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- 1000 station memories
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• Gain: 10-12dBi

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17 Element LPA  
• 105-1300MHz  
• Gain: 11dBi

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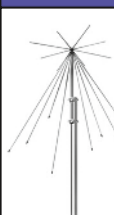
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- CX455.....(455 - 470)MHz pwr 4.15 dBi.....£39.95
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- SY50-5.....5 el 50MHz 10.5dBi.....£129.95
- SY68-3.....3 el 70MHz 7.0 dBi.....£79.95
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### Icom AH-8000

Professional Discone Antenna Suitable for both Transmit and Receive

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Aircell 7 per metre.....£2.99 price per 102m drum.....£269

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N type connector (part: 7392).....£5.25

Aircell 5 per metre.....£2.75 price per 102m drum.....£259

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#### 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

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### AOR AR-DV1

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- New Firmware** - gives TETRA decoding and more!
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Supplied with: 4GB SD Card

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**30 Day Money Back Guarantee**



### AR-DV10

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- Latest Firmware!

**£999.95**

**£939.95**

**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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### IC-R6E

#### Pocket sized Wideband Scanner

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- 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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### BEARCAT



### SDS-100E

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- Frequency: 25-1300MHz (w/gaps)
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**Standard Version**  
(licence required to activate DMR, NXDN)

**£599.95**

**Activated Version**  
(DMR, NXDN already activated)

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### BEARCAT



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#### Digital Scanning Receiver

- With DMR, NXDN, and ProVoice monitoring modes
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- Too many features to list here - visit our web site for more details!

**£779.99**

### BEARCAT



### UBCE-3600XLT

#### Digital Scanner with 'Close Call' and Analogue AM/FM

- Receives: 25-1300MHz
- SD card slot

**£425**

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

**£479.95**

### 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



### 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)
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- Upgradable CPU, DSP, and library
- Store Scan lists
- EZ Scan PC software
- IF/discriminator output
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- Clock & Calendar function
- Spectrum Sweeper



**Whistler TRX-2**

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- Advanced unit suitable for all your batteries
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# Contents

Favourites

Reviews

Features

News

Profiles

## RadioUser

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Any technical queries by e-mail are very unlikely to receive immediate attention either. So, if you require help with problems relating to topics covered by RU, then please write to the Editorial Offices, we will do our best to help.

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36

### 6 Subscriptions Page

Take a look at our subscriptions offers, enjoy safe to-your-door delivery and keep abreast of all the very latest radio trends through our wide range of columns, features, and products reviews.

### 7 News and Products

ICOM IC-M94DE Marine Handheld & AH-41 Antenna, Nevada Dual 3B-222 & SIRIO CX-4-68 Antennas, ML&S Anytone At-D878UVII 'Plus'; Gear from RFCOMMS, RigExpert, and SDRplay. (see also pp.7-12, 29, 34-35, 40, 47, 51, 55, and 59)

### 12 European Private Short Wave Stations

The latest instalment of Stig Hartvig Nielsen's monthly listing of innovative short wave broadcasters, and a call for future authors.

### 13 Bookstore

You can visit our ever-expanding RadioUser bookshop for a great choice of books we have reviewed here, and covering many other titles of historical, technical and general interest.

### 14 Book Review

This month, David Harris gets to grips with a much-discussed new book on the current state of the BBC before he evaluates a portrait of a remarkable Scottish local community radio station.

### 16 Emerging Issues in Radio

In Part Two of her survey of the history, art and function of QSL cards, Chrissy Brand looks at how these documents symbolize and build identities, commemorate events and celebrate sporting glory.

## Cover Story

### 36 Radio Communications and Safety at Sea

John Periam and Geoffrey Lee are back to show us the range of maritime communications devices used for purposes of safety and security at sea, and in case of search-and-rescue emergencies.

### 20 History: The Eiffel Tower

Scott Caldwell delves into the amazing story of this French icon as an antenna, multi-platform radio transmitter, scientific instrument, & strategic asset.

### 24 The Fading Phenomenon

In the first instalment of a comprehensive two-part article, Nils Schiffhauer explains fading on short wave, illustrating how and why this propagation phenomenon occurs, and how you can measure it.

### 30 Airband News

David Smith has news about remote-control towers, investigates the significance of Earth's magnetic field for the future of aircraft comms and reveals communications at RAF Leeming.

### 34 Rallies and Events

Our monthly round-up of radio club meetings, rallies and swap-meets, special events, training initiatives and lectures the length and breadth of the country. Check before you travel!

### 40 News Extra

A sample of the latest news, events and technologies from the world of radio broadcasting, current affairs, and radio science





# Welcome



## 41 TV and Radio Past and Present

Don't miss this article by Keith Hamer and Garry Smith, in which the authors meet Oliver Heaviside enjoy more vintage radio ads, remember *Westward Television* and explore TV graphics designers.

## 44 Digital Radio

Continuing this month's focus on signals analysis, Kevin Ryan provides a thorough review of the remarkable *QIRX* listening and analysis tool for digital radio.

## 48 International Radio

Chrissy Brand unearths some prime Scottish radio gems and gets moving with radio; she introduces programmes and stations from North Africa and previews the coverage of the Tokyo Olympics.

## 52 Aerials Now Special: Review

Keith Rawlings reviews three CB base-station aerial models from the *Sharman Storm* series and shares the latest on the new Ofcom *EM-Field Exposure* Regulations.

## 56 Signals from Space

Tim Kirby shows how you can receive radio emissions from the planet Jupiter, explains the signals' origin and remembers the radio astronomers who detected them.

## 60 Maritime Matters

Robert Connolly shares maritime radio results from an ITU online seminar, dives into submarine communications and explains radio equipment inspections.

# Maritime Safety & the Voice of the Planets

Georg Wiessala  
wiessala@hotmail.com

**H**ello and welcome to the July 2021 issue of *RadioUser*. Things still hang in the balance, as far as Covid restrictions are concerned, and ten days from the day I am writing this, we are supposed to celebrate Freedom Day, 21<sup>st</sup> June 2021; I am not holding my breath, and I am convinced radio, in all its forms, will continue to be of paramount importance to many after that date.

I hope that we have succeeded in bringing you a full and diverse issue again this month. Our cover image shows neither Prince Harry, nor Ed Sheeran, but hints at one of our main features: the importance of the right emergency communications when at Sea. I am not far from the coast here in the Northwest, and the Marine Band is always busy here, especially in the 'carefree' summer months.

This feature is best read in conjunction with Robert Connolly's *Maritime Matters* column, which, amongst other things covers submarine comms.

In our other main feature, we welcome back leading signals analysis expert Nils Schiffhauer, who deconstructs the phenomenon of fading on the short waves, this month and next, in an expertly illustrated piece. Chrissy Brand demonstrates, in the second part of her mini-series, how QSL cards can both reflect and build (what we imagine to be) identities of communities, nations and, of course, broadcasters, as well as celebrating sports-related and other events.

And, talking about national symbols, do not miss Scott Caldwell's contribution about the Eiffel Tower as a radio transmitter; an amazing exploration of the lesser-known aspects of a world monument.

Moreover, in his bi-monthly column on *Signals from Space*, Tim Kirby shows



how you can receive, appreciate and analyse the radio emissions from the planet Jupiter with very simple means.

Take a look at our other 'regulars' and book reviews too, if you wish; here, you can learn about the current debates surrounding the BBC, the impact of Earth's magnetic field on aeronautical navigation, the work of Oliver Heaviside, Scottish radio, and

In terms of reviews this time around, Kevin Ryan, in *Digital Radio*, takes a good look at the *QIRX* digital radio listening and analysis software, while Keith Rawlings, for his *Aerials Now* contribution, tests three CB base-station aerials from the *Sharman Storm* range, which are certainly not a storm in a teacup.

Go to his review now to learn more about them, and about the latest concerning Ofcom and EM field-exposure rules.

Make sure that you check our website regularly and – most importantly – please let me know what you would like to see appear there.

Maybe, you would also be interested in writing for this magazine? See our call for authors in this issue.

Last but not least, please remember to double-check before you set off for any radio or air shows this summer ...

Good listening, take care and stay safe.

**Georg Wiessala**  
Editor, *Radio User Magazine*  
[www.radioenthusiast.co.uk](http://www.radioenthusiast.co.uk)

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# What's New

Have you got something new to tell our readers about? If so, then drop a line to [wiessala@hotmail.com](mailto:wiessala@hotmail.com)

## Handheld Marine Radio with AIS

Icom brings all the features of your fixed VHF to a hand portable with the introduction of the all-new IC-M94DE. The IC-M94DE is the first handheld marine radio that offers users receive information broadcast by other AIS-equipped vessels. The IC-M94DE provides vessel traffic information shown on the radio's large clear display. With its elegant design and abundance of simple-to-use features, this is a game-changing device for anyone who ventures out to sea for recreation or work. The IC-M94DE does not just come with added AIS. Other features include 6W of RF power, 1500 mW of audio output with improved acoustic sound clarity, ensuring clear communications, no matter the environment. This radio has more battery power (approximately 10 hours) for extended operations. You can also assign up to 50 favourite destinations, fishing spots, and so on, as 'waypoints', with the enhanced Navigation feature. The radio features Icom's Float'n Flash and AquaQuake features keeping it operational if it becomes submerged. The Man Overboard function is included for operator protection. Pressing the distress button, while Float'n Flash is activated, will transmit the MOB distress signal, allowing the operator to be located more quickly and easily. The IC-M94DE is available from Icom marine dealers, with a suggested retail price of £349.95 (Inc. VAT).

<https://icomuk.co.uk>  
[sales@icomuk.co.uk](mailto:sales@icomuk.co.uk)



## Icom AH-41 Active Antenna System

ICOM has news on its new active satellite antenna system for using the IC-SAT100 satellite PTT radio in a Building. The Icom AH-41 active antenna system is a new solution that allows a satellite PTT device to connect to satellites by relaying the signal from the roof-mounted antennas to the radios. By replacing the IC-SAT100 antenna with an external antenna, satellite communication is possible either from a vehicle or building. The AH-41 consists of a pair of outdoor TX and RX antennas and BC-253 'power-box', which injects a DC current into the coaxial cable to make the amplifier circuits of the antennas work. The main unit is IP67-waterproof and dust-tight, protected for outdoor installation. It covers both Iridium satellite frequencies and GNSS L1 band frequencies. It provides an excellent solution for expeditions or responders looking to set up logistics/operations or base camp.

(SOURCE: Ian Lockyer, Icom UK)  
<https://icomuk.co.uk>  
[sales@icomuk.co.uk](mailto:sales@icomuk.co.uk)



### STARWAVES DRM SOFT DRM DECODER:

Starwaves GmbH (Gesellschaft mit beschränkter Haftung = 'Ltd.') has released a new app for Android devices to decode DRM broadcasts on the AM and FM bands, using an SDR (software defined radio) and an aerial connected to the device's USB port. Digital Radio Mondiale (DRM) is the digital successor standard for AM and

FM radio services. The Starwaves app enables Android phones and tablets to receive radio broadcasts, text information, and emergency warnings via DRM Digital Radio. The app also supports many more DRM features such as image slideshows, station logos, and service descriptions. The app uses technology from Fraunhofer, a long-time supporter and developer

of DRM technology, who announced their intention of releasing such an app in late 2020. The app is aimed at the radio market in India but is available worldwide on the Amazon Fire and Google Play stores priced at around £4. A full review will appear in a future issue of RadioUser. (SOURCE: Kevin Ryan | RADIO WORLD)  
<https://tinyurl.com/44b7wtm6>

For the latest news and product reviews, visit [www.radioenthusiast.co.uk](http://www.radioenthusiast.co.uk)



## SIRIO CX4-68 available from Nevada

With the explosion of 4m use – now that several modern transceivers include 70MHz coverage – Nevada is pleased to announce a new updated Vertical from Sirio Italy, the CX4-68. The timing is perfect as we enter the summer sporadic E season, and 4 metres has already been opening to the Mediterranean area. The antenna is also suitable for wideband receiving as it covers from 68 to 73 MHz. The CX4-68 is a  $\frac{3}{4}$  wave J pole type vertical that can cover from 63 to 73 MHz; this provides full coverage of the 4m Amateur Band. The antenna is around 3 metres long, has 4.15 dBi gain and 500-watt power handling. It is suitable for both local vertically polarised FM contacts and for use in Sporadic E openings where it is omni-directional. All parts are DC grounded to protect from static and constructed from high-quality aluminium-alloy 6063 T-832. This latest version has improved wet weather protection and performance. The antenna sells for £69.95 and available from UK importers, Nevada.

[www.nevadaradio.co.uk](http://www.nevadaradio.co.uk)



## DUAL Antennas DUAL 3B-222

Nevada is happy to introduce a new 6-element beam aerial that will appeal to Radio Amateurs who are also and CB radio enthusiasts. The DUAL 3B-222 from YU1FC at DUAL Antennas in Serbia is a 6-element beam that covers all three major Amateur bands 20m, 15m, 10m plus the CB radio band from 26 – 27.855MHz. The antenna has a gain from 5.3dBi to 7.3 dBi, depending on the band in use. The boom is just 3 metres long with rugged elements and a maximum element length of 12 metres. With a single common

feed and supplied Balun, the antenna is capable of handling powers up to 1.5kW. It should be noted that whilst as a Licenced Radio Amateur you may use the antenna to listen in to CB radio transmissions, it is illegal to transmit in the CB radio band with your Amateur transceiver or a beam antenna. Both the radio and antenna should meet current UK CB radio specifications. The beam is priced at £649.95 and will be available to buy from July 2021 onwards.

[www.nevadaradio.co.uk](http://www.nevadaradio.co.uk)

**STRONGER REGULATION:** A proposal from the Government to look at strengthening the BBC's system of governance and regulation has been welcomed by *Radiocentre*. The suggestion by Culture Secretary Oliver Dowden to consider these issues as part of the mid-term review of the BBC Charter in early 2022 was outlined in an article for The Times on 24 May following the failings identified as a result of the investigation and report led by Lord Dyson. *Radiocentre* Chief Executive Siobhan Kenny has written to Mr Dowden to welcome his approach and express support for the mid-term review to be used as a means for key issues of regulation and governance “to be considered calmly, carefully and systematically, bearing in mind the importance of the BBC's independence”. In the same letter, *Radiocentre* also proposes that

Ofcom's planned review of BBC regulation and its Operating Licence, expected to commence summer 2021, be put on hold until the mid-term review is complete. Otherwise, there is a risk that some of the most crucial decisions on the future of the BBC, its distinctiveness and its public value role, will have been made before the mid-term review has even started.

(SOURCE: National Press | *Radiocentre*)

<https://tinyurl.com/ub9hr5ud>

**A SPY IN EVERY EMBASSY:** “Witness the ‘Intelligence Coup of the Century’” – Here is the extraordinary story of the longest-running and most successful secret intelligence operation of the 20th Century:

(SOURCE: Bob Houlston G4PVB)

[www.tinyurl.com/embassyspies](http://www.tinyurl.com/embassyspies)

Enter our competitions at [www.radioenthusiast.co.uk/competitions](http://www.radioenthusiast.co.uk/competitions)





## DVMEGA Globetrotter: Call From Anywhere To Anyone

By using the Globetrotter in combination with BlueDV, you have a powerful digital voice communication tool that allows you to communicate from anywhere to anyone with just a simple internet connection. The Globetrotter is an AMBE server and AMBE dongle in one. ('AMBE' stands for Advanced Multi-Band Excitation, an audio compression technology developed by Digital Voice Systems, Inc. (DVS)). The device can be switched between server and dongle in a few simple steps. With the server active you can connect your Android BlueDV AMBE app to the Globetrotter anywhere within range of the internet (Wi-Fi). It is also possible to use the Globetrotter on the road while it is physically at your home. In dongle mode, the Globetrotter is connected with a micro USB cable to the machine running BlueDV. For the more experienced user, the Globetrotter can also be used as a remote AMBE server for Peanut, and so on. The auto-update mechanism checks for new firmware each time it is switched on. It is then installed by a single push of a button. Priced at £139.95.

<https://tinyurl.com/4x6d7c>

[tony@hamradio.co.uk](mailto:tony@hamradio.co.uk)

[www.hamradio.co.uk](http://www.hamradio.co.uk)

### NAVIGATING THE WORLD OF PODCASTING:

*Amplifi Media's Helpful Guide to Navigating the Podcasting Ecosystem* is a very handy introduction to the increasingly complex world of podcasting. You can download this useful at-a-glance graphic at the first URL below, to get an idea of the Who's Who of the podcast world. The second website will take you to A Quick Review of Audio Developments, written by Matt Deegan. (SOURCES: Industry Press | BLOGSTEIN | Amplifi Media | eRadio)

<https://tinyurl.com/9zerpm87>

<https://tinyurl.com/3473ujwe>

**OFCOM MAY REMOVE PRODUCT LISTINGS FROM EBAY:** Media reports suggest 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; eBay said the move was designed to speed up the removal of "illegal or unsafe items" without waiting for approval from the company. Only selected, trusted authorities will have access to the new tools. But those that do will have, "the ability to take down any listings from the marketplace themselves", the company said. More than 50 authorities around the world are already involved in the early stages of the project, it added.

(SOURCE: ICQ Colin Butler)

<https://tinyurl.com/vc5hz73y>



## New Anytone AT-D878UV11 'Plus' DMR Handheld Transceiver at ML&S

Tony Wiltshire M0TNY/ZB2TY, Sales Manager ML&S Ltd., called in to let us know that the ML&S Showroom is open for business again, with all major models on demonstration. The sales team is on hand to answer any questions you may have. In terms of new products, the Anytone AT-D878UV11 'Plus' Bluetooth Digital DMR dual-band handheld is a commercial transceiver with a 1.77-inch colour TFT display and GPS. This new AT-D878UV11 'Plus' model includes DMR Roaming, a faster processor and a larger memory capacity for future enhancements. Ideal for Fire, Search & Rescue, EMS, Police, Forestry and Security operations. Frequency coverage is 144-146 / 430-440 MHz. Includes USB Programming cable. Take a look at the ML&S website, for the full specifications of this transceiver.

**BUTEL SOFTWARE:** There is exciting news from Gommert Buijsen at Butel in the Netherlands. Butel now offers all its software on a USB stick, instead of on a CD. Butel's most popular product is the ARC125 software for the Uniden UBC125XLT scanner. It is both programming software and virtual control, rolled into one. Recently, Butel has added a nice new feature on bank names in the virtual display, because the UBC125XLT is lacking the option of displaying bank names. This update is free for registered users.

