland).

https://tinyurl.com/ewu3j84c
www.eastcoast.fm/coast
https://radioplayer.ie
www.ibireland.ie

Horrors

We are nearing that slightly spooky time of year when many people indulge in the spirit of Halloween. My theme of programmes this month then, joins in with the darker side of life and fiction.

How about some audio drama in the shape of *Ravenscourt* (Fig. 5), by David Horgan? This is an enthralling series in the shape of a gothic-horror, *"ghost story about a psychiatrist who is haunted by past mistakes, the patient he failed and the place he now believes may have played a role in all of it. The story is inspired by St Anne's Asylum in Cork City. The now derelict building was built in the 1850s and the corridor asylum is said to be one of the longest buildings in Europe."*

Described as an "ongoing Lovecraftian tale", it is acted by Mark D'Aughton and Irene Kelleher (Game of Thrones).

www.cornucopia-radio.co.uk/ravenscourt

Another scary offering from *Cornucopia Radio* has Seraphina Winters and Damien Green talk of initiation rituals in front of an esteemed elder council, to join a rather sinister temple.

www.cornucopia-radio.co.uk/simple

Cornucopia Radio began thirteen years ago in Sheffield and encompasses a range of award-winning audio projects that are overseen by Peter Beeston in Sheffield. Going back a decade to 2011, *The First Days of Noise* investigated the early days of sound recording, highlighting some of the very first recordings made.

https://tinyurl.com/3c3k5pdu

There is also a live stream at the radio section of the website that showcases programmes of its partners.

www.cornucopia-radio.co.uk/radio-stream

The real-life horrors of the *Pendle Witch Trials,* which took place in Lancashire in 1612, have been covered in several podcasts and radio programmes. Last December, The *Litty Tittys* podcast covered it, whilst a couple of months earlier, comedian Josh Jones revisited the trials, in a Halloween edition of the history podcast, *Dead Drama*.

https://tinyurl.com/2yhfj6d3
https://tinyurl.com/2npbtjym

Cult US podcast *Welcome to Night Vale* (*RadioUser*, October 2019: 49-51) has an otherworldly feel. The programmes through October will doubtless add an element of 'trick-or-treating'. If that was not enough, the latest novel by programme co-founder Joseph Fink is called *The Halloween Moon*. *"This wickedly fun middle-grade novel follows the adventures of Esther Gold, a Halloween-obsessed girl who goes out trick-or-treating for one last year, only to find her town under the thrall of a mysterious presence."*

The novels, albums and merchandise are a way to support the podcast, which

is free and is another example of a great way to sustain the arts. A series of live dates are scheduled for 2022, but only in the USA, so far.

Night Vale straddles many podcast platforms, which is not a cheap process but certainly maximises the programme's reach. Heading towards 200 episodes now, on *Apple Podcasts, Google Podcasts, RadioPublic, Spotify, Stitcher, iHeartRadio, YouTube* and an RSS feed.

www.welcometonightvale.com

On Short Wave

Graham Smith recently logged a handful of stations. These included broadcasting giants Radio Romania International, in Romanian on 15430kHz at 1300 UTC, and China National Radio 1, on 15275kHz at 1310 UTC. He also heard Radio Dabanga at 1610 UTC on 15550kHz in Arabic with a 45545 SINPO.

You may recall that this station was started in 2008 to report on the Darfur crisis. On short wave radio, satellite television and online platforms, *Radio Dabanga* has since, "*gained a widespread and diverse audience, and has a particular strength in serving marginalised and hard-to-reach communities. When the 2019 'people's revolution' brought about the end of the al-Bashir led regime,* Dabanga *was at the forefront to broadcast trusted news and information.*"

DAVID HORGAN

5

Although the station first operated in exile in The Netherlands, it now has a team of reporters and stringers in Sudan (Fig. 1) who provide extensive grassroots coverage.

You can hear an hour of the daily broadcasts online. The lively jingles and music interspersing news headlines and stories make them worth listening to, even if you don't understand the music. There is a real sense of a radio station here, which tries to make a difference.

The *Radio Dabanga* website publishes articles in English. On July 23rd, its *Inspirational Women* series featured Siham Osman Mohamed Ahmed. She is a powerful force in the Sudanese government, and the first woman to hold the position of Under-Secretary of the Minister of Justice. She is also the Chairperson of the *Committee to Combat Human Trafficking*.

www.dabangasudan.org/en/broadcasts
https://tinyurl.com/DabangaWomen

David Smith
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DAVID SMITH

1

A Remarkable Feline Operator

David Smith visits what remains of a notable Wartime High-Frequency Direction-Finding (DF) station in the New Forest National Park and explains its purpose and radio procedures.

You Have Found the Huff-Duff on the Hill" – So reads the headline on the information board inside this derelict wartime structure, which stands on the fringes of the New Forest, near the former RAF Ibsley fighter aerodrome. Even knowing its general location, it is not easy to find, although it helps if you have a map reference – and we did not!

My wife Paula spotted it first: A tiny block about half a mile away almost indiscernible amid the heather and ferns of the heathland (Fig. 1).

A closer inspection revealed the structure to have octagonal brick walls about 2m high with an entrance protected by a blast wall. The information board is the work of the New Forest National Park as part of its *The Forest at War* commemoration.

https://www.newforestnpa.gov.uk
https://tinyurl.com/yzf59nsv

It begins: 'Within these walls once stood a three-storey tower called a High-Frequency Direction Finding Station ('Huff-Duff' for short). A network of these top-secret stations was spread across the country.

They played a vital role in identifying the locations of Allied aircraft, helping them to intercept them. They could also transmit a homing bearing to help pilots navigate their way home.

These stations saved thousands of lives during World War 2 (1939-1945).

Construction and Aerials

In the station's original form, a 10m high tower – wooden to minimise both electrical and magnetic interference – was bolted to the concrete base of the building (Fig. 2).

Surrounding the tower about 30m away, there were 16 small concrete blocks positioned to indicate cardinal compass points. Most of these have survived at Ibsley, including the one at True North (Fig. 3).

This has a metal socket in front of it, perhaps for a marker post or flag.

It is presumed that the blocks were used for regular checks on the accurate alignment of the equipment.

Unsurprisingly, the obtrusive wooden tower is long gone (Fig. 4 shoes a digital reconstruction).

The two or three crew would listen for radio transmissions from the lead aircraft of a scrambled squadron by rotating an aerial in the roof section that pivoted on a central support. The aerial would be turned to pick up the strongest signal. Each DF station in a sector would then telephone the bearing information they each received to their Sector Operations Room.

Three bearings would enable a squadron's location to be triangulated on a large map plotting table. It could then be guided to intercept enemy aircraft located by radar and observer posts and also plotted on the map table. Later on, further developments resulted in a cathode ray tube display and a fixed aerial that would instantaneously reveal the direction of the transmission without the need to rotate the aerial.

The tower was now topped by a fixed small aerial array of four vertical dipoles arranged in a square configuration. There is the concrete base of a crew accommodation building about 100m away to the southeast. It is surmised from surviving structures at other sites that this also housed a generator to charge batteries and run the radio receivers in the tower.

Adjacent to this building is an underground air-raid shelter, blocked to prevent access but apparently intact.

Feline Interceptors

The shelter's entrance has another information board telling the story of 'a rather lazy ginger tom cat', name unknown, sourced from a nearby farm as a kitten in 1942. The unofficial crew member cat spent most of his time reclining on the warm signal generating set, twitching his ears whenever a radio transmission was received from an aircraft.

[This is where you will need to check out the Cats and Radios *Facebook group page – Ed.].*

https://tinyurl.com/uc2z5em

DAVID SMITH

DAVID SMITH

Fig. 1: Paula and the Huff-Duff. Fig. 2: The author (right) with friend Ken Haddleton inside the Huff-Duff, standing on the concrete base onto which the tower was bolted; the bolts are still there; the wall inscription is a recent addition. Fig. 3: Paula and the True North calibration marker. Fig. 4: The Huff-Duff with a CGI tower.

In recognition of the cat's ability to sense these incoming radio transmissions, he was given his own pair of headphones. As time progressed, the crew started to take their cues from the cat, sending a bearing transmission even if they could not hear a strong signal.

In the summer of 1942, an American *P-38 Lightning* pilot with a rough-running engine sent out a *Mayday* call and requested a bearing. The transmission was too weak to elicit any response from ground stations on the common frequency – but at Ibsley the cat started to twitch.

This alerted the operator to hunt for any radio calls, but he could only hear a faint break in the background noise every now and again. This was sufficient to send out a bearing. A further break indicated that it had been received. Helped by continued feline monitoring, further bearings were sent and the pilot eventually landed safely near Exeter. It appears that many more pilots owed a lot to the cat and crew!

Well Worth a Visit

My verdict: This is an interesting site in a very scenic setting, enhanced by placid groups of wild ponies. The whole area is crisscrossed with paths and tracks, making the three-mile round-trip walk very easy.

Currently, a total of 66 Huff-Duff sites have been identified across the UK, 36 still extant with some remains present, and 24 removed with no trace.

Six possible sites may or may not have been part of this network of fixer stations.

In addition, there were many more Huff-Duffs sited on operational airfields; for homing purposes, their height was reduced from three to two storeys. From about 1943, HF D/F stations were reduced in number and became less important as *Gee* became more widely used. However, the service was maintained in attenuated form as a safety aid and communications channel.

Gee, sometimes written *GEE*, was a radio navigation system, which measured the time delay between two radio signals to produce a fix, with accuracy in the order of a few hundred metres at ranges up to about 350 miles (560km).

It was the first hyperbolic navigation system to be used operationally, entering service with RAF Bomber Command in 1942.

It is evident that much further research is necessary, both in the National Archives and elsewhere, to establish the full facts of this intriguingly obscure aspect of wartime signals procedure.

My thanks go to Richard Flagg and Paul Bellamy of the *Airfield Research Group,* for providing some supporting information. **www.airfieldresearchgroup.org.uk**

COURTESY OF THE NEW FOREST REMEMBERS

Further Information

- *Atlantik Wall:* **https://tinyurl.com/2dd65pxf**
- *The Frontline Ulster* **www.frontlineulster.co.uk** (Huff-Duffs in Northern Ireland and mainland UK; contains a wealth of information).

Tim Kirby
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TIM KIRBY

1

Inrico T-310, CB in the USA, and Long-Distance PMR446

Tim Kirby takes a look at the new T-310 network radio device from Inrico, reports on some noteworthy CB news from the USA and revisits the popular subject of PMR446 communications.

Inrico is one of the leading suppliers of Network Radio equipment used by hobby communicators.

Their T-320 model set a *de facto* standard for some time.

A few weeks ago, Chris Taylor at Moonraker kindly e-mailed and said that he had the new T-310 model (Fig. 1) in stock and would we like to take a look at it? Of course, we said!

Those of you who enjoyed Chris Rolinson's excellent *Network Radio* column in *RadioUser* (2019-2020) will probably not need any reminder that a network radio is essentially an Android smartphone capable of running various applications used for communication (including phone calls). *Zello* is one of the most common applications but for radio amateurs, there are other applications, such as *Echolink* and *DroidStar*.

So, what are the features claimed by the manufacturer?

Inrico states that, "*in line with [the] T300 series' tradition, the T310 has abundant standard features such as HD speaker, one key SOS, torchlight, dual SIM-card slots, TF card slot, IP54 and packs all of them into a highly ergonomic and compact body – Modular design, easy to configure, designed with users in mind with optional rear camera, NFC, touchscreen and more.*

Table 1 lists the main features and specifications of this network radio device.

Basic Connections

In reality, there is not much you need to take too much notice of here. However, one thing to look at is the version of Android on the device, which is 7.1.1. The current version of Android is 11, so the T-310 is running a fairly old version of the OS.

Does that matter? It might, if applications cease to support older versions of the operating system, although there is no suggestion of that presently. Security patching is another point to bear in mind. Android is a fairly 'dynamic' OS and it is not unknown for 'exploits' to be produced. You can always get over some of these concerns by installing a 'Firewall' application on the device, which is what I did on the original T-320.

It is, perhaps, a little unfair to single out the T-310 as having an old version of Android. Many similar devices have older versions of Android too. The RFinder B1, which I reviewed a few months back (*RadioUser*, June 2021: 40-43) is somewhat more up-to-date, on version 8.1, but still adrift of the current levels.

There were very few applications installed on the device as it arrived: 'Contacts' 'Settings' 'Phone', 'Messaging', 'Play Store', 'Maps' and 'File Manager'. The first application I installed was *Zello*. I logged into my *Zello* account and immediately could see all my channels and contacts listed. I tried a call through the *Southern Ireland Repeater Group* network channel, which is connected to a number of repeaters situated throughout, well, Southern Ireland.

I immediately had a response and had a very enjoyable chat, which confirmed that the transmitted audio was of good quality and certainly the received audio was too. Zello-to-Zello connections feature exceptional quality audio, which for me is one of the highlights of this form of commu-

Features

- Ergonomic and anti-slip design – easier and firmer grab hold with belt clip ready for use in motion
- 2.4" screen with 240 x 320 resolution
- AI face recognition-ready
- One-key torchlight on – easy and fast, usability in detail
- Suitable for public safety, municipality, transportation, property management, and so on
- The INRICO APP enables users to work more efficiently.

Technical Specifications:

- Frequency (EU Version): GSM:B2/B3/B5/B8. WCDMA:B1/B5/B8. FDD: B1/B3/B5/B7/B8/B20/B28a/B28b. TDD:B38/B40
- Wi-Fi: IEEE 802.11 a/b/g/n(2.4G and 5G)
- Bluetooth: BT4.2
- Location: GPS,GLONASS,AGPS
- NFC: Customisable
- CPU: MT6739,1.5GHz, Quad core
- Memory: 1GB(RAM)+ 8GB(ROM)
- TF Card: Support up to 32GB
- SIM Card Slot: Dual micro SIM card
- USB Port: Micro USB 2.0
- Interface: 3.5mm earphone jack
- Display: G + F touch screen (customisable)
- Screen Size: 2.4"
- Flashlight: LED flashlight
- Speaker: Ø36mm Speaker, 8Ω 2W
- Microphone: Anti-interference MIC
- Battery: 2800mAh
- Speaking Time: 8 Hours
- Standby Time: 23 hours
- Operation System: Android 7.1
- Dimensions: 135mm x 60mm x 10.8mm (without belt clip and antenna)
- Working Temperature: -20°C ~ 60°C
- Storage Temperature: -20°C ~ 70°C
- Protection Level: IP54
- Drop: 1.0 Meters | Certificate: CE/FCC.

Table 1: In Detail: The Inrico T-310 Network Radio.

TIM KIRBY

2

nication. Using *Zello*, I was able to use the T-310's PTT button on the side of the set to transmit, rather than the on-screen button.

As Chris Rolinson observed, this really does make the set feel like a 'walkie talkie' kind of radio.

In terms of the form factor, the T-310 is different from the T-320 because it does not have a small aerial on top of the set (which did not seem to make much difference to the performance of the set). Just below the PTT button, there are the volume up and volume down buttons, making control of the audio very simple and trouble-free.

The T-320 had a problem with the volume control, which meant that adjusting the audio could result in 'full blast' audio if you were not careful. This problem has been resolved on the T-310.

DroidStar and Audio

Next to be installed was the *DroidStar* application. This allows radio amateurs to connect to various amateur radio digital networks including DMR, D-STAR, YSF, NXDN, M17, and so on. The application installed fine, although I had a little bit of trouble setting it up. The keyboard on the T-310 is pretty small, and I kept entering my password wrongly, but could not see it! Once that was entered correctly, I was able to connect as expected.

I set up the DMR connection to the *Salop Radio Network*, a DMR network on the amateur bands in the West Midlands, Shropshire, Gloucestershire area. Rather timidly, I put out a call. I say 'timidly' because *DroidStar* does not have the best reputation for transmitted audio quality. The reason for this is that the software very cleverly uses a software-based CODEC to decode the digital signals into audio. This works remarkably well, but not quite as well as a hardware-based CODEC, which a 'traditional' digital radio would have.

I need not have worried. I was delighted to have an answer to my call from Dan M0MST in Evesham. I quickly 'fessed-up' to using *DroidStar* in case it sounded ropey! Dan said that although it was clear that I was using *DroidStar*, the audio quality was acceptable – a big 'thumbs-up' for the T-310. Received audio was alright too, considerably better than I have heard on some devices using *DroidStar*. Although I am not an advocate of using *DroidStar* for lengthy contacts, it is certainly a very useful tool for monitoring digital networks and having some quick contacts too.

Using the T-310

The T-310 has a nice feel to it. It is noticeably slimmer than the T-320, its predecessor (Fig. 2). This is much better for fitting in a pocket to take with you. The T-320 is a bit chunkier and I found I had to transport it in my rucksack when I was out and about. The battery is 2800maH, so the battery life of the T-310 is quite respectable. You can charge it using a standard charger cable from a USB charger.

The T-310 has a LED torch on the top of the set, which could be quite useful for late-night dog-walking or peering in dark corners of the house. There is no camera on this version of the T-310. On a network radio, this doesn't seem to me to be a big disadvantage, although some people have enjoyed the ability to send pictures to a *Zello* channel.

I tested the T-310 using Wi-Fi (a nice touch is that it works on both 2.4 and 5GHz

Fig. 1: The Inrico T-310 Network Radio.
Fig. 2: The T-310 (on the right) is noticeably more compact than its predecessor, the T-320.
Fig. 3: The Inrico T-310 Network Radio in outdoor use. Fig. 4: FM is now permitted on CB Radio in the USA. This is a *President Jackson II* CB transceiver, capable of multimode operation.

networks) but if you want to use it on the cellular networks there are two SIM card slots; plus, it works on 4G networks (no 5G on this model at the moment). Realistically, that is not a problem for now.

The T-310 has Bluetooth, of course, which you can use to pair with your car's audio system if available or, if not, a Bluetooth headset allowing you to use the set when you are out and about.

There is an 'SOS' button on the keypad of the T-310. This made me nervous. With a small keypad, it would be easy to hit the button by mistake and the last thing you want to do is to initiate an unintended call to the Emergency Services.

On later versions of Android, it seems to be possible to disable the button, but I could not immediately see how to do it on Android 7.1.

Conclusion

As a portable 'network radio' I liked the T-310. It is slimmer than some of the previous units, making it easier to carry with you. Performance on *Zello* was very good indeed and on *DroidStar*, was much better than expected. Battery life seemed good. The lack of a camera was a bit of a surprise, but as long as you realise that at the outset should not be a problem.

Of course, you can use the T-310 as a mobile phone, although I did not test that functionality.

As a smartphone, I think the small screen and on-screen keyboard would probably be rather frustrating.

I enjoyed using the T-310, and it was fun to try *Zello* again after a period of not using it. Did I mention the audio quality? It is excellent. If you are looking for a small and portable 'network radio' then the T-310 is well worth a look.

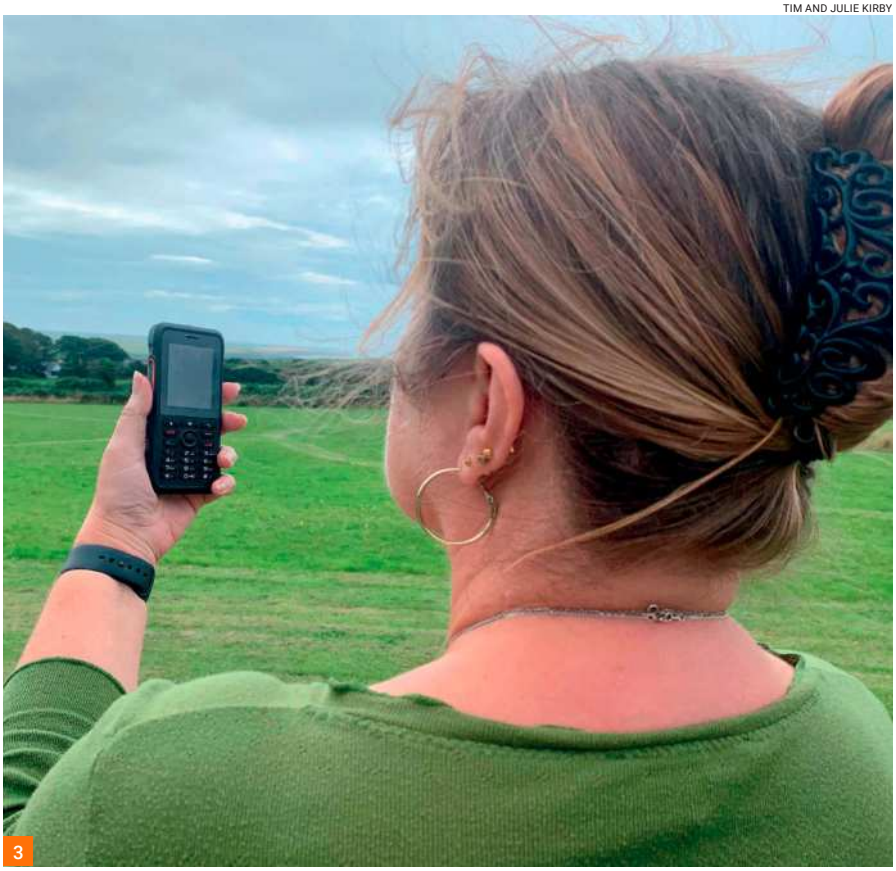
Fig. 3 shows the radio in use outdoors.

Many thanks to Chris Taylor of Moonraker for the loan of the review model and for answering my questions.

The Inrico T-310 is available, priced £129.95, including VAT, from Moonraker. https://tinyurl.com/3eh68cxw

Thanks to the generosity of Chris and Moonraker Ltd, you can win the review model.

TIM AND JULIE KIRBY



3

DANIEL KIRNER THROUGH *PIXABAY*

4

*[Details of our exciting competition to win a T-310 can be found elsewhere in the magazine! – **Ed**.]*

FM CB from the United States

I was interested to read that the FCC in the USA has granted a petition – presented by Cobra Electronics, who manufacture CB radios – to legalise FM CB in the USA (Fig. 4).

The petition was presented in 2017 and has only just been granted. No FM-only sets will be sold in the USA, but radios may be AM/FM or AM/FM/SSB.

You may hear FM signals from the USA on the CEPT allocated CB channels (known by many as the 'mid-block') in future.

It will be interesting to see how much this gets used. AM is very much ingrained into the US CB 'psyche', as it has been the mode of choice for most US CB users since the

1940s. I wonder how much uptake the new FM mode will have? Bear in mind that no frequency allocations will change, so you should not expect to hear, given good propagation, US FM signals on the original set of CB channels authorised in the UK, otherwise known as the 27/81 allocation.
https://tinyurl.com/4f4c6usm

More on PMR446 Contacts

There was a lot of interest in my last column about the possibilities of long-distance contacts using legal handhelds on PMR446 (see: *RadioUser*, August 2021; cover & pp. 57-59).

One or two people did enquire about the set we pictured, Ed Spicer's *Floureon FC200s*. Unfortunately, these sets seem to be unavailable now. Ed said that he had seen one or two sets originating from the USA on eBay but said that he would discourage people from buying them as they may be set up to work on the *US Family Radio Service* frequencies rather than PMR446.

One reader commented that making contacts over many miles or kilometres was 'unrealistic'.

It would be unrealistic to expect that level of performance from legal PMR446 handhelds in difficult terrain or an urban environment. However, if you are prepared to seek out a good high location, then you may well be able to make contacts over a far greater distance than you might otherwise expect. There is nothing unrealistic about that at all – it is what many radio enthusiasts do every day.

I wonder if any readers made any interesting PMR446 contacts over the summer period? It would be interesting to hear about them. Drop me a line! I would also be interested to hear if there are any regular nets or activity periods on PMR446 that readers might like to listen out for.

I know there used to be a net on the band on a Sunday afternoon some years ago, which attracted portable activity in the south of England and beyond.

Your favourite Zello Channels

I am also looking for readers' recommendations on your favourite *Zello* channels which might be interesting to other *Zello* users. I sometimes monitor the 'Network Radios' channels but understand there are many others available.

I wonder whether readers would like to share their favourite *Zello* places to meet up and have a chat.

That is it for this month! See you again in two months.

Please keep your news and information coming – it is very much appreciated!

WORTH £130

Win an Inrico T-310 Network Radio

Thanks to the generosity of our friends at Moonraker, we have one Inrico T-310 Network Radio to give away.

The exciting handheld Inrico T-310 network radio (internet transceiver) provides worldwide communication using either a mobile network or a Wi-Fi connection. It is a compact Android smartphone, featuring a push-to-talk button making it extremely flexible to use.

Depending on your interests, you can install the applications you want from the *Google Play* store. Network Radio enthusiasts may use applications such as *Zello* and *Teamspeak* to communicate worldwide with crystal-clear audio quality. Amateur Radio operators may use the same, but can add applications such as *Droid*Star, Echolink* and *APRSDroid,* which connect directly to amateur radio systems through Internet gateways. With the T-310 in your pocket, an interesting conversation is just a few button presses away!

To be in with a chance of winning this fabulous Inrico network radio, all you need to do is to go to our website and answer the following question correctly.
www.radioenthusiast.co.uk/competitions

The Inrico T-310 is certified to survive a drop of how many metres?

a. 0.5m b. 1m c. 5m

Entry is only via our website. Entries close at midnight on **7th November 2021**. To enter you must answer the question correctly and answers received after the end date will not be accepted. The winner will be notified by email by **14th November 2021**. Warners Group Publications Plc standard competition terms apply, to view visit **warners.gr/compterms**. For information on how your personal data is processed, secured and your rights, our Privacy Policy can be viewed here – **warners.gr/privacy**; it is available in hard copy upon request. The winner will also be announced in the **December 2021 issue** of *RadioUser*.

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

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This multi-system adaptive digital trunking scanner supports Motorola P25 Phase I, X2-TDMA, Phase II and DMR.

Buy the TRX-1E for just

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WS1065 Desktop Radio Scanner

The Whistler WS1065 employs cutting edge technology to bring a high level of performance and innovative features. This model clearly raises the bar in the area of advanced trunking scanners. Frequency coverage is extensive including: 25-54, 108-17, 137-174, 216-512, 764-776, 795-805, 849-869, 896-960 and 1240-1300 MHz.
1800 memories are available and may be dynamically structured to bank sizes you prefer. Plus you can store 21 virtual scanners (so that is a total of 37,800 objects).
The large backlit LCD is four lines by 16 characters. The keys are also backlit. Supported trunking systems include Motorola Analog, EDACS, LTR and Digital APCO (9600 bps).

KEY FEATURES

- Alert LED • Audible Alarms • Automatic Adaptive Digital Tracking
- Backlit Liquid Crystal Display • Data Cloning • Digital AGC
- Flexible Antenna with BNC Connector • High Speed PC Interface
- Free-Form Memory Organization • LTR Home Repeater AutoMove
- Key Lock • Lock-out Function • Memory Backup
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- Multi-System Trunking • P25 NAC Functionality

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WHISTLER

WS1025 Desktop Radio Scanner

This 200-channel scanner can be categorized into 10 separate memory banks. Plus one-touch searches of marine, air and ham Frequency Range: 29-54 VHF Low Band. 87.3-107.9 FM Broadcast Band. 108-137 Civil Aircraft Band Includes 833 kHz steps. 137-144 VHF. 144-148 Amateur Band 2 Meters 148-174 VHF High Band

Buy the WS1025 for just

£89.95

WHISTLER

TRX-2E Digital Desktop Scanner

Buy the TRX-2E for just

£479.95

The radios will receive both amateur and commercial DMR transmissions as apart from the frequency they are fundamentally the same mode. The radio is supplied with software and users can select mode when writing memories or select auto and it will work out the mode itself!

This multi-system adaptive digital trunking scanner supports Motorola P25 Phase I, X2-TDMA, Phase II and DMR making it capable of monitoring the following unencrypted channels/systems:

- Conventional DMR (Entered as a DMR trunked system)
- Hytera XPT
- MotoTRBO™ Capacity Plus
- MotoTRBO™ Connect Plus
- MotoTRBO™ Linked Cap Plus systems
- NXDN & DMR out of the box

KEY SPECIFICATIONS

- Frequency: 25-54MHz, 108-136.99MHz, 137-174MHz, 216-379.97MHz, 380-512MHz, 764-781MHz, 791-796MHz, 806-960MHz (excluding cellular), 1240-1300MHz
- Simple Zip Code programming
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- Removable, remote magnetic head
- Scanning at up to 70 channels/second
- CTCSS and DCS subaudible decoder
- IF Discriminator Out • Store Favourites Scan List
- User upgradable CPU firmware
- Spectrum Sweeper • Clock / Calendar
- Tuning Steps: 2.5, 3.125, 5, 6.25, 7.5, 8.33, 10, 12.5 ad 25 kHz.

WHISTLER

WS1010 Handheld Scanner

This 200-channel scanner lets you listen to FM radio bands and can be categorized into 10 separate memory banks. Also, it offers the convenience of one-touch searches of marine, air and ham
Key Features/Specifcations:
200 Channel memory - plenty of memory to store all your favorite frequencies in 10 separate storage banks. Backlit Liquid Crystal Display - easy to read and program data even in low light situations.. Data Cloning - allows transfer of the programmed data to another WS1010 scanner.

Buy the WS1010 for just

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WS1040 Handheld Scanner

The WS1040 scans most common trunked radio system signalling formats, including Motorola, EDACS, LTR and P25 trunked radio networks. Talk group and individual call monitoring is supported.
When monitoring P25 digital systems, the exclusive Automatic Adaptive Digital Tracking instantly adapts the digital decoder to the digital modulation format of the transmitted signal, then analyses the signal over 50 times each second and adapts to any subtle changes caused by multipath or fading. No cumbersome manual adjustments are required.

Buy the WS1040 for just

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Uniden

SDS100E Digital Handheld Scanner

Uniden creates another first with the SDS100 True I/Q Scanner, the first scanner to incorporate Software Defined Radio technology to provide incredible digital performance in even the most challenging RF environments.
The SDS100's digital performance is better than any other scanner in both simulcast and weak-signal environments. It is also the first scanner that allows you to decide what to display, where, and in what colour. Custom fields put the information important to you right where you need it.

Buy the SDS100E for just

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579 WATTS

Uniden

UBC-125XLT Handheld Scanner

UK's Best Seller

A best selling Handheld scanner with great performance at a budget price! Uniden UBC 125XLT is a quality handheld scanner in a stylish compact design that is made from robust materials. Uniden UBC 125XLT is designed for indoor and outdoor activities in the professional world. The programmed channels are grouped into 10 Banks with 50 channels in each. In this way Uniden UBC125XLT is very easy to use once the interesting frequencies are programmed. Uniden UBC 125XLT has Close Call and 10 preset frequency bands.

Buy the UBC-125XLT for just

£129.95

129 WATTS

Uniden

Bearcat UBCD-3600XLT Digital Handheld Scanner

This is a new digital Truck Tracker V Professional Scanner Receiver, covers 25 - 1300MHz wideband frequencies. The Truck Tracker V operation allows this scanner to scan APCO 25 Phase 1 and Phase 2, DMR, Motorola, EDACS, LTR Trucked Systems, NXDN as well as conventional analogue and P25 digital channels. With features such as close call RF capture, 4GB memory, location based scanning, range control, multi-site trunking, audio recording and multi-colour LED alert, this is must have equipment for all the professional users out there!

Buy the UBCD-3600XLT for just

£479.95

479 WATTS

Uniden

SDS200 Digital Desktop Scanner

This has the same features as the handheld version SDS100, plus some extra enhancements. It incorporates the latest True I/Q receiver technology, which provides the best digital decode performance in the industry.

KEY FEATURES

- True I/Q Receiver • TrunkTracker X
- Direct Ethernet Connectivity for Streaming and Control
- Complete USA/Canada Radio Database Location Control for Simple Operation • 3.5" Customizable Colour Display

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749 WATTS

Uniden

UBC-370CLT Desktop Scanner

A quality desk top scanner. It is designed for home use, with a big speaker for excellent sound. Included: 12VDC power supply, Telescopic antenna, 500 Channels in 10 banks FM & broadcast (Store & search upto 30 Preset FM broadcast channels).

KEY FEATURES

- 500 Channels in 10 banks
- FM & broadcast (Store and search upto 30 Preset FM broadcast channels) • CTCSS/DCS (Search and display any tone)
- Alarm Clock • USB PC Programmable

Buy the UBC-370CLT for just

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119 WATTS

Uniden

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With Uniden exclusive features like Advanced Dynamic Memory System, Close Call RF Capture Technology and GPS compatibility. The Close Call Technology instantly locks onto nearby radio transmissions even if you haven't programmed them into the scanner and then conveniently scans those Close Call Hits so you can stay up to date even after leaving the Close Call range. Enabled scanner with TrunkTracker III technology

KEY FEATURES

- Frequency Coverage: 25-512, 758-823.9875MHz, 849.0125-868.9875MHz, 894.0125-960MHz, 1240-1300 MHz
- 9000 Dynamically Allocated Channels

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Uniden

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Uniden UBC 355CLT is a quality base and mobile scanner in an elegant cabinet. it is designed for home and mobile use, with a large speaker for excellent sound.The fixed channels are placed in eight banks, where seven are pre-programmed for known frequencies.

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89 WATTS

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Uniden EZI 33XLT Plus is a handheld scanner in a compact design. New: Includes Rechargeable NiMH Batteries and USB Charging Cable
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The fixed channels are placed in nine banks, one for each frequency band. Thus allowing for a very easy access to all the interesting, pre-programmed frequencies.

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£74.95

74 WATTS

Uniden

UBC-75XLT Handheld Scanner

The UBC-75XLT's Main features include 300 memory programmable channels, close call RF capture with Do-Not-Disturb, automatic close call detection and tune into nearby transmission, 10 pre-programmed service searches, 10 custom search ranges, channel priority with Do-Not-Disturb, temporary lockout, PC programming, battery save and low battery alert, scan/search delay/resume options, quick and turbo search facility, triple conversation circuit, key confirmation tones, three power options and many more.

Buy the UBC-75XLT for just

£99.95

99 WATTS

CHRISSY BRAND

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A Tale of Two Stations

Chrissy Brand
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Chrissy Brand visits two very different community radio stations – one of them modest and the other mighty: Welcome to Oldham Community Radio & Radio Caroline.

I went behind the scenes at two radio stations in the summer. When compared, the stations offer a vast contrast, in their history, geography, output and reach. One you may not have heard of, Oldham Community Radio, while the other one is the legendary brand, Radio Caroline. Both are exemplars for the wider radio industry, staffed by dozens of enthusiastic volunteers with a desire to serve their listeners and to build audiences across their specific communities.

The more I travel around England, the more I conclude that much of it seems a set of disparate mini nations with little in common, apart, perhaps, for an ingrained passion for radio. I know I am biased, but radio can bind communities and regions together in a unique way.

Cities and villages, coast and countryside – the accents change as much and as often as the geology does on this small island. This was illustrated on my travels, from 'Lancastrian' at north-west stations to the 'Estuary English' on the Essex airwaves. Although only around 250 or so miles apart, the language is quite different. A radio announcer in one region may refer to a 'bread roll', while the same item elsewhere is a 'bap', a 'stottie' or a 'barm cake'.

A love of music and a zest for life are uniting factors that radio brings. The genres of music may cut across class and cultural preferences, with mainstream radio's three-minute pop songs patter being the most commonplace, and specialist radio, such as Classic FM, Chris Country and Jazz FM, as a counterbalance.

Oldham Oldies

In July, Oldham Community Radio held an open day. This was a way to drum up trade and recruit new volunteers for the station. Due to concerns around Covid-19, the open day was limited in the number of people who could attend. The event was advertised on the air, and people needed to book in advance for either a morning or afternoon session.

The town centre was buzzing when I arrived, as the *Festival Oldham* was also taking place (Fig. 1). Entertainment was also the order of the day a couple of streets away at Oldham Community Radio.

The station's two studios and reception area are set in a building within the local market. Tommyfields Indoor Market and the adjoining outdoor market has been an Oldham

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Fig. 1: *Festival Oldham* in full swing, close to Oldham Community Radio. Fig. 2: Join Geoff Oliver on Thursdays at noon for Oldham Community Radio's *Classical Music Show*. Fig. 3: Johnny Lewis maps offshore radio stations and locations off the Essex coast. Fig. 4: Approaching the *Ross Revenge* in the River Blackwater. Fig. 5: Paul Brown, live from the *Ross Revenge*, on 13th August. Fig. 6: A novel way to display a radio station's frequency.

institution for decades. Being located at the heart of the community is a highly appropriate place for any local radio station.

The atmosphere at the station was informal and convivial. Information packs were handed out, along with a voucher for a butty and a brew at the market café. The station's technical director, Phil Edmonds, gave a presentation on the background to the station, the awards won, funding models, and the types of programmes broadcast.

After that, visitors could take a turn behind the microphone, recording station identification announcements, some of which will be used on the air. This was rather a nice touch, with authentic local voices being encouraged to take part at the station. The keenest of the volunteers could then undergo an application process, followed by training in the autumn to join the station's team, in an administrative, technical or on-the-air role.

Oldham Community Radio's early days evolved via a series of nine *Restricted Service Licences (RSL)* from 1994. The success of these broadcasts led to the station being granted an Ofcom community radio licence, and the station began its 24/7 service in 2007.

Today, the station estimates that 20,000 people a week tune in on 99.7MHz or stream the programmes online. That seems to be a very respectable percentage of the population, which Oldham Council predict to reach 241,100 by 2022.

The station plays to its strengths, for instance, broadcasting programmes for schools during the breakfast time slot. This is a sensible approach, rather than trying to compete in the overcrowded and often formulaic breakfast show marketplace: there are four local BBC stations within range (Merseyside, Manchester, Leeds and Lancashire), plus the ubiquitous Heart, Capital and Greatest Hits. There are also another dozen or so Greater Manchester community radio stations that can be heard around the orbit of the nearby M60 motorway, including Bolton, Salford, Tameside, and Wythenshawe.

In the early evenings, Oldham Community Radio offers children's bedtime stories. *Night Night, Sleep Tight* is a rare concession from a radio station to its youngest audiences. Other, wealthier and more powerful stations should take note. Catering for children will help grow future generations of audiences and industry professionals.

Programmes for the Bangla and Urdu-speaking communities are also in the schedule, while some of the music programmes offer content not heard very often on the radio. Examples of these are Caribbean sounds, Northern Soul, brass bands, folk and country. RnB, hip hop, dance and classical also get a look in. Geoff Oliver presents an hour of classical music, in *Going Classical* each Thursday at noon (Fig. 2). Perhaps the most popular programme is *The Wireless Programme*, which plays music from the pre-rock n roll era and reflects the station's older listenership.

The station gives live coverage of Oldham's Rugby League team but is unable to cover Oldham Athletic FC games. This is due to licencing fees, which cost £8,000 per season for the coverage of football league matches, or an extortionate £30,000 a season to cover a Premier League club.

Notably, Oldham Community Radio is mostly staffed by a white male demographic of presenters of retirement age. I feel that more needs to be done to attract a wider demographic to the station, especially young, female and people of colour. Volunteers are wanted from all backgrounds.

Funding comes partly in the form of the "300 Club Lottery", a group of up to 300 loyal listeners who donate £1 per week. Part of the income is then put into regular cash prize draws for one of the members; the rest is ploughed into Oldham Community Radio coffers. An annual *Radiothon Week* also solicits donations.

There are social meetings in the park, picnics, coffee mornings, and walks to mark the

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Peterloo Massacre Commemoration. Oldham Community Radio is clearly a success. I particularly like one listener quote: *"When you turn on Oldham Community Radio, it's like meeting an old friend, not some DJ attempting to be smart."*

www.oldhamcommunityradio.com

Caroline Calling

I visited Radio Caroline on the *Ross Revenge* during the station's four-day annual fundraiser in August. The ship was built in 1960 and became an Icelandic diesel-powered fishing trawler. It later found a far lovelier, better role, as the home to Radio Caroline in the early 1980s: it was this incarnation of the station that I grew to love, having missed out on the station's 1960s ground-breaking heyday.

One weekend a month, Radio Caroline North broadcasts live from the *Ross Revenge* on the Blackwater River, off of the Essex salt marsh coast. As well as on the station's 648kHz frequency, DAB and online, it is aired on Manx Radio on 1368kHz. This first came about in 2014 when both stations celebrated their 50th anniversaries. Radio Caroline North was moored off of the Isle of Man in the 1960s, and a working relationship grew out of this.

Although, or perhaps because, the bulk of its listenership is now the over sixties age group, Radio Caroline has a reputation and legacy that dwarves most other radio stations, UK and globally.

Everyone I spoke to on my three-day trip camping trip to Mersea Island, Othona and Bradwell knew something about the station, from 'twentysomethings' to elders. I chatted with a teacher and a café owner in Brightlingsea. Both women were radio fans, the teacher with friends back in Scarborough running an internet radio station,

On my tour of the ship, which was conducted in groups of six, I spoke with a loyal listener, Jennifer, a former power plant engineer. She commented on how she likes the way Caroline songs start the day in gentle and soft mode and build to a night-time crescendo. Like many listeners today, she eschews conventional radio receivers and simply asks her smart speaker to "Play Caroline".

Our guide on the *Ross Revenge* was Johnny Lewis (Fig. 3), who had come on board to present the *Friday Morning Show*. He was a DJ on the *Ross Revenge* back in the 1980s. Today, Johnny is also heard on Caroline Community Radio, a separate station for the towns and villages within the Maldon District on the Essex coast, on 94.7MHz.

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Johnny gave us a thorough tour, from the outside (Fig. 4) and engine room to the transmitters, through to the record library, all of the studios (Fig. 5) and the shop. The beautiful but slightly rusting ship needs constant repair, which, along with a need to raise funds for a power increase on the 648kHz transmitter, were the main focus of this year's fundraiser.

Caroline Content

"Europe's first album station" is still a proud claim that Caroline uses, almost as often as the ship's bell heralds the top of each hour. One Thursday night programme I enjoyed in my tent, whilst watching the sunset, was the countdown of album sounds, presented by Steve Dack. A mix of listeners' current favourite albums featured artists from the 1980s to the current day. I was pleasantly surprised to hear two well-respected contemporary bands riding high in this particular chart: Wolf Alice and London Grammar.

Tim Charles hosts the three-hour, Thursday night *Magic Carpet Ride*, from 2000 UTC. That particular Thursday, he played music with a radio theme, to mark the *1967 Marine Offences Act*, which changed Radio Caroline and other offshore and free radio stations forever.

The Van Morrison eight-minute epic, *In the Days Before Rock and Roll*, opened the programme, poignantly, with its references to station names on the old dial: Luxembourg, AFN and Athlone.

Tim stated how he did not see Caroline as ever being a 'pirate', as he does not like the term. The station was not breaching the law until the said *Marine Offences Act* came into force, after which Radio Caroline and its staff had merely become outlaws.

Radio Caroline does play quite diverse musical content, to a point. It is difficult to predict what the next song will be: new or old, rock, pop, protest or folk-edged. Musical acts range from the up-and-coming Grace Petrie to many well-established old-timers like The Black Keys, Journey and Edie Brickell.

One programme with a difference is *The Mellow Show* with Gary Ziepe. It is, *"a chance to escape reality and step into an oasis of calm with a set of eclectic, laid-back, tracks across times and genres."* Suzy Wilde appears to be the only female DJ at present, and she highlights a different classic album on each of her programmes.

The Radio Caroline Legacy

Radio Caroline is still a major force in the world of radio, although it could choose to rest happily (and deservedly) on its laurels; its starting *modus operandi*, after all, has long been achieved. It was the underground outlet for teenagers to hear pop and rock on the barren radio dials of the 1960s.

Today, Caroline retains its credibility as an album station playing old and new music, still concentrating on the pop and rock genres. Rarely has a radio listenership been so loyal and generous, keeping loving awareness and the free radio dream alive since 1964.

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Supporters groups meet regularly, many fund the station, and has a radio station ever been written about so much? Books, anecdotes, memoirs, websites, blogs, social media channels, audio and video all catalogue every aspect of the station: presenters, technical ships, studios, and programme content. Had it not been for pioneers behind Radio Caroline and the other offshore and free radio stations, the UK community radio landscape would not have evolved to the positive position that it is in today. I encountered some good examples of this in Essex. I listened to Caroline Community Radio and Chelmsford Community Radio, both doing an admirable job of reporting local news, events and creating community cohesion. All too often though, younger people seem left out of the community radio scene, when it is that very demographic that needs to be inspired to carry the baton forward.