For the latest news and product reviews, visit [www.radioenthusiast.co.uk](http://www.radioenthusiast.co.uk)

# Radio News

**EM MEASUREMENTS:** Ofcom has updated its web page, stating its final decision on EMF. The page also includes an EMF calculator.  
(SOURCES: Ofcom | ICQ Amateur Radio Podcast)  
<http://ofcom.org.uk/emf>

**EAST LANCs DAB NEWS:** A new company has been created to apply for a small-scale DAB multiplex licence in East Lancashire. The area, in Round 2 of Ofcom's roll-out plan, will be advertised on June 1st, 2021, and East Lancs Digital has confirmed it will be applying. East Lancs Digital is made up of community stations Pendle Community Radio (Awaz FM) and Rossendale Radio, along with broadcast company fac365. They are working with Viamux to help secure the licence. Anyone interested in adding a radio service to the *Burnley and Blackburn with Darwen Small-Scale DAB* is invited to contact the company via this website:  
(SOURCE: Local and National Press)  
[www.EastLancsDigital.co.uk](http://www.EastLancsDigital.co.uk)  
<https://tinyurl.com/y7xjsnmy>  
<https://tinyurl.com/dyssrw68>  
<https://tinyurl.com/h3dyjv26>

**DEATH BY DEGREES:** Ten more BBC local and national radio stations are closing their medium wave transmitters in May/June: BBC Radios Essex, Cambridgeshire, Devon, Leeds, Sheffield, Hereford & Worcester, Stoke, Lancashire, as well as Radios Ulster and Foyle, will all leave medium wave. Moreover, two BBC stations will reduce AM Coverage of Radio Wales (closing Penmon, 882kHz, and Wrexham, 657kHz) and Radio Gloucestershire (closing Bourton-on-the-Water, 1413kHz). A Total of 17 transmitters will be  
657 BBC R Wales Wrexham  
729 BBC Essex Manningtree  
738 BBC Hereford & Worcester, Worcester  
765 BBC Essex Chelmsford  
774 BBC R Leeds Farnley  
792 BBC R Foyle Londonderry  
801 BBC R Devon Barnstaple  
855 BBC R Lancashire Preston (Riley Green)  
873 BBC R Ulster Enniskillen  
882 BBC R Wales \* Penmon  
990 BBC R Devon Exeter  
1026 BBC R Cambridgeshire Chesterton Fen  
1035 BBC R Sheffield, Sheffield  
1341 BBC R Ulster Lisnagarvey  
1413 BBC R Gloucestershire \*\*  
Bourton-on-the-Water  
1503 BBC R Stoke Sideway  
1584 BBC Hereford & Worcester Woofferton  
(\* BBC R Wales 882 kHz Washford continues)  
(\*\* BBC R Glos 1413 Berkeley continues)



## HF Transmission Matching Baluns & Transformers

Geoff G4ICD/GJ4ICD wrote to us about his business, RF COMMS. Geoff has had an interest in radio since 1958 and although now retired, he is running a small commercial HF antenna/balun business for overseas HF users. Check out the URL, below. Some of Geoff's items are being cleared out and are collect-only but may interest our readers in the Hampshire/Sussex/Dorset areas.  
<https://rfcomms.co.uk>



In announcing these closures, the BBC's director of distribution & business development Kieran Clifton stated: "As I have written about in previous blog posts, we have been closing some medium wave transmitters across the UK which no longer offer sufficient value for money for licence-fee payers. A large and increasing share of radio listening in the UK is digital, and the BBC is committed to a digital future for radio... all of our local radio stations are available on digital terrestrial TV (such as Freeview), and we have transformed our online and mobile offering with BBC Sounds..." Just seven BBC local stations now remain on MW: Cumbria (756 kHz), Derby (1116 kHz), Gloucestershire (1413 kHz), Guernsey (1116 kHz), Jersey (1026 kHz), Norfolk (873 kHz), and Somerset (1566 kHz). Bauer closed four of its AM transmitters on 30 April. All four switched to a retuning message

from 27 April until they went off the air on 30 April: 828kHz Greatest Hits Radio Leeds; 999kHz Greatest Hits Radio Preston; 1152kHz Greatest Hits Radio Manchester; and 1161kHz Magic Radio, Hull. The closure of all these transmitters means that nine medium wave channels will no longer be used in the UK: 657, 729, 738, 765, 792, 801, 873, 1341, and 1503kHz.  
(SOURCE: BDXC, Communication, May 2021)  
[www.bdx.org.uk](http://www.bdx.org.uk)  
<https://tinyurl.com/yjjdd3db>

**LEARNING MORSE CODE:** What is the advantage of learning Morse code for the SWL? Check out the link on *Spy Radio and Cracking the CW Code*, by Peter Waters G3OJV, here:  
(SOURCE: Bob Houlston)  
[www.tinyurl.com/4xtfbtp7](http://www.tinyurl.com/4xtfbtp7)

Enter our competitions at [www.radioenthusiast.co.uk/competitions](http://www.radioenthusiast.co.uk/competitions)





### SMARTPHONES CAN DETECT GEOMAGNETIC STORMS:

Your smartphone may be able to sense space weather and even get a little disoriented by it, according to a researcher, who tested how geomagnetic storms affect the magnetic sensors in cell phones. The new research suggests that apps being developed to use cell phone magnetometers to pinpoint locations could be susceptible to space weather errors. On the other hand, millions of phones sensing changes in Earth's magnetic field could potentially create a vast observatory to help scientists understand these geomagnetic storms. Cell phone magnetometer chips are being explored as a backup for GPS, which uses satellite signals to triangulate location and thus is often inaccurate or unavailable in places where signals can't penetrate, such as inside large buildings or underground. "Smartphone magnetometers are being commercially explored for applications as diverse as locating customers in shopping malls for targeted advertising, to precision needle-guided surgery," wrote Sten Odenwald, of NASA's Space Science Education Consortium at Goddard Space Flight Center in Maryland, in Space Weather. But there's a catch. Geomagnetic storms can buffet and temporarily alter the shape of Earth's magnetic field. So, theoretically, they could degrade the accuracy of magnetometer chips. This degradation could be a problem if your target advertising hits in the wrong place, or you're performing needle-guided surgery and miss the mark. To find out whether phones are susceptible to the vagaries of space weather, Odenwald tested the iPhone 6S, Samsung Galaxy Note 5, Samsung Galaxy S8, and Samsung Galaxy S9 in simulated geomagnetic storms [...]. Read the full story on the websites listed below.

(SOURCE: AGU | Space Weather | Larry O'Hanlon)

<https://tinyurl.com/ydxah93h>

<https://tinyurl.com/vkj2n44v>

<https://doi.org/10.1029/2020SW002669>

### COMMUNITY RADIO FUND 2021-22 OPENS FOR APPLICATIONS:

The first round of the Community Radio Fund 2021-22, with £400,000 available, is now open for applications. For the first time, C-DSP licence holders can apply, with a closing date of 5 pm on Friday 25 June



## RigExpert: MixW4 Software Release

RigExpert Ukraine has completed work on the next release of the MixW4 software. MixW4 version 1.4.0 was not just conceived as an improvement on version 1.3.0. The MixW team has significantly reworked the core, added a lot of interesting new features, and implemented its

own digital signal processing algorithms. Now, MixW 1.4.0. is a simple and convenient tool for radio amateurs for use both in everyday QSOs and in contests. In addition to all the familiar digital modes, such as PSK, RTTY, MFSK, and so on, this program also includes the newly popular FT4 and FT8 modes, which were implemented using our own code. The most important features of MixW4 are as follows: 3 in 1 (Logger, Digital, Contests) • KiwiSDR support • Digital modes including FT8 and FT4 with proprietary digital signal processing algorithms • Unique CW software algorithm with fine-tuning for solid (FB) signal Convenient interface with the ability to multi-window, customize fonts, and display • A wide range of macros allowing for faster communication • Contest mode with support for modules with extended statistics.

[office@rigexpert.com](mailto:office@rigexpert.com)

<https://rigexpert.com>



## SDRplay: Scheduler Function & Fake Products Warning

UK-based SDR receiver manufacturer, SDRplay is close to releasing a new scheduler function. Available with upcoming release version 1.41 of SDRUno, the new scheduler software allows you to set up numerous recording events for your radio. As well as providing all the expected calendar options (time of day, date, start and stop times, repeating options and so on), you

can also set the 'profile' for each recording – this allows you to pre-set frequencies, bandwidths, demodulator options (AM/FM/USB/LSB etc.), choice of filters and antenna port selection. Additionally, you can choose the settings for connectivity to other third party software or the running of a specific plugin. Watch out for some new demonstration videos on the SDRplay YouTube channel (see URL, below) – SDRplay also asked RU to warn our readers that there is an increase in the number of rogue traders and fake "SDRplay" products out there on the internet and urge everyone to double-check that they are only buying from SDRplay or their approved resellers. Some of the counterfeit devices appear cosmetically the same as the genuine SDRplay® devices. There is a high likelihood that these devices will not work, since the counterfeiters have no access to the rigorous production test solutions used by SDRplay.

<https://www.sdrplay.com/distributors>

<https://www.youtube.com/c/sdrplayrsp>

[jon.hudson@sdrplay.com](mailto:jon.hudson@sdrplay.com)

2021. In 2020-21, grants were provided as emergency cash funding to support stations facing severe financial difficulty due to the Coronavirus outbreak. For 2021-22, the Fund will return to supporting the core costs of running Ofcom-licensed community radio stations, as set out in the guidance notes. Licensees that hold a Community Digital Sound Programme (C-DSP) licence are eligible to apply for the Fund if the station is broadcasting on a digital radio multiplex at the date of their application. Ofcom says it expects that the Community Radio Fund Panel will meet in August 2021 to consider the applications. However, scheduling will

depend on the volume of applications received. Reacting to the news, Martin Steers from the UK Community Radio Network, said, "It's great to see the fund has opened to support community radio, and we welcome the changes back to core funding to enable stations to grow and develop to become more sustainable. We also welcome the addition of C-DSP licenses now being able to apply for funding but will continue the call on the DCMS and wider government to increase the fund to enable the ever-increasing number of eligible stations to be able to receive much-needed funding."

(SOURCE: CRF | RadioToday)

<https://tinyurl.com/matbeve3>

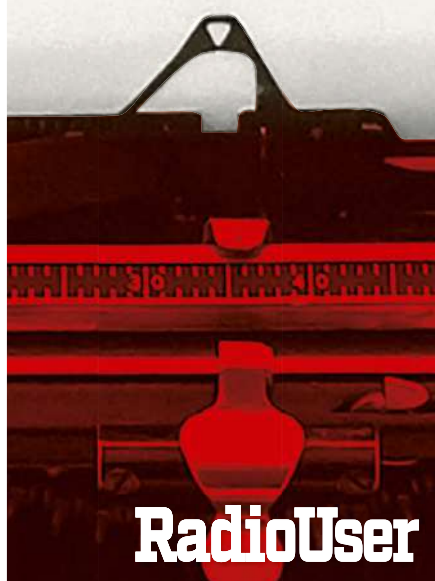
## This is your chance to write for RadioUser

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If you would like to share your expertise and enthusiasm with our readers, and if you enjoy testing equipment and software, then please drop me a line. Previous experience in writing for publication is an advantage but not a prerequisite.

Georg Wiessala  
wiessala@hotmail.com



# European Private Shortwave Stations

June 1st 2021

Only legal stations are included. Most stations use 100 to 3,000W of power.

D = Germany, DNK = Denmark, FIN = Finland, NL = Netherlands, NOR = Norway, Irr. = irregular, F.pl.: future plan, min. = minutes, Mo = Monday, Tu = Tuesday, We = Wednesday, Th = Thursday, Fr = Friday, Sa = Saturday, Su = Sunday.

| kHz   | Country | Name                       | Transmitter Site | Schedule (UTC)                          |
|-------|---------|----------------------------|------------------|-----------------------------------------|
| 3920  | NL      | Radio Piepender            | Zwolle           | Irr. We                                 |
| 3955  | D       | Radio Channel2 92          | Rohrbach Waal    | 24/7                                    |
| 3975  | D       | Shortwave Radio            | Winsen           | Daily 1500-2200                         |
| 3985  | D       | Shortwave service          | Kall-Krekel      | Daily 1400-2200                         |
| 3995  | D       | HCJB                       | Weenermoor       | 24/7                                    |
| 5880  | NL      | Radio Piepender            | Zwolle           | Irr. - alternative to 5955              |
| 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      | Radio Piepender            | Zwolle           | Irr.- weekends                          |
| 5970  | DNK     | Radio 208                  | Hvidovre         | 24/7                                    |
| 5980  | DNK     | Radio OZ-Viola             | Hillerød         | We 2100-2200, Sa-Su 1100-1300           |
| 5980  | FIN     | Scandinavian Weekend Radio | Virrat           | 1st Sa of the month                     |
| 6005  | D       | Short wave 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                            |
| 6055  | DNK     | Radio OZ-Viola             | Hillerød         | Alternative to 5980                     |
| 6070  | D       | Radio Channel 292          | Rohrbach Waal    | 24/7                                    |
| 6085  | D       | Short wave service         | Kall-Krekel      | Daily 0700-1700 (Radio Mi Amigo Int'l)  |
| 6115  | D       | Radio SE-TA2               | Hartenstein      | Inactive                                |
| 6140  | NL      | Radio Onda, Belgium        | Borculo, NL      | Weekends only: F. pl.: Daily 0630-1900  |
| 6150  | D       | Europa 24                  | Datteln          | Daily 0800-1600                         |
| 6160  | D       | Shortwave Radio            | Winsen           | Mo-Sa 10-16, Su 08-16 & 18-22           |
| 6170  | FIN     | Scandinavian Weekend Radio | Virrat           | 1st Sa of the month                     |
| 7365  | D       | HCJB                       | Weenermoor       | 0800-1300                               |
| 7460  | NL      | Radio Piepender            | Zwolle           | Will be cancelled initially             |
| 9530  | NL      | Radio Onda, Belgium        | Borculo, NL      | F.pl.: from Jul yor August              |
| 9670  | D       | Radio Channel 292          | Rohrbach Waal    | 24/7                                    |
| 11690 | FIN     | Scandinavian Weekend Radio | Virrat           | 1st Sa of the month                     |
| 11720 | FIN     | Scandinavian Weekend Radio | Virrat           | 1st Sa of the month                     |
| 15505 | NL      | Radio Piepender            | Zwolle           | Irr.-weekends (LP)                      |
| 15790 | DNK     | World Music Radio          | Randers          | Sa-Su 0700-2000 + irr. at other times   |
| 25800 | DNK     | World Music Radio          | Mårslet, Aarhus  | F.pl.: 24/7 from late June or July 2021 |

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 and HFCC registrations. The list is not copyrighted and may be published everywhere. Subscription by email is free of charge; write to [shn@wmr.dk](mailto:shn@wmr.dk).

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David Harris

mydogisfinn@gmail.com

**David Harris reviews a topical new book plugging into the current debate surrounding the nature and future of the BBC before he evaluates a well-illustrated title on a famous Scottish local community radio station.**

## The War Against the BBC

This book is about why the BBC is in peril, why this matters and what can be done about it. The authors are passionate advocates of the BBC, and the book is a counter to the anti-BBC propaganda which has become widespread in recent years. The BBC is more than just another broadcaster – it is part of the country's understanding of itself. It is at the heart of British broadcasting, creating original British content.

The challenges to the BBC are not just political. There have been huge changes in technology, which have given rise to subscription services such as *Netflix*, *Amazon*, *Disney* and advertising-funded channel *YouTube*. These are particularly popular with younger people who watch less terrestrial TV than previous generations. The BBC has also come under attack from the right-wing press and Conservative politicians who have alleged that it lacks impartiality. Moreover, the BBC is subsumed under a large regulatory framework, which often makes change difficult to implement.

In this volume, the authors point out that, in real terms, the BBC's funding has been cut by 30% since 2010. An additional burden, imposed by the Government, is the requirement to provide free TV licences for the over 75s. The cost of this is around £600 million a year, or one-fifth of the BBC's licence fee income.

The BBC was founded in 1922 and became a statutory public corporation in 1927. Since then, it has operated under a Charter, which gets renewed every 10 years. The current charter will expire in 2027.

The BBC currently provides six TV channels, 13 regional TV news programmes, 10 national and 40 local radio stations. There is also BBC Online and *BBC Sounds / iPlayer*. No other broadcaster offers such a wide variety of material. It amounts to 280 hours of original programming a day and is used by 99% of households each week.

A major critic of the BBC has been the Murdoch empire, which owns *News International* and publishes *The Times* and *The Sun*. Rupert Murdoch also owned Sky



# The Future BBC and Scottish Radio

which he sold to *Comcast* in 2018 for £30 billion. The *Daily Mail* has also been a stern critic of the BBC.

The authors further cite the role of the right-wing think tanks, for example, the Institute of *Economic Affairs*, the *Adam Smith Institute*, the *Tax Payers Alliance*, the *New Culture Forum*, the *Centre of Policy Studies*, *Civitas*, and *Policy Exchange*. These organisations lack transparency over how they are funded but have an immense influence on certain sections of the Conservative party; they are regularly quoted by the Tory press.

According to the authors, the reason why the BBC is under attack is twofold: First, the Libertarian Right are ideologically opposed to public sector broadcasting. Their views

are that the free market should run every aspect of society. The other adversary comes from those commercial businesses which would benefit if the BBC were to be sold off or scaled-down. These include the US media corporations: *Facebook*, *Apple*, *Amazon*, *Netflix*, *Comcast* and *Google*. The BBC also has its critics on the left who see it as a pro-establishment, white, Oxbridge-dominated organisation promoting elite interests (cf. *The BBC: The Myth of a Public Service* by Tom Mills, which was reviewed in *RadioUser*, April 2017: 29).

One of the most contentious issues is the licence fee, which has been in existence since 1923. It is seen as simple, secure, predictable and is associated with how the BBC is funded. However, its critics claim



**The War Against the BBC. How an unprecedented combination of hostile forces is destroying Britain's greatest cultural institution ... And why you should care.**

**Patrick Barwise  
Peter York**



*The War Against the BBC. How an unprecedented combination of hostile forces is destroying Britain's greatest cultural institution...*

*And why you should care.*

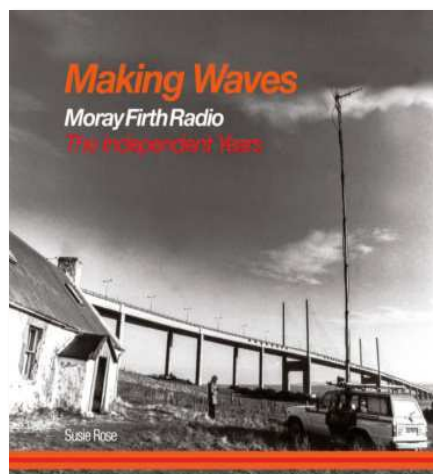
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that it is regressive, offers no choice to those who do not consume BBC content, is expensive to collect and has a 5% evasion rate. In this book, Barwise and York assess the alternatives, such as advertising and subscriptions, which are both discounted. They favour a levy (rather like the Council Tax), charged to every household, regardless of whether services are consumed. This model is in use in Germany and other countries.

The book offers a lengthy explanation of how liberal democracy has been challenged in the West by militant nationalism, populism, intolerance, division and disinformation – much of it fuelled by social media.

The Trump Presidency in the USA and 'Brexit' in the UK are cited as examples of how the political landscape has changed. The 'Brexit' issue illustrates how a contentious political matter can be 'talked up' and create division. The same forces that brought 'Brexit' to the political agenda could do the same and turn opinion against the BBC. I feel that this book should be read by anyone who feels that the BBC is worth saving.



*Making Waves: Moray Firth Radio:*

*The Independent Years*

by Susie Rose

Published by Matador

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[www.troubador.com/matador](http://www.troubador.com/matador)

### **Making Waves**

Moray Firth Radio (MFR) was founded in 1982 as an independent local radio station serving the Moray Firth area of North Eastern Scotland. It was based in Inverness and served an area from Wick (100 miles to the North) to Banff (70 miles to the East). It was the first commercial station to serve a sparsely populated area.

This new book was written by Susie Rose who started at the station as a volunteer in the early 1990s and was employed by MFR from 1997-2007.

The book spans the period from the late 1970s – when the idea of a 'local' radio station first began to be discussed – to around 2000 when MFR had become a fully commercial station. Although the station had paid employees and was funded by advertising, it was initially a hybrid community/commercial station, heavily dependent upon volunteer input.

The book is abundantly illustrated with photos of presenters, guests, outside broadcast locations and radio ephemera. It does not purport to be the definitive history of the station.

The archives of MFR have been preserved and will be lodged with the *Highland Archive Centre*, Inverness. Perhaps one day a student will exploit this resource and produce an academic study of one of Britain's most interesting and innovative commercial stations.

The radio listener in Inverness in 1982 could listen to BBC stations Radio 1 (AM

only), Radio 2, Radio 3, Radio 4, Radio Scotland, and Radio Highland (a BBC opt-out, based in Inverness, which broadcasts for a couple of hours a day). There were no other commercial stations, and community radio was decades away.

MFR transmitted on both AM and FM, and this gave people the chance to listen to popular music and enjoy good quality reception. The station's start-up costs were around £250,000, some of which was provided by local investors. However, *Standard Broadcasting of Canada* was a major investor, and the *Highland and Islands Development Board* awarded MFR a £58,000 grant and a £155,000 loan.

The original *Moray Firth Community Radio Group* held 10% of the shares.

Station managers were able to show that the coverage area supported no less than 18 local newspapers.

MFR began broadcasting on 23 February 1982, employing local people, including some who had worked for the local hospital radio. They had a potential audience of around 160,000 and were permitted to broadcast for 12 hours a day. By October 1982, the station had a reach of 58% and was the most popular station in the area. Operators sold a lot of local advertising, which they recorded themselves.