Funky SX (Essex) is doing just this. Licensed for *The Real Sound of Young Essex*, it is a lively and passionate station playing urban dance music including house, garage, grime, dance, trance, drum and bass. Funky Essex started as an internet radio station in 2009 and was awarded a legal community license in 2015. It can be heard on 103.7 FM and online.

https://funkysx.com

Caroline Tours

Tours of the *Ross Revenge* (Fig. 6) are available for £25 but get booked up a long time in advance. The tours also run when Radio Caroline is not broadcasting from the ship. However, going on a tour during a live broadcast does bring an extra element of excitement. A tour of the ship lasts approximately one-and-a-half hours. The journey time on the *Razorbill 3* tender that you catch from West Mersea, which takes you out to the *Ross Revenge* on the River Blackwater, is around 25 minutes each way.

www.radiocaroline.co.uk
http://rcsocietysales.co.uk/bookings.html

Reading about a Famous Station:

- Anderson, R. (2017) *Radio Caroline South: Photo Book* (50th Anniversary Edition, East Anglian Productions), and:
- Anderson, R. (2018) *Radio Caroline North: Photo Book* (50th Anniversary Edition, East Anglian Productions)
- Bailey, N. (2019) *Across the Waves: From Radio Caroline to Classic FM* (Otherwise; Illustrated Edition)
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Radio News

THE ESA CLUSTER MISSION: In two decades, *Cluster* has shed light on the auroral acceleration region, where parallel electric fields send charged particles on a collision course with the atmosphere. Earth's aurorae form when charged particles from the magnetosphere strike molecules in the atmosphere, energizing or even ionizing them. As the molecules relax to the ground state, they emit a photon of visible light in a characteristic colour. These colliding particles—largely electrons—are accelerated by localized electric fields parallel to the local magnetic field occurring in a region spanning several Earth radii. Evidence of these electric fields has been provided by sounding spacecraft missions dating to as far back as the 1960s, yet no definitive formation mechanism has been accepted. To properly discriminate between several hypotheses, researchers need a better understanding of the spatial and temporal distribution and evolution of these fields. When the European Space Agency's (ESA) *Cluster* mission lowered its perigee in 2008, these observations became possible. *Cluster* consists of four identical spacecraft, flying with separations that can vary from tens of km to tens of thousands. Simultaneous observations between the four craft enable space physicists to deduce the 3D structure of the electric field. Marklund and Lindqvist have collected and summarized the contributions of *Cluster* to our understanding of the auroral acceleration region (AAR), the area of space in which the above take place.

(SOURCE: Rehnberg, M. (2021), *Understanding Aurora Formation with ESA's Cluster Mission*, Eos, 102)

https://doi.org/10.1029/2021EO162945
https://tinyurl.com/xxu76yka

LOCAL RADIO DAY 2021: Local Radio Day is back on Friday 15th October 2021. The event, which was started by UKRD in 2015, will this year celebrate the theme 'Love Your Place' and is organised by the Local Radio Alliance. Listeners and presenters will be encouraged to share their favourite locations – the special spots which have meant the most during challenging times. Maxine Stride, Director at Local Radio Alliance said, *"Wherever you feel you belong and wherever makes you happy, we want to know about it. This will highlight what is special about where we live; from local businesses to arts, sports, countryside, and urban spots. "Use #LocalRadioDay to join the conversation on Twitter and brighten our feeds with your participation this year."* BBC local radio stations are taking part, along with community and commercial services. This year's celebration is supported by *The Radio Academy, Community Media Association, Local Media Network, BBC Local Radio, RadioToday,* and radio stations across the UK.

(SOURCES: BBC | *RadioToday* | *Local Radio Day*)

www.localradioday.co.uk

Electronic Scanning and the 1936 Radiolympia Exhibition

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Continuing their celebrations of 85 years of the BBC Television Service, **Keith Hamer** and **Garry Smith** explore the types of electronic scanning used in 1936 and remember the 1936 Radiolympia Exhibition.

In the early days of TV, the *Baird System* used installed an 'Electron' camera in a studio. With this, as indeed with the Marconi-EMI system, the technical television process was entirely different to previous methods, in that scanning was carried out by purely electronic means without the use of any moving parts (Fig. 1). In the Marconi-EMI system, the 'Emitron' camera was used, a device which was described in 1936 as the 'electric eye' (Fig. 2).

A lens, representing the eye's cornea, cast an image of the scene to be transmitted upon a specially-prepared plate, which was a close imitation of the retina, and which was placed at the wide end of a cathode-ray tube.

The plate was made of insulating material, was covered with tiny photo-sensitive nodules, which were very close together; but each one was separated from the others. When the optical image fell upon this plate or 'mosaic', photo-emission took place, and the elements acquired a charge of electricity; this was greater or smaller, in proportion to the amount of light falling upon the nodules, so that the plate had upon it a faithful electrical picture of the original scene.

Inside the tube, there was a device known as an 'electron gun'; it shot a stream of electrons, or particles of negative electricity, like bullets from a machine gun. The gun was aimed at the mosaic, and its aim was varied by application of suitable electric fields so that the point where the beam impinged on the mosaic was moved across the surface in a series of lines. By this means, the whole of the surface of the mosaic was explored line by line, and the charges which accumulated on it were carried away by the electron streams which acted as a weightless brush and formed the vision signal to be transmitted. After the passage of the beam, the mosaic was left wiped clean like a slate, and ready to receive the next series of impressions.

The *Emitron* was mounted in a portable camera similar to motion-picture equipment. A typical *Emitron* camera tube used in 1936 is shown in Fig. 3. Several such cameras could be used in the presentation of studio and outside scenes, or in conjunction with a projector for the reproduction of standard film.


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The amount of information to be transmitted in order to make up a good picture was immense, and it was estimated that one picture signal contained as much information as would be contained (at that time) by about 1,000 simultaneous telephone calls. This required the transmitting of a band of frequencies, or electrical vibrations, which ranged from one vibration in many seconds to about 2,500,000 oscillations per second. Compared with the frequency range required for the transmission of sound, this band was colossal. Good-quality sound could be transmitted in a band of frequencies only 30 to 10,000 vibrations per second.

The Baird Television System

Based on the actual official documents issued by the two rival companies, the comprehensive technical details covering each system were as follows: Using the arbitrary aerial current units of zero to 100, the total modulation for synchronising (black) extended between the tolerance limits of zero - 5 and 37.5 - 42.5, while the picture modulation (black to white) extended between the tolerance limits 37.5 - 42.5 and 100.

The high-frequency synchronising impulse was rectangular and was maintained for 8 per cent of the total time taken in tracing the line; it occurred between the 'line' traversals.

The low-frequency synchronising impulse, which was also rectangular, was maintained during the time that 12 lines were traced, and it occurred between the 'frame' traversals. These traversals, *as seen by an observer looking at the received image from the front*, were scanned from left to right ('line') and from top to bottom ('frame').

In addition to the above 8 per cent of the line traversal time occupied by the high-frequency synchronising impulse, a further 2 per cent was masked off to form a black edging. Similarly, an additional 8 lines were masked off in the case of the low-frequency synchronising impulse for the same purpose

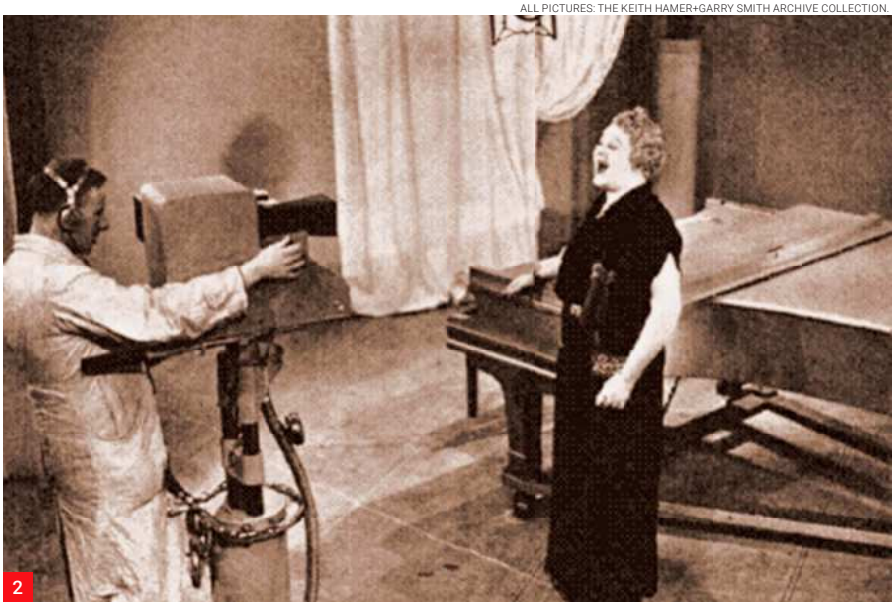
In the Baird System, the total number of lines in the complete picture was 240, scanned sequentially and horizontally at 25 picture traversals per second and 25 complete frames per second. The *line frequency* was 6,000 impulses per second, and the *frame frequency* was 25. The dimensions of the observed picture had a ratio of 4 horizontal to 3 vertical. Amplitude modulation was employed.

This resulted in light intensity modulation in the observed picture; the transmitter carrier increased towards the white. Line and frame synchronising signals were in the sense opposite to the increasing picture modulation. The maximum frequency band involved was 2 Megacycles, and the average component of light in the picture was transmitted. Black in the picture was transmitted as black, and white transmitted as white, as described above.

The Marconi-EMI Television System

The Marconi-EMI television system transmitted 25 complete pictures per second, each consisting of 405 lines. These lines were

ALL PICTURES: THE KEITH HAMER+GARRY SMITH ARCHIVE COLLECTION.



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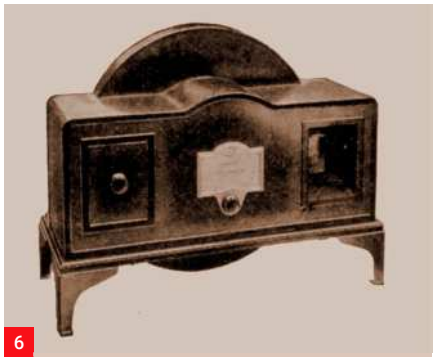

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Fig.1: A Baird 'Electron' television camera in production.Fig. 2: An 'Emitron' television camera in the Marconi-EMI Studio, with Sophie Tucker performing during a *Starlight* programme in 1936. Fig. 3: A Marconi-EMI 'Emitron' camera tube from 1936. Fig. 4: The Marconi-EMI Control Room in 1936, showing the pulse generators (left) and the *Emitron* camera amplifiers (right). Fig. 5: An early television receiver. Fig. 6: An original Baird 'Televisor'. Fig. 7: Miss Helen McKay performed the specially composed song, *Here's Looking at You* for the opening of *Radiolympia* in 1936.

interlaced so that the frame and flicker frequency was 50 per second. The transmitter radiated signals with sidebands extending to about 2 Megacycles on either side of the carrier frequency.

Good pictures could be received utilising only a fraction of the radiated band but, of course, the quality of the received picture depended upon the degree to which the receiver made use of the transmitted bandwidth. The Marconi-EMI Control Room is shown in Fig. 4.

In this system, the line frequency was 10,125 lines per second, scanned from left to right when looking at the received picture. The frame frequency was 50 frames per second, scanned from top to bottom of the received picture. In terms of scanning types, the scanning was interlaced. Two frames, each of 202.5 lines, were interwoven to give a total of 405 lines with a complete picture speed of 25 per second.

The line and frame components of scanning were regularly recurrent, the interlace being derived from the fractional relationship between line and frame frequencies. The picture ratio was 5:4; that is to say, the distance scanned during the active 85 per cent of the total line period was 5/4 times the distance scanned during the 192.5 active lines of the frame.

Radiolympia: The First Public Experimental Broadcasts

The programme history of the London Television Station begins with the *Radiolympia Exhibition* in August 1936. It was soon realised that the Exhibition offered a particularly favourable opportunity for giving large numbers of the public a glimpse of television.

It had been left to Radiolympia to make it abundantly clear that television, as a form of entertainment, had arrived in Great Britain. But neither the BBC nor the radio trade had had sufficient time in which to prepare adequately for its official introduction. Television was added to the annual *Radiolympia* Exhibition as a last-minute thought in conjunction with the BBC at Alexandra Palace.

Gerald A. Cock was hurriedly appointed *Director of Television*.

Television immediately became the star attraction of *Radiolympia*. For the first time, the public was able to see test transmissions. Visitors came in their thousands. Not only was it new, but it was also free! People had been given a foretaste of what could be accomplished and had witnessed 'live' television, albeit under perfect conditions.

All the leading radio firms, such as I*smay, Ekco, GEC, Baird, Marconi-EMI, Philips, Cossor,* and *Pye*, displayed their television sets at *Radiolympia*. They ranged in price from £85 to £105. A member of a famous radio firm thought that it would be five years before the cost of television sets would come down to the £50 mark.

A typical early television receiver is shown in Fig. 5.

The image in Fig. 6 shows an original Baird 'Televisor'.

Pictures in the home in 1936 were limited to about 12 x 10in. Cathode-ray tubes were employed, owing to the impracticability of constructing larger screens that could stand up to the pressure of the atmosphere. It was anticipated that means of enlarging the picture would be forthcoming in due course, and a great deal of research work was directed to

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this end. Nowadays, televisions are as large as 85 inches, measured diagonally. There are even reports that a mind-blowing 292-inch domestic flat-screen receiver is available from a well-known manufacturer. The first experimental transmission specifically for *Radiolympia* took place on August 26th, 1936. There were two one-hour daily transmissions for the duration of the Exhibition, which finished on September 5th, 1936. The two systems (Baird and Marconi-EMI) were used alternately by days, the choice of the first day being decided by the toss of a coin.

The daily programme consisted of short vaudeville entertainments, news-reels, short documentary films, and excerpts from current British and American film productions. Perhaps the most memorable part of *Radiolympia* (because this appears to be the only filmed recording that still exists) was Miss Helen McKay. *Hostess Announcer* (as they were known in 1936), Elizabeth Cowell, introduced the 'live' transmissions by welcoming viewers with the famous greeting: *"Hello everyone. This is direct television from the Studios at Alexandra Palace. And now you're going to see and hear someone you know well - Miss Helen McKay"*.

The BBC Television Orchestra, conducted by Hyam Greenbaum, struck up and Miss McKay performed the specially composed song, *Here's Looking at You* (Fig. 7). The script and running order for the first broadcast were signed by all those who took part including the Producer, Cecil Madden, the first Television Announcer, Leslie Mitchell, singer Helen McKay, and the conductor of the BBC Television Orchestra, Hyam Greenbaum, plus BBC engineer, Tony Bridgewater, and Engineer-in-Charge, Douglas Birkinshaw.

It was estimated that more than 100,000 people visited the television booths. At the conclusion of *Radiolympia 1936*, the station closed down in preparation for service transmission, and in October 1936, several public test transmissions were radiated.

The Red-Headed League

Anyone with red hair looking for a job in television in 1936 was destined to be sadly disappointed. One of the authors would not have been allowed anywhere near the television studio! A decree was issued in December 1935 stating, in effect, that red-haired men and women were banned by the British Broadcasting Corporation from posts as television announcers. The ban also extended to married women, whatever colour their hair.

The BBC executives had no personal aversion to red hair, and they did not even prefer blondes. It was purely a technical matter. *"The explanation is simple,"* an official of the BBC explained. *"When we advertised for announcers for our future Television Service, we stipulated that they must not have red hair as the colour cannot be transmitted satisfactorily."*

Marion Lorne, a well-known auburn-haired actress in the Thirties, discussing the BBC ban, said in December 1935: *"The decision seems absurd. Many film stars have red hair, and the films do not show it. I shall never desert the stage for films or television in any case, but at least red hair is not a disadvantage on the stage."*

Ellen Wilkinson, an auburn-haired MP, saw the BBC ban as a blow to all the 'red-heads' of Britain. *"I think we ought to form ourselves into a League of the Auburn-Haired,"* she said. *"It so happens, I was one of the first people to be televised some years ago, and I was told that the result was perfectly satisfactory."*

The BBC also banned married women as television announcers because of the exacting nature of the work. An official said in 1935: *"We considered that an unmarried woman would be better fitted for the task than one who has home and other ties to take up her time and attention."*

Television: No Threat to Radio

Thousands of listeners throughout the country were delaying the purchase of new wireless sets at the beginning of 1936, in the belief that television for the masses was just around the corner. Some newspapers, however, reported (incorrectly) in February 1936 that, *"every-day television in the home is still some years away. There will be no 'mass production' of television sets at present and no commercial television receiving set is likely to be marketed at less than £50 for some time. In other words, the new wireless set will not be rendered obsolete within a few months by the advent of television. The growing realisation of this fact by the man in the street means the continued employment of thousands of men and women."*

Various newspapers had other dire warnings: *"Wireless is more or less taken for granted nowadays. But television will be another matter. Lights will have to be switched off or dimmed, and one's whole attention will have to be concentrated on a screen even smaller than that on which 'home movies' are projected. For that reason, while sound radio - which has still a long way to develop - will remain the background to life in countless homes, a television programme must always remain a special occasion."*

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

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 enquiries relating to technical issues or give advice on suitable equipment.

ALL PICTURES: KEVIN RYAN

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QSL Treasures, DRM Broadcasts & DAB Licenses

Kevin Ryan
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Kevin Ryan enjoys his QSL card collection, remembers a great example of Anglo-German radio collaboration, surveys the development of the DRM mode and shares the latest DAB News.

I have been busy cataloguing my QSL card collection and have now reached the point when I began reporting on DRM broadcasts. I sent reports on quite a lot of transmissions in 2004. However, some broadcasters seemed almost reluctant to acknowledge that they were using the DRM technology.

The earliest QSL I have in my collection is from Radio Télé Luxembourg (RTL) using their transmission site at Junglinster (Luxembourg), which has now been dismantled. Back then, RTL had two 24-hour DRM services in French (5990kHz) and German (6095kHz). Later German was also carried on 1440kHz from Marnach.

The German service mainly relayed the *Die Besten Hits Aller Zeiten* ('Best Hits of All Time') programme that mainly consisted of pop music in English from the 70s onwards. It became my regular afternoon station.

As time went on, the hours were reduced, and in 2008 RTL relayed other broadcasters to offset the cost of the service. The French service sadly closed that same year, followed by German transmissions in late 2011.

Radio Luxembourg

RTL was very enthusiastic about DRM and in 2005 they restored their Radio Luxembourg English (Fig. 1) service using a short wave transmitter at Jülich in Germany, but it was short-lived: RTL moved it online for a while and eventually closed it down. My logs note good reception on 7295kHz from Jülich in Germany in stereo. DRM is mentioned on the RTL website, along with a lot of other (now largely historical) information, mainly from their analogue days.
http://www.radioluxembourg.co.uk

Other Stations

Several other broadcasters tried out DRM, usually for a short period. My logs from the same period note Radio Monte Carlo Info simulcasting their 216kHz service on 6175kHz. However, the reception was very poor, so no QSL was possible. Bible Voice Broadcasting also tried the technology, and there were reports that the Centre for Christian Broadcasting (C4CB) would use transmitters in Norway, for a service to Europe in English. Wisely they made their decision dependent on DRM receivers being available to the general public and we know how that turned out!

There was a lot of station co-operation during these early years, with interested broadcasters able to relay their programmes via a partner who had invested in a DRM modulator or had transmitters able to handle the DRM signal. The BBCWS relayed tests from Radio Australia, NHK and KBS Korea, among others, and I eventually got good enough reception from the relay via Woofferton (it started at Rampisham) to get my report to KBS verified.

Fig. 1: Radio Luxembourg made a brief, but welcome, return to the airwaves via DRM. Its launch epitomized the early enthusiasm some broadcasters had for DRM. Fig. 2: The combined BBC World Service and Deutsche Welle service in English showed DRM at its best, but wider decisions about the future of international broadcasting meant that it could not last. Fig. 3: This is ABC, via a remote KiwiSDR receiver. This DRM test will only provide good reception in a very small area. There are likely some very good reasons for a restriction in DRM signal propagation. Fig. 4: Soleil Radio is a new, locally-owned, radio station for the Channel Islands. Two more, from Bailiwick Broadcasting, are scheduled to follow.

I have QSL-cards from Radio Nederland broadcasting from their own sites at Flevo and Bonaire. I also received verifications from Radio Canada International via the Flevo relay and their transmitter site in Sackville.

Over the years I further verified the Voice of Russia, which experimented at first with dual-channel transmissions. I used to be in regular contact with a technician at the Taldom site. Other stations offering regular confirmations were All India Radio (AIR) and Radio Romania International (RRI), both of which are still transmitting DRM services.

I came across a special verification from *AWR Wavescan* for a DRM broadcast via the Kostinbrod transmitter in Bulgaria.

Some stations stayed with DRM for a much longer time. Bayerischer Rundfunk in Germany converted their 6085kHz transmitter to DRM, and Christian Voice (CVC) tested DRM from Darwin in Australia and Chile. Radio Exterior de España broadcast in DRM to Europe in Spanish on 9780 for several years.

Deutsche Welle/BBCWS

Germany was very active from 2004, both domestically (where many AM transmitters were replaced with DRM-capable units) and internationally, via Deutsche Welle (DW) who upgraded four of their short wave transmitter sites. I verified Jülich, Wertachtal, Sines (Portugal) and Trincomalee (Sri Lanka). They never equipped their Kigali, Rwanda relay to be DRM capable.

A highlight of this period of enthusiasm from broadcasters was a combined DW-BBCWS (label: 'BBC & DW') service beamed to Europe. Programmes in English started on 10th December 2008 and had all the DRM features enabled – *Journaline*, Automatic Frequency Switching (AFS) and Electronic Programme Guide (EPG).

In hindsight, this large data payload forced the use of high modulation rates and made the service hard to decode. At its peak, it broadcast for up to 18 hours a day.

Through 2008, the BBCWS and DW gradually cut back their DRM schedules to a few hours on the 75 Meter band from Skelton and Sines. This was mainly due to DW stopping using transmitter sites in Germany. By 2011, the DW focus had shifted to Asia, but DRM transmissions for that area only lasted for another year.

The BBC maintained a 4-hour service in the morning to Europe for a while, before reducing that to an hour and transmitting for four hours a day to Asia. Now the BBCWS has an hour in DRM for each area.