The big difference between MFR and commercial stations today is that MFR offered a lot of speech-oriented programmes (not just phone-ins) and undertook numerous outside broadcasts. Many of the staff went on to work for national media, including Jeff Zycinski, who became head of BBC Radio Scotland and wrote about his time at MFR in his memoir *Red Light Zone*, which was reviewed in *Radio User*, June 2019: 49).

The station won the *Sony Local Radio Station of the Year Award* every year between 1996 and 1999.

Overall, I believe that this book provides a valuable insight into what was a truly local community station, covering a distinctive part of Scotland with its own sense of identity.

The book is mainly aimed at people who live in the Inverness area and remember the 'golden days' of MFR but it is also of significance to media scholars who have an interest in community radio.

The author is to be congratulated for putting together such a fine account of the station.

For more about the early years of MFR, take a look at this website:

[www.vintagemfr.scot](http://www.vintagemfr.scot)



ALL PICTURES: CHRISSEY BRAND, EXCEPT FIG. 5: QSL REVIEW

Chrissy Brand  
chrissyLB@hotmail.co.uk

# Windows into Global Cultures

**F**rom the 1960s onwards, with many countries still finding their place in the new world order, any additional way to project a country as being 'benevolent' and 'trustworthy' was seized upon by governments and their respective state broadcasters. Shaping an audience's opinion and world view became many broadcasters' fundamental *raison d'être*. Promoting a modern image was part of this, with new national identities and world views being forged, along with ties to both economic and political blocks.

The US and USSR's military power and propaganda were reflected in every way possible, including through QSL cards. Washington's *Armed Forces Radio and TV Service* and Moscow's *Radio Station Peace and Progress* were supposedly separate from the Voice of America and Radio Moscow and carried different programming from their two funding bodies, but with the same message as their respective governments.

However, the QSL cards issued – the US Ministry of Defense crest with an American Eagle, and the *Peace and Progress* drawings of doves and Lenin's Mausoleum – under-

**Chrissy Brand** concludes her mini-series on how QSL cards reflect both national and community identities. She looks at present-day broadcasters and appreciates QSLs issued for commemorative and sporting events.

lined both stations' ideological messages of 'strength and might', representative of the two largest world powers.

Elsewhere, African countries fought for, and gained, independence from their colonial straitjackets. Many new radio stations that emerged proudly displayed their new identity in the only way they could, i.e. through their broadcasts and QSL cards. The Voice of Nigeria and the Ghana Broadcasting Corporation were just two examples of stations whose branding and QSLs included the colours of their new flags.

## A Tourism Asset

Many broadcasters' QSLs have depicted transmitter sites, radio studios or presenters, targeted specifically at DXers, as they are, naturally, interested in the operational side of a station. Photos of transmitter sites on QSLs have included WRMI at Okeechobee and Vatican Radio at Santa Maria di Galeria. Relay sites in exotic locations have also been depicted, such as NHK using the Gabon relay, and, in the 2010s, those for IBB relay sites in Sri Lanka, the Philippines and São Tomé.

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Fig. 1: QSLs with strong graphic imagery can showcase a station's global standing. Fig. 2: Radio Taiwan's QSLs suggest the country has a strong, modern, artistic community. Fig. 3: Radio Romania continues to promote tourism in its 2021 QSL card series. Fig. 4: A Radio Korea 1988 Olympics QSL card. Fig. 5: This 2021 Bangladesh DX QSL continues the tradition of the positive representation of a country.

Sometimes the representations of broadcasts in QSLs have been accomplished with graphic flair and panache. The 1988 upgrade of the Yamata transmitter site in Japan and Radio Bremen's blue and yellow transmitter tower card spring to mind (Fig. 1). This is the promotion of an identity that would appeal to most DXers and, in turn, perhaps give someone another reason to stay in contact or visit a station or country for reasons beyond conventional tourism.

QSL cards are an obvious tool to help promote a country or region's tourism potential. For many years, the main QSL card issued by the BBC World Service depicted a photo of Tower Bridge. I suppose this was a representation and symbol of London's imperial past and underpinned the positive global reputation that the BBC had earned in its coverage of World War II.

A more appropriate QSL, issued in the 1980s, depicted a night-time view of the BBC World Service's HQ Bush House. Working at the BBC myself in that era, this was also given away as a postcard to visitors. For me, it encapsulated the spirit of the BBC motto, *Nation Shall Speak Peace Unto Nation*.



A country's landmarks, culture and natural beauty are a sure-fire way to engage with potential tourists, both DXers and any friends or family that catch sight of a QSL card popping through the letterbox.

State broadcasters in Egypt, Greece, Iran and India have often celebrated their thousands of years of history through photos of porcelain, pottery and sculptures.

Issuing QSL cards in this vein also suggests that a station, its broadcasts, its country and culture have gravitas and heritage that has earned respect from the rest of the globe. The inference could be that, by listening to the relevant language service of such stations, you too can be imparted with knowl-

edge and wisdom that is rooted in ancient times.

There have been many radio stations that simply send standard picture postcards, with a photo of the city or country concerned. These might have a station logo and details printed on the back and space for details of the verification – date, time, frequency.

Radio Cairo, Radio France International, Uruguay's Emisora Ciudad de Montevideo, Rádio Nacional do Brasil are among countless international broadcasters who explored that route.

I imagine that, although some station used this as standard procedure, others had a pile of postcards in the verification office,

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<https://tinyurl.com/ak3xrs46>

which were then used if official QSL cards were running low. Either way, a postcard is a nice way of promoting a city or region and also signifies a feeling of friendship and connection with the station, in the same way as a holiday postcard sent from a friend (in pre-internet days) would. A win-win situation for both the station and listener, although I am sure that some QSL collectors would be disappointed to not receive a more specialist QSL card, showing transmitters or studios.

Overall, QSLs from broadcasters usually reflect a perceived, shared external projection of itself. This idea of nations as, in Benedict Anderson's oft-quoted words, *imagined communities* is typified by a range of The Voice of Greece's QSL cards, with photos of the islands and the blue Aegean Sea. In recent years, the broadcaster has issued e-QSLs depicting the country's heritage, such as a 1500 BCE fresco from Knossos, jewellery from Skyros, and views of ancient Athens.

Some have used QSL cards to promote a picture of national unity, even if the reality may be a little different. China Radio International, for instance, featured a range of ethnic minority groups with its *Great Family of the Chinese Nation* QSL series. These have been issued throughout the past decade and continue today. It has been a fascinating and collectable series, with Blang, Kirgiz, Lahu, Maonan, Mongolian, Va and Yi people being among the diverse peoples featured. In order to collect the entire series, you would need to expose yourself to many hours of China

Radio International programming.

In 1970's Poland, Radio Polonia echoed its government's claim to be a socially progressive country, with a range of artistic QSL cards. In the style of that era, Radio Polonia showcased urban achievements and rural beauty through artwork focusing on communities, countryside, transport and shipbuilding.

## Sporting Chance

Sporting events have also provided opportunities for radio stations to publicise their host country's kudos and global standing. In pre-Covid times, to be designated an Olympic and Paralympic city or Euro or World Cup host, boosted a country's reputation as a tourist attraction, with coverage through global media.

A country can be seen by the rest of the world as dependable, and even trustworthy when it hosts a successful sporting extravaganza that creates a festive spirit of inclusivity. State-funded radio stations have always been happy to help celebrate that. The Moscow Olympics of 1980, the Seoul Olympics of 1988, the 2008 Beijing Olympics and the 2014 Sochi Winter Olympics took place in countries considered by most to be authoritarian. Yet the good publicity gained through sport helped to gloss over some uncomfortable truths.

Radio Korea produced some stunning QSL cards of athletes in action for the 1988 games, while CRI showcased its spectacular stadia in a 2006 QSL series.

The FIFA World Cups in West Germany in 1974 and 2006 in Germany were commemorated by Deutsche Welle with QSL cards, including the depiction of mascots *Tip* and *Tap* in 1974. The 2018 Winter Olympics in Pyeongchang, South Korea, were marked by KBS World with mascots *Soohorang* and *Bandabi* in cartoon form on a QSL card. Using a more serious approach, NRK Radio Norway celebrated hosting the 1992 Winter Olympics with a QSL card of the event's medals.

After the national team's triumph in Munich at the 1988 Euros (then called the European Nations Championship), Radio Netherlands issued a QSL card with a photo of the Dutch team on the front. This was a nice way to celebrate the victory and to continue to raise the Netherlands' well-respected reputation as a nation of healthiness and athleticism.

Will there be any QSL cards issued this year by NHK Radio Japan for the Olympic Games, or by European broadcasters for the UEFA Euros?

## Novelties and Collectable QSL Memorabilia

Smaller stations also have a chance to raise their international profile, through broadcasts with a QSL card tie-in. In the 1990s, Radio St. Helena broadcast a special annual programme for St. Helena Day. This initiative began in partnership with the NorDX Club. Each February, *Radio Ömrang* airs a programme on short wave in the Frisian dialect, which has put the region on the map, at least with DXers.

The European DX Council (EDXC) has also produced commemorative QSL cards, usually associated with programmes that have been aired from, or about, its annual conference.

It is a good way of spreading awareness among the wider DXing global community, as well as being a popular addition to QSL collections.

<https://edxcnews.wordpress.com>

Ronald Kenyon wrote in about an unusual Radio Roma QSL card illustrated with a robin and a musical score. The music is a Neapolitan song, *Catari*, by Salvatore di Giacomo and Mario Costa. This was a novel approach to promote a country's musical pedigree on a QSL card, which is more often the domain of photographers and painters.

Some stations have issued QSL folders rather than cards. A Radio Kuwait QSL card folded out into three parts, packed full of information. While, in 2010, Radio Belarus produced a nice card with station images and logos. Mine contained copious handwritten correspondence, signing off by stating, "you are welcome to Minsk and our radio station".

In recent years, TRT, the Voice of Turkey have issued special QSL cards to mark *International Teacher's Day*, *International Women's Day* and *Fathers' Day*.

Revolutions have been commemorated on QSLs, such as a 1984 QSL from IRIB (Islamic Republic of Iran Broadcasting). There was a photo of a protest on one side, while the back included the message, "*War is ugly, but to be dominated by aliens is still uglier.*"

Radio Moscow's 1977 QSL cards celebrated 60 years of the Russian Revolution, whilst a standard Radio Tirana QSL in the 1980s comprised a line drawing of a woman waving a flag with a star. and the slogan, "*Haut Leve L'Esprit Revolutionnaire.*"

War has also allowed broadcasters to push a viewpoint through QSL cards. An example of this is Radio Atlantico del Sur, the Spanish-language short wave station operated by the British Ministry of Defence in the 1982 Falklands War.



### Current-Day QSL Cards

QSL cards are still sent out by some broadcasters, often as e-QSLs rather than printed form, due to costs, but these are still very welcome and continue to promote a station's image.

The Voice of Vietnam, The Voice of Turkey, Radio Romania International, and Radio Prague International are just four of the many stations that still pursue the issuing of QSL cards, in order to promote civic and national pride, generate potential tourism income and, perhaps, encourage future trade links.

Radio Taiwan International, meanwhile, has tended to celebrate its own anniversaries with artists commissioned to produce vibrant QSL card designs (Fig. 2).

Bangladesh DX Report is a segment on AWR's *Wavescan* which produces some stunning QSL cards. The photos of Bangladesh (Fig. 5) continue the tradition of lifting a country's international PR profile.

Radio Prague's QSL series this year celebrates a variety of achievements under the banner of "Made in Czech Republic". The eight inventions featured include contact lenses, Jawa motorcycles and the sugar

cube. Previous series have covered a diverse range which included castles and châteaux, landscapes, artists, athletes, and radio technology.

Radio Romania International operates on a similar agenda, with cards of castles, coins and Romanian landscapes being amongst recent years' series. In 2021, a *Visit Oradea* campaign is underway (Fig 3.)

Free Radio stations, certainly those operating on short wave, are steeped in the tradition of creating QSL cards, as most of these broadcasters are also listeners. This is also the case for many of the licensed radio broadcasters such as Denmark's World Music Radio, and those heard on Channel 292 and The Shortwave Service.

Examples of the latter include one hundred years of German radio (*100 Jahre Rundfunk*), being marked, last year, in a QSL series from Welle 370 via Channel 292. Radio Northern Europe International, The Ghoul and KSOL are amongst other stations that hire airtime on relay stations, and which are worth e-mailing a reception report to, for an e-QSL.

In today's still thriving short wave free radio scene, it is a case of "anything goes"

with QSL card design. Both the programme and QSL card content is down to the station operator's tastes.

Photos of sunsets, equipment, landscapes and attractive women are commonplace. Face de Blatte (which, weirdly, means 'cockroach face'), Radio Casanova, Free Radio Service Holland, Bogusman, and Radio Pacman all produce a variety of QSLs that illustrate this.

It would require me to write a book were I to fully consider all the ways that QSL cards have been used throughout the decades. I have only touched upon some of the themes in this mini-series and have left out many broadcasters.

However, to conclude, it is safe to say that the QSL is still very much in use today, as a further tool to promote an image of a broadcaster's identity and as a talisman for a wider regional or national unity. In the case of individual and smaller organisations and programme-makers hiring airtime on licensed relays and also across the free radio community, the QSL card remains an incentive to ensure listener-station interactions.

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**T**he Eiffel Tower (Fig. 1; Table 1) (nicknamed the *Iron Lady*) was constructed in situ, on the *Champ de Mars* in Paris. Gustave Eiffel (Fig. 2; 1832-1923) was granted a 20-year concession, which ran from 31<sup>st</sup> December 1889 until 1<sup>st</sup> January 1910, when the ownership was to revert to the city of Paris.

<https://www.toureiffel.paris/en>

At the time, the future of the Eiffel Tower was by no means guaranteed, since it had originally been designed for the 1889 *Universal Exhibition*, and its popularity had now begun to decline significantly among Parisians.

<https://tinyurl.com/khw9jec5>

Initially, there was considerable outrage amongst the academic community of Paris. A total of 300 prominent artists and writers publicly expressed their hatred for Eiffel's 'iron giant'. In a petition published in the French newspaper *Le Temps* just as construction commenced, the group referred to the Tower as a 'giddy ridiculous tower dominating Paris like a gigantic black smokestack'.

This outrage was most noticeable at the 1900 *World's Fair* when it was perceived as an 'eyesore' that dominated the city's elegant skyline. Another line of attack was directed at Eiffel and had a more sinister tone. In an article titled *The Jewish Question*, someone claimed that Eiffel was, in fact, a German Jew, claiming to have traced his family history.

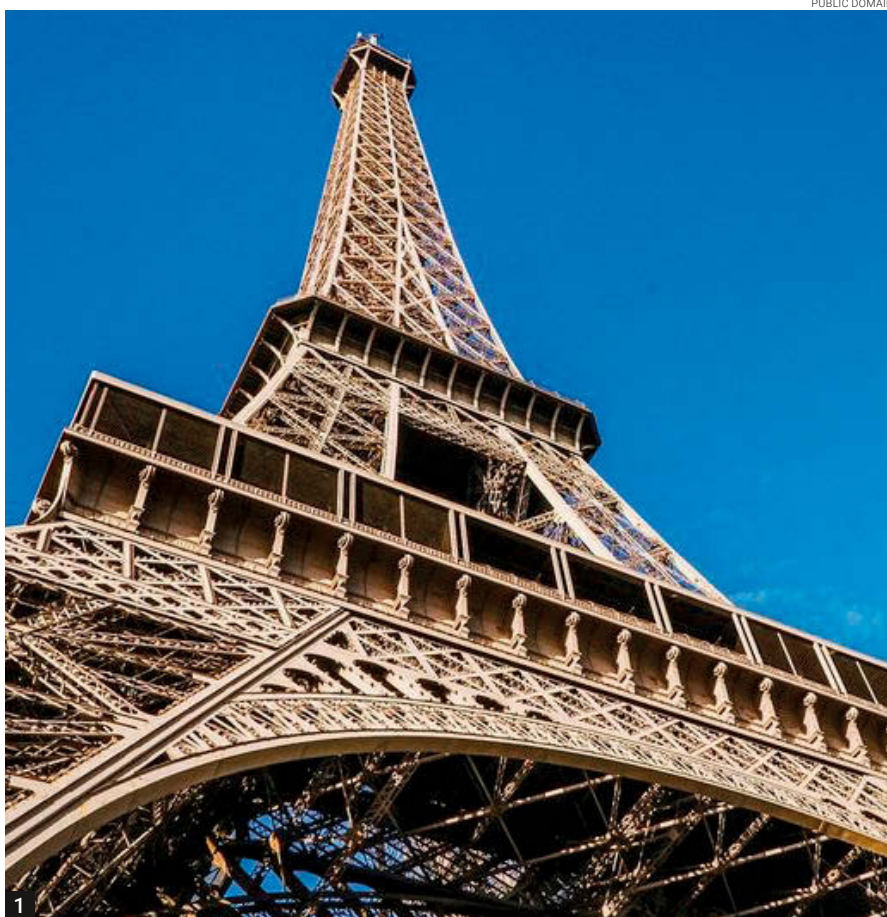
(See also Scott's article on Radio Technology at the World's Fairs, *RadioUser*, May 2021: 46-48 Ed.).

### A Scientific Rationale

From its very inception, Eiffel knew that only the tower's utilisation for scientific ends would eventually safeguard it from his business adversaries and prolong its lifespan. To address this challenge, he specified the tower's scientific purposes, which were as follows:

- Meteorological and astronomical observations;
- Physics experiments;
- A strategic vantage point
- An optical-telegraph communications facility; and
- A beacon for electronic lighting.

Eiffel argued that "It will be for everyone an observatory and a laboratory the likes of which has never before been available to science. It is the reason why, from day one, all of our



# Radio and the Eiffel Tower

**Scott Caldwell** goes to lofty heights to explain the radio-related history of Paris's Iron Giant, looking at the scientific work conducted here, and at the strategic functions of the Tower.

*scientists have encouraged me with their utmost sympathies".*

### The Exposition Universelle

The Paris exhibition of 1889 commemorated the centenary of the French Revolution. It was meant to be a monument to progress and human achievement, a symbol of social solidarity, and a spectacle that would be a marvel of the world.

By contrast, its detractors argued that it signified the ugly triumph of capitalism and industry which dominated the

French Third Republic (*La Troisième République*, from 1870).

### Wireless Telegraphy: The Saving Grace of the Eiffel Tower

On November 5<sup>th</sup>, 1898, Eugène Ducretet carried out the first wireless telegraphy trials between the Eiffel Tower and the Panthéon, separated by a distance of 4km. Ducretet reported his findings to the Academy of Sciences on November 7<sup>th</sup>, 1898: "Transmission-tests between the Eiffel Tower and the Panthéon, which I started on October



**Fig. 1: The Eiffel Tower – radio transmitter and important multi-purpose scientific platform.**

**Fig. 2: Gustave Eiffel, the famous designer of the eponymous tower.**

**Fig. 3: The daring, doomed, aviator Leon Collet.**

26<sup>th</sup>, have been followed to this day. The distance crossed is 4km, and the gap is occupied by a large number of high buildings; the signals received at the Panthéon have always been very clear, even by a rather thick fog; it is thus possible to affirm that with the same apparatuses this distance could be appreciably increased ...

"The transmitting station installed on the third platform of the Eiffel Tower included: A 25cm Rühmkorff spool, powered by my motor switch and a hand switch, for strong currents, producing intermittent emissions of oscillating discharges between the three spheres of an oscillator. One of the extreme spheres of this oscillator was placed in communication with the insulated end of the radiator wire, suspended in space to the intermediate platform; the other extreme sphere was directly connected to the metal mass of the tower, playing the role of the Earth ...

"Under these conditions, the length of the spark between the spheres of the oscillator is greatly diminished, probably because the radiator wire, in the vicinity of the metal tower, acquires a large capacity. The receiving apparatus was installed in the Panthéon, on the terrace above the colonnades. By placing oneself in the opposite conditions – the Panthéon becoming a transmitter and the receiving Eiffel Tower – one obtains no reception of waves; the immediate vicinity of the metal tower and the vertical collecting wire cancels the effect of the waves should act on the radio-conductor".