The website for the combined operation is still online (Fig. 2) and your browser will be forwarded to an archive web page on the BBC website.

http://www.bbcdw.org

DRM and the MW Band

At one time, the top of the medium wave band was alive with DRM transmissions. For example, Oldiestar Radio on 1575kHz, Vatican on 1611kHz, WDR Klassik 2 on 1593kHz, Radio Vatican on 1530kHz, Oldiestar on 1485kHz, RTL (on the famous 1440kHz frequency) and, of course, the BBC World Service from Orfordness, on 1296kHz, from 0400 to 2200 UTC. Deutschlandfunk (DLF) eventually tested DRM on 1422kHz as well.

Moreover, RTÉ tested DRM features of their new long wave transmitter on 252kHz in the summer and autumn of 2007. The transmitter also used DRM for the *All Ireland Hurling & Football* relays on shortwave.

However, the use of DRM ceased when the 567kHz service closed down and RTÉ Radio 1 used 252kHz to cover both the UK and Ireland.

DRM Decline

I think that 2012 became a pivotal year for the technology. Many DRM projects were abandoned, and the current DRM broadcasters were the only ones left, after widespread cuts to external services removed major international broadcasters, such as Radio Australia, Radio Nederland, and the Voice of Russia, from short wave. Several countries in Europe closed all their high powered medium and long wave transmitters and dozens of shortwave sites were also closed removing much of the infrastructure that DRM needed to be adopted more widely.

Where Now for DRM?

The recent *Trends in Digital Radio 2021* publication from *RadioWorld* included an interview with Ruxandra Obreja, the Chair of the *DRM Consortium*, who again highlighted the uptake of DRM in India, Indonesia and China, plus some long term tests in Pakistan and Russia, even if they are only using a single FM transmitter.

https://tinyurl.com/42bs5d6k

In this context, Ruxandra made a somewhat cryptic remark, claiming that it was time to stop quoting manufactured receiver numbers as a sign of success and that 'real' data was often not available from the manufacturers. As radio listeners, we know that the high cost of acquiring a DRM receiver plays a part in this, even from the very few available at any given time. There was an implication in her answer that the future will be via DRM apps/SDRs and emerging technologies.

The *DRM Consortium* is also looking beyond audio transmission to the use of DRM for pure data carriage. For example, a

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broadcaster could use a single DRM transmitter to send updates to multiple devices, such as public information signs and bus stop displays.

Their vision also includes using DRM to provide internet content and other information to people and places without reliable connections.

A Long Haul

Reviewing my interest in DRM over the last 17 years brings home to me that the DRM story has not changed that much because its future is linked to *digitizing analogue radio*. The general public still does not have access to a DRM-capable radio, unlike DAB listeners who are spoilt for choice. I have never seen a valid explanation for this difference in approach from radio manufacturers. India has about 3 million car radios. However, China, with an extensive DRM network, seems uninterested in manufacturing cheap receivers.

ABC Radio National Testing DRM

I picked up the DRM test transmission from ABC Radio National on 747kHz (Fig. 3); this was the other half of a simulcast transmission in standard AM on 756kHz (callsign 3RN, using 10kW). The transmitter site is Dockers Plains 10km north of Wangaratta in Victoria. The antenna pattern for 756kHz is directional towards the south with the maximum radiation at 150 to 220 degrees.

The power on 747 kHz is unknown. Based on a BBC DRM trial in Plymouth in 2009, the DRM power to achieve equivalent coverage would be at about 2kW. It may be lower than that. I tuned in at different times and finally detected a DRM signal at 10.50 UTC on the 30th of July.

Reception was poor (no audio decoded) due to co-channel interference. The technical details of the transmission are mode A9 (medium wave mode using 9kHz bandwidth). The 4-16 QAM encoding technique was used to give a signal fairly immune to interference, with the audio encoded using xHE-AAC with a data rate of 16.4 kbps.

There is no published schedule of the tests, and there are long periods of poor reception on the remote receivers, so I had to keep trying different times and days for a brief snatch of audio. The test came out of the blue, although the 2003 Report on Developing Digital Radio by the Australian Communications and Media Authority (ACMA) supported further trials of DRM as a replacement for wide coverage AM radio.

The same report suggested testing DRM+ as a replacement for sub-metropolitan community services not currently catered for in the DAB+ rollout.
https://www.acma.gov.au

ABC Australia broadcast for several years in DRM mode on short wave from Brandon on the west coast and had purchased new DRM-capable transmitters before continuous budget cuts forced the closure of Radio Australia.

DRM in India

All India Radio's (AIR) short wave services more or less closed completely during 2020 and very slowly returned from their remaining transmitter sites at Bengaluru and Delhi. A DRM service in French is beamed towards Europe on 9620kHz from 19.30 to 20.30. When I listened in, the audio (Fig. 3) was terrible. It sounded muffled, and I think another radio monitor is correct in that it is clipped. I logged a brief test from AIR on the same frequency in English at 14.30 one Sunday afternoon where the audio sounded better. AIR used to transmit a two-channel service, both with 10.48 kbps audio, and it seems to me that one channel has been disabled without making the spare capacity available to the remaining service. This service has a habit of returning to AM for long periods. The content is not always in French, and I have heard English as well at various times.

The only other scheduled AIR transmission is in Russian from 0945-1045 on 17710kHz, but I have not heard it or seen any report of it being logged recently.

Indonesian DRM News

I seem to have missed the setting up of a small FM network using DRM on five transmitters located in Pelubharan Ratu (West Java), Pantai Labuan (West Java), Cilacap (Java Tengah province), Labuan Bajo (Nusa Tengarah, Timor) and Painin (West Sumatra). One of the main purposes of these transmitters is for emergency warnings of events like tsunamis. I have been unable to locate any definitive frequency information to show that this network is still operational.

UK National DAB

The Department for Culture, Media and Sports (DCMS) issued a consultation document seeking views on the renewal of the two national DAB multiplexes. *Digital One* started in 1999, with a 12-year licence. Because the *1996 Broadcasting Act* only allowed for one roll-over, the licence must be re-advertised by November 2023. The *Sound Digital (SDL)* multiplex started in 2016, and their 12-year term ends in 2028.

The document in question considers three options. Option one is to do nothing and re-advertise the licenses in 2023 and 2028. The other two options look to amend the 1996 Broadcasting Act to bring the two expiry dates together and re-advertise them together in either 2030 or 2035.

Choosing the 2030 date aligns the renewal date with the end dates of most of the local multiplexes. Therefore, this might be a time to review how the DAB spectrum is being used by national, local and small-scale DAB services. I can see a third national multiplex created, for stations like Great Hits Radio and Hits Radio. This will free up capacity on local multiplexes for small scale DAB services that want to reach a wider audience. I guess that, during this period, more of the services sharing Band III will also have moved away.

The later date of 2035 would provide the current operators with a long period of stability that might help the switchover from analogue to fully digital operation.
https://tinyurl.com/3ubazybz

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Channel Islands Multiplex

Bailiwick Broadcasting was awarded a licence in 2019 to broadcast 25 new digital stations to Jersey, Guernsey, Herm, Sark, and Alderney. The pandemic forced a delay, but it is now on air even though some of the proposed stations have been replaced by alternatives.

The multiplex launched on channel 12A from transmitters in Jersey (*Les Platons*) and Guernsey (*Les Touillets*), with Alderney to follow later. A total of 22 services started on the 1st of August with at least four more to come. All the commercial services use DAB+ HE-AAC-V2 in stereo, with the BBC opting for V1 or AAC-LC for maximum compatibility with older radios.

AAC-LC stands for 'Low Complexity', meaning it is the simplest form and the most widely used version of MPEG-4 AAC. There is an AAC also available in MPEG-2.

The BBC has their two local radio services from Jersey and Guernsey plus a secondary service for each station transmitting local sittings of parliament (*States Assembly* for Jersey and *States of Deliberation* for Guernsey) simulcasting the respective AM services.

A Wider Choice

Seven stations from Nation Broadcasting currently broadcast on the Glasgow small-scale DAB multiplex with some available in Portsmouth and West Wales. The *Wireless Group* slots in talkSPORT, Virgin Radio and Times Radio. The local radio operator, *Tindle*, adds a new service called Radio Soleil (Fig. 4) to its two local stations and Quay FM from Alderney is now available to all the islands. Bailiwick Broadcasting has yet to launch its two services called *Bailiwick Radio Classics* and *Bailiwick Radio Hits*, which will be joined by two services from UCB later. Muxco is the multiplex operator, and their press release has links to all stations currently broadcasting.

https://tinyurl.com/uyexppn3
https://tinyurl.com/96x6apz4

DAB Secondary Services

A 'secondary service' is a station that only operates part-time or comes or air to provide an alternative programme to the main service. For example, BBC Radio 4 has spawned *Parliament* and the *Daily Service*.

Your DAB receiver will probably handle secondary services in one of two ways. The service might be listed preceded by a question mark. Selecting it will either give an error message such as 'Station Off Air' or 'Station Unavailable' or more likely switch over to the parent service. If I access Parliament when it is not on the air, the radio switches to BBC Radio 4.

Isles of Scilly Small Scale DAB

Staying with the islands theme Ofcom awarded the licence to the only application. Like DAB Ltd. This is another consortium that counts Nation Broadcasting and UK DAB Networks among the team. I singled this one out because it seems the most speculative, given the only station on the islands (Islands FM) does not seem interested in the venture. Nevertheless, Ofcom seems happy to let the multiplex launch within the next 18 months with a range of commercial services. One to watch, I think, given the proposed station list looks a lot like those suggested for the Channel Islands, and quite a few of them never made it on air.

https://tinyurl.com/pzyhwmwy

Radio News

COMMUNITY RADIO GRANTS – OFCOM: Ofcom has granted just over £220k to 23 radio stations in the latest *Community Radio Fund* round. Over a million pounds was applied for by over 70 radio stations, but 49 of these grants were refused. The grants awarded ranged from £2,000 up to £19,760 for individual positions, with an average of £9,629. Most of the grants were awarded to pay for a person to raise funds, for positions such as Sales Manager, Business Development Manager and Funding Co-Ordinator. In 2020-21, grants were provided as emergency cash funding to support stations facing severe financial difficulty due to the coronavirus outbreak. Several stations submitted applications for emergency cash, even though the guidance made it clear that such grants would not be considered in this Round. Two successful applications were for the development of community radio as a sector – with Gateway 97.8 getting £3,500 to help fund Radio Hub and NLive Radio getting £2,000 to continue running the UK *Community Radio Network* meetings and events. However, the Panel hopes that in future such networks will be self-sustaining. Ofcom added, *"It is likely that this round will be the last time networking events will be supported by the Fund."* […].
(SOURCE: Ofcom | RadioToday | Industry Press)
https://tinyurl.com/2jb74y54

TM100AA - 100 YEARS OF AMATEUR RADIO IN FRANCE: For the 'centenary' of the first official authorization of an amateur station, the REF will use the call sign 'TM100AA' from 1st to 15h September 2021. The call sign '8AA' was assigned to André Riss on September 3, 1921. André was born in 1894, in Boulogne and was authorized at the age of 27 to use a transmitter of his own construction with a power of 1 kW. It became 'eF8AA' (Europe France 8AA) in 1927, then 'F8AA' in 1932. He joined the REF in August 1927 (n° REF 423). André was active until his death on March 2, 1982.
(SOURCE: *ICQ Amateur/ Ham Radio Podcast*, 5th September 2021; Colin Butler)
https://tinyurl.com/hxxadht6

Georg Wiessala
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Meteorological Radio: Resources and Techniques

The editor takes inspiration from some recent columns in RadioUser and looks at some of the diverse ways in which enthusiasts can acquire regular weather forecasts and climate data by radio.

When our *Maritime Matters/ NDB DXing* columnist Robert Connolly sent over his contributions for the September issue (*RadioUser*, September 2021: 49-52), I became very interested in what Robert had to say about the *Voluntary Observing Ships (VOS) Scheme*, and on weather data via radio in general. His point on how many professionals depend on accurate weather predictions (Fig. 1) struck a chord.

The maritime and aeronautical worlds are just two examples; you might also consider agriculture, viticulture, commercial gardening, and fishing. And, needless to say, Search-and-Rescue operations, mountain rescue, RAYNET networks, and all manner of public services are highly dependent on the forecasts.

Most of us are aware that weather and climate have a significant effect on the propagation of radio waves. Moreover, radio stations and local broadcasters, as well as radio campaign planners, are all too aware that weather conditions strongly influence the behaviour of potential consumers and listeners.

On the day I spoke to Robert, I had, literally, just come off the phone to my unfortunate cousin in Germany, who had found his house flooded the day before because of the torrential July rains there. I think for many people the July floods in Germany, the Netherlands and Belgium were quite a shock.

Since I have family across all three of these countries, I kept hearing stories of how it had been known that this particular storm was on its way and how its effects could, arguably, have been mitigated.

The local radio streams from various cities available on my *Roberts Stream 107* internet radio confirmed this.

Sadly, in some cases, it seems this was another case calling to mind phrases like 'bolted', 'horse' and 'stable-door'. Not that we are free of this kind of worry in the UK, especially here in the Ribble Valley (Lancashire) where the last flooding in the village is still fresh in people's memory, not least because it closed down the pub for age; and then, it closed again for Covid – But I digress.

Weather and the Radio User

I think it is probably fair to say that many amateur radio operators and radio enthusiasts also have a healthy interest in the changing weather in these Isles and beyond. Next to radios and accessories, weather stations, I am reliably informed, are among the bestsellers with many of our traders and advertisers.

As for my own shack, I have long been the owner of the *Davis Vantage Vue* model, which sits on the roof and reliably transmits to an indoor console (on 868.0-868.6MHz [US: 902-928MHz], Fig. 2).

What is more, a quick scan of the *RadioUser* archives shows me that we have covered the subject of weather and radio before; on its own and – more frequently – as part of our regular columns on *Aerials Now, Airband News, Maritime Matters, Propagation, Signals from Space, Two-Way Communications*, and others.

New technology has, sometimes, been the catalyst for weather-related content here. One recent example of this was a contribution by Robert Connolly on *DRM Data-Casting* in *Maritime Matters*.

Finally, there are several posts on radio and weather on our very own *Radio Enthusiast* website as well.

Details of all the articles and resources mentioned here, and some more, are on the website, to accompany this piece. There are too many to fit into the pages at my disposal here this month.

https://tinyurl.com/4bsymw36

What we have *not* done, so far as I can see, is to gather together the various strands of weather monitoring by radio and to weave them into a short practical guide. It is this that I have in mind for this article. I aim to offer you a shackful of easy-to-follow ways, in which you can keep up-to-date on weather, and, perhaps, learn a little

ALL PICTURES: GEORG WIESSALA EXCEPT FIG. 6: ANCHORLIGHT MARINE PUBLISHING

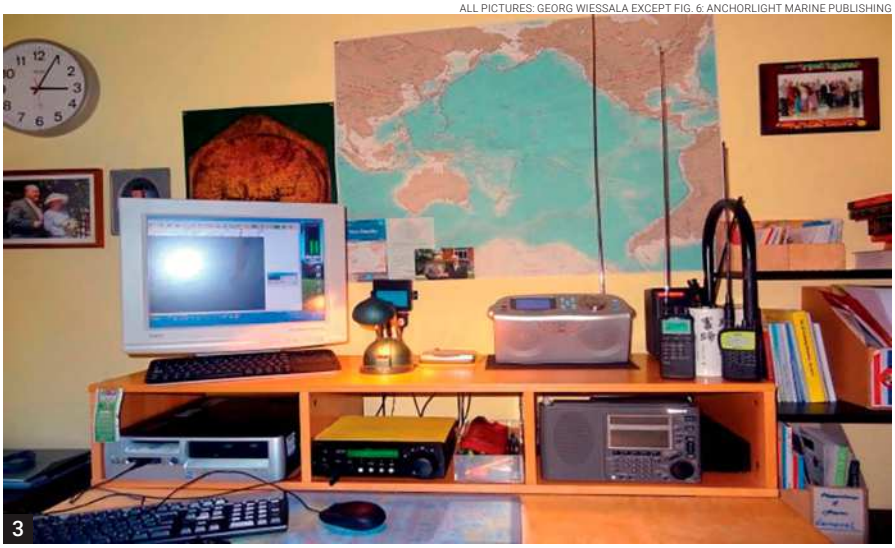


Fig.1: Accurate weather forecasts are vital - not just for the RNLI.
Fig. 2: My Davis *Vantage Vue* weather station in the back garden.
Fig. 3: My weather observation post in a converted garage over a decade ago. The only radio I still have is the AOR AR7030.
Fig. 4: Voice weather forecasts from the DWD on 5905kHz, with a Palstar R30A.
Fig. 5: The Grundig Satellit 650: A very reliable (marine) weather radio for many years.

about propagation, climate and radio too. Or you could show this to your children and grandchildren, play radio with them, and call it 'home-schooling' at the same time!
https://tinyurl.com/tbya3he9

Radio Weather Watchers

There are, of course, many reasons why we would all want to keep a weather eye on the horizon. If you are a keen radio fan concerned about climate change, you might have seen the International Telecommunication Union (ITU) document *Use of Radio Spectrum for Meteorology*, or similar papers distributed by the *World Meteorological Organisation (WMO)*.

A little closer to home, many of us have large antennas, masts or towers to keep an eye on. Therefore, whether we are radio amateurs, SOTA fans, DXers, skippers or pilots, we all need reliable weather information to assess safety, possible signal paths and propagation conditions.

Beyond utility, however, many radio enthusiasts are simply fascinated by the changing weather in itself and like to monitor conditions, locally, regionally or on a wider scale.

Consequently, in the remainder of this article, I will pick out a handful of methods you can try to get weather information with your radios, without going to great expense. Like in many other areas of our hobby, much of this comes down to personal preferences – some of you might prefer the more traditional ways of weather watching, using 'legacy equipment' (i.e., radios with knobs on).

Alternatively, you might be captivated by the extended possibilities of more recent technology, such as Software-Defined Radios (SDR) or some of the weather-specific software out there.

I am going to include something on all of those methods in what follows, my own modest knowledge of the technology allowing. I am thinking of 'weather information' in a slightly wider sense here, including signals that you might prefer to interpret as larger atmospheric, ionospheric or general propagation data.

Since 'weather', in its most general sense, can be defined as *the state of the atmosphere above and around your (or another) location* – I thought it permissible to also include aspects of what we may term space-weather and solar observation by radio.

Order and Method, Miss Lemon

One final word of introduction: technology has moved on over the last decade. My own 'state-of-the-art' radio weather shack just 8-10 years ago relied heavily on an AOR AR7030, a Sony ICF SW77, an ICOM IC-R 20, a Uniden UBC72XLT scanner, and a *Roberts Stream WM-202* internet radio (Fig. 3).
https://www.robertsradio.com

I have had many other HF receivers in my shack, on and off, such as the Lowe models (150, 225, 250, 350), a Palstar R30A, and a Yaesu FRG100, to recall but a few. Many were not mine to keep, and they have come

and gone. However, the AOR 7030 remains. *Authority on Radio*, indeed. There are also a PURE Evoke 3 DAB radio and a later-model *Roberts Stream107* Internet Radio now.

In the SDR corner, I have used, when the opportunity arose, an *AirSpy HF+ 'Discovery'* an *SDRPlay RSPdx* and an *ELAD FDMduo R* hybrid SDR.

For (indirect) observations of the Sun's influence on the Ionosphere on VLF, I deploy a VLF loop aerial and aerial tuner from the UK Radio Astronomy Association (UKRAA), a *Behringer UMC202HD uPhoria 2x2 192kHz USB* Audio Interface and my PC with software such as *Radio Sky Pipe* and *Spectrum Lab* (e.g.: *RadioUser*, November 2016: 33; see resources-list, online).

www.ukraa.com

My main 'radio-meteorology aerials' are a Wellbrook ALA150 loop, a Cross Country Wireless (CCW) loop with an amplifier, a Tecsun AN-48x (mobile), and a Moonraker X1-HF Vertical 1-50MHz trapped coil aerial.

There is, of course, a plethora of other ways and means by which radio amateurs and listening enthusiasts are now able to gather up-to-date weather information.

A small selection is shown in Table 1, and I am certain that you can think of many more examples.

Many hobbyists I know think of 'radio-weather' in terms of a set of *concentric circles*, looking at conditions at their home location first, then at the regional and national picture, and lastly at the big international trends.

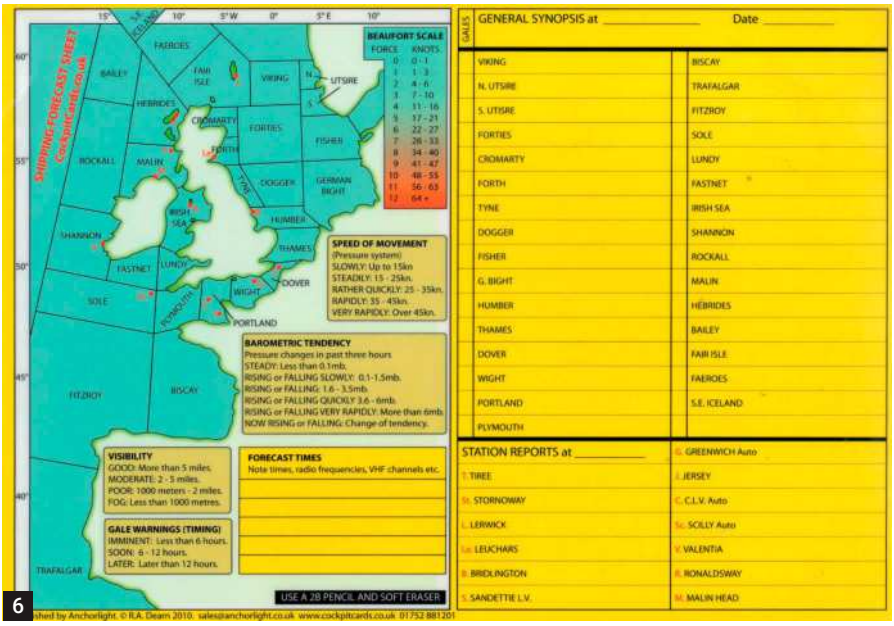
Alternatively, you can use a *temporal framework* and work yourself through a whole day (or night) of successive weather watching projects with your radios.

The Basics: Pen, Paper and Portable

Gone are the days when there was a plethora of medium wave broadcasters across Europe offering regular weather reports. The likes of Norddeutscher Rundfunk (NDR), for example, are more famous these days for their annual Christmas broadcasts, *Gruß an Bord* to sailors around the globe. More on that when the tide comes in, later.

For a daily weather picture on radio, here and in other European countries, I have to press the *Roberts* into use once again – and that's fine, things have moved on, haven't they?

I occasionally catch (snippets of) weather reports on long- and medium wave, on 225 (Polskie Radio), 234kHz (RTL), 252 (RTÉ), 270 (CRO1), and on (still) quite a large number of medium wave stations.



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However, that is the exception for me, not the rule.

HF Voice from the DWD

For regular météo-info by voice, I must return, for now, to Robert Connolly's tips from September 2021 and try to catch the German Weather Service (*Deutscher Wetterdienst*, DWD) in Pinneberg, near Hamburg on **5905** and 6180, at 06:00-06:30, 12:00-12:30, 16:00-16:30, 20:00-20:15, and 20:15-20:30 UTC.

https://tinyurl.com/sr99ha2s

Last night I did catch them with my Palstar R30A (Fig. 4), loud and clear, just after 2100 UK time, with what they call a 'test- transmission'. The forecast slowly travelled around Europe, along the German, UK and Scandinavian coastlines, down the Bay of Biscay, through the Pillars of Hercules and into the Mediterranean. Just listening awakens my *Fernweh* (longing to travel), as well as making me, somehow, feel safer.

AM was fine, but USB was slightly better, audio-wise. This is the sort of thing where a noise-reduction unit or circuit will come in very handy. I used the one on my bhi and ELAD external speakers, and I found that was more than enough.

For unaided voice-listening of this kind, the Palstar R30A and AOR AR7030 are eminently suitable for this kind of project, on account of their higher-quality built-in speakers, reminiscent of the golden era of the Grundigs. When first I listened to DWD, years ago, it was on the amazing *Satellite 650 Europa*, which has always been custom-designed for maritime and weather purposes (Fig. 5).

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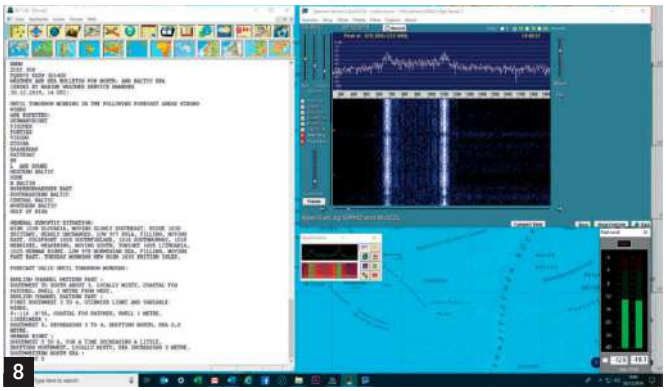
A British Institution

Of course, I get the same kind of *frisson* when I put on the *BBC Shipping Forecast*. One of my most treasured daily rituals is listening to the iconic programme on BBC Radio Four Long Wave (198kHz LW / Internet Radio). It is said to be the longest-running continuous forecast in the world.

Scores of books and articles have been written about this venerable British Institution, and nothing replaces the dulcet tones of the announcer on **198kHz** long wave, each day at 0048 and 0520 (long wave and FM) 1201 and 1754 (normally long wave only). Both the Met Office and the BBC offer great websites around the *Shipping Forecast*, and there are some good enthusiast-driven homepages too.

If you are a skipper or just 'Germanically-serious', you can use a log sheet to log what you hear, for example with one of the *Cockpit Cards* by Anchorlight Marine Publishing (Fig. 6). Or you can make use of the once very popular *RYA / R Met Soc Met Maps* for your notes.

www.cockpitcards.co.uk
https://tinyurl.com/zh3zhc5j



8

9

10

Fig. 6: A Shipping Forecast log sheet from Anchorlight.
Fig. 7: The Sony ICF- SW77 on an RAF VOLMET frequency (5450kHz).
Fig. 8: A daytime transmission from DDH47 on 7646kHz (tune to 7644.1 USB).
Fig. 9: The NASA Marine Target 147 Decoder for 147.3kHz long wave transmissions from the DWD.
Fig. 10: Still decoding after all these years: The ERA Microreader.

I frequently listen to weather data mobile, with a radio such as my trusty old Sony ICF SW77 (Fig. 7).

There are many other suitable portables for this, of course; you can check out Clint Gouveia's recent *RadioUser* series on *Portable Dxing* and *Ultra-Light Radio*.

To correlate what you hear with what is going on at your local level, you may wish to compare the forecast with your own observations at your private weather station (Fig. 2) or during a walk. You can rig up an SDR to read the data from your weather station too.

https://tinyurl.com/jvpyjmts

A reliable shack clock and an environment meter are also bare necessities, I feel, for the serious weather-watcher. And, if you are green-fingered, don't miss the gardening weather forecasts on such programmes as *Gardeners World*, *Gardeners Question Time*, *Country File*, or (online) at *MetCheck*, *BBC Weather* or *Accuweather*.

https://tinyurl.com/tcux3u4s

Lonesome Long Wave

I recommend that you try and receive the weather transmissions from DDH47 (0500-2200) on **147.3kHz** (in easy German). The DWD (*Deutscher Wetterdienst*, DWD) puts out RTTY on this very low frequency, and the transmissions are quite reliable in the UK, plus they contain plenty of Europe-wide information.

The DWD runs the following transmitters: DDH47 147.3kHz, (Programme 2) DDK2 4583kHz (Programme 1), DDH7 7646kHz (1), DDK9 10100.8 kHz (1), DDH9 11039kHz (2), and DDH8 14467.3kHz (2).

We will return to some of them later when we come to more RTTY and FAX (below, and Table 2).

The screenshot in Fig. 8 shows a typical daytime transmission from DDH47, received here in the Northwest in July 2021 (7646kHz).

Much of this is in clear text; some of it is synoptic data, which you will need to translate into a readable format. For many years, I have been running a *NASA Marine 147* for this (Fig. 9) – old but still available and reasonably dependable – *just like me*, my wife says.

The *NASA Clipper 147* was an alternative, which did pretty much the same thing.

https://tinyurl.com/zr5yvbvn
https://tinyurl.com/yxj2ncs8

There are other hardware decoders still around, for example, the trusty *ERA Microreader*, for which a very elegant 4-line extension screen used to be available (Figs. 10 and 11). Very hard to find these days.

Many of the aforementioned devices you can still find on eBay, and, of course, at radio shows, swap meets and Hamfests.

As for aerials, *Mörer Schiffselektronik and NASA Marine* both offer special devices tailored to this frequency; in the case of *Mörer*, a small, indoor magnetic aerial and, for *NASA Marine*, the N147S outdoor vertical (eBay).

https://tinyurl.com/r4dnks97
https://tinyurl.com/bmzn9s58

Viable Software Alternatives

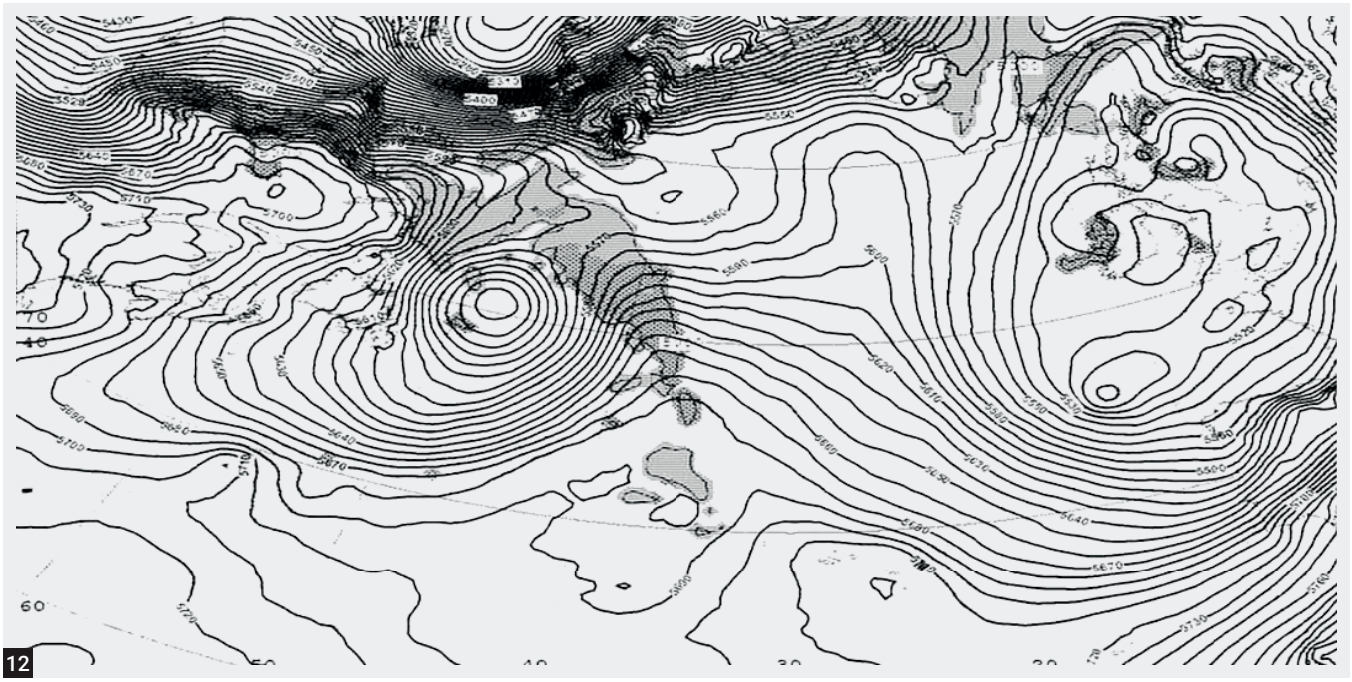
For many, the use (and feel) of a solidly-built piece of decoding hardware, such as the items just mentioned is an indispensable part of their listening and monitoring world, especially when out and about.

However, when the *ERA Microreader* and the *Nasa Target 147* or the *Clipper 147* are not in use, there are alternatives. Another 'Weather Info Box' from Mörer, the *WIB3S*, is a stand-alone device with a screen for both long wave and NAVTEX.

By contrast, the *WIB1* model will store up weather data received on 147.3kHz and display them on your PC, via a USB connection.

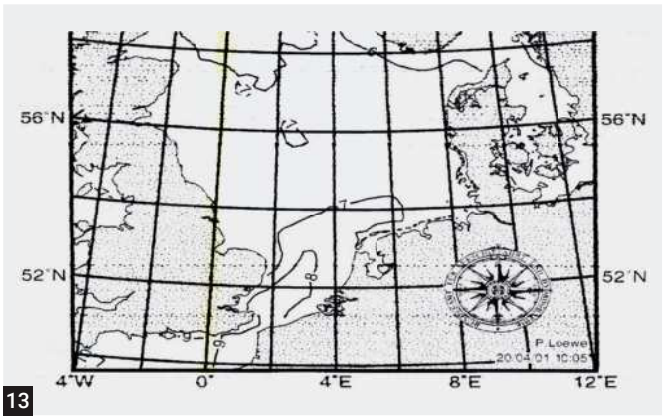
The *NAVCODE Wetter-Maus*, formerly distributed by Tapp Navtronic, did the same and added a bit of wonderful fun too. However, at the time of writing, I am not sure this 'weather-mouse' is still readily available, try second hand.

https://moerer.de/wetterinfobox-info/wib1
https://tinyurl.com/4rzs86a9
https://tinyurl.com/4yhrf4dt



12

11



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For the full digital weather monitoring experience, DDH47 comes in with the aid of my PC and decoding software, such as *Sorcerer, Fldigi, JVComm32, MultiPSK, SeaTTY,* or *Zorns Lemma 11.42.*

The latter has a specific preset for this mode and frequency (147.3kHz).

However, when I don't want any PCs on, the *ERA Microreader* or the *NASA Target 147* does its job, steadily and uncomplainingly, in the background, in the shack, all day.

A bit like that trusty old cat that's been warming its belly on your £5,000 transceiver for years (did you know there is a Facebook Group called *Cats and Radios*?).

Maps, Images, and Synoptic Forecasts

Weather Fax (WEFAX) has been with us since the 'Year-DOS', as it were (e.g. the *ICS 'Fax' I to 'Fax 6'* legacy software).

https://tinyurl.com/2nxu67sj

The meteorological radio facsimile (Weather Fax, WEFAX) and Radio Telex (RTTY) transmissions derive from the obligations of the *International Safety of Life at Sea (SOLAS) Agreement*, from 1914 onwards.

I admit that WEFAX and RTTY have had a hold over me for decades. Despite much modern technology, I love to see weather maps build up on my screen, line by, line, in around 20 minutes each.

The DWD WEFAX Service is a fairly reliable source in the UK, on 3855, **7880**, 13882.5, and 159880kHz.

Furthermore, the *Joint Operational and Meteorological Operations Centre [JOMOC])* transmissions, on 2618.5, 4610, **8040** and 11086.5kHz come from Northwood.

Here, the JOMOC produces and distributes worldwide environmental information for both UK and NATO Forces.

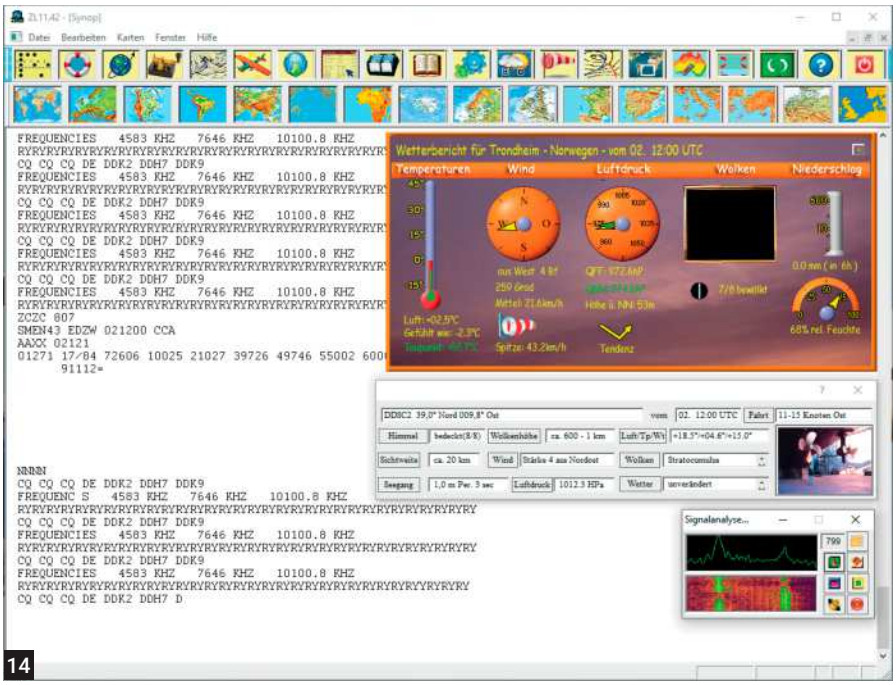
http://www.jomoc.net

Remember to set the diaL at up to 1.9kHz lower (when in USB mode) or higher (LSB) than indicated, to get a clearER picture (Figs 12 and 13). This can, at times, be a matter of a bit of fine-tuning, trial and error.

Radio Teletype (RTTY) weather forecasts are available, with changeable reliability, on 147.3 (DDH47, see above), 4583, **7646**, 10100.8, 11039, and 14467.3kHz.

If you use the *Zorns Lemma (11.4.2.)* software package, you can translate the synoptic forecasts into images of the ships, buoys and other stations where the data came from. These pop up on-screen as you go along – very neat (Fig. 14).

The *SeaTTY* and *Black Cat Fax Decoder* software suites are also in constant use in my shack. Other than those, you might wish to try programmes such as *FLDIGI, MixW4, MultiPSK, Sorcerer* or *W-Code* to unlock and visualise your growing collection of weather data.



14

Fig. 11: This RS232 extension-screen for the ERA Microreader was once very popular. Fig. 12: A Weather Fax (WFAX) weather forecast from the DWD. You might also try JOMOC on 4610kHz. Fig. 13: A recent screenshot of a DWD WEFAX forecast map, with the Greenwich Meridian drawn in. Fig. 14: Radio teletype (RTTY) Weather Data with (partial) images and some forecast symbols (*Zorns Lemma* 11.42).

Nifty Nautical NAVTEX

The *Shipping Forecast* has already been mentioned, and the images and maps available via RTTY and WEFAX (see the previous section) have a mainly maritime purpose too. In addition to these, you may also wish to try and decode the regular NAVTEX (SITOR-B ['Simplex-Telex-Over-Radio'], FEC) transmissions on **490** and **518kHz**. NAVTEX covers 21 global NAVAREA regions and is linked to the Global Maritime Distress and Safety System (GMDSS).

The signals can be resolved and decoded by a hardware receiver, such as the *NASA BT-3* (Fig. 15) or a stand-alone device, such as the popular *Mörer Infobox WIB2D* (Fig. 16).

Among skippers, many prefer this method, for reasons of portability and ease of use, especially if you are often engaged in hiring or transferring craft.

https://tinyurl.com/5ytpkend
https://tinyurl.com/6jyf7ymf

The NASA device allows you to see the received data on your smartphone, via the *Blue NAVTEX 2* app, and the WIB2D is made for mariners and meant to be carried around.

Some of the plethora of other NAVTEX (or suitable general) decoders around at the moment include *Frisnit, JVComm32, Mscan Meteo Pro, SeaTTY, Sorcerer, Yand ('Yet-Another-NAVTEX-Decoder'),* and *Zorns-Lemma 11.42*.

Check out our occasional posts on the *Radio Enthusiast* website, for download links to those, and more.

Remember that, although there is but one NAVTEX channel for HF (**4209.5kHz**), there are many NAVTEX transmissions from coastal stations which are using Narrow-Band Direct Printing (NBDP).

You will find a wealth of weather-related information on MF and HF maritime and aeronautical SSB voice channels if you are listening in occasionally.

https://tinyurl.com/5hd3nzru

The 'quick-fix' option, of course, is to check in with the BBC, Met Office, Royal National Lifeboat Institution (RNLI) and others for the latest updates (for websites, see the *Radio Enthusiast* homepage).

Finally, you may also enjoy Konstantin Sedov's website, *NAVTEX LIVE*.

www.navtex.lv

Maritime Safety Information

In the UK and Ireland, you can also switch to VHF for local MSI (Maritime Safety Information) broadcasts from the Coast Guard. Frequencies are in the Marine Band; for example, Liverpool/ Holyhead is on 161.725MHz.

A full list of UK MSI frequencies can be found on the websites of the Royal Yachting Association (RYA) or Maritime and Coastguard Agency (MCI).

If you are interested in the shape (and fascinating history) of the various UK and European Sea Areas, have a look at some of the books in the resources lists, and at these websites:

https://tinyurl.com/3kta8u84

In terms of general resources, the *Klingenfuss Guides* are very reliable, as are the *Admiralty List of Radio Signals* and the document *Worldwide Marine Radio Facsimile Broadcast Schedules* by the US Department of Commerce (National Oceanic and Atmospheric Administration, NOOA, as of 12th February 2020).

Weather and Aviation

VOLMET broadcasts (from the French portmanteau-term '*vol*' ('flight') and '*met*' ('*météo*' = 'weather-report') cover meteorological information for aircraft in flight. The VOLMET envelope covers a bundle of services, including *Aviation Routine Weather Reports (METAR), Special Observations (SPECI, Terminal Area Forecasts (TAF),* and *Other Significant Meteorological Information (SIGMET)* (Schiffhauer, 2018).

This, and much more, is described in the *Meteorological Service for International Air Navigation* document by the International Civil Aviation Organisation (ICAO).

Aeronautical weather forecasts on VHF are local to each airport or region (e.g. London Main: 135.375 MHz; North: 126.600 MHz; South: 128.600 MHz) and Scottish (125.725).

The HF VOLMET transmissions are, of course, trans-regional. RAF VOLMET comes in on **5450** and 11253kHz (USB, Fig. 7), and Shannon VOLMET on 5505 (USB), both can be easily received and may, for many be their first foray into utility listening.

Rostov Volmet on 6617kHz may be more of a challenge.

From here, you may well wish to branch off and explore HF voice comms on the aeronautical HF bands, High-Frequency Data Link (HFDL) communications, Russian Aero Nets and other topics (see Table 1).

https://tinyurl.com/56yx85tr

William Hepburn's *Worldwide Volmet Broadcasts HF Aeronautical Stations* list at the *dxinfocentre* and the VOLMET section on *Skybrary* are good starting points if you want to find out more about VOLMET.

https://www.dxinfocentre.com
https://tinyurl.com/3a2ttfkm

Fig.15: The *NASA BT-3* hardware NAVTEX receiver. You can use it with your smartphone, within a relatively short range.
Fig.16: Nifty and extremely portable: The *Mörer Infobox WIB2D* NAVTEX Receiver and (accurate) atmospheric pressure meter.

Sources of Weather Information via Radio and Amateur Radio

- ACARS (VHF & HF)
- Amateur Radio Emergency Service (ARES-ARRL, USA): http://www.arrl.org/ares
- DRM Weather 'Datacasting' (Robert Connolly: Weather by All Means)
- GRidded Information in Binary (GRIB) files (from numerical weather prediction programs)
- HF SITOR MFI Broadcasts
- HF VOLMET (RAF [5450 and 11253kHz]; Shannon [3413, 5505, 8957, and 13264kHz])
- Ionosondes and Lightning Detectors (e.g. Boltek http://www.boltek.com)
- Local Amateur Radio Operators and Nets
- Marine Observation Programme (MAROB, USA): https://www.weather.gov/marine/voluntary
- Maritime Mobile Service Network (MMSN, USA): http://mmsn.org
- Morse code (partly historical)
- MSI (Maritime Safety Information Broadcasts, e.g. Liverpool Coastguard on 161.725MHz)
- NAVTEX (408 and 518 kHz)
- Non-Directional Beacons (NDB)
- Online weather sources
- Radiosondes (Weather Balloons) (https://www.rtl-sdr.com/receiving-weather-balloon-data-with-rtl-sdr)
- RNLI Pager (historical)
- RTTY (clear-text and synoptic reports, many software decoders are available)
- Skywarn (Storm Spotter Programme, USA): https://www.weather.gov/SKYWARN
- SYNOP Data through Software (Digital Atmosphere, Zorns Lemma)
- Time signals with (encoded) weather information (e.g. DCF77/ METEOTIME)
- VHF VOLMET (Various)
- VLF Observations (Very Low Frequency)
- Weather Fax (WEFAX)
- Weather Satellites (WXSAT, e.g. with the *R2FX* or *Vierling Weatherman* systems).

Table 1: Various Sources of Weather Data.