## Patronage and Strategy

In 1903, Eiffel enlisted the influential patronage of Captain Gustave Ferrière (1868 – 1932), who was engaged in studying the military applications of wireless communications. In 1905, the network was extended to communicate with fortified towns in Eastern France. The French lived in constant fear of another armed conflict with the Prussian Empire.

Their defeat at the hands of Prussia in 1871 still dominated French military planning, requiring reliable command and control capabilities.

It was also strategically vital that Paris could freely communicate with French possessions in Africa, Asia, America, and Oceania.

In terms of military preparations and international commerce, the country was keen



on strengthening its position in the 'Concert of Europe'. Encouraged by the experimental results obtained by Ferrière, the Ministry of Military Engineering authorised the construction of fixed wireless antennas at the Eiffel Tower.

Initially, the French military was sceptical and favoured optical signals and racing pigeons, due to their apparent reliability. However, the excellent results obtained slowly changed their perception of long-distance wireless communications.

In 1910, the city of Paris renewed the Eiffel Tower's permit for another 70 years, safeguarding its long-term future.

A *New York Times* article dated January 27<sup>th</sup>, 1908, highlighted the strategic importance of the Eiffel Tower and its wireless communication capability most clearly: "A highly placed French military official told the *New York Times* correspondent that the French Government, by means of its wireless station on the Eiffel Tower, hoped to have a unique method of communication with French warships in all parts of the world. 'You were quite right', he said in announcing recently, that Paris, in the near future, would be able to communicate by this means with New York, though I do not believe that, up to the present, the Government has considered any project for establishing a permanent station beyond the Atlantic. Communications could be sent to our warships without using any land receiving station. In the case of the campaign in Morocco, we send dispatches direct to the French warship that is in the vicinity of the point we wish to reach. In the same way, if the Klebes was lying in New Orleans, for example, we could send her a message direct without employing the present roundabout methods".

## World War I and the Arrest of Mata Hari

At the outbreak of the First World War in August 1914, the Eiffel Tower was considered a vital military asset. One of the most famous feats of the wireless station was the interception of a coded message between Spain and Germany, which contained information associated with Operative H-21.

The infamous Mata Hari (1876 – 1917) was subsequently identified as *Operative H-21*, and the Eiffel Tower – through the method of radio detection – played a key role in her arrest in relation to charges of espionage. The wireless at the Eiffel Tower provided the French military with another strategic advantage over the Germans. Therefore, German signals were routinely jammed. This denied the German military the capability to coordinate their attacks and they became reliant on pigeons to deliver messages to the frontline.

The French High-Command even managed to construct a complete organisational chart of the German army (except von Kluck's 1<sup>st</sup> Army, which was not yet engaged in the conflict). The German Zeppelin airships also utilised the wireless station at the Eiffel Tower as a fixed point of reference to aid their navigation. During a raid of October 19<sup>th</sup>, 1917, Ferrière ceased his transmissions, and they were switched to a station in Lyon La-Doua. As a direct consequence, one Zeppelin ended up in the South of France while another one was lost in the Mediterranean Sea.

Due to its strategic importance, the Eiffel Tower was heavily guarded against sabotage attacks. On the ground, the structure was reinforced by a ring of barbed wire, while a network of anti-aircraft guns offered a measure of protection from air attacks. American embassy attaché Eric Fisher Wood wrote on August 4<sup>th</sup>, 1914, that, 'all night the beams of searchlights comb the sky for invaders and cast a tragic reflected glow upon the city beneath'.

Later that month he recalled a more vivid impression of wartime Paris:

"It is an uncanny experience to walk through a great city which is absolutely dark. The Champs-Élysées is probably, at present, the darkest avenue on earth. All those monumental lamp posts, which used to stand like beacons in the midst of the stream of traffic, now shine no more. The Sun seldom rises without revealing the ruins of one of these lamps and an automobile, the two having mutually destroyed each other in the darkness'.

On November 10<sup>th</sup>, 1918, the Eiffel Tower intercepted a message from the German High Command agreeing to the terms of the Armistice.

Voices from America

Experiments in the long-distance transmissions of speech by radio waves, continued unabated, despite France’s involvement in the First World War. In October 1915, spoken words were transmitted from Arlington, Virginia, and received at the Eiffel Tower. A telegram was sent to the US Navy confirming that the words had been subsequently received.

This was a significant moment in the history of global wireless communications: It was the first time that a voice message had been transmitted by radiotelephone across the Atlantic Ocean, a distance of almost 4,000 miles. The experiment was conducted on three separate days, and it was also, remarkably, received in Honolulu.

The *New York Times* reported on the success of the experiment: “*The Navy Department has successfully talked to the Eiffel Tower on the wireless telephone. The American Telephone and Telegraph company received a telegram to the effect. The voice of the official at the Arlington wireless was heard, but the Eiffel Tower was not equipped with a transmitting apparatus and could not reply telephonically.*”

The Tragic Death of Leon Collet

Lieutenant Leon Collet (Fig. 3) was an adventurous army aviator who attempted to fly under an arch beneath the lowest story of the Eiffel Tower. The inspiration for the daring stunt was the result of a wager made with a chance American acquaintance, made in a Parisian restaurant. The American piqued Collet’s pride, claiming that if the Eiffel Tower were in America an airman would have long ago performed the daring stunt.

Tragically, he caught his wing against the wireless antenna that descended to the Champ de Mars from the top of the Eiffel Tower. His plane crashed to the ground, and he burned to death in front of horrified spectators.

The weather before the attempt was far from ideal. On the day, he circled about for more than an hour, waiting until the mist had sufficiently cleared. At approximately 9 o’clock he gained control and confidence and managed to guide his plane under the lower platform. It was alleged by his colleagues that he was well aware of the presence of the steel wire antenna but failed to see it.

Conclusion

The Eiffel Tower stands as a cultural symbol of France, and its utilisation as a wireless communications station is largely unknown by most visitors who seek an all-inspiring



|                            |                                                                                          |
|----------------------------|------------------------------------------------------------------------------------------|
| Current Height             | 1,063 feet                                                                               |
| Original Height            | 1,024 feet                                                                               |
| First Floor                | 187 feet/ 14,485 Square feet                                                             |
| Second Floor               | 377 feet/ 4,692 Square feet                                                              |
| Third Floor                | 906 feet/ 820 Square feet                                                                |
| Lifts                      | 5 Lifts from the Esplanade to Second Floor<br>2x2 Duo Lifts from Second Floor to the Top |
| Weight of the Metal Frame  | 7,300 tons                                                                               |
| Total Weight               | 10,100 tons                                                                              |
| Number of Rivets           | 2,500,000                                                                                |
| Number of Iron Sections    | 18,038                                                                                   |
| Paint                      | 40 tons                                                                                  |
| Number of Steps to the Top | 1,652                                                                                    |
| Pillars                    | 4 Pillars Forming a 410 Square feet Sideways Square                                      |

Table 1: The Dimensions of the Eiffel Tower.

view of Paris. Without its multi-functional role as a tourist attraction and wireless station, it is most likely the Eiffel Tower would have been dismantled after only 20 years of service. This would have robbed France of a national and cultural icon that is truly unique.

The 1920s witnessed the development of a production studio that supported further radio communication experiments. These experiments naturally progressed to television programming under the administration of Édouard Belin (1876 – 1963).

This, in turn, may have safeguarded the Eiffel Tower’s future as its unique capabilities provided the perfect platform to transmit television signals.

Resources and Suggested Further Reading

- Durant, S. (2013) ‘Gustave Eiffel: Aerodynamic Experiments 1903 – 1921’, *Engineering History and Heritage*, 166(4), pp. 227 – 235.
- Hogan, J.L. (1914) ‘Radio Telegraphy at the Eiffel Tower’, *Scientific American*, 111(16), pp. 325 – 326.
- Jonnes, J. (2009) *Eiffel’s Tower*. Penguin Books: London.
- Peyrel, B. (2020) *The Eiffel Tower: Timeless Monument*. Abrams Books: London.



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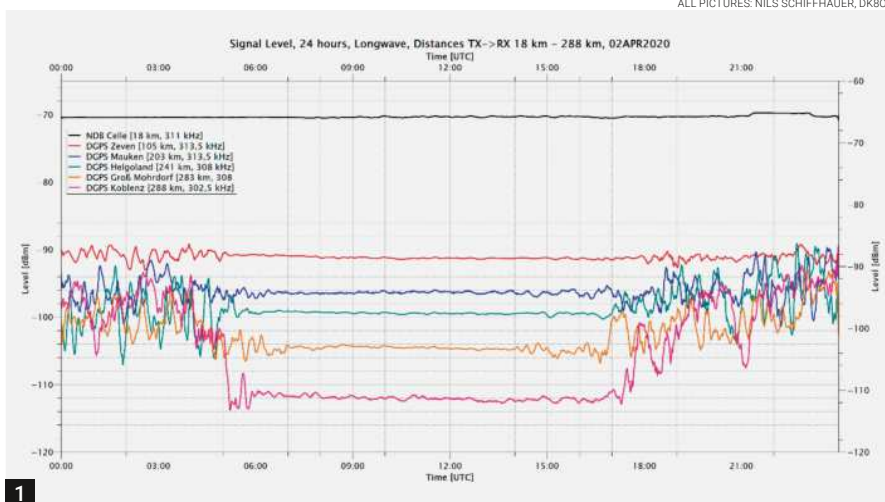
**S**ignals come, fade and go: Fading is a constant companion of all DXers (Fig. 1). SDRs and matching software now provide fascinating insights into fading but also contain many new possibilities for analysing the actual transmitter activity, including sign-on and sign-off times, as well as aerial repositioning.

Fading results from the properties of, and activities within, the Earth's ionosphere. To illustrate this influence through a signal, we need to know exactly what properties this observed signal has at its starting point, the transmitting antenna. Transmitters with a near-permanent stable level, such as the carriers of AM radio transmitters or professional phase-modulated transmitters (PSK), are particularly suitable for this purpose. SSB and CW signals, on the other hand, are only suitable in exceptional cases.

This article is limited to examining signal strength as a global value. Propagation phenomena such as Doppler-shift, multipath propagation and geomagnetic effects are not included; they are not considered *qualitatively* but only *quantitatively* – in terms of their effect on the signal strength and its temporal course.

Listeners and radio amateurs alike are familiar with the procedure of signal strength measurement from the very beginning: they first evaluate reception quality according to signal level, as indicated on the S-meter and found as 'S-points' in the SI(NP)O or RST code. Conventional receivers use the control voltage of the automatic gain control (AGC) for display; they measure the signal level at the antenna input, at best indirectly and usually non-linearly. In addition to this, the quality and setting of the AGC have a considerable effect on such measurements, which are particularly unreliable at low signal levels.

Software-Defined Receivers (SDR), on the other hand, measure the signal directly and largely in a linear fashion (bypassing an AGC); they measure in dBFS (decibels relative to the fullest possible measuring range) and in – dBfs (relative to full scale). The software converts these values into the familiar S-values, although professional a display in dBm is preferable. This in turn refers to an input power of 1mW, so that S9 (below 30MHz) corresponds to a value of -73dBm. For our tests, only an SDR with proper software is suitable, where the levels can be saved for later inspection.



1

# Fading: How to Monitor and Evaluate Signal Strength (Part I)

Nils Schiffhauer DK8OK delves deeply into the fascinating subject of how HF signals fluctuate, describing fade-in and fade-out, plateauing, and smoothing, and introducing reliable measurement techniques you can try at home.

## How to Proceed: Hardware – Software – Workflow

These requirements often make the SDR-V3 software by Simon Brown, G4ELI, with its 'Data File Analyser', my tool of choice. It collects these values and saves them in a .csv file (in which the values are separated by commas). This is only possible with pre-recorded and saved RF files, from which a spectrogram has to be created first. In this context, bear in mind that the number of lines/second determines the maximum temporal resolution. It can be selected between 10 and 0.01, which corresponds to a resolution of 1 millisecond to 100 seconds.

However, the maximum amount of data must not exceed 100,000 lines. Working for 24 hours, at a one-second resolution, is still well below this limit with 86,400 data. This is

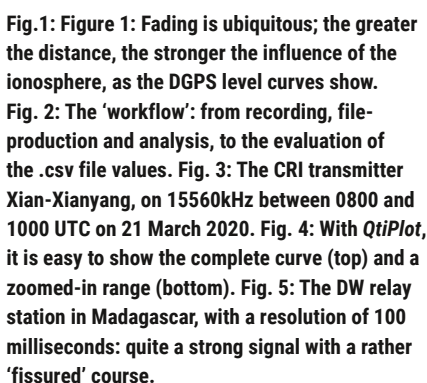
sufficient for many applications. For a higher resolution, simply select a smaller time range; for example, up to about 20 seconds, at 1-millisecond resolution.

Longer recordings at this resolution can be achieved by merging individual files of this type with a maximum of 100,000 data regarding both 'time' and 'level'. The concept is shown in Fig. 2, using my setup here.

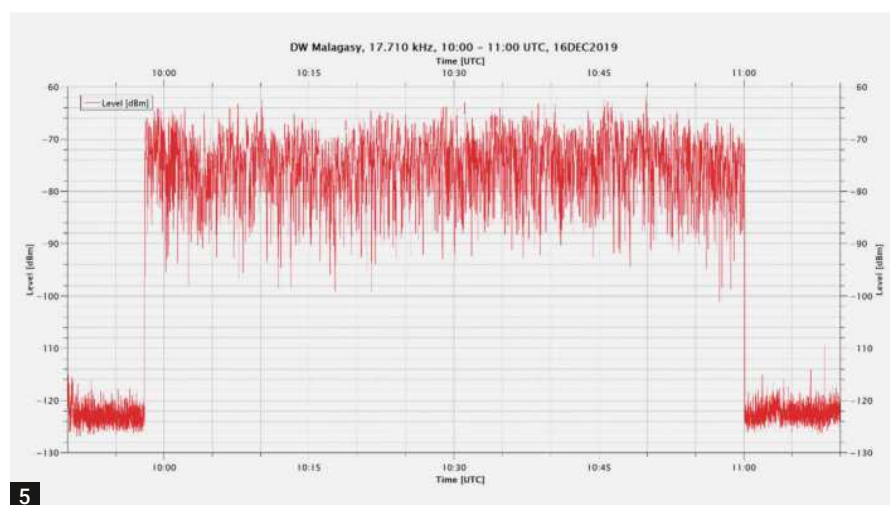
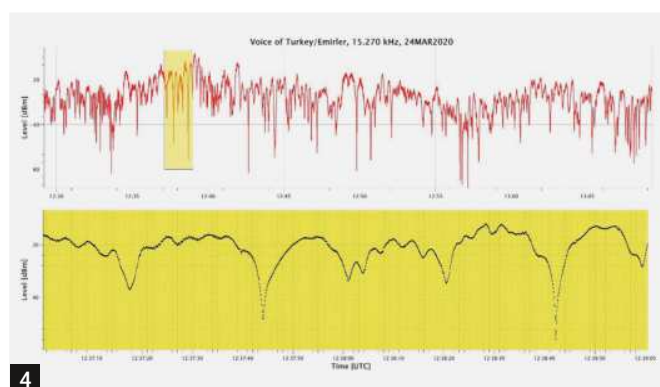
The latter consists of the vertical active antenna MD300DX with a vertical 2 x 5 m dipole, the professional SDR Winradio Excalibur Sigma and a powerful PC connected via USB3.0 to an external hard disk of 28 TB capacity.

This ensures a more professional approach: the active antenna offers an almost equal antenna factor over the entire short wave range; the receiver processes this signal linearly, and PC and external



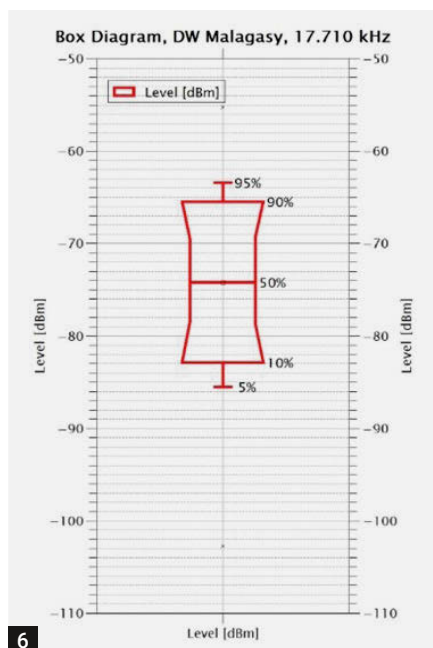


With its *Signal History/F* function, the onboard analyser of *SDRC-V3* already offers an initial inspection of the data, which can be used to proceed further (Fig. 3). The CSV

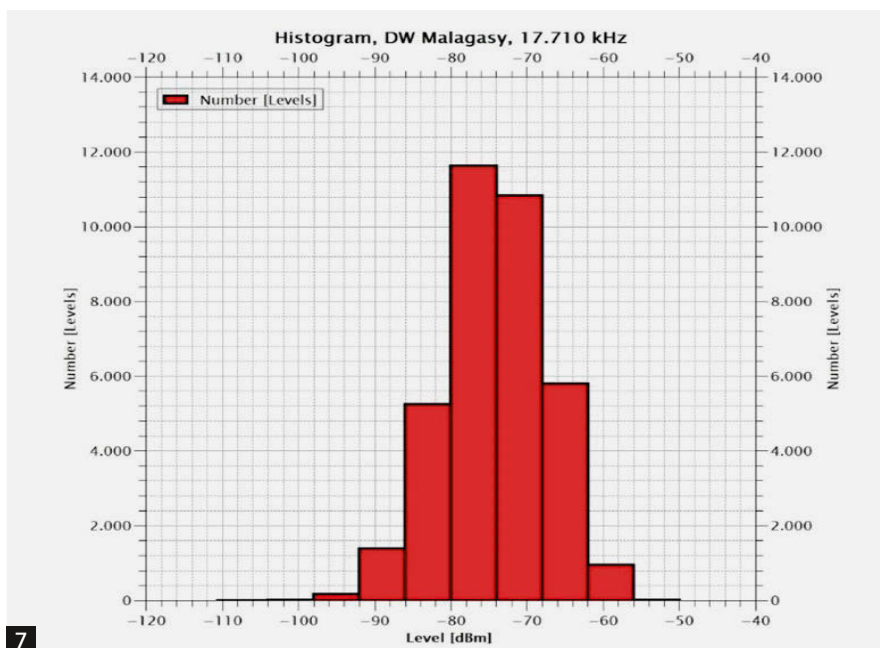


I have compiled some of my observations below, which at the same time contain some methodical hints. You have to know beforehand what the original, transmitted, signal you want to analyse looks like. The carrier frequencies of AM radio transmitters are most suitable here: They are either constant (which is the case with old transmitters), or they are slightly co-modulated, in time with the modulation, to save energy.

This method of so-called MDCL (modulation-dependent carrier control) ensures modulation-dependent changes in carrier amplitude by mostly 3dB, but also by



6



7

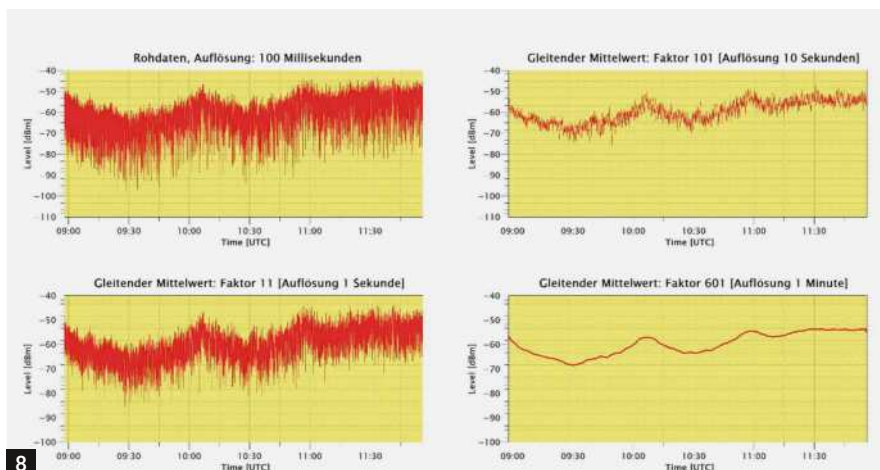
up to 6dB for just regional broadcasters. In contrast to this, many data signals, including DRM, are transmitted with constant power in professional applications such as STANAG4285.