A comprehensive list of international VOLMET stations by Nils Schiffhauer is reproduced in *RadioUser*, July 2018: 32.

Moreover, this (downloadable) *Aeronautical HF Radio Map* is a piece of pure joy for aviation enthusiasts:
https://tinyurl.com/465xyad4

It is possible – given suitable propagation conditions – to receive HF VOLMET from outside Europe. For example, Gander, in North America may be heard on 3485, 10051 and 13270kHz. With a good receiver and aerial, HF VOLMET from the Far East can be received in Europe. For example, 6676 kHz carries Bangkok, Karachi, Singapore, Mumbai and Sydney; on 6679kHz, Hong Kong and Auckland may be received on occasions. A detailed VOLMET station listing is available on William Hepburn's website:
www.dxinfo.com

Another non-aviation weather station often received in Europe during the evening is Bangkok Meteo Radio Thailand on 6765.1 kHz (HSA) and 8742 kHz (HSW). Stations such as these can provide an interesting insight into the weather in other parts of the world for the casual listener or help the amateur weather forecaster to build a bigger picture of world weather.

*[Additional information kindly supplied by Robert Connolly – **Ed**.]*

Other Weather Resources

In an article of this length, it is just possible to scratch the surface of the plethora of resources available to the UK-based radio and weather observation enthusiast. I have been guided by the areas we have covered in *PW* and *RadioUser* magazines before, and by the ease of use for the beginner in this section of the hobby.

There are many other ways of weather monitoring and weather data reception that I have no room to cover here, and which will be picked up further by our columnists.

The reception of data from Weather Satellites (WXSAT) is an obvious example. I have used the handy *Vierling Weatherman* for this before.
https://tinyurl.com/bat2ddce

Our columnist Tim Kirby will, on occasion, come back to this subject, building on his *Signals from Space* column in the May 2020 issue of RU (*RadioUser*, May 2020: 28-30).

You may also wish to get to grips with

Frequency (kHz)	Callsign	Broadcast Times	Tx Power	Baud	Shift
147.3	DDH 47	05.30 - 22.00 UTC	20 kW	50 Bd	85 Hz
4583	DDK 2	00.00 - 24.00 UTC	1 kW	50 Bd	225 Hz
7646	DDH 7	00.00 - 24.00 UTC	1 kW	50 Bd	450 Hz
10100.8	DDK 9	00.00 - 24.00 UTC	10 kW	50 Bd	450 Hz
11039	DDH 9	05.30 - 22.00 UTC	1 kW	50 Bd	450 Hz

Table 2: The German Weather Service (*Deutscher Wetterdienst, DWD*).

GRidded Information in Binary (GRIB) files. These are data derived from numerical weather prediction programs, and the output values appear on a 3D 'grid' of points. For this, you will need a GRIB file viewer, such as *Météociel*.

Alternatively, you may wish to check out an unusual resource: the web pages of the *21st Operational US Weather Squadron* from Sembach, Germany:

https://www.meteociel.com
https://tinyurl.com/uxn3qtf

Last, but certainly not least, the beautiful weather maps that you can assemble, from synoptic data, with software such as *Zorns Lemma 11.42* (Fig. 13) or *Digital Atmosphere*, are almost works of art in themselves.

However, we are getting further away from what you and I might understand as 'radio' here.

The concept of Space Weather and Propagation will be the subject of a future article in *RadioUser*.

There are weather monitors made by some companies (TFA, IROX), which include the functionality to receive the METEOTEST time signals – on the back of the DCF77 VLF (**77.5kHz**) time signal, from Mainflingen in Germany. This data stream can be fully decoded and displayed in the UK.

Meinberg Funkuhren (radio clocks), as well as any number of other European providers, make specialist receivers/ time signal decoders, such as the *DCF600USB* model for the DCF77 time signal station (RadioUser, April 2020: 30-31).

https://tinyurl.com/s3bjbaht

The *TFA Meteotime Weather Centre*, for instance, provides weather forecasts using this 'ride-on-a-time-signal' method. The forecast data are assembled by professional meteorologists for 470 cities in Europe (60 regions with four-day forecasts, and 30 regions with two-day forecasts).

https://tinyurl.com/2m9jzxdh
https://tinyurl.com/bv6nu9f4
https://tinyurl.com/takztfcz

I hope this short overview has made you more aware of just how many ways there are to stay informed about local, regional and international weather conditions, and combine this with a fascination for our beloved radio hobby (see also Table 1).

Many warm thanks to Nils Schiffhauer for his advice, and to our *Maritime Matters* columnist Robert Connolly, for some valued additional input on HF VOLMET.

*[A list with further reading materials and resources on this subject has been uploaded onto the Radio Enthusiast website – **Ed**.]*

Radio News

NEW WEBSDR IN ICELAND: Iceland's *IRA* reported on August 24th that Karl Georg Karlsson TF3CZ connected a new receiver over the internet covering 24-1800MHz. A translation of the IRA post reads: QTH is Perlan in Öskjuhlíð in Reykjavík. These are Airspy R2 SDR receivers for 24-1800 MHz (on VHF and UHF). The antenna is a Diamond D-190. Karl Georg stated the following on Facebook: *"The extension is not just for 2m, it can only be on one band at a time. So if one user switches, others who are connected also move between bands. (However, you can listen to each frequency within the same band). The receiver automatically tunes to APRS QRG 144.800MHz."* (see the APRS website)
(SOURCE: *Íslendskir radíóamatörar*)

http://SDR.ekkert.org/map
https://tinyurl.com/IcelandIRA

OFCOM/ EBAY: The BBC reports that the online sales platform eBay is handing Ofcom the power to remove listings. Theoretically, this could enable Ofcom to remove products that do not conform to EMC requirements.
(SOURCE: RSARS & Southgate ARN | via Bob Houlston G4PVB, Volunteer Correspondent)

https://tinyurl.com/yyk2tj4c

RADIO PRESENTER GRAHAM HART JAILED: An online radio presenter has been sentenced to 32 months imprisonment for using antisemitic language and racial slurs on his live radio show. Graham Hart was sentenced on 6th August 2021 at Truro Magistrates' Court after he pleaded guilty in June 2021. An investigation by the Devon and Cornwall Police was made into eight radio shows broadcast on the internet between 18 July 2016 and 24 December 2020 in which 69-year-old Hart was either a presenter or guest. The CPS proved that Graham Hart sought to dehumanise members of the Jewish race. On these broadcasts, he made references to Jewish people being an enemy to be fought and defeated and suggested they should be excluded from society. On *The Graham Hart Show*, broadcast on 18 July 2016, he insulted Jewish people with antisemitic language intending to incite racial hatred. This was one of many occasions when he dehumanised Jewish people. The CPS also showed that Graham Hart intended these broadcasts to persuade his listeners of the 'evil' of the Jewish race and thereby stir up hatred against them. He stated on several occasions during the broadcasts that this was his aim. Nick Price, Head of the Special Crime and Counter-Terrorism Division in the CPS said: *"Graham Hart used his position to influence people as a radio host to stir up racial hatred and incite violence against the Jewish race. I am pleased that he has been brought to justice and we have put an end to his abusive and insulting broadcasts. The CPS is committed to prosecuting hate crime and will continue to work as an independent body to ensure justice is served."* Images were also found on his social media which corroborated his anti-Semitic views, particularly posts presenting the Holocaust as a hoax and ridiculing Jewish people. Books and papers relating to the Holocaust were recovered from his property. These findings were used to prove that he intended to stir up hatred against Jewish people on the various broadcasts that were found online and left him little choice but to plead guilty in June 2021.
(SOURCE: *RadioToday*)

https://tinyurl.com/kyx4etdw

RADIO TIMES PODCAST: The *Radio Times Podcast* is set to launch next week with radio presenter Jane Garvey and film critic Rhianna Dhillon as hosts. But instead of discussing the topic of radio, as the name might suggest, the *Radio Times Podcast* is all about the medium of television. In episode one, out on September 8th, *Killing Eve's* Jodie Comer and *Line of Duty's* Stephen Graham will appear talking about their television shows.
(SOURCE: *RadioToday* | *RadioTimes*)

www.RadioTimes.com/podcasts
https://tinyurl.com/nunxt5tu

PMR 446 PROSECUTIONS: In a reply to a Freedom of Information (FOI) Request, Ofcom acknowledged they have never prosecuted a user of PMR 446. Ofcom was asked: *"I was wondering if it's possible to give me figures as to how many prosecutions have been made against a person or persons for the specific offence relating to using equipment on the PMR 446 band (446Mhz) against the licencing conditions. I appreciate this is a licence-exempt band, but for example, can you tell me if anyone has ever been prosecuted for using the equipment above the permitted .5 Watts or for using an external antenna"*. Ofcom replied: *"We are not aware of any prosecutions against any person(s) for specific offences relating to using equipment on the PMR 446 band (446Mhz) against the licencing conditions"*.
(SOURCES: *ICQ Amateur* | Colin Butler)

https://tinyurl.com/puk6kjfy

Feedback

RADIOUSER, SEPTEMBER 2021: p. 18: The picture is not of the author of the book under review but shows *Woman's Hour* presenter Jenni Murray chairing an NHS event. More information about both Jenni Murray and Justine Lloyd can be found here:
https://tinyurl.com/sbu33d9t
https://tinyurl.com/m4sfdats

RADIOUSER, SEPTEMBER 2021, P. 31: The source for the first news item (*Antiques Road Show* ...) was 'Royal Signals ARS', not 'Radio Signals ARS'.

RADIOUSER, SEPTEMBER 2021, CONTENTS LIST & EDITORIAL (P. 5) PP. 46-48 ('ANGRY-9'). N.B.: (1) The *Angry-9* radio was not used in WW2, but it was widely used by U.S. Forces during the Korean and Vietnam Wars. (2) The title, of the article, *The Dependable 'Angry-9': Workhorse of the U.S. Special Forces*, was intended to link directly to comments on the *Angry-9* made by the Special Warfare U.S. Army Chief of Information, which were edited from the text. (3) The edited text relating to amateur QRP operation over very considerable distances implies that Fig. 2. is a typical antenna suitable for amateur low-power work. Fig.2 is, in fact, the illustration of a military whip antenna with limited range (R/T 25 miles; CW, 75 miles) as mentioned in the article.
*[My apologies to Bob Houlston, David Harris and Tony Smith for getting it wrong – **Ed**.]*

Radio News

SILENT CUBE SAT IS AWAKE!: Radio Amateur Satellite Corporation (AMSAT) volunteers have established communications with *RadFxSat-2*, a small CubeSat that had been silent since it deployed in a Virgin Orbit launch on 17th January 2021. That day, the California-based company successfully deployed 10 CubeSats selected by NASA as part of the agency's *CubeSat Launch Initiative*. Nine of them were designed, built and tested by universities across the United States. The *RadFxSat-2* CubeSat was built by AMSAT with the science payload built at Vanderbilt by electrical engineering graduate students Rebekah Austin and James Trippe. Austin is now with NASA Goddard Space Flight Center; Trippe is with Sandia National Laboratories [...]. *RadFxSat-2* is a joint mission partnership between Vanderbilt University and AMSAT and is the fourth miniature satellite launched in the partnership to test radiation effects on space electronics. This project was supported in part by the Arnold Engineering Development Complex, the Defense Threat Reduction Agency, and Broadcom Corporation.
(SOURCES: ICQ Amateur / Ham Radio Podcast)
https://tinyurl.com/ep738bz4

European Private Shortwave Stations

September 1st 2021
Only legal stations are included. Most stations use low power, but a few use several kW. Note that UTC is used here – not CET/CEST. D = Germany, DNK = Denmark, FIN = Finland, NL = Netherlands, NOR = Norway F.pl.: future plan, Int'l = International, Irr. = irregular, 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)
3920	NL	Radio Piepzender	Zwolle	Irr.
3955	D	Radio Channel 292	Rohrbach Waal	24/7
3975	D	Shortwave Gold	Winsen	Daily 1800-2200
3985	D	Shortwave service	Kall-Krekel	Daily 1400-2200
3995	D	HCJB	Weenermoor	24/7
5895	NOR	Radio Northern Star	Bergen	Daily 0329-2210
5920	D	HCJB	Weenermoor	Daily 0600-1600
5930	DNK	World Music Radio	Bramming	24/7
5955	NL	Sunlite	Overslag	F.pl. from November: Daily 0600-1800
5970	DNK	Radio 208	Hvidovre	24/7
5980	DNK	RadioOZ-Viola	Hillerød	We 2100-2200, Sa-Su 1100-1300
5980	FIN	Scandinavian Weekend Radio	Virrat	1st Sa of the month (not in September)
5985	NL	Radio Delta International	Elburg	F.pl. from November
6005	D	Shortwave service	Kall-Krekel	Daily 0800-1600
6005	NL	Radio Delta International	Elburg	Sa 2000-2100 & 2200-0100
6020	NL	Radio Delta International	Elburg	Su 0600-1800
6035	S	Radio Nord Revival	Julita	September 4th–5th: 0700-1900
6055	DNK	Radio OZ-Viola	Hillerød	Alternative to 5980
6070	D	Radio Channel 292	Rohrbach Waal	24/7
6085	D	Shortwave service	Kall-Krekel	Daily 0700-1700 (Radio Mi Amigo Int'l)
6115	NL	Radio Europe	Alphen a/d Rijn	Irr. (14-23 UTC)
6115	D	Radio SE-TA2	Gera	Irr. (10-12 UTC)
6140	NL	Radio Onda, Belgium	Borculo, NL	Daily 0600-1700
6150	D	Europa 24	Datteln	Daily 0800-1600
6160	D	Shortwave Gold	Winsen	Daily 18-22 + Sa 10-16 & Su 08-16
6170	FIN	Scandinavian Weekend Radio	Virrat	1st Sa of the month (not inSeptember)
6185	NL	Radio Piepzender	Zwolle	Irr.
7220	NL	Rockpower	Nijmegen	Irr. (alt.: 7215kHzfromNovember)
7365	D	HCJB	Weenermoor	0800-1300
9520	NL	Radio Onda, Belgium	Borculo, NL	F.pl.fromOctoberorNovember
9670	D	Radio Channel 292	RohrbachWaal	24/7
11690	FIN	Scandinavian Weekend Radio	Virrat	1st Sa of the month (not inSeptember)
11720	FIN	Scandinavian Weekend Radio	Virrat	1st Sa of the month (not inSeptember)
15790	DNK	World Music Radio	Randers	1st Sa of the month (not inSeptember)
25800	DNK	World Music Radio	Mårslet, Aarhus	24/7

This list is compiled by Stig Hartvig Nielsen each first day of the month – and is based on details supplied by the various radio stations, the stations websites, monitoring observations, HFCC registrations, and some presumptions. The list is not copyrighted and may be published everywhere. Subscription by email is free of charge; write to **shn@wmr.dk.**

Scott Caldwell
Scottandrew.caldwell@yahoo.co.uk

A Maverick and Radio Pioneer (Pt II)

In the concluding part of his fascinating profile of Oliver Heaviside, **Scott Caldwell** encompasses the later stages of the pioneer's life, looking at both his growing recognition and declining mental health.

In December 2019, Tom Hopper's film adaption of the classic Andrew Lloyd Webber's stage musical *Cats* was released to widespread public acclaim. In the film, it is revealed that one lucky cat will have a new life by ascending to the 'Heaviside Layer', where it will be transformed into anything and everything it wanted to be.

The term *Heaviside Layer* appeared in (unpublished) writings by T.S. Eliot, which were sent to Andrew Lloyd Webber by Valerie Eliot (T.S. Eliot's widow).

An Eccentric Genius

Many of the academic papers Oliver Heaviside (1850-1925; *RadioUser*, September 2021: 40-42) produced were on the theories regarding electromagnetism, by his near-contemporary James Clerk Maxwell (1831-1879). It has to be said that, at the time of their publication in the mid-1880s, they drew little attention, outside of specialist circles. Many general readers would, perhaps, have been confused by the unfamiliar mathematical symbols that formed the now famous equations.

Despite this, Oliver Heaviside always remained resolute in continuing his pioneering research, and he was not initially concerned by the readers' response. He wrote to Irish physicist Joseph Larmor, many years later and revealed his true feelings: *"There was a time, indeed, in my life when I was something like Teufelsdröckh in his garret* [a reference to the German philosopher in Thomas Carlyle's *Sartor Resartus*] *and was in some measure not what other may think of their importance. They were meat and drink and company to me"*.

https://tinyurl.com/3hvhsmc9

Heaviside's behaviour appears to have become progressively more eccentric over time. He was known to paint his fingernails pink, and he even dyed his hair black and put a tea cosy over his head, while it subsequently dried.

In general, Oliver Heaviside is a challenging subject for historians to research. He rarely made public appearances, rarely attended meetings, and never invited friends or acquaintances to accompany him for dinner. He delivered the manuscripts of his key *Electrical Papers* to a grocery store, where the editor arranged their subsequent collection.

"However, absurd it may seem, I do in all seriousness hereby declare that I am animated mainly by philanthropic motives. I desire to do good to my fellow-creatures, even to the Cui bonos"

(Oliver Heaviside, Electrical Papers, 1882).

Mental Health Issues

Heaviside became an avid bicyclist in the 1890s. He confessed to physicist G.F. FitzGerald that, *"Idiots consider me a madman about the bike; I ride every day"* (Mahon, 2017). The scientist was prone to prolonged periods of paranoia, and he subsequently complained of being 'spied on'. Because of this, some of Heaviside's scientific colleagues decided to act on his behalf and lobbied the government to award Heaviside a pension, in recognition of his scientific research and the subsequent benefits it brought to mankind. Consequently, the sum of £120 per year was awarded to him (later rising to £220). It was deemed as an honour by Heaviside, and he had no reservations about accepting it.

After his parents had passed away, Heaviside decided to stay at the family home. When he moved to the seaside town of Newton Abbot, he met a mixed reception from the local community: Some historians believe that a part of the persecutions he suffered was, no doubt, real, while some were probably, more or less, imagined – or merely alleged – by Heaviside. In September 1898, Heaviside wrote a letter to Oliver Lodge (1851-1940), detailing accounts of '*devilish hanky-panky*' – He complained that the local boys were calling him names, stopping his sewer line, and even throwing stones through his windows.

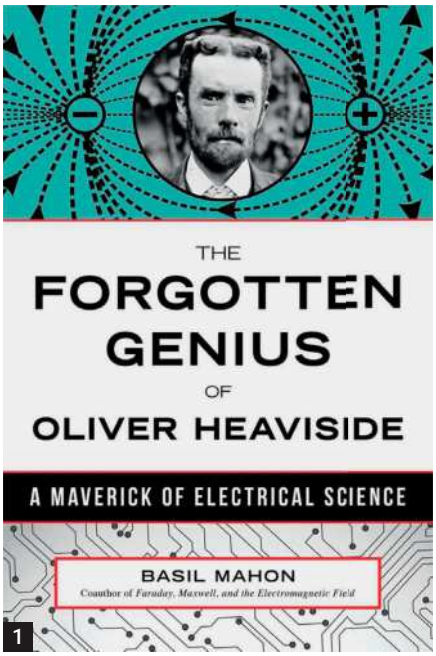


Fig.1: ***The Forgotten Genius of Oliver Heaviside: A Maverick of Electrical Science*** **by Basil Mahon.**

https://tinyurl.com/3hvhsmc9

In 1908, his brother Charles became increasingly concerned for Oliver's welfare, and he intervened by arranging for him to relocate to Torquay. His declining mental state was further evidenced by his correspondence, which he began signing as 'W.O.R.M'. His neighbours also related stories of Heaviside as a strange and embittered hermit who replaced his furniture with, *"granite blocks, which stood about in the bare rooms like the furnishings of some Neolithic giant. Through those fantastic rooms, he wandered, growing dirtier and dirtier, and more and more unkempt – with one exception. His nails were always exquisitely manicured and*

painted a glistening cherry pink".

His home in Torquay was known by many of the locals as the 'inexhaustible cavity', in reference to the lifestyle of splendid isolation that the scientist preferred.

https://tinyurl.com/3jmk98hr
https://tinyurl.com/3hvhsmc9

A Legend in His Lifetime

As Heaviside's fame spread, he became something of a 'celebrity' in his lifetime. He did, however, receive very little financial reward for his research and publications.

He later claimed that, he had *"earned less than a hodman"* (i.e. a labourer who carries bricks and mortar).However, his lifestyle was modest at best; while the money was welcome, it was far more important to him to occupy his time with rigorous scientific research and writing.

His only known, continuous, relationships with women were confined to his mother, nieces, and housekeepers. It seemed that the added burden of romance was out of the question for Heaviside, as it would have interfered with his demanding research and writing schedules. Even the most elementary social interactions resulted in a feeling of anxiety. A typical note in his diary recalled the chance meeting with a townsperson while walking on the grounds of his home.

He concluded that it had been a rather nasty business.

Nobel Prize and Faraday Medal

In 1912, Oliver Heaviside, along with Albert Einstein (1879-1955), Ernst Mach (1838-1916), Hendrik Lorentz (1853-1928), and Max Planck (1858-1947) were selected as the final contenders for the Physics Nobel Prize.

Unfortunately, they were all unsuccessful on this occasion: The winner was Nils Gustaf Dalén (1869-1937), the Swedish industrialist who had invented a regulator for feeding gas to lighthouse lamps.

https://tinyurl.com/4y625399

That notwithstanding, 1922 turned out to be a successful year for Heaviside who finally received a measure of professional acclaim and recognition. The Institution of Electrical Engineers (IEE) elected him as an honorary member, and he was awarded the institution's first *Faraday Medal*, in recognition of his scientific research and publications.

This award is given on an annual basis to distinguished individuals for either notable scientific or individual achievement, or conspicuous service rendered to the advancement of science, engineering, or technology. The medal also commemorated the 50th Anniversary of the *first Ordinary Meeting of the Society of Telegraph Engineers* and was a visual link to both the history and future of the institution.

It could be argued that Heaviside's research encompassed all these branches (science, engineering, and technology) making him a very worthy winner of this most prestigious medal.

It is now on display at the London Headquarters of the Institution of Electrical Engineers (IEE), now the Institution of Engineering and Technology (IET; in 2006, the IEE had merged with the Institution of Incorporated Engineers to form the Institution of Engineering and Technology (IET).

https://www.theiet.org

The *Faraday Medal* is the Institution's highest honour and one of the world's most prestigious awards for engineers and scientists. It is also one of the oldest scientific medals still being awarded today (Table 1).