It is also important not to rely just on 'curves and numbers', but to *listen* again and again: Is this, in fact, the listed station I am measuring? Is it possible that the modulation of the adjacent channel during a pause in transmission of the station might be observable? There are some common errors.

The illustration in Fig. 4 shows an example using the signal of the German-language broadcast of the Voice of Turkey on 15270kHz: the top half shows the almost complete hour of broadcasting, the bottom half two minutes, which I have zoomed in to. This clearly shows the individual data points of the broadcast recorded with a resolution of 100 milliseconds, especially in the short, sharp drops of the signal.

### Fading: Some Key Figures

Monitors can describe the typical properties of fading using just some key figures as well as describing the means of smoothing. Fig. 5 shows the level of the Madagascar transmitter of Deutsche Welle on 17710kHz for 60 minutes between 1000 and 1100 UTC, with a 100-milliseconds resolution. The Swahili transmission with 250kW is directed towards East Africa, so that Central Europe is still well covered by the 310° lobe of the curtain directional antenna. My QTH here in Germany is at 324°; the signals arrive after not just one hop, but three jumps over about 8,700 km.



8

The *QtiPlot* software suite determined the following key figures for the signal:

- Maximum: -55.2 dBm
- Minimum: -102.8 dBm
- Average value: -74.2 dBm
- Median: -74.2 dBm
- Standard deviation: 6.7 dBm.

In this case, the 'mean' and 'median' denote the same value.

The phenomenon we know as 'fading range' is also crucial. This is the difference between the levels reached during 10% and 90% of the time. The box diagram in Fig. 6 illustrates this, while the histogram (Fig. 7) provides information about the distribution of the levels over time.

For this purpose, the fading range between minimum and maximum of 47.6 dB is divided into ten groups of equal size (here: 4.8 dB), and the number of measurements

falling into each of these groups is shown. If we look at the fading over a short time of only about ten minutes, the distribution is asymmetrical (*Rayleigh-Distribution*). This means that small values are found much more frequently than large values. These differences almost cancel each other out over a longer period, such as a few tens of minutes, resulting in a largely symmetrical distribution, the famous *Gaussian Bell Curve*.

### A Clear Arrangement: Smoothing

At a resolution of 100 ms or lower, there can be (far) more than 100,000 data pairs per time/level for the period we are interested in. This high resolution is important if we want to look at the finer structure of the fading, or if we wish to determine exactly the sign-on and sign-off times of a station, as well as the influence of other transmit-



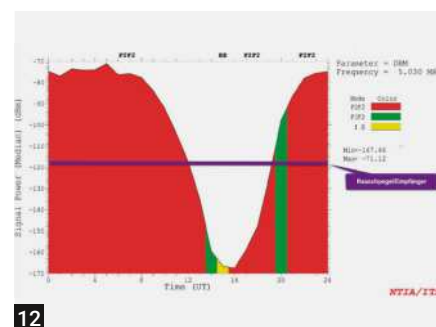
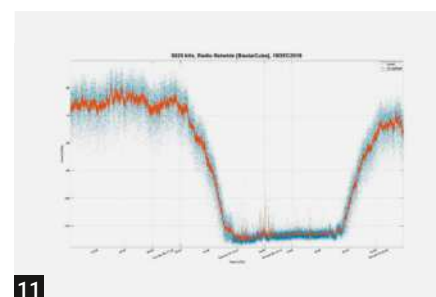
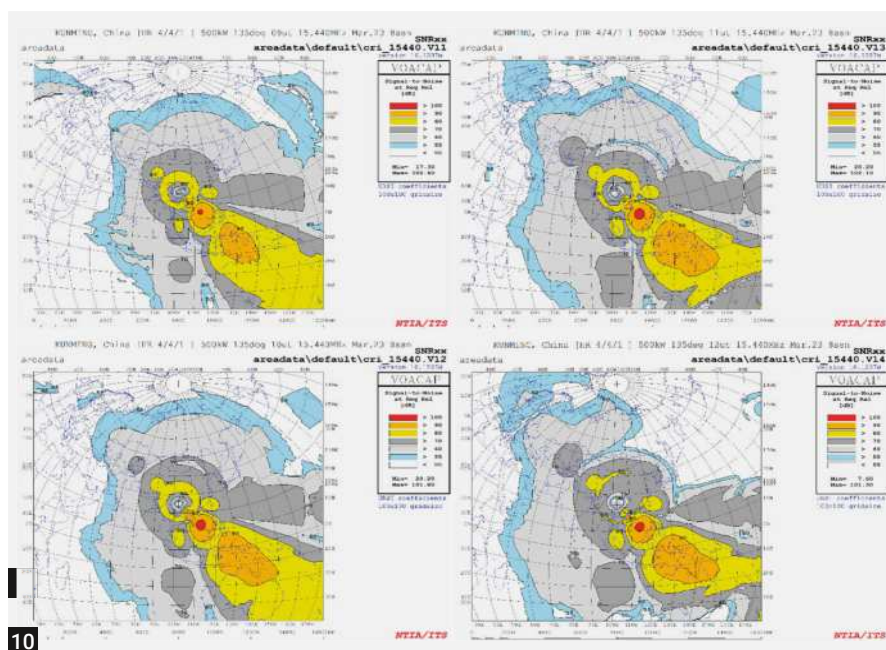
DBF Manager

File Edit Search View Set Record Tools Window Help

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| FREQ     | STATION                      | UTC       | DAYS    | LANGUAGE       | TARGET  | LOCATION       | LOC | POWER   | AZ  | ANTENNA  | MO  | MODT | NP | CP | SA | EL | AF | ME | AS | AL | PA | CIRAFZONES     | STN   | BRK  | ADT | COUNTRY     | LC | LONGI  | LATI  | POSITION             |
|----------|------------------------------|-----------|---------|----------------|---------|----------------|-----|---------|-----|----------|-----|------|----|----|----|----|----|----|----|----|----|----------------|-------|------|-----|-------------|----|--------|-------|----------------------|
| 15435.00 | CHINA RADIO INTERNATIONAL    | 0200-0227 | 1234567 | Phaeto         | neME    | Xian-Xianyang  | XIA | 500.000 | 292 | HR 4/4/5 | AM  | A3E  | -  | -  | -  | -  | -  | -  | -  | -  | -  | 40E 41NW       | CRI   | CRI  | CHI | China       | 43 | 10836E | 3422N | 108 36 37E 34 22 33N |
| 15435.00 | CHINA RADIO INTERNATIONAL    | 0300-0357 | 1234567 | Russian        | seEU    | Xian-Xianyang  | XIA | 500.000 | 292 | HR 4/4/5 | AM  | A3E  | -  | -  | -  | -  | -  | -  | -  | -  | -  | 29S 30S        | CRI   | CRI  | CHI | China       | 43 | 10836E | 3422N | 108 36 37E 34 22 33N |
| 15435.00 | FAR EAST BROADCASTING COMP   | 0000-0045 | 1234567 | Shan (Burmese) | seASn   | Bocau          | BOC | 100.000 | 305 | HR52/2/5 | AM  | A3E  | -  | -  | -  | -  | -  | -  | -  | -  | -  | 43S 49N        | FEBC  | FEBC | PHI | Philippines | 50 | 12054E | 1440N | 120 54 37E 14 40 00N |
| 15435.00 | FAR EAST BROADCASTING COMP   | 0045-0100 | 1234567 | Tai Hua        | seASn   | Bocau          | BOC | 100.000 | 305 | HR52/2/5 | AM  | A3E  | -  | -  | -  | -  | -  | -  | -  | -  | -  | 43S 49N        | FEBC  | FEBC | PHI | Philippines | 50 | 12054E | 1440N | 120 54 37E 14 40 00N |
| 15440.00 | CHINA RADIO INTERNATIONAL    | 0900-1000 | 1234567 | Mandarin       | AU      | Kunming-Anning | KUN | 500.000 | 135 | HR 4/4/1 | AM  | A3E  | -  | -  | -  | -  | -  | -  | -  | -  | -  | AL PA 55 59 60 | CRI   | CRI  | CHI | China       | 43 | 10229E | 2452N | 102 29 44E 24 52 54N |
| 15440.00 | CHINA RADIO INTERNATIONAL    | 1000-1057 | 1234567 | Cantonese      | AU      | Kunming-Anning | KUN | 500.000 | 135 | HR 4/4/1 | AM  | A3E  | -  | -  | -  | -  | -  | -  | -  | -  | -  | AL PA 55 59 60 | CRI   | CRI  | CHI | China       | 43 | 10229E | 2452N | 102 29 44E 24 52 54N |
| 15440.00 | CHINA RADIO INTERNATIONAL    | 1100-1157 | 1234567 | Mandarin       | AU      | Kunming-Anning | KUN | 500.000 | 135 | HR 4/4/1 | AM  | A3E  | -  | -  | -  | -  | -  | -  | -  | -  | -  | AL PA 55 59 60 | CRI   | CRI  | CHI | China       | 43 | 10229E | 2452N | 102 29 44E 24 52 54N |
| 15440.00 | VOICE OF ISLAMIC REP OF IRAN | 0653-0720 | 1234567 | Hebrew         | neAF/ME | Sigan          | SIR | 500.000 | 295 | HR 4/3/5 | AM  | A3E  | -  | -  | -  | -  | -  | -  | -  | -  | -  | 30NE 39W       | VOIRI | IRB  | IRN | Iran        | 40 | 05547E | 2935N | 055 47 03E 29 35 49N |
| 15442.40 | MFA Pyongyang                | 1200-1500 | 1234567 | DATA TELEX     | EU/NAF  | Pyongyang      | PYO | 5.000   | 320 | RHO      | LSB | F1B  | -  | -  | -  | -  | -  | -  | -  | -  | -  | 27-29.37.38    | NKDN  | XDI  | KRE | Korea-North | 44 | 12533E | 3905N | 125 33 00E 39 05 00N |



ters on the same frequency (see below). But first, we should get an overview, and reducing the values in a targeted manner does this.

This sounds absurd at first but becomes clear from Fig. 8, I hope. Here, a smoothing average is applied: Each level value of the raw data is replaced by the average value of neighbouring data points. If a factor '11' is set, the sixth level value is replaced by the average of its  $\pm 5$  neighbouring points. And not only at this point ('6'). Every other data value is the average of its neighbours. If the raw data are available in a resolution of 100 ms in this way, a picture results similar to the case as if we had only recorded the level every second, with factor '601' every minute in this way, and so on.

Smoothing can also be understood as applying a low-pass filter: the fast level changes are filtered out; the slower ones appear more clearly. Fig. 8 shows this procedure and its effects using the example of the China Radio International (CRI), Kunming-Anning station, with its 500kW transmission on 15440kHz in Mandarin/Cantonese towards Australia, between 0900 and 1200 UTC on 23 March 2020.

The transmitter data is taken from Bernd

Friedewald's *International Listening Guide* (ILG), one of the most frequently updated and most accurate databases around.

<https://www.ilgradio.com>

Fig. 9 is a read-out with *DBF Manager*.

It also allows for some more exact modelling with the *Voice of America Coverage Analysis Program* (VOACAP) propagation prediction software (Fig. 10).

<https://www.voacap.com>

These four figures here show how even the back lobe of the curtain antenna used still provides a sufficient signal-to-noise ratio for good reception. The signal 'swells' and 'falls' in a very characteristic way. These are exactly the 'hills' and 'valleys' we find in the level recording in Fig. 8, with peaks at 0900 UTC, shortly after 1000 UTC and 1100 UTC.

From there on, the level reached at 1115 UTC remains reasonably stable until the end of transmission at 1200 UTC.

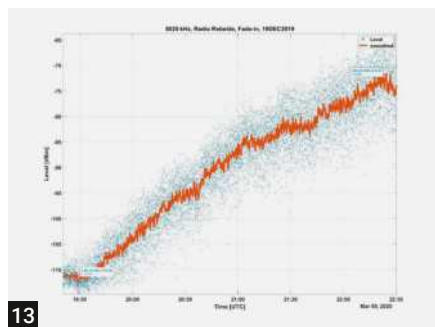
### Fade-in, Fade-Out, and Plateau

Now we have all the tools we need to track down some exciting phenomena that have a decisive impact on successful DXing. *Absorption Fading* is, perhaps, the best-known effect: low frequencies are best received when it is dark, high frequencies in

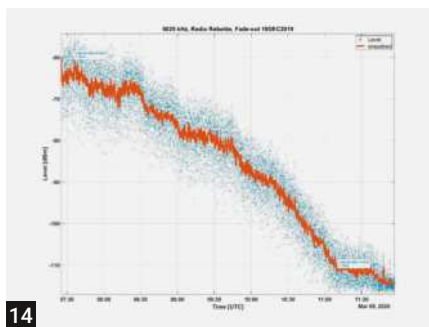
**Fig. 6: The signal waveform of DW Malagasy on 17710kHz for one hour in the morning shows these characteristics. Fig. 7: The histogram shows the distribution of the signal strengths in ten categories, or 'bins'. Fig. 8: The raw data, in the upper left-hand corner, is smoothed in three steps. Fig. 9: Bernd Friedewald offers current, and detailed, information about almost all stations on short wave. Fig. 10: Dispersion can be simulated via the VOACAP software suite. Fig. 11: Level development of the carrier of Radio Rebelde (Bauta / Cuba) on 5025kHz on 19<sup>th</sup> December 2019 (24h). Fig. 12: VOACAP can simulate propagation with great reliability and accuracy.**

the daytime. The position of the first or last reflection point on the propagation path is the decisive factor. At low frequencies during the day, the high ionisation power of the Sun blocks reception by creating a D-layer that attenuates these rather longer waves.

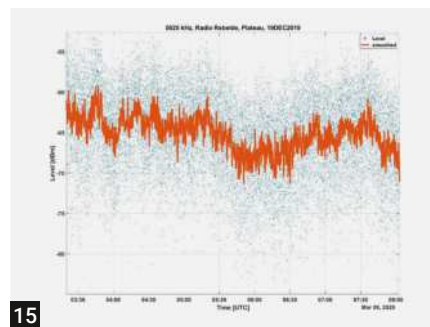
Conversely, high frequencies can only propagate when the ionization has reached a certain strength. Take a look at Fig. 11: It shows the daily variation of Radio Rebelde/ Cuba on 5025kHz, on 19<sup>th</sup> December 2019. Roughly speaking, the level curve breaks down into the following four phases with roughly the following times:



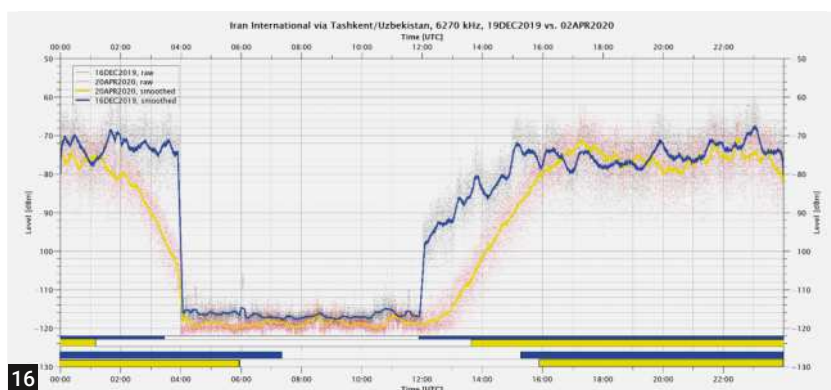
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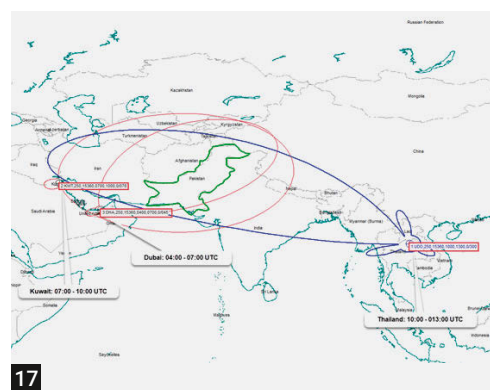
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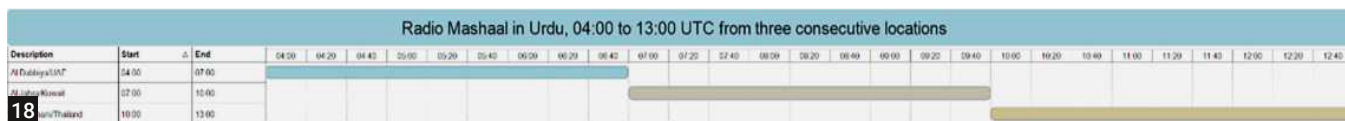
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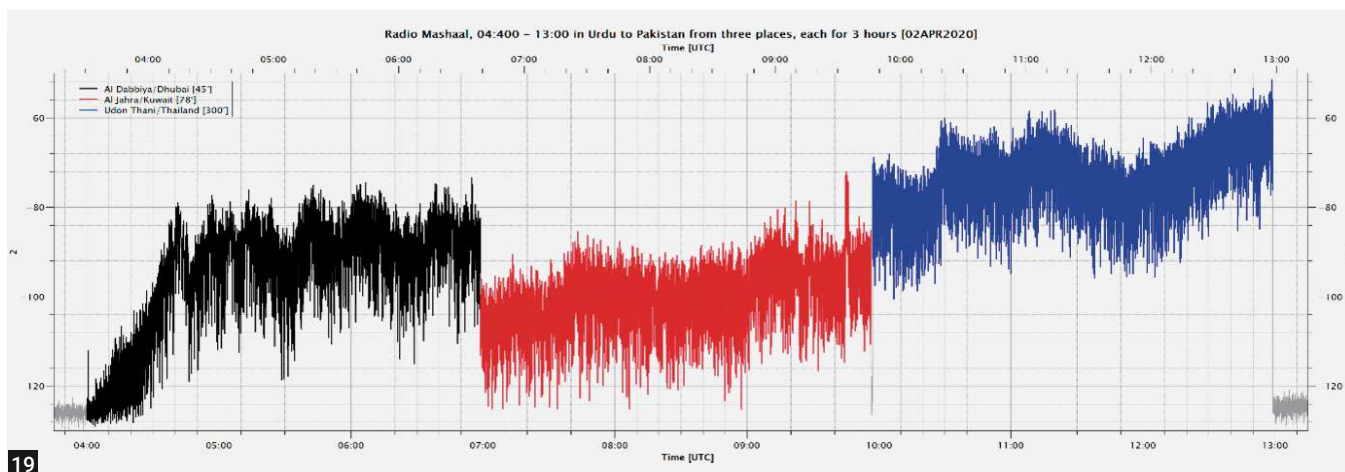
16



17



18



19

- Fade-in (1930 to 2230 UTC)
- Plateau-phase; a good signal, with some very small fluctuations of approx.  $\pm 6$  dB (2230 to 0800 UTC)
- Fade-out (0730 to 1100 UTC)
- No reception, because the D-layer, built up in the meantime, does not allow propagation (1100 to 2000 UTC).

The VOACAP prediction software, which is in widespread use by DXers across the World, simulates this very accurately (Fig. 12). Now let us take a closer look at the individual

phases. They follow the respective degree of ionization of the ionosphere at the reflection points: Fade-in is the 'coming-in of the signal as it rises from the noise to the plateau phase. In the Cuba example in Fig. 13, the fade-in starts at about 1930 UTC from a level of -111 dBm and reaches the plateau phase at about -72 dBm after about three hours. The slope is quite regular and amounts to about +13 dB/hour.

By contrast, fade-out shows how the signal level sinks from the plateau phase back into noise. In the Cuba example in Fig.

14, the fade-out starts at about 0735 UTC from a level of -61 dBm and reaches the noise floor of about -111 dBm after about three and a half hours. As with fade-in, the slope (negative) is quite linear and is a good -14 dB/hour.

At this point, the plateau phase will be treated in summary form: Since reception goes on past midnight, but the recording extends from 0000 UTC to 2400 UTC, the plateau is divided into two sections. If we pick the longer one of the two, we get the picture shown in Fig. 15. This plateau phase



**Fig. 13: The fade-in takes about three hours.** Around 2222 UTC the signal reaches the 'plateau phase'. **Fig. 14: The fade-out runs from -61 dBm around 0735 UTC to -111 dBm at about 1109 UTC with a 'slope' of -14.3 dB/hour.** **Fig. 15: In the 'plateau phase', signal levels oscillate within a relatively narrow range.** **Fig. 16: The Tashkent Transmitter of Iran International on 6270kHz (19<sup>th</sup> December 2019 and 2<sup>nd</sup> April 2020).** **Fig. 17: Radio Mashaal broadcasts in Urdu (language distribution has been marked) from three locations in succession.** **Fig. 18: Radio Mashaal's Urdu schedule (0400 - 1300 UTC) from three successive transmitter sites on 15360kHz.** **Fig. 19: The levels make it relatively easy to follow the switchovers from one station to another.**

is, so to speak, the 'fillet steak' of the DXing hobbyist's reception.

When planning frequencies and transmission times, one tries to arrange them in such a way that they are within the desired period in the coverage area. DXers on the other hand can of course also achieve nice results in fade-in or fade-out. The plateau cannot only be described by the well-known statistical figures such as minimum (-85 dBm), maximum (-52.6 dBm), average (-65.2 dBm), and median (-67.8 dBm).

The 'fading range', which the International Telecommunications Union (ITU) defines as *"the difference between the lower and upper deciles of all values"* is much more meaningful than this.

<https://www.itu.int/en/Pages/default.aspx>

This method results in a smoothed value, which, in this example, is a good 12 dB over more than five hours, and it also corresponds to the subjective auditory impression with AGC.

A look at Fig. 15 further reveals that, overall, the best reception is at around 0345 UTC and 0745 UTC. At these times, we can find the strongest signal, combined with the lowest short-term fading phenomena.

### Lack of Reception and Seasonality

During the darker season, although a transmitter may operate for 24 hours a day, fade-out can finally interrupt reception completely, due to the D-layer. This builds up and attenuates the sunlight as the daylight increases. In this case, the signal disappeared into noise between 1109 UTC and 1935 UTC (Fig. 15).

Possible signal peaks within this 'bathtub' may come from other signals or man-made noise. Remarkably, the noise increases slightly towards dusk. This is because the

atmospheric noise from the east is already noticeable. However, by contrast to this, no signal can be heard from the west yet.

At high frequencies, a reverse effect occurs.

We already know a lot about the daily course of rather low frequencies. The steepness of the fade-in or fade-out depends on how fast the Earth's shadow moves on the great circle (the shortest distance between transmitter and receiver). This depends on the geographical position as well as on the season. An example is shown in Fig. 16, for which I have compared the signal from Iran International on 6270kHz, via the transmitter Tashkent/Uzbekistan, on 16<sup>th</sup> December 2019 and 2<sup>nd</sup> April 2020. According to the transmission schedule, the station operates between 12:00 and 0400 UTC. This can be completely followed in winter, while in spring fade-in and fade-out make it a bit more difficult to determine the exact switch-on and switch-off time. The reception time shrinks again towards summer, while the window opens again from late summer.

Unfortunately, there are only very few 24-hour transmitters anymore, so that one often has to rely on cut-outs; however, these can also deliver meaningful information.

### Observing the Transmitters

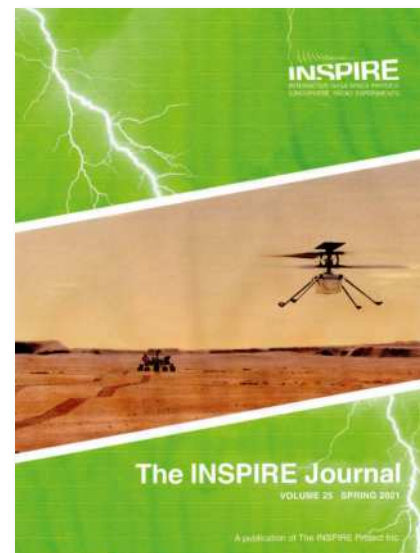
Checking the switch-on and switch-off times is routine for almost every HF monitor. My first example to show this is the US propaganda station Radio Mashaal, which aims to serve Pakistan in Urdu between 0400 and 1300 UTC, on just a single frequency of 15360kHz, with an equally good signal throughout the country. The only way to do this over nine hours is to change location as seamlessly as possible.

In the example, this occurs in the following sequence, and at three-hour intervals: *Al Dabbiya/Dubai, Al Jahra/Kuwait*, and finally *Udon Thani/Thailand* (Fig. 17; image created with the free software *WPLOT2000* by Norbert Schall, DK4PY). The transmission plan of the respective 250kW transmitters is shown in Fig. 18, while Fig. 19 shows the corresponding pattern of reception levels here in Germany.

In Part Two of this article, I will be looking much more closely at how you can analyse your data even more, by spotting signal similarities, correlations and repeat patterns, and I will be explaining some specific propagation phenomena, such as grey zone propagation (the so-called 'twilight effect').

Looking forward to seeing you next month...

## Radio News



### KEY RADIO PUBLICATIONS THIS MONTH

BDXC: Broadcasts in English: A21 Season, April to October 2021

BDXC: Communication (No. 559; June 2021)  
ISSN 0958-2142

<http://bdxc.org.uk#>

CQ-DATV

<https://cq-datv.mobi/96.php>

includes an interesting article on the Voyager spacecraft

INSPIRE JOURNAL (NASA | VLF GROUP):  
Spring 2021 Volume 25

<https://tinyurl.com/45k44589>

includes an article on 'The Sounds of Mars Helicopter Captured During Fourth Flight on 30 April 2021'.

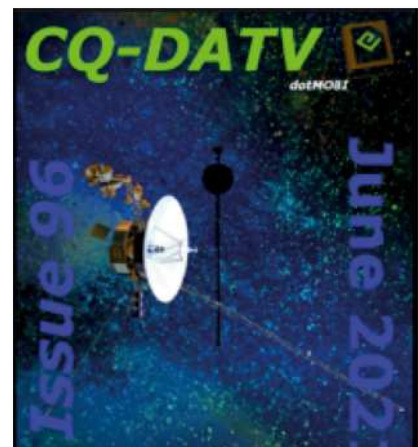
RADIO WORLD E-BOOK: Transmitter Sites

<https://tinyurl.com/wmt4u7y4>

RADIO WORLD 26TH MAY 2021

<https://tinyurl.com/5x46e9d2>

includes articles on microphones.



David Smith

dj.daviator@btinternet.com

**L**ondon City Airport has become the first major international airport to be fully controlled by a remote digital ATC tower. This follows intensive testing and 'live' trials of the revolutionary technology during the lockdown. All flights are now being guided to land or take off from the heart of the London Docklands business district by controllers at the London Area Control Centre at Swanwick, Hampshire. They use an 'enhanced reality' view, supplied by what is described as a state-of-the-art 50m tower sited at the airport.

The multi-million-pound investment in SAAB's remote digital technology, already proven at two Swedish airports, marks a major milestone in City Airport's investment in its future, following the completion of new aircraft stands and a full-length parallel taxiway, which became operational in December 2020.

How does it work? A total of 16 high-definition cameras and sensors capture a 360-degree view of the City Airport. This is relayed through a super-fast fibre connection to a control room at Swanwick.

A team of controllers use the live footage, an audio feed from the airfield, and radar information to instruct aircraft movements in and out of the airport.

The live feed, transmitted through independent secure fibre networks, is displayed on 14 HD screens at Swanwick to provide a panoramic moving image. This can be overlaid with digital data to provide an 'enhanced-reality' view.

Information such as callsigns, altitude and speed of aircraft approaching and leaving the airport, weather readings, and the ability to track moving objects can all be included in this single visual display.

Pan-tilt-zoom cameras can magnify images up to 30 times for close inspection. The tower has metal spikes on top to protect its cameras from birds, and each camera has a self-cleaning mechanism to stop insects and debris from blurring the lens.

This kind of digital technology significantly improves controllers' situational awareness, enabling quick and informed decisions to improve safety and operational efficiency. The live sound of the airport is piped into the new control centre so that controllers still hear aircraft engines and the reverse thrust of touchdown.



## Enhanced Reality and True North

**David Smith** describes the launch of a remote control tower at London City Airport, outlines a convincing argument to change a basic principle of air navigation and presents a profile of RAF Leeming ATC.

One of the controllers is quoted as saying: *"Fundamentally, the job hasn't changed. It's still about the controllers' eyes finding the aircraft and monitoring it visually. The difference is we're using screens instead of windows"*. Once flying recovers after the pandemic, City will be able to handle 45 movements per hour; this is up from 40 in 2019.

### True North v. Magnetic North

In recent years, ATC provider NAV CANADA has been leading a charge to move the aviation industry away from 'magnetic' north to 'true' north. This radical prospect makes sense because modern technology has arguably rendered magnetic north obsolete. So why are we still using it?

The simple answer is because we always have because international regulations say that bearings, tracks and radials must still be published in degrees magnetic. In the

early days of flying, directional reference had to be simple and light, the magnetic compass being the obvious answer.

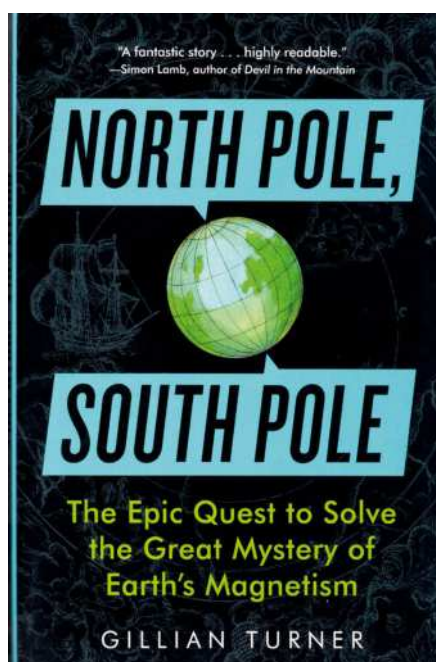
However, with modern navigation systems, reference is to the true north. Inertial and GPS systems both use simple automatic conversions so that the information can be displayed to pilots as a magnetic reference to match their charts and procedures.

The big problem with using magnetic north as a reference is that we are forced to deal with magnetic variation – the angular difference between the true and magnetic poles.

It is an issue that costs the industry a huge amount of money a year to manage and can potentially lead to serious safety issues if things are not handled properly on the ground and in the sky.

The Earth has its own magnetic field because its outer core contains molten iron which, since it is a liquid, moves





around. This means the magnetic North Pole does too, close to 40 miles each year. As of last year, it was about 250 miles away from the true pole and heading for Siberia!

This constant movement is of no use to modern navigation systems which rely on a 'geodetic reference system'.

Two variables, latitude and longitude, come together and thus define any spot on the surface of the earth. All meridians of longitude are anchored to the true North Pole because it never changes.

It is simply the northern end of the axis around which the world spins. Latitude on the other hand is referenced to the equator, which does not move either.

Each time the (magnetic) North Pole moves, magnetic variation changes, and the industry has to re-jig everything. Every computer that references magnetic north in some way has to be updated. All flight procedures, from en route to terminal and approach phases, have to be changed and re-published.

Flight Management Systems (FMS) have to be programmed to match too. VOR beacons have to be adjusted and nav aids flight tested. Radars have to be realigned and airport signs replaced. Even runways have to be repainted with new designators.

Canada has already proved that it works, having referenced conventional and advanced navigation procedures to True North for some time in its northern domestic airspace, where magnetic references become unusable.

Technically, converting from true to

## RAF ATC Profiles 3: Leeming

ICAO Code: EGXE IATA Code: QXL

| Frequencies            | (MHz)                                                                  |
|------------------------|------------------------------------------------------------------------|
| Leeming Approach/Radar | 278.225                                                                |
| Leeming Zone:          | 372.300                                                                |
|                        | 362.300                                                                |
|                        | 123.300                                                                |
| Leeming Director       | 233.900                                                                |
| Leeming Talkdown       | 373.550                                                                |
|                        | 245.625                                                                |
|                        | 123.550                                                                |
|                        | 123.300                                                                |
| Leeming Tower          | 376.850                                                                |
|                        | 120.500                                                                |
|                        | 122.100                                                                |
| Leeming Ground         | 377.900                                                                |
| Leeming Ops            | 377.750                                                                |
| <b>ATIS</b>            |                                                                        |
| Information            | 369.475                                                                |
| Nav aids               | ILS/DME CAT I Runway 16;<br>TACAN LEE 112.600                          |
| Runways                | 16 (2291 x 45m)<br>34 (2291 x 45m)<br>03 (793 x 15m)<br>21 (793 x 15m) |

Note that Runway 34 has an Operational Readiness Platform (ORP) marked with blue taxiway edge lighting.

### NOTES (A-Z)

#### Helicopter Operations

Helicopter arrival/departure procedures at RAF Leeming are significantly restricted by aircraft noise sensitivity within the local area. In essence, helicopter arrivals/departures to/from the west of the airfield are prohibited within an area bounded by the following villages: Bedale, Leeming Bar, Londonderry, and Theakston. Helicopter overflights of this area may be permitted but only by light helicopters (e.g. Gazelle) not below 500ft, whilst medium/heavy helicopters (e.g. Puma/Chinook/CH-53) must not be below 2000ft. When hover-taxying on the airfield, helicopter crews should route over paved surfaces. However, direct routing over grassed areas is permissible, as long as it is at a height that the aircraft's downwash will not cause unnecessary damage to the grassed surfaces or create FOD (Foreign Object Debris).

#### Use of Runways

Excessive use of thrust, or downwash from above, can cause serious damage to the arrestor barriers. As such, visiting jet/large aircraft with greater than 10,000lb dry or reheat thrust, or jet/large aircraft/rotary with significant jet efflux/downwash are to move forward a minimum of 500ft from the threshold before applying reheat/full power. In addition, reheat departures must be requested from ATC. Excessive downwash from low hovering aircraft directly over the barrier on approach is to be avoided unless required for flight safety reasons. After landing, the eastern side of the runway is designated as the slow lane for multi-aircraft recoveries.

#### Warnings

Uncontrolled glider activity outside opening hours at RAF Topcliffe at all levels. Air Experience Flight cadet flying throughout the year within a 20nm radius of Leeming up to 8000ft. Station-based fast jets have priority for take-off. Visiting aircraft, especially practice diversions, may have to break off an instrument approach to permit departures. Wind shear may be encountered in the undershoot of Runway 16 when the surface wind is between 210-250 degrees at 10-25kts.

magnetic would be a very simple process, as simple as flicking a switch. A lot of aircraft even have that switch already on their FMS. It remains to be seen how soon the project is adopted internationally.

This month's pictures show a Hawk 'gate-guardian' at RAF Valley, a Bücker-Jungmann with Spanish Air Force markings (foreground) and a Yakovlev Yak-11 (background), seen at Sleaf, Shropshire.

The book shown is a great introduction to how the Earth's magnetism works.



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**IC-R6** 100 kHz-1300 MHz AM/FM/WFM 1300 memory analogue scanner ..... **£199.95**  
**IC-R30** 100 kHz-3300 MHz All mode professional digital scanner .. **£569.95**

### Base

**IC-R8600** is a super wideband communication receiver that covers the radio spectrum from 10 kHz to 3 GHz. It also has the capability to decode selected digital communication signals including, D-STAR, NXDN, dPMR and P25..... **£2499.95**

### Accessories

**BC-194** drop in charger for IC-R6 ..... **£21.95**  
**CP-18E** cigar lighter cable ..... **£24.95**  
**CS-R6** cloning software for IC-R6 ..... **£34.99**  
**SP-27** clear acoustic earpiece..... **£24.95**  
**BC-223** rapid charger for IC-R30..... **£59.95**  
**BP-287** hi capacity 3280 mAh replacement battery for IC-R30..... **£74.95**  
**BP-293** dry cell case (3x AA) for IC-R30 ..... **£34.99**  
**CS-R30** programming software for IC-R30..... **£59.95**  
**LC-189** soft case for IC-R30..... **£24.95**  
**CS-R8600** software for IC-R8600..... **£69.95**  
**RS-R8600** remote control software for IC-R8600..... **£99.95**  
**RC-28** remote control system for IC-R8600..... **£279.95**  
**SP-38** desk top speaker for IC-R8600..... **£149.95**  
**SP-39AD** external speaker with DC power supply for IC-R8600 ..... **£199.99**  
**AH-8000** 100-3300 MHz professional discone receiving antenna.. **£209.95**

**AOR**



**4595  
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AOR, LTD is a renowned Japanese communications equipment manufacturer est. 1978, headquartered in Tokyo, Japan, serves the monitoring enthusiasts, communication professionals, amateur radio operators and electronics industries throughout the world

### Handheld

**AR-DV10** 100 kHz-1300 MHz Digital scanner with TETRA DMR, NXDN, dPMR, APC025, D-STAR ..... **£939.95**

### Mobile/Base

**AR-DV1** 100 kHz -1300MHz Multi mode digital base scanner..... **£1199.00**  
**AR-5700D** 9 kHz - 3700 MHz Advanced digital communications receiver ..... **£4595.00**

### Accessories

**DA-3200** 25-3000 MHz professional discone antenna ..... **£169.95**  
**DA-5000** 700-3000 MHz professional compact discone antenna... **£269.95**  
**LA-400** 10kHz - 500 MHz Magnetic receiving loop..... **£399.95**

**Uniden**



**749  
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Uniden is the best known manufacturer of scanner radios in the world. Under its renowned "Bearcat" brand name, Uniden scanners are at the cutting edge of design and technology. Their high-end scanner radios, while complex, are used by radio hobbyists, media, businesses and at all levels of government and there lower end versions are beautifully designed and easy-to-use

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**UBC-75XLT** 25-512 MHz 300 channel analogue scanner... **£99.95**  
**UBC-125XLT** (best seller) 25-960 MHz 500 channel analogue scanner..... **£139.95**  
**UBCD-3600XLT** (NXDN Version) 25-1300 MHz Digital & Analogue scanner ..... **£479.99**  
**SDS-100E** Advanced 25-1300 MHz Digital & Analogue scanner ... **£589.95**  
**SDS-100EDN** as above but preloaded with DMR & NXDN **£649.99**

### Mobile/Base

**UCB-355CLT** 25-960 MHz 300 channel analogue scanner **£89.99**  
**UBC-370CLT** 25-960 MHz 500 channel analogue scanner ..... **£119.95**  
**BCT-15X** GPS enabled 25-1300 MHz 9000 channel analogue scanner ..... **£249.95**  
**SDS-200E** Activated DMR+NXDN+ProVoice 25-1300 MHz Digital & Analogue..... **£749.99**

### Accessories

**UBCD3600XLT** soft leather case..... **£29.95**  
**UBC-125/75** soft leather case..... **£24.95**  
**ARC-536** pro software for UBCD-3600XLT ..... **£49.99**  
**ARC-536** basic software for UBCD-3600XLT ..... **£29.99**  
**ARC-370** software for UBC-370CLT ..... **£24.95**

**DIAMOND  
ANTENNA**

Based in Japan, Diamond Antenna manufactures a wide range of antennas and accessories for both hobby radio and commercial use. They are well known products that meet the highest standards in quality.



**129  
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### Scanner Antennas

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**D-190** is a high performance wideband discone antenna covering 100-1500 MHz including 10m RG58 terminated in PL259 ..... **£99.95**

**D-130M** is a Discone antenna with wide frequency coverage on receive 25 to 1300MHz and covers 6m (20W) and 2m (200W) when used with a transmitter. This model is supplied with 15m RG58A/U and 2 x PL259 plugs ..... **£129.95**

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**WS1040** 25-1300 MHz storage for 1800 frequencies analogue scanner..... **£299.95**  
**TRX-1E** 25-1300 MHz best-selling Digital & Analogue scanner .... **£419.95**

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for TRX-1 £29.95**



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**29  
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FlightAware has revolutionized the world of USB SDR ADS-B Receivers with the FlightAware Pro Stick and Pro Stick Plus, high-performance USB R820T2 software defined radios (SDR) with a built-in RF amp for maximum ADS-B/MLAT performance. The first of its kind, FlightAware's Pro Stick is compatible with PiAware or any other device that supports USB RTLSDR receivers, and is less expensive than any other RTLSDR USB receiver in the world. The Pro Stick Plus adds a built-in 1090 MHz bandpass filter for increased performance and range of reception in areas with moderate RF noise as is typically experienced in most urban areas.