Some of the other honours and awards granted to this early pioneer of radio are listed in Table 2.

Final Years and Conclusion

By the beginning of 1925, Heaviside's health rapidly declined. He was laid to rest on Friday 6th February 1925, only his relatives and Mr T.H. Tree, representing the Institution of Electrical Engineers, were present at the service. His last resting place is at the Paignton Cemetery, alongside his parents. His name was subsequently added below his parents, it was completely obscured by weeds as time marched on. However, in 2005 an anonymous benefactor had the tombstone cleaned and reset upright.

Heaviside's genius and complexity were acknowledged in an obituary notice in the prestigious scientific journal *Nature*: *"Heaviside published many papers, which gradually became more and more technical and more and more difficult to understand, as it became necessary, in order to avoid repetition, to assume that the reader knew some of the writer's previous work. Self-inductions in the air, Everywhere, everywhere; Waves are running to and fro, here they are, there they go. Try to stop 'em if you can. You British Engineering man!"*

https://tinyurl.com/3hvhsmc9

In July 2014, academics at Newcastle University and the *Newcastle Electromagnetics Interest Group* established the *Heaviside Memorial Project*. They have worked extremely hard to generate public interest in Heaviside's remarkable life and his scientific achievements.

https://www.ncl.ac.uk
https://tinyurl.com/5pyr7476

If my mini-series about Oliver Heaviside has made you curious, take a look at Basil Mahon's book, *The Forgotten Genius of Oliver Heaviside* (Fig. 1). It offers, I feel, an unrivalled synopsis of the great man.

[Further Reading: RadioUser, *September 2021: 42; plus: Hunt, B. (2012) 'Oliver Heaviside: A First-Rate Oddity';* Physics Today, *Vol. 65, No. 11: 48ff. –* ***SC/Ed****.]*.

https://tinyurl.com/385bc8ad

Oliver Heaviside	1922	Transmissions Line Theory H-Step Function
Charles Parsons	1923	Steam Turbines
Sir Joseph John Thomson	1925	Electrons
John Ambrose Fleming	1928	Vacuum Tubes
Ernest Rutherford	1930	Atomic Nucleus

Table 1: Prominent Recipients of the Faraday Medal (www.liquisearch.com/faraday_medal/recipients).

1891	Fellow of the Royal Society
1899	Elected as an Honorary Member of the American Academy of Arts and Science
1908	Elected as an Honorary Member of the Institution of Electrical Engineers
1918	Elected as an Honorary Member of the American Institute of Electrical Engineers
1921	First Recipient of the Faraday Medal of the IEE
1922	Honorary Degree of Doctor of Philosophy (Dr Phil) from the University of Göttingen (Germany)

Table 2: Oliver Heaviside: Main Awards and Honorary Titles.

Robert Connolly
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Seasonal Coast Guard Action & Narrow Band Direct Printing

Robert Connolly witnesses the importance of carrying a VHF maritime radio during the late holiday season, explains the workings of the NAVTEX Narrow-Band Direct Printing mode and celebrates a lighthouse event.

Many readers will be aware of me often promoting safety while at the seaside and pointing to the hazards of inflatable water toys being used in the sea. Summer this year has seen many maritime incidents with some, sadly, resulting in the loss of life. This may come as no great surprise, given that Covid 'staycations' and restrictions on foreign travel have taken the use of our beaches to levels not experienced for many years.

My local beach, for example, has seen many more families enjoying themselves and going seawater swimming. In fact, I have not witnessed such high numbers since the late 1960s.

At around 2100 local time, during one evening at the end of July, I became aware of an ongoing maritime incident that required our local inshore RNLI lifeboat *Atlantic 85* to be deployed. A male was reported missing after going to sea in his inflatable dinghy (later described by Irish coastguard officials as a "back-garden toy") from a rural coastal location on the Cooley peninsular, Co. Louth in the Republic of Ireland.

Garda (The Irish police) along with Irish Coastguard (*Garda Cósta na hÉireann*) arrived in the area and heard shouts for help coming from the sea. The Dublin Coast Guard, who were controlling the incident, requested the Dublin-based Coast Guard rescue helicopter, *Rescue 116*, our local inshore lifeboat to be launched and assistance from any vessels in the vicinity. https://tinyurl.com/a8uh58tr

The Carlingford Lough pilot boat *Mourne Mist* was in transit to transfer a pilot to a cargo vessel that was destined for a local port and heard the request for assistance broadcast by Dublin Coast Guard. It immediately diverted to the search area, quickly found a person in the water and recovered him to the pilot vessel. A short time later, the inshore lifeboat rendezvoused with the vessel.

A Local Rescue Operation

The lifeboat crew carried out an immediate medical assessment on the casualty, who was very cold before he was transferred to the lifeboat. The initial plan was for the lifeboat to proceed to the nearest suitable landing point and transfer the casualty to an ambulance. However, the area was fairly remote, and it was going to be over half an hour before an ambulance would be able to arrive on the scene. After a brief discussion between the lifeboat and Dublin Coast Guard it was agreed that Rescue 116 would continue to the scene to winch the casualty off the lifeboat and transport him to hospital in Dublin.

All communications were carried out on CH16 (156.800MHz) as the Irish Coast Guard do not have the private CH0 (156.000MHz) that the UK Coastguard use. It transpired that the man had been in the water for around 10 hours after his inflatable dinghy capsized. He was extremely lucky to be alive.

Two factors probably helped to save his life; first, the hot weather we experienced for several weeks at the time would have made the water warmer than normal; second, the casualty was wearing a lifejacket. It would, however, appear that the casualty did not have a portable marine VHF transceiver.

The Importance of a VHF Transceiver

Had the man taken one, he would, more likely than not, have been able to raise the alarm and seek assistance many hours earlier. Therefore, if you are planning any seawater activity – be it from a busy seaside resort or a quiet rural location – make sure that you let somebody know where you will be, and for how long.

In addition to this, you should equip yourself with appropriate safety equipment, for example, lifejackets, flares and a portable marine transceiver. With the best planning in the world, you never know when something unexpected can happen and if you have safety equipment you are in a far better position, not only to summon help but also to ensure your survival.

You should not, under any circumstances, rely on your mobile phone, as you may not be in a position to get a signal to make an emergency phone call and your mobile phone does not take kindly to seawater, plus if you drop it into the water, it keeps going down. If you purchase a portable marine transceiver that is not submersible, then purchase a proper (sealed and waterproof) bag to put it in.

These are not expensive (around £10), and most of them are fitted with a neck cord keeping your hands free for other things while ensuring your radio is constantly with you. Safety equipment is like an insurance policy: Hopefully, you will never need it; but if you do, it will help save your life. For those who windsurf, paddleboard, and so on, there are packs of mini flares available that are easily carried.

NAVTEX: Narrow Band Direct Printing

Many of you monitor NAVTEX transmissions and are aware that each station has a ten-minute transmission slot every four hours. Moreover, NAVTEX transmissions on 518kHz are always in English.

The 490kHz frequency is used for transmitting more local information, often

ROBERT CONNOLLY

KEVIN HEWITT

Fig. 1: The beautiful annual external illumination of the Haulbowline Lighthouse, Carlingford Lough, Northern Ireland.
Fig. 2: The *Prince of Wales* at Gibraltar.

in the local language.

Transmission is via Narrow Band Direct Printing (NBDP).

This type of transmission is also used on HF frequencies, and some refer to it as 'HF-NAVTEX'. HF NBDP transmissions occur in the 4, 6, 8, 12, 19 and 22MHz marine bands. Unlike 'proper' NAVTEX (on 518 and 490kHz) the HF transmissions are not confined to ten minutes except the transmissions on 4209.5 kHz.

Any station may transmit its detailed maritime safety information for over two hours and use English for one part of their transmission and their own language for the other. The Information transmitted by HF coast stations includes not only weather and navigation data but also ice conditions.

An excellent, and up-to-date resource for transmitting stations, frequencies and times in this mode, and many others, is William Hepburn's comprehensive website: https://tinyurl.com/5dyexhs7

At my location here in Northern Ireland, I have frequently received Boston, USA, on 6314, 8416.5, 12579 and 16806.5kHz; Buenos Aires, Argentina, on 8416.5, 12579 and 16806.5kHz; UAT Moscow, on 8416.5 and 12579kHz, and Iqaluit, Canada, Vardo, Norway and (on rare occasions) Honolulu, Hawaii, on 8416.5kHz.

On the 4209.5kHz frequency, I have been able to copy Istanbul, Turkey, along with Heraklion (Ηράκλειο) Greece, (both quite common) and Nha Trang, Vietnam.

NBDP is obligatory for vessels operating in Sea Area A2 (the area between 30 and 100 nautical miles from the coast) as per the SOLAS (*Safety Of Life At Sea*) Rules (Chapter IV, Regulation 9.3.1).

Some ships do not carry NBDP equipment; under SOLAS (Chapter IV, Regulation 9.3) the requirement of having NBDP can be fulfilled by providing an additional Inmarsat Ship-Earth station.

For this reason, vessels without NBDP facilities carry an additional Sat-C terminal.

https://tinyurl.com/2c7wx2wt
https://tinyurl.com/4v875d4w
https://tinyurl.com/5uw4ezh6

Error Correction: ARQ and FEC

By definition, NBDP uses a narrow bandwidth for transmitting; when a signal is received, it is displayed on the screen and printed by a printer connected to the receiver. NBDP users can send and receive text messages to and from a single station and transmit text stored in the equipment, for example, on an SD card.

NBDP technology can also broadcast a message to all stations that have their NBDP equipment tuned to the frequency on which the message is transmitted. The NBDP terminal is like a small computer monitor and keyboard linked to the MF/HF marine radio transceiver.

Two types of digital transmission modes are generally used for NBDP: ARQ (Automatic Repeat Request) and FEC (Forward Error Correction).

The ARQ mode is used for a one-to-one connection, from a ship to another (specific) ship or a coast station. When you are at the transmitting station, you send an information text. If you press the 'over' key (F9) on the keyboard, *you become the receiving station* and can read the message being transmitted by the other party.

The FEC (Forward Error Correction) mode is for one to several stations to broadcast a message. As an example, a coast station

transmitting Maritime Safety Information (MIS) would use FEC mode. Also, if a ship needed to broadcast a distress NBDP signal, it would use the FEC mode to broadcast its distress to other ships and coast stations. FEC mode is only a one-way transmission, that is to say, you transmit the message, and the communication ends with the connection terminated. It is not possible in FEC mode to *switch between transmit and receive*, this can only be done with ARQ mode.

NBDP frequency assignment from the *Radio Regulations* (2020, Appendix 17) is as follows:

Many frequencies (paired and non-paired) are assigned to ship stations for NBDP telegraphy and data transmission systems at speeds not exceeding 100 Bd for FSK (Frequency Shift Keying) and 200 Bd for PSK (Phase Shift Keying). These are: 4170.5 to 4180kHz; 6263 to 6269.5kHz; 6260.25 to 6260.75kHz; 8339.25 to 8339.75kHz; 12419.25 to 12419.75kHz; 12422kHz; 16615.25 to 16616.75kHz, and 18873.5 to 18880kHz.

https://tinyurl.com/wat4wsrn
https://www.itu.int/pub/R-REP-M.2082

Other specific NBDP frequencies are shown in Table 1. These days, the ship-based use of the mode for communication is not as extensive as it used to be, due to the availability of satellite communications.

As a result, the main handling is by coast stations transmitting weather and other maritime safety information.

[see also Robert's Maritime Matters *column in* RadioUser, *September 2021: 49-52 – **Ed**.]*.

Emerging Technologies

Existing maritime navigation and communication systems are being constantly improved, and new technologies continue to emerge, in parallel with efforts to improve safety at sea, protect the maritime environment and transport cargoes efficiently.

Currently, the International Telecommunications Union (ITU) is looking at the transition to digital technologies in all bands, particularly in the following areas:

- Voice communications and Maritime Safety Information (MSI)
- Increased global coverage and higher data transmission rates
- GMDSS modernization (Satellite systems and networks, in line with SOLAS Convention)
- Full Implementation of e-navigation
- Further development of AIS technology and adaptation of technologies to enhance the potential of maritime communications.

The ITU's next *World Radio-communication Conference (WRC)* is scheduled for 2023, with *Agenda Item 1.11* planned, *"to consider possible regulatory actions to support the modernization of the Global Maritime Distress and Safety System and the implementation of e-navigation, in accordance with Resolution 361 (Rev. WRC-19)"*. This item includes GMDSS modernization and implementation of e-navigation. As we know, it is often quite a time before new equipment and/or procedures are adopted. The NAVDAT technology is one example of this. However, significant experimentation and extensive testing are always required to ensure that new developments are as safe as possible for both ships and their crews.

ITU:
https://tinyurl.com/25bmc4y6
WRC:
https://tinyurl.com/yyjazx7v

Helicopters and Illuminations

At the beginning of this article, I mentioned our local inshore lifeboat being involved in a SAR mission. This summer has been much busier than normal for the coastguard and RNLI crews. Certainly, the two lifeboats stationed closest to me were deployed several times per week during the July holiday period. In addition to the coast, we also have mountains locally, and the mountain rescue team has also been very busy, sometimes responding to multiple incidents on the same day.

These often involve a rescue helicopter to evacuate an injured casualty. Normally here this would involve the Irish Coast Guard rescue helicopter based in Dublin if it is available. However, on several occasions, a UK Coastguard helicopter has been tasked from either Prestwick in Scotland or Caernarfon in Wales, with both involving a transit time of close to an hour. Northern Ireland does not have a Coastguard rescue helicopter.

However, there are Air Ambulance and Police Helicopters capable of evacuating a casualty. Nevertheless, neither of those have winching facilities. Normally, when a Coastguard rescue helicopter is deployed for a task in Northern Ireland, this also requires a land team, deployed to protect the landing site if a casualty is being transferred to an ambulance, or where a landing site at our closest hospital is used as the hospital does not have a helipad.

Freq (kHz)	Purpose
2174.5	GMDSS distress frequency for NBDP telegraphy
4177.5	GMDSS distress and safety traffic by NBDP
4209.5	National NAVTEX service transmissions by coast stations (NBDP)
4210	Transmission by coast stations of MSI by means of NBDP
6268	GMDSS distress and safety traffic by NBDP
6314	Transmission by coast stations of MSI by means of NBDP
6425	Transmission by coast stations of MSI by means of NBDP
8376.5	GMDSS distress and safety traffic by NBDP
8416.5	Transmission by coast stations of MSI by means of NBDP
12520	GMDSS distress and safety traffic by NBDP
12579	Transmission by coast stations of MSI by means of NBDP
16695	GMDSS distress and safety traffic by NBDP
16806.5	Transmission by coast stations of MSI by means of NBDP
19680.5	Transmission by coast stations of MSI by means of NBDP
22376	Transmission by coast stations of MSI by means of NBDP
26100.5	Transmission by coast stations of MSI by means of NBDP.

Table 1: NBDP Frequencies.

Further Information

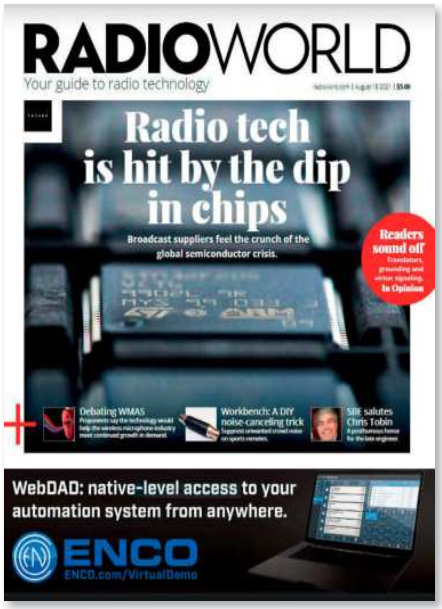
- Error-Correction Techniques
  https://tinyurl.com/dxm9zuzx
- Furuno
  https://www.furuno.com/en
- My Sea Time
  https://tinyurl.com/9545dp87

August saw the annual external illumination of Haulbowline Lighthouse, Carlingford Lough, Northern Ireland (Fig. 1). This is the only wave-washed lighthouse in the British Isles that is externally illuminated. The illumination ran every evening during August and is now an annual event. This year the illumination is dedicated to all those who have lost their lives at sea.

https://tinyurl.com/pb9c25b6

Finally, my thanks go to Kevin Hewitt for this month's picture of the new aircraft carrier, *Prince of Wales* (Fig. 2), at Gibraltar. Until next time, *Fair Winds!*

Publications & Resources



BRITISH DX CLUB (BDXC) COMMUNICATION: ['Visit to the Ross Revenge', '75 Years of BBC Radio3', 'UVB-76': and more! Ed]
http://bdxc.org.uk/Communication.pdf

CQ-DATV (SEPT. 2021)
https://cq-datv.mobi/99.php
Back Issues:
https://cq-datv.mobi/ebooks.php

E-MEDIUM WAVE NEWS SEPT. 2021 VOLUME 67 NO. 04 (MEDIUM WAVE CIRCLE): [e.g. articles on: 'Catch a US Daytimer'; 'Three States of Brazil', and 'Is DX a Two-Way Street?' – Ed.]
https://mwcircle.org

OFCOM REPORT: MEDIA NATIONS 2020/2021
https://tinyurl.com/75zysyw3

RADIO SCIENCE (AGU; VOL. 56, NO. 8)
https://tinyurl.com/3cmetf3r

RADIOWORLD (1ST SEPT. 2021)
https://tinyurl.com/39k69r6w

RADIOWORLD (ENGINEERING EXTRA) 18H AUG 2021: [article on noise-cancelling mics – Ed.].
https://tinyurl.com/8ewnsjut

THE SPECTRUM MONITOR (SEPT. 2021)
https://tinyurl.com/45aepuz5

AMPLIFI MEDIA'S HELPFUL GUIDE TO NAVIGATING THE PODCAST ECOSYSTEM
https://tinyurl.com/h2e73sn7

K9YA TELEGRAPH (FREE E-ZINE)
www.tinyurl.com/k9yatele
https://tinyurl.com/4y4javzd

RADIOWORLD 2021 FALL PRODUCT PLANNER: RCA RADIO-TOURS MAP
[a wonderful resource - Ed.]
https://tinyurl.com/87xneftz

SWLING POST (DIGEST)
https://tinyurl.com/rhy24fwu

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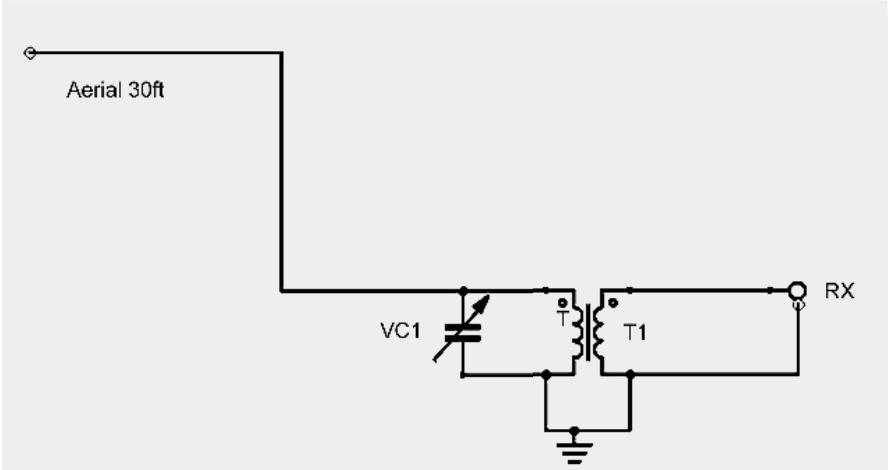


1

Birds and Slugs

Keith Rawlings investigates a reader's design for a simple and short end-fed aerial system, and he demonstrates how to get the best out of a conventional Bird 43 Thruline Power/Watt Meter.

This month, I will cover a design by our reader Alan, which was sent to me some while ago. Alan needed a simple and quick-to-build aerial for HF listening when using his Kenwood R600. He managed to run out about 25 feet of wire from a downstairs window up to the branches of a tree and fed that to the high-impedance input of the R600 which he found worked well.

Wanting to see whether reception could be improved, Alan looked to see if he could find a design for a simple AMU (Aerial Matching Unit) and looked online for some ideas. After a bit of searching, he found a design that was simplicity in itself. It merely used a variable capacitor and a coil wound on a toroid ring.

Alan admits that it was fortuitous that he already had a suitable variable capacitor, and that another quick online search revealed a supplier of the toroid rings he would need.

After some experimentation, he came up with a combination of coils that covered most HF bands, and he is pleased enough with his design to want to share it with other readers. The matching section used is a simple parallel tuned circuit as shown in Fig. 1. The primary turn on the toroid has one wire connected to the aerial and to the insulated terminal on the capacitor, which connects to the fixed vanes on the cap.

The other wire is grounded to the capacitor body and the system ground. A two-turn wire link over the toroid has one wire connected to the inner of a short run of coax cable to his receiver, with the other one connected to the variable capacitor body/ground.

Constructing the Design

The original design was apparently for tuning a short length of wire on the 80m amateur band. Alan reasoned that, by reducing the number of turns on the coil, he would be able to swap coils for use at higher frequencies while still using the same capacitor. The variable capacitor used was a 500pf dual-gang unit using just a single gang.

The toroid winding details Alan supplied can be seen in Table 1.

I quickly lashed together a toroid using 33 turns of 28 SWG enamelled copper wire and soldered it to a 480pf variable capacitor. Once connected to about 25 feet of wire, I found that I could peak signals in the 80m band. Therefore, this little circuit does indeed work and should provide a little more selectivity to incoming signals. I have not tried it on other frequency ranges. For multi-band use, a switch would be needed; alternatively, arrangements could be made for plug-in coils, as Andy did.

For frequencies above around 10MHz or so, yellow mix toroids could be used. The smaller T50 rings may be usable on transformers that have fewer windings. As there will be variations in coil winding and aerial lengths, a certain amount of experimentation may be required for any individual designs.

Alan's photos were not usable so I have included a picture of my own 'lash up' (Fig. 2). Thanks for this Alan.