**Flightaware** Prostick Plus ..... **£29.99**  
**Flightaware** Prostick ..... **£24.95**  
**FlightAware** ADSB 1090MHz Band-pass SMA Filter..... **£17.99**





Airspy is a line of super popular Software-Defined Radio (SDR) receivers developed to achieve high performance at an affordable price using innovative combinations of DSP and RF techniques. The goal is to satisfy the most demanding telecommunications professionals and radio enthusiasts while being a serious alternative to both cost sensitive and higher end receivers. Airspy Radios feature world class reception quality and ease of use thanks to the tight integration with the de facto standard free SDR# software for signal acquisition, analysis and demodulation.



|                                                                    |                |
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| <b>R2</b> VHF/UHF 24-1800MHz SDR receiver .....                    | <b>£209.95</b> |
| <b>MINI</b> VHF/UHF 24-1700MHz SDR dongle .....                    | <b>£119.95</b> |
| <b>Spyverter R2</b> extend your AIRSPY coverage .....              | <b>£59.99</b>  |
| <b>NEW YouLOOP indoor HF Antenna</b> 0.5-52MHz .....               | <b>£29.99</b>  |



**DA-3200 25-3000MHz Discone Antenna** Rugged 16 element discone. 25 MHz - 3000 MHz. Ideal for professional, surveillance and monitoring applications. Ultra-wideband design providing continuous coverage from 25 MHz to 3000 MHz. Vertical radiation pattern. Return loss chart. Supplied with 15m of low loss 5D-2V coaxial cable **£169.95**

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**LA-400 10KHZ-500MHz Magnetic Loop Antenna** Wide range receiving magnetic loop aerial that covers from 10 kHz to 500 MHz. Ideal when space is at a premium, and this shielded loop works effectively against local noise. 4 x selectable band ranges from 150 kHz to 30 MHz allow manual tuning and then fixed operation for covered frequencies from 10-149 kHz and 30-500 MHz. The LA-400 has a built-in low noise 20dB gain amplifier for superb low noise level reception. Output is via a BNC jack. 3.3 foot BNC to BNC patch cable is provided. 12 VDC or via the supplied AC wall adaptor ..... **£399.95**



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The log periodic antenna is a particularly useful design when modest levels of gain are required, combined with wideband operation. A typical example of this type of RF antenna design will provide between 4 and 6 dB gain over a bandwidth of 2:1 while retaining an SWR level of better than 1.3:1. With this level of performance it is ideal for many applications, although a log periodic antenna will be much larger than a Yagi that will produce equivalent gain. However the Yagi is unable to operate over such a wide bandwidth



### Discone Antennas

**DISCONE** 25-13000MHz Discone antenna Length: 100cm Connection: SO239 ..... **£39.95**

**ROYAL DISCONE 2000** 25-2000MHz Stainless Steel Discone Length: 155cm Connection: N-Type..... **£59.95**

**HF DISCONE** 0.05-2000MHz Length: 185cm Connection: SO239 ..... **£69.95**

### Base Antennas

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**X1-HF** Wideband HF/VHF vertical antenna Freq: 1-50MHz Length: 200cm Connection: SO239 ..... **£69.95**

**D777** Civil & Military GRP receiving antenna Freq: 120/300MHz Gain: 3.4/5.5dBi Length: 1.7m Connection: SO239 ..... **£54.95**

**SSSMKII** The original white stick scanner antenna Freq: 25-2000MHz Gain VHF 4.5dBd+ UHF 7.2dBd+ Length: 150cm Connection: SO239. .... **£49.95**

**SSSMKI** as above but compact version Freq: 25-2000MHz Gain VHF 2.5dBd+ UHF 3.2dBd+ Length: 75cm Connection: SO239 ..... **£39.95**

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**SKYSCAN DESKTOP** this is the best all round wideband 25-2000MHz desktop scanner antenna on the current market – comes complete with 4m RG58 terminated in BNC ..... **£49.95**

### Amplifiers

**MRP-2000 MKII** 25-2000MHz 6-20dB gain complete with BNC patch lead ..... **£39.95**

**M-100 Professional** 24-2300MHz -10-2300MHz variable gain complete with BNC patch lead ..... **£69.95**



### Internal

#### SDR Antenna Kit

This is a great complete starting kit for listening to SDR receivers. The loop covers all HF and the desktop discone covers 25MHz and up. All cables included..... **£79.95**



### MINI-1300 0.1-1300MHz Handheld Antenna Analyser

Instantly check and tune any antenna from 0.1-1300MHz with this rugged easy-to-use complete antenna test unit. No more lugging bulky, expensive test equipment to remote antenna sites and hard-to-get-places ..... **£199.95**



The people behind SDRplay are a small group of engineers based in the UK with strong connections to the UK Wireless Chip Industry. They have both software and hardware expertise and the RSP was designed by them here in the UK.



**RSPDUO** is a dual-tuner wideband full featured 14-bit SDR which covers the entire RF spectrum from 1kHz to 2GHz giving 10MHz of spectrum visibility..... **£239.99**

**RSPDX** covers all frequencies from 1kHz through VLF; LF, MW, HF, VHF, UHF and L-band to 2GHz, with no gaps ..... **£194.95**

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**PL-680** is a fully featured world band portable radio with SSB covering FM 87-108 MHz MW 522-1620 kHz SW 1711-29999kHz LW 100-519 kHz AIR 118-137 MHz..... **£149.95**

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The SD3000U works on 300-3000 MHz in reception and on many amateur frequencies in transmission (70cm, 33cm, 23cm, 13cm). This antenna is made of stainless steel, chromed brass, and anodized aluminium to guarantee the best efficiency and performance. **£54.95**

**SD 2000U 100-2000MHz Discone Antenna** Similar to above with TX frequencies (@ SWR ≤2): 130-160, 221-445, 610-682, 860-960, 1075-1500, 1610-2000 MHz ..... **£66.95**

**SD 1300U 25-1300 MHz Discone Antenna** Similar to above with TX frequencies TX (@ SWR ≤2): 49.5-50.5, 120-180, 215-300, 415-465, 610-650, 710-1000, 1130-1300 MHz ..... **£69.95**



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# 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 **10th June 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](http://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](mailto:wiessala@hotmail.com)

4 July

## DARTMOOR RADIO RALLY (NEW VENUE)

The Yelverton War Memorial Hall, Meavy Lane, Yelverton, Devon PL20 6AL. Open 10 am. Admission: £2.50. (FP | TS | BB | R)

Roger: Tel: 07854 088 882  
<https://tinyurl.com/5hvrts7>  
[2e0rph@gmail.com](mailto:2e0rph@gmail.com)

11 July

## EAST SUFFOLK WIRELESS REVIVAL (FDARS IPSWICH RALLY)

Kirton Recreation Ground, Back Road, Kirton IP10 0PW (just off the A14). Opens at 9.30 am. Admission: £2. Trade tables from £10. GB4SWR HF Station. (BB | CBS | CR | RSGB | SIG | TS)

Kevin Ayris, G8MXV  
Tel: 07710 046846  
[www.eswr.org.uk](http://www.eswr.org.uk)

11 July

## MCMICHAEL RADIO RALLY AND CAR BOOT SALE

Reading Rugby Football Club, Sonning Lane, Sonning on Thames, Reading RG4 6ST.

<https://mcmichaelrally.radarc.org>

25 July

## FINNINGLEY ARS CAR BOOT BRING-AND-BUY

Outdoor only. Near J2, M18 Doncaster; starts at 10:00 am.

[www.g0ghk.com/cbr21](http://www.g0ghk.com/cbr21)  
kevin.g3aaf@gmail.com  
martin.m0hom@gmail.com

1 August

## WILTSHIRE RADIO AND CAR BOOT SALE

Kington Langley Village Hall and Playing Field, Kington Langley, Wiltshire SN15 5NJ. 9 am to 1 pm. Traders welcome.

[Chairman@Chippenhamradio.club](mailto:Chairman@Chippenhamradio.club)

1 August

## THE 31ST KLARC GREAT EASTERN RADIO RALLY

Gaywood Community Centre (off Gayton Rd.), King's Lynn PE30 4EL (NGR – TF638 203). 9 am to 2 pm. Admission £3.

Ted G4OZG Tel: 01553 768 701  
(Mob: 0794 683 8656)  
<http://www.klarc.org.uk/Home.php>  
[Rally.klarc@gmail.com](mailto:Rally.klarc@gmail.com)

21-22 August

## BATC CONVENTION FOR AMATEUR TV 2021

Midland Air Museum, Rowley Road, Coventry CV3 4FR. AGC is Sunday afternoon. Test facilities available for 5.6GHz/Portsdown/Minitiuner/Ryde/power amplifiers/preamps. (L [streamed])

<http://www.midlandairmuseum.co.uk>

22 August

## GRAND FIELD DAY OUT

Willesborough Windmill, Ashford, just off junction 10 of M20. Gates open from 10 am to 4 pm. Free event. Various bands in operation, portable working at its best. Explore different modes and share tips and ideas.

Natter with friends you have not seen for a while or bring along things to sell from your table or car boot. All interested parties wishing to set up a station, please contact the e-mail below. Set-up is from 9 am, and clear-away from 4-5 pm. To have free access, we need to ensure all food/drink on site is purchased from the Trust's Cafe/BBQ. Thank you for your cooperation.

[g0gcq@yahoo.co.uk](mailto:g0gcq@yahoo.co.uk)

29 August

## TORBAY ANNUAL COMMUNICATIONS FAIR

Newton Abbot Racecourse, Devon TQ12 3AF. 10 am (9 am D). Admission: £2. (BB | CR | FP | RSGB)

Pete: G4VTO Tel: 01803 864 528  
Mike: G1TUU Tel: 01803 557 941  
[rally@tars.org.uk](mailto:rally@tars.org.uk)

30 August

## HUNTINGDONSHIRE ARS (HARS) ANNUAL BANK HOLIDAY MONDAY RALLY

Ernulf Academy, St Neots PE19 2SH. Open 7 am (traders), 9 am (public). Stalls available. (FP | BB | CR)

Malcolm M0OLG: Tel: 01480 214 282  
[www.hunts-hams.co.uk](http://www.hunts-hams.co.uk)  
[events@hunts-hams.co.uk](mailto:events@hunts-hams.co.uk)

4-5 September

## GQRP CONVENTION | TELFORD HAMFEST

Harper Adams University Campus TF10 8NB  
Martyn G3UKV Tel: 01952 255 416  
[www.telfordhamfest.org.uk](http://www.telfordhamfest.org.uk)



12 September

## CAISTER LIFEBOAT RALLY

Caister Lifeboat Station, Tan Lane, Caister-on-Sea, Norfolk NR30 5DJ. 9.30 am (8 am for sellers); easy parking; access via car park in Beach Road. Raffle. The museum will be open. (CR | TI [22])

Zane M1BFI Tel: 0771 121 4790)

12 September

## EXETER RADIO AND ELECTRONICS RALLY

America Hall, De la Rue Way, Pinhoe, Exeter EX4 8PW.

Pete G3ZVI  
Tel: 07714 198 374  
[g3zvi@yahoo.co.uk](mailto:g3zvi@yahoo.co.uk)

19 September

## CAMBRIDGE REPEATER GROUP RALLY

Foxton Village Hall, Harman Road, Foxton, Cambridge CB22 6RN. Open 9.30 am (7.30 traders). Admission £3. (BB | CR | RSGB)

Lawrence M0LCM Tel: 07994 197 2724  
[rally2021@cambridgerepeaters.net](mailto:rally2021@cambridgerepeaters.net)  
[www.cambridgerepeaters.net](http://www.cambridgerepeaters.net)

24-25 September

## NATIONAL HAMFEST

Newark and Nottinghamshire Showground, Lincoln Road, Lincoln LN4 2NY.

(Decision due in June 2021)  
[www.nationalhamfest.org.uk](http://www.nationalhamfest.org.uk)

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

For the latest news and product reviews, visit [www.radioenthusiast.co.uk](http://www.radioenthusiast.co.uk)



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

3 October

# **THE 48TH WELSH RADIO RALLY:**

Rougemont School, Llantarnam Hall, Malpas, Newport NP20 6QB. Opens 10.30 am (D: 9.30); Admission: £3. (BB | CR | L | RSGB | TS | SIG)

Tel: 01495 220 455

mw0cvt@sky.com

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)

Andy G0IBN Tel: 0745 342 6087.

g0ibn1@yahoo.com

17 October

# **HORNSEA AMATEUR RADIO RALLY:**

Driffeld Show Ground, Driffeld YO25 3AE. Open 10 am. Admission: £2 (under 14s free). Raffle. (BB | CR | CBS | FP)

Les 2E0LBJ Tel: 01377 252 393

lbjpinkney1@hotmail.com

17 October

# **HACK GREEN RADIO SURPLUS**

**HANGAR SALE:** Hack Green Secret Nuclear Bunker, Nantwich, Cheshire CW5 8AL.

www.facebook.com/HGsecretbunker/

7 November

# **HOLSWORTHY RADIO RALLY:**

Holsworthy Leisure Centre, Well Park, Western Road, Holsworthy, Devon, EX22 6DH. Open 10 am. Traders. (BB | CR | D)

Howard M0MYB

m0omc@m0omc.co.uk



## **General Information**

• DX Zone: UK Amateur Radio Clubs:

<https://tinyurl.com/r8r39jj4>

• ICOM UK: Amateur Radio Clubs:

<https://tinyurl.com/sc6tah7v>

• RSGB Club Finder:

<https://rsgb.org/main/clubs/club-finder>

• UK Radio Rallies:

[www.g4rga.org.uk/All.html](http://www.g4rga.org.uk/All.html)

## **Selected Clubs & Events**

• Andover Radio Amateur Club

[www.arac.org.uk/events.html](http://www.arac.org.uk/events.html)

• ASRA

<https://asrarally.com>

• Bishop Auckland Amateur Radio Club

<https://www.barac.org.uk>

• Callington ARS

[www.callingtonradiosociety.org.uk](http://www.callingtonradiosociety.org.uk)

• CDXC Convention

[www.cdxc.org.uk/event-4213351](http://www.cdxc.org.uk/event-4213351)

• Cornish Radio Amateur Club

<http://gx4crc.com>

• Dartmoor Radio Club

<https://dartmoorradioclub.uk>

• Dover ARC 'Hamzilla'

<http://hamzilla.uk>

• Durham District ARS

<https://g4euz.com/club>

• Exeter ARS

<https://www.exeterars.co.uk>

• Felixstowe & District ARS

[www.eswr.org.uk](http://www.eswr.org.uk)

• Fittingley ARS

<http://g0ghk.com>

• Flight Refuelling ARS (FRARS)

<https://www.frars.co.uk>

• GMDX Convention

<https://tinyurl.com/vkumdj6>

• Leicester Radio Society

<https://www.g3lrs.org.uk>

• Lothians Radio Society

<https://tinyurl.com/2fvu866x>

• Moray Firth ARS

[www.mfars.club](http://www.mfars.club)

• Newbury & District ARS

(NADARS)

[www.nadars.org.uk/rally.asp](http://www.nadars.org.uk/rally.asp)

• Reading DX Meetings

<http://bdxc.org.uk/diary.html>

• Rochdale & District

<https://g0roc.co.uk>

• Rugby Amateur Transmitting Society

<https://tinyurl.com/2bez8eey>

• South Normanton,

Alfreton & District ARS

<https://www.snadarc.com>

• Spalding DARS

<https://sdars.org.uk>

• Stirling & District ARS

<https://gm6nx.com>

• Stockport Radio Society

<https://www.g8srs.co.uk>

• West London Radio & Electronics Fair

[www.radiofairs.co.uk](http://www.radiofairs.co.uk)

• West Manchester ARS (Red Rose Rallies)

[www.wmrc.co.uk/rallies.htm](http://www.wmrc.co.uk/rallies.htm)

• West of England ARSs

<https://westrally.weebly.com>

• Wythall Radio Club

[www.wythallradioclub.co.uk/2021](http://www.wythallradioclub.co.uk/2021)

• Yeovil ARC

<https://tinyurl.com/x3a4hkpz>

• York Radio Club

[www.yorkradioclub.uk](http://www.yorkradioclub.uk)

# **In next month's RadioUser**

- The Fading Phenomenon (Part Two)
- Radio and the Lockerbie Disaster
- Non-Directional Beacon (NDB) Quarterly
- Ultra-Light Radios Compared

Plus all your favourite regular features and columns

**The August issue is on sale on the 29th July 2021**



**John Periam**

periam.photojournalist@btinternet.com

**Geoffrey Lee**

planeofocus@iCloud.com

**T**he right communication links must be made when asking for assistance in an emergency at sea, using the right kinds of maritime comms equipment (Fig. 1). To find out more about this, I recently spoke to Frankie Horne, Fishing Safety Manager at the Royal National Lifeboat Institution (RNLI); much of what follows is based on that interview, and on the practical emergency exercise activities I witnessed (e.g. Figs. 2 and 3).

<https://rnli.org>

In the course of my conversation with Frankie, I became all too aware that his past personal involvement in rescues as an RNLI Crew member of the *Peel* lifeboat for 29 years, and as a fisherman based on the Isle of Man, means that he has seen at first-hand how important communication is.

The advice from experienced operators,

# Emergency Comms at Sea and the work of the RNLI & MAIB

**John Periam** and **Geoffrey Lee** investigate communications devices in use in maritime emergencies, and they profile the RNLI Fishing Safety Team and the Maritime Accident Investigation Branch.

such as Frankie will helping our fishermen fully come to grips with the technical know-how and means of communication. What follows is derived directly from conversations with him.

## Background and Data Analysis

Interestingly, the analysis of data relating to

commercial fishing fatalities between 2008 and 2017, undertaken by the Royal National Lifeboat Institution (RNLI) shows that most calls for help came from phones, rather than VHF/DSC radio equipment or even from devices such as Emergency Position-Indication Radio Beacons (EPIRB) or and Personal Locator Beacons (PLB).





**Fig.1: A range of typical communications equipment used by the UK maritime rescue services.**  
**Fig. 2: Life-jackets and Personal Floatation Devices (PFDs) are part of the essential equipment.**

However, not all situations allow for someone to make that essential call for help. Take the case of any fishing personnel working on their own. If someone were to fall overboard, without a means of calling for help on their person, it could be hours before the alarm was raised and a Search and Rescue (SAR) operation for the person and vessel could get underway. Such time delays typically increase the search area and often reduce the likelihood of a successful outcome.

During any search and rescue mission, there is more likely to be a successful outcome if the call for help is initiated immediately. The information provided by the first informant is vital for the deployment of the appropriate SAR assets, including Lifeboats/Helicopters, and any other vessels able to assist with the operation.

If the relevant rescue assets have those

vital bits of information on, for example, location, time, the nature of the incident, and any persons on board, this is invaluable to any rescue and will greatly impact the outcome.

When they do not, it is down to a process of elimination to narrow down the possibilities of where and when the incident happened. From my previous experience as a Lifeboat crew/coxswain, this can be a long process, and sometimes a 'best-guess scenario'.

In the UK, Her Majesty's Coastguard (HMCG) – a section of the Maritime and Coastguard Agency (MCCA) – is the body responsible for this, and, in Ireland, the equivalent Irish Coast Guard (ICG) forms part of the Department of Transport of Ireland.