The Bird 43 Thruline

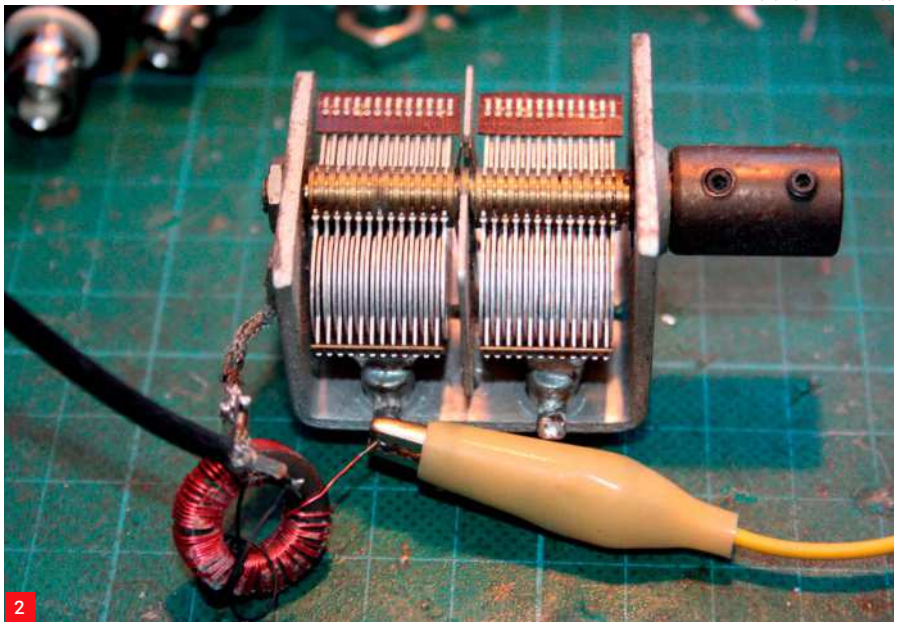
Back in the April 2021 edition, I described the Bird Termaline Dummy Load/Watt Meter (*RadioUser*, April 2021: 60-62). The Bird 43 Thruline range of Power/Watt meters are, arguably, one of the most common power meters to be found. They are compact and lightweight, making them widespread for field use.

They are also perfectly at home in the workshop as a bench power meter as well. With a frequency range of 450kHz to 2.7GHz and a power input range from 100mw to 10kW, they are truly versatile instruments for general purpose power measurement. As such, they appeal to broadcast and Telecom engineers, and radio amateurs.

Unlike the Termaline described then (where RF power measurements are terminated into an inbuilt 50Ω dummy load) the Thruline, as its name implies, makes through-measurements. This makes it extremely useful as, having no inbuilt load, there are no restrictions on the power level that can be measured, or indeed the frequency it can be used at, within its operating range, as long as the load can cope.

My Termaline has a frequency range of 25-512MHz and an upper power level of 60W. The 43 may be attached to any size dummy load that is suitable for the frequency and power level required. While this sounds rosy, there is the drawback that the Bird 43 uses plug-in inserts or elements ('slugs') which determine the frequency range and power level for

ALL PICTURES: KEITH RAWLINGS



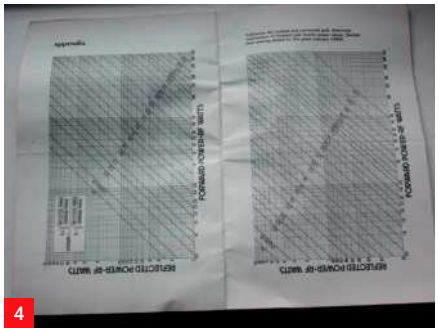


Fig. 1: Schematic of Alan's end-fed arrangement. Fig. 2: My lash-up of the end-fed tuner. Fig. 3: The Bird 43 with a Bird Dummy Load attached. Fig. 4: The SWR charts from the Bird meter's manual. Fig. 5: Bird slugs, including a 'sniffer-slug', and one with its cover missing. Fig. 6: The Bird 43 with Bird Dummy Load, and the carry case with stored slugs.

measurement. There is an extensive range of these elements, and to collect enough to match every frequency range and power level that the 43 is capable of would cost a fortune, even when bought second hand.

Therefore, users tend to collect a range of elements that match their needs. Mine, for example, is equipped with elements that cover the VHF and UHF PMR bands, from 10-50W. These being 100-250MHz at 5,10 and 50W, 400-1000MHz at 50W, 200-500MHz at 10W and one that found its way into the kit, covering 25-60MHz at 100W.

This way, a number of amateur bands are covered as well.

I also have a couple of 35 dB 'sniffer-elements', both covering 400-800MHz; one for a 500W max rating and the other one for 700W. These are used to sample RF for feeding to other equipment, such as spectrum analysers and modulation meters.

The Meter in Use

The operation of the meter is simple: Insert the correct element for the frequency to be measured, typically, connect the power source you wish to measure to the left-hand, Type-N, socket and the load to the right-hand socket. This load may be an aerial or, as can be seen in Fig. 3, where a Bird 'Termaline' 25W 50Ω dummy load has been screwed into position.

Readings are taken directly from the meter, with reference made to the correct scale. Therefore, '100' would be used for 100W,10W, 1W, and Full Scale Deflection (FSD).

Likewise, '50' would be taken for 500W, 50W, 5W; '25' would be interpreted as 250W, 25W, 2.5W, and so on.

Because of its portability, the Bird 43 is great for taking measurements anywhere. The one you see in the photos has been used to measure the output of radio equipment fitted to commercial vehicles. It has seen the inside of various radio base stations, to verify the output of transmitters, and it was also used in a radio workshop. It has now found a well-deserved 'semi-retirement' in my workshop, after having been my companion for many years.

Low Frequency	High Frequency	Turns	Wire Gauge	Toroid Type	Estimated Inductance
1.5 MHz	3MHz	45 turns	28 SWG	T68-2 RED	11.5uh
2.5 MHz	4.5 MHz	33 Turns	28 SWG	T68-2 RED	6.2uh
4 MHz	11 MHz	22 Turns	28 SWG	T68-2 RED	2.8uh
10 MHz	30 MHz	11 turns	28 SWG	T68-2 RED	.7uh

Table 1: Alan's toroid winding details.

The 43 is not just a watt meter. You may have noticed from the photos that the elements have an arrow on them. This arrow depicts the direction of RF flow. This means that you can connect the source and load to either of the ports and just rotate the slug through 180 degrees to match the RF flow. Some of you may have, perhaps, realised another benefit of this: By rotating the slug, we can measure RF flow *in either direction*, we can gauge both the RF going forward, and – by reversing the slug – the RF coming back, and therefore find the VSWR.

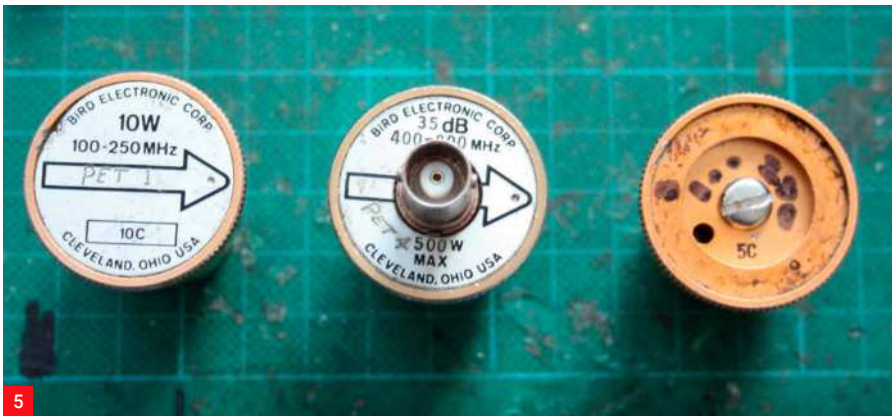
This may require a bit of math or, with a copy of the manual, a look at the Voltage Standing Wave Ratio (VSWR) charts included (Fig. 4).

VSWR and Relative Field Strength

The Bird 43, therefore, makes a rugged VSWR meter. I mentioned earlier about using my 43 on vehicles. This was a large project involving the removal and reinstallation of new radio systems to many hundreds of vehicles located all over the East of England. We also had to remove and replace the aerials fitted to a range of small and large vans and some lorries. This involved fitting new λ/4 whips, which were found to be more suitable than the λ/2 ones already fitted to most vehicles.

Further Resources

- Bird Meters
  https://tinyurl.com/4z2t6y9z
- End-fed Wire Aerials (RSGB)
  https://tinyurl.com/4h6teuy3
- Poole, I., and Telenius-Lowe, S. (2012) *Successful Wire Antennas* (RSGB)
- YouTube (Bird 43)
  https://tinyurl.com/r7c7c7pc



5

6

In this work, the 43 was connected in line to the aerial. The element was then repeatedly turned through 180 degrees, while small amounts were chopped off the stainless steel whips to get minimum reflected power. Once done, forward power was finally checked to note if it was correct.

This sounds easy enough but doing this outside and often in the pouring rain, where everything gets soaked, makes one appreciate the ruggedness and versatility of the Bird 43. A colleague, who also reads *RadioUser*, will well remember the project I am talking about!

Another useful insert available for the 43 (and other meters) is the 4030 Relative Field Strength Element.

This plugs in like a standard element and can be used from 1MHz to 1GHz to measure relative field strengths.

You may notice from Fig. 5 that the elements – as well as having the arrow and power/ frequency range printed on the foil – also carry another number, in this case '10C'. The '10' depicts the power range of the element (10W) and 'C' denotes the frequency range, 100-250MHz. As you can see, sometimes the foil cover can fall off the element and will need glueing back into place (this slug is still identifiable as a '5C').

There will be a small dimple in the foil and the brass element housing; these need to be lined up correctly to maintain the element's directional indication.

The drawback when buying any equipment second hand, especially something as portable as the 43, is that it is not always possible to tell what sort of life it has endured in the hands of its previous owners. Equipment used by companies may not have been 'cherished' quite as much as it should have been. The Bird 43 is no exception, although you can often tell a well-weathered one by the condition of its paintwork.

The same can be said for the elements. Therefore, unless provenance is known, a certain amount of caution is needed when relying on measurements, unless a comparison is made against a known and accurate reference.

The plug-in element is an RF detector with a diode. The rectified RF output of this element drives the meter.

If it is subject to too much power, it can be damaged.

I have an element here that is rated at 50W. However, when measuring the output from a 30W radio it barely reads 20W, while another known good element of the same type reads a touch over 30W.

Elements may get damaged but there are resources on the internet describing how to fix and recalibrate them. With the correct elements, the Bird 43 is a useful power meter to have around the amateur shack (Fig. 6).

https://tinyurl.com/4z2t6y9z
https://tinyurl.com/33wrwzjw

That's it for this month. By the time you read this, autumn will be here. Consequently, in preparation for winter, now may be a good time to give your outside aerials and feeders the once-over before any bad weather gets here.

Scotland

Somerset

South Yorkshire

Suffolk

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HackRF One from Great Scott Gadgets is a Software Defined Radio peripheral capable of transmission or reception of radio signals from 1MHz to 6GHz.

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RECEIVERS

ELAD FDM-DUOr

A Receive-only Version of the famous FDM-DUO!

10kHz-54MHz Direct Conversion SDR Receiver.

SDR receiver that offers the possibility to operate stand-alone like traditional radio or attached to a Personal Computer discovering the possibilities offered by the SDR technologies. After the great success of the FDM-DUO transceiver the manufacturer now offers the "R" as a receiver — as to be expected by Elad in a sleek Italian design and equipped with top-notch technology.

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Elad Companion Speaker SP1 for FDM-Duo. *£134.95*

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Designed for home and mobile use, with a large speaker for excellent sound.

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New digital TruckTracker V Professional Scanner Receiver. 25-1300MHz wideband frequencies.

The TruckTracker V operation allows this scanner to scan APCO 25 Phase 1 and Phase 2, DMR, Motorola, EDACS, LTR Trucked Systems as well as conventional analog and P25 digital channels.

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100 channel per second scanning speed, 1,300 memory channels, 15 hours of continuous receive capability.

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Base Scanner with watch, alarm clock & FM broadcast radio.

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- CTCSS/DCS (Search and display any tone)
- Alarm Clock
- USB PC Programmable

ML&S: £129.95

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DIGITAL DESKTOP MOBILE RADIO SCANNER

ML&S: £489.95

Multi-system adaptive digital trunking scanner capable of monitoring these unencrypted channels/systems: Conventional DMR (Entered as a DMR trunked system, NXDN™, Hytera XPT, MotoTRBO™ Capacity Plus, MotoTRBO™ Connect Plus, and MotoTRBO™ Linked Cap Plus systems and NXDN.

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The ULTIMATE all mode digital handheld scanning receiver.

Latest firmware! 100kHz-1300MHz Analogue & Digital Modes.

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Supports all of the usual analogue modes (FM, AM, SSB, CW) as well a a few digital modes including NXDN, P25, DPMR and DSTAR. A worthy upgrade over the older IC-R20.

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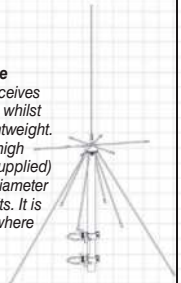
ML&S: £209.95

AOR DA1500

DA1500 is a multi-purpose wideband antenna *that receives 70 to 1500MHz continuous whilst being small in size and lightweight. The antenna is only 92cm high and attaches to any (non-supplied) mast from 25 to 50mm in diameter with the two supplied V-bolts. It is recommended for places where space is limited.*



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AOR LA400

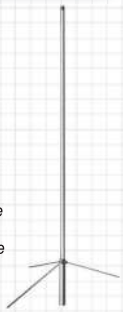
10kHz-500MHz, Receive only Magnetic Loop

Since the invention of this revolutionary concept by KOLSTER in 1915, loop antennas, especially of the active type, have also been widely used by the military in the 70s, before becoming very popular among hobby listeners.

ML&S: £419.95

Diamond D-777

VHF/UHF air band receiving antenna*, not for transmitting. 3.4dB on VHF (120MHz) and 5.5dB UHF (300MHz) with an approximate length of 1.7 metres. The antenna is constructed from fibre glass materials and it is pre-tuned and fully weatherproofed. Mounting components are included. It's fitted with an SO239 connector, so can be connected to a PL-259 without the need of an adaptor. Tuned to receive 108-137.975MHz civilian air band, 225-400MHz military air band.*



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ML&S ONLY: £66.95

Diamond D-190

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The Battle of Britain
IN COLOUR

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This 164-page special collector's edition commemorates the 80th Anniversary of the momentous Battle of Britain, making it the perfect gift for any aviation or Battle of Britain enthusiast.

THE BATTLE OF BRITAIN IN COLOUR

The Battle Looms

The Battle of Britain was one of the most iconic battles of the Second World War, embedding itself indelibly into the nation's consciousness. Earlier, the Battle of France could easily have spelled defeat before the air battles got underway in July 1940.

After the outbreak of war in September 1939, there followed eight months of what became known as the 'Phoney War'. However, it was clear that large-scale fighting would ultimately follow, and a British Expeditionary Force was sent to France before the end of that year. As part of that BEF, a large Air Component was supplemented by an Advanced Air Striking Force. In total, these air forces amounted to 25 squadrons, six of which were Hawker Hurricane-equipped fighter squadrons. The remainder of the RAF force in France comprised largely light bombers and Army Co-Operation squadrons. Eventually, however, the 'Stukageig' became the 'Blitzkrieg'

On 10 May 1940, German forces launched their all-out assault on France and the Low Countries and what followed in Belgium, the Netherlands etc. was the complete collapse of those countries under the overwhelming might of German military power. Across France, German forces rolled inexorably onwards towards the English Channel and while the French and British tried desperately to stem the advance, so the situation became ever more hopeless.

Predicted Catastrophe

When the fighting had broken out in earnest on 10 May 1940, aircraft of the Air Component were in almost constant combat, and losses had to continually be made good from squadrons based in Britain. The Commander-in-Chief of RAF Fighter Command, Air Chief Marshal Hugh Dowding, had already stated as early as September 1939, that if he was expected to defend Britain's skies, then he would need 52 fighter squadrons. At that time, he had only 32 under his command and was told it would be impossible to produce the number he required. However, efforts would be made to provide him with a further eight.

During the fighting in France, increasing numbers of fighter squadrons were sent across the Channel, urged on by desperate appeals from the French Prime Minister, Paul Reynaud. Dowding saw his resources 'slipping away like

— 6 —

BACKGROUND TO BATTLE

Left A Hurricane of 501 Squadron starts-up for an operational sortie at Bethenville, France, May 1940. Air Chief Marshal Hugh Dowding argued successfully against further wastage of the home-based RAF fighter force by sending yet more fighters to France to bolster a futile defence.

Right As the unstoppable juggernaut of German military might advanced across Europe, the deadly Junkers 87 Stuka dive-bomber came into its own. However, the RAF quickly learned how aircraft, and this stood t when facing the Stuka a Britain.

Below right Panzer IV t France in May 1940. Th was rapid and overwhel weeks France had colla were evacuating from D

THE RAF FIGHTER PILOT

were not afraid that they were either liars or foolish. However, a strident jangling of the telephone could mean several things. Sometimes, to intense relief, it could send a message to 'Stand Down'. Other times, it called pilots to readiness, and then to the heart-pounding order: 'SCRAMBLE!'

Years afterwards, veterans of the Battle of Britain told how they hated the sound of a ringing telephone.

On the order to scramble, there was a mad rush by pilots to their allotted aircraft where the fitter and rigger were ready and waiting: the rigger on the wing ready to help in his pilot, and the fitter standing by with the starter plugged in on the starboard side of the engine. Heaving himself into the cockpit, the pilot went through a number of tasks: helmet pulled on, oxygen plugged in, radio jack-plug in its socket, magneto switches 'on', Ki-Gas cylinder priming pump given a couple of brief strokes and thumb ready on the starter. Meanwhile, leaning into the cockpit, the Fitter helped the pilot with his parachute harness straps, then his Sutton seat harness.

By this time, the starter button was pushed after a thumbs-up from the fitter, who unplugged the starter trolley, ensuring it was clear of the aircraft. Unable to communicate over the roar of the Merlin engine, the pilot and rigger exchanged thumbs up signals, the rigger slapping his pilot on the shoulder to convey reassurance and good-luck as he leapt from the wing. As he jumped, the aircraft was already rolling, and the rigger dodged out of the way of the tail-plane, buffeted by the slipstream which was kicking up dust and grass. Getting out of the way, he was hit by a blast of hot exhaust gasses. Now, the aircraft gathered speed ahead, into wind, bouncing and rocking across the grass airfield. Others careered along around it, in the organised chaos that was a squadron scramble.

Getting airborne, the pilots concentrated on keeping station as they selected 'Gear Up', closing the cockpit canopy while listening out for instructions from the CO or flight commander who was talking to the Sector Operations Room and garnering instructions as to heading, altitude and

Facing page Pilots of 19 Squadron are delivered to their dispersal point at RAF Duxford ready for operations early one morning during the summer of 1940.

Above Their relaxed look perhaps concealing the tension, these Hurricane pilots of 501 Squadron pose for the camera during the summer of 1940. All of them saw action. Several of them shot down enemy aircraft and some of them were killed.

what it was they were intercepting. It may have been an instruction along the lines of: "MITOR Squadron, ANGELS 18, Vector Two-three-zero, Fifty Plus. BUSTER." Listening in, the other pilots could interpret these coded instructions: "40 Squadron to climb to 18,000 ft on a heading of 230 degrees. Fifty plus enemy aircraft. Maximum cruising speed".

Mentally and Physically Draining

Settling into the climb, the pilots automatically slid into section order and the preferred squadron formation. Meanwhile, the CO or flight commander concentrated on setting course as the

— 19 —

THE RAF FIGHTER PILOT

other pilots concentrated on what was going on in their cockpits: oil temperatures and pressures, fuel state, oxygen contents checked and selected to 'On', microphone not on 'Transmit' (this could effectively block all other transmissions), straps tight, gun-sight 'On' and illuminated, straps tight and canopy firmly shut. A surprising number could carry out a little good luck routine – the feeling for a lucky charm, or even crossing themselves.

Now, the workload was high, and still they needed to concentrate on formation keeping while permanently keeping a wary eye open for the enemy and quartering the sky in a relentless search. A moment of relapse could literally spell death. The squadron 'Weaves', winding from side to side, kept a rather more wary eye open than the rest, as the squadron got closer by the second to their quarry. Brief instructions might crackle through the headphones: 'Close up Red 2' or, on receipt of further instructions from the Fighter Controller: 'Turning to Port, Go!'

Meanwhile, pilots fiddled with the radio tuner, struggling to tune and re-tune their wireless sets in a constant battle to receive and properly understand the messages. Sometimes, a squawk of static drowned out everything, sometimes resulting in one section

having off suddenly, upwards or downwards, the rest of the squadron watching in bemusement and puzzled because they received no transmission, or else just couldn't understand what had been said. Meanwhile, constant juggling of the throttle setting with the left hand, and judicious adjustment of position through the control column and rudder pedal inputs, were all necessary just to keep station. It was incredibly hard work, and mentally and physically draining.

By now, the squadron was 'on oxygen', masks clamped securely to pilot's faces as cold began to permeate the cockpits. Now, with all the hard work of take-off, formation flying and getting to altitude, came further nervous tension with realisation that the enemy were near. Then, a tight knot of fear returned as the gunsight was checked and the SAFE and FIRE ring on the gun button turned, ready, to the FIRE position. Goggles pulled down. And then the shout:

'BANDITS! Ten o'clock, above. Coming down now! Break, break, break...'

Chatter Of Gunfire

Suddenly, to avoid the 'bounce' of fighters coming out of the sun, the squadron had dispersed in a pre-ordered plan. Now, the enemy fighters were among them. This time, there was no

Facing page Although posed for a news cameraman, the squadron telephone orderly shouts instructions for a 'scramble' as pilots lounge in the dispersal hut. The smartly dressed officer is Duty Pilot – the pilot rostered for ground-admin tasks such as recording take-off and landing times etc.

Above It was not unusual for aircraft to return damaged after an engagement and with pilots wounded. This brand-new Spitfire had just been delivered to 602 Squadron at RAF Westhampnett when it was hit by cannon shells from a Messerschmitt 109 in a combat on 18 August 1940. The aircraft was written off and Flight Lieutenant Dunlop Urie wounded in his feet.

chance of a well-ordered textbook 'Number One Attack'. Instead, it was every man for himself, but with 'wing men' desperately trying to maintain station and protect their section leader.

Now, the pilots were climbing and hanging on their props, the sun glaring and blinding as they turned, all the while listening out and looking out. Now, there were shouts: "Behind you Blue 3!", permeated by chattering gunfire. A cacophony of shouts and static made communication unintelligible. One pilot may be drawing a bead on a

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