<https://tinyurl.com/4bbkbjaw>

<https://tinyurl.com/h7mknw9z>

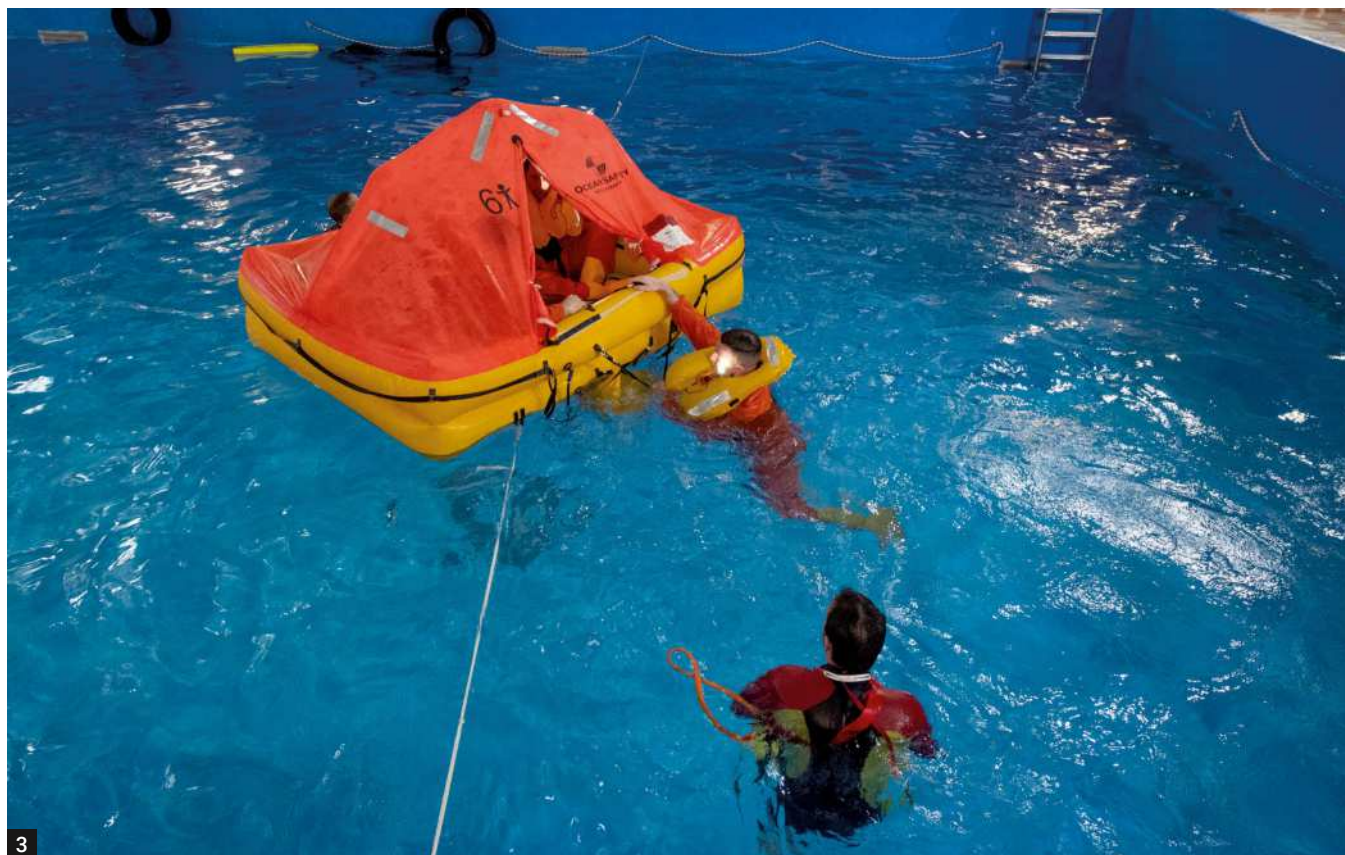
### Types of Emergency Comms Equipment

A selection of devices is in regular use, in terms of maritime calls for help and emergencies at Sea. The most important ones of them can be summarised as follows

**Fixed VHF/DSC Radios:** This is the

preferred means of communication with the Coastguard. A Digital Selective Calling (DSC) Distress Alert is a recognised emergency signal, and it also transmits your position. When required, send a DSC alert, followed by a voice call on VHF Channel 16 (156.8 MHz), communicating the distress message to all vessels and shore stations in range. This means that all are aware of your situation and can respond even before the rescue mission has been initiated.

**EPIRB:** Emergency Position Indicating Radio Beacon. This system is used to indicate that a vessel has an Emergency and requires assistance. It can be float-free and automatically or manually activated. With worldwide coverage, EPIRBs provide rescue services with information about time, position and vessel identification. The positional information is regularly updated when activated. It is fitted with a flashing light and transmits a homing signal for Direction Finding fitted vessels. It is most important to make sure this equipment is registered on the EPIRB Registry with the Coastguard.



**Fig. 3: A life raft can save lives. Constant communications with it are, therefore, most crucial.**

**Fig. 4: National links are controlled from the Maritime National Operations Centre (MNOC).**

**PLB (Personal Locator Beacon):** This is a recognised emergency signal with worldwide coverage. PLBs are manually activated, so the owner should make themselves fully cognizant of how to use and maintain the radio device. It should be kept on your person and in a position where it is easily accessible if it is not already attached to your lifejacket. PLBs should be registered with HMGG/ICG with the correct details, in order to help with the rescue coordination.

**AIS/MOB** This is an Automatic Identification System Man Overboard Device. It communicates by electronically exchanging data with AIS receivers on vessels and in base stations. In a man-overboard situation, this device automatically alerts all AIS receivers within range, which is 5nm or less, dependent on aerial height and any obstacles. Although not GMDSS-approved, some vessels with several crew members on board, or those working 80nm to 100nm offshore (where rescue will be a long time coming) are now using AIS/MOB devices attached to their Personal Floatation Devices (PFD), so that

they can track a man overboard and effect a rescue themselves, where possible.

Last but not least, **Pyrotechnics (Flares) are used.** These work as visual indicators that assistance is required. Parachute Rocket Flares can be seen for up to 28nm in good visibility. Red Paras, Handheld flares and Buoyant Smoke markers are perfect for calling for help, provided someone can see them. For instance, if you are fishing in an area where there is a lot of activity and you lose your electricity or drifting close to shore any one of these will alert someone to your situation.

Fishermen all over the UK and Ireland have an unwritten rule to help each other in times of need or distress. They tend only to call for help from others as a last resort. I am sure this will continue for years to come.

However, when a situation is becoming life-threatening – or is likely to escalate to life-threatening – a call must be made early (Fig. 4).

As someone who has served in the RNLI as a lifeboat crew/coxswain, Frankie Horne feels certain that he speaks for all in the rescue services by saying that he would rather be there 10 minutes early than 10 minutes late.

At the end of the day, it is all about being prepared for such emergencies. Even the most experienced crew members sadly at

times do not heed this advice resulting in the loss of life and often the vessel.

That is when the Marine Accident Investigation Branch (MAIB) come into play to determine just what went wrong.

### Behind the Scenes of the MAIB

The Marine Accident Investigation Branch (MAIB) was set up in 1989, following the *Herald of Free Enterprise* disaster two years earlier, when the roll-on, roll-off ferry capsized as it was sailing out of the port of Zeebrugge. Nearly 200 people lost their lives in that accident, which was the worst UK shipping disaster for many years.

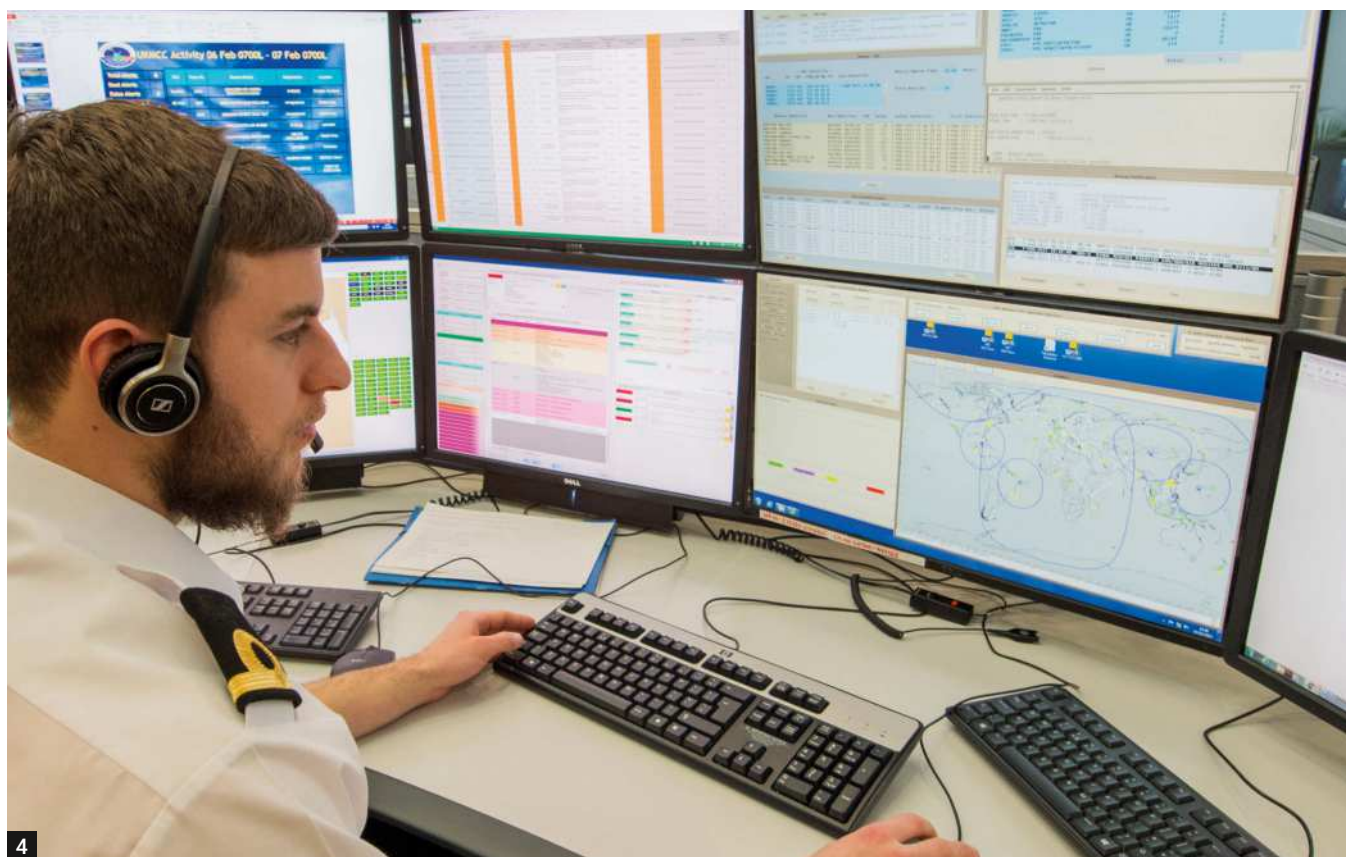
It is of great importance to educate all those working at Sea about how such incidents can be avoided in the future.

The MAIB is part of the Department for Transport and is entirely independent of the marine regulator, the Maritime and Coastguard Agency (see above).

The Chief Inspector, who reports directly to the Secretary of State, is responsible for investigating accidents involving UK-registered shipping anywhere in the world, and marine accidents and incidents involving any vessels in UK waters.

The sole aim of an MAIB investigation is to learn lessons that will help prevent an accident from re-occurring.





The Branch does not apportion blame, and it does not establish liability, enforce laws or carry out prosecutions.

In a typical year, the MAIB will receive around 1,200 accident and incident notifications, and it will investigate around 30 accidents in-depth and publish its findings. Besides telling the story of what happened, the main outputs from an investigation are the recommendations made to improve safety. Not all MAIB reports are into fatalities, as it is much better to learn lessons from lesser accidents and near misses.

However, when the Branch has investigated a death, its report is made available to the Coroner or Sheriff and the lead investigator will attend the inquest or fatal accident inquiry to report the findings of the investigation.

<https://tinyurl.com/bu3xb938>

### How The MAIB Investigates

MAIB investigators deploy worldwide to investigate accidents, and a multi-disciplinary team is always available at two hours' notice to deploy to the scene of an accident. Investigators are marine professionals – fishing vessel skippers, master mariners, chief engineers, naval architects, and human factors specialists. All of them possess extensive experience in the industry, and they are trained especially to investigate accidents.

The training can take up to 18 months, at the end of which the investigator goes through a formal accreditation process. Supporting the investigators on the scene are MAIB technicians, who are experts in recovering and analysing all manner of electronic data from CCTV recordings to voyage data recorders, which are the marine equivalent of the aircraft 'black box'. No fewer than two investigators will deploy to an accident, but the team will be as large as it needs to be, and a complex accident can often see eight to 10 MAIB staff deployed.

Their spokesperson said, *"As with any investigation, it is important to collect evidence while it is fresh and, if possible before any clearing up commences, though the Branch would never aim to impede the work of the emergency services. Besides collecting physical evidence, the accident site and all craft involved will be carefully examined, and the persons involved, and any witnesses to the accident, are interviewed. If necessary, the equipment can be taken away for further examination. A debrief is then held that involves looking at the circumstances of the accident, whilst considering wider issues such as; the relevant regulations and guidance, the population at risk should the accident be repeated, and the history of similar accidents."*

Once the investigation phase is complete

and all the evidence has been analysed, the Chief Inspector will normally hold a meeting with industry experts who will assist him in developing targeted recommendations to improve safety and help prevent a re-occurrence. The scope of recommendations can range from a locally targeted recommendation to improve, for example, working practices, training or signage, to a recommendation to Government to introduce or amend the regulations governing a particular activity. The important principle underlying all recommendations is that they should be achievable, effective, and result in improvements to safety. More than 97% of all MAIB recommendations are accepted and implemented.

Finally, before an MAIB investigation report is published, it is circulated to those involved and other stakeholders for 30 days of consultation. This is the opportunity for anyone who might be adversely affected by the report's conclusions to comment.

All comments made as part of the consultation process are considered, feedback given and, if appropriate, the report is amended before it is published on the MAIB website.

Concise safety flyers for investigations, which summarise the report findings and safety recommendations, are also produced.

## Radio News

**HAMSCI SCIENCE EXPERIMENT:** *HamSCI* was recently looking for ham radio operators to share their recordings of time-standard stations during the June 2021 Annular Solar Eclipse across the Arctic Circle as part of a 'citizen-science' experiment. Researchers will use the data crowd-sourced in this way to investigate the superimposed effects of auroral particle precipitation and the eclipse on HF Doppler shift. Many participants collected data using an HF radio connected to a computer running open-source software. Radio amateurs and short wave listeners around the globe were invited to take part, even stations far from the path of totality. Last year's (2020) eclipse festivals included more than 100 participants from 45 countries. The experiment ran from 7-12th June 2021. All participants received QSL certificates and updates as the data are processed.  
(SOURCE: IColin Butler)

<https://tinyurl.com/25jj4ew9>

**RADIO STAR @ RIBBLE FM:** Broadcaster and Programme Controller at Ribble FM Mark Blackman has made it to the next stage of the International OnAir Radio Star Competition for 2021. Mark who has worked in radio for over 20 years, currently presents *The Breakfast Show* at the local radio station for the Ribble Valley of Lancashire – 106.7 Ribble FM. Over 350 entries were received by the judges for the competition organised by Nails Mahoney and Tracey Lee from onaircoach.net – and Mark received a call from Nails and Tracey to say that he made it to Number 20 of 25 for Stage 2.

Mark has progressed to Stage 2, which now involves getting attention on social media, working with the mentors on his show, and coming up with unique features and ideas on how to get listeners to interact.

For more details on the competition and radio coaching, visit [www.onaircoach.net](http://www.onaircoach.net) and click on *Radio Star 21*.

[www.onaircoach.net](http://www.onaircoach.net)

**RADIO TECHCON:** The team at *Radio TechCon* has decided to make this year's event online only again due to ongoing uncertainty with the coronavirus pandemic. The date has also been



announced for the virtual gathering as Monday 29th November 2021. "Radio TechCon is vital for ensuring that the technical industry in radio and audio can come together to share ideas, learn and celebrate successes during these complex times," said Aradhna Tayal from organisers TBC Media Ltd. "We strive to deliver a fully inclusive and accessible event each year, to give everyone in our sector the opportunity to get involved. While government guidelines indicate the easing of restrictions for summer events, there is still deep uncertainty about large indoor gatherings during winter."

*We are disappointed that we won't yet be able to return to IET London and meet in person. Safety is our priority. In consultation with the technical community, we have decided to hold a 'virtual' event to ensure everyone feels able to join the conference and enjoy the full benefits of Radio TechCon 2021.* Details of the sessions and speakers will be announced in due course, and suggestions are welcome for topics to be covered, just contact:

(SOURCE: Radio TechCon | Radio Today)

<https://tinyurl.com/2tn5mr9d>  
[team@radiotechcon.com](mailto:team@radiotechcon.com)

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**M**ention has been made in previous columns that the German physicist, Heinrich Rudolf Hertz (1857-1894) in his original experiments, used short waves, namely those of only a few metres in length. Subsequent experimenters found that these waves became quickly attenuated as they travelled away from their source over the Earth's surface. It was also discovered that the attenuation was reduced as the wavelength was increased. Consequently, in the race for long-distance transmission, wavelengths were increased. By the early 1920s, the transoceanic telegraph services used wavelengths in the order of 10,000 to 20,000 metres.

The increase in wavelength also involved a corresponding decrease in the frequency of the oscillations, resulting in the simplification of many electrical problems which had previously arisen.

Between 1917 and 1927, an immense amount of work had been conducted, and a corresponding amount of experience had been gained in the actual propagation of 'ether' waves around the Earth. It was not until the mid-1920's that anyone realised that radio waves could be propagated by ionisation. Physicists were prompted to declare: "We are led to believe that there exists, at a varying height above the Earth's surface (from 60 to 180 miles) a layer of atmosphere which becomes ionised by the Sun's rays during daylight." The existence of such an ionised layer was originally discovered by Oliver Heaviside FRS (1850-1925; Fig. 1).

In 1911, Dr William Henry Eccles D. Sc., ARCS, MI, FRS (1875-1966) called it "the Heaviside Layer", when he proposed his theory of wave propagation.

It was subsequently discovered by experimentation that short waves which reached this layer were refracted when they entered it and were bent back towards the Earth. Furthermore, experimenters stated at the time: "If the receiver happens to be situated at such a point on the Earth's surface, the signal will be received at considerable strength, for the wave will not be attenuated to the same large extent that it would have been had it travelled all the way on the Earth's surface."

It was now possible to signal over great distances on short waves, using very little power. The main difficulties were the varying strength of signals due to the changing states

# Early Short Wave Radio

**Keith Hamer** and **Garry Smith** relive the early days of short wave radio, explore historical radio adverts, take a nostalgic look at Westward Television and continue their new series on graphic design in the world of TV.

of the Heaviside Layer. These variations could reach a certain limit and stop transmission of the signal. Many physicists and engineers worked on the problem, in particular, the British experimenters, Thomas Lydwell Eckersley FRS (1886-1959) and Edward Victor Appleton, GBE, KCB, FRS (1892-1965). Through experimentation, it was proposed that, by using the right wavelength at the appropriate time of day, this unreliability could be reduced to a minimum.

## Vintage Wireless Equipment

This month's meander through vintage copies of deserted newspapers and magazines has unearthed the *Perfect Five Condensers* (Fig. 2). This is the full description of the range of capacitors manufactured by *Jackson Brothers* of 8, Poland Street in London. The text (Table 1) has been left in its original format to reflect the spelling and punctuation of the time. This particular advertisement was published in 1927: "Always choose the Condensers with years of reputation behind them - condensers which are as perfect as modern science can make them. In other words, do justice to your set and select from the Perfect Five with the Trade Mark J.B."

*Bakelite* is a trading name for a material often used to make receiver cabinets and is much loved by owners of vintage radios and televisions. It was developed and patented by Leo Baekeland (1863-1944) in the early 1900s.

The generic name for Bakelite is *polyoxybenzylmethylenglycol*. It was the first plastic made from synthetic components. It is a thermosetting phenol formaldehyde resin formed from a condensation reaction of phenol with formaldehyde.

In the advert (Table 1) 'SLF' refers to a particular type of condenser, or capacitor. 'SL' is an abbreviation for 'straight-line' and refers to the linearity between shaft rotation and the change of either capacitance (SLC), wavelength (SLW), or oscillator frequency (SLF). The abbreviation 'mfd' (microFarad) is also expressed as 'µF', and 'mmfd' (micromicro-Farad, or pF) is now usually denoted as 'pF' (picoFarad).



Prices shown in the advertisement are, of course, pre-decimal so, for example, 10/- means 10 shillings, which is equivalent to 50p. We thought we would explain this to readers of a certain age (like the authors!).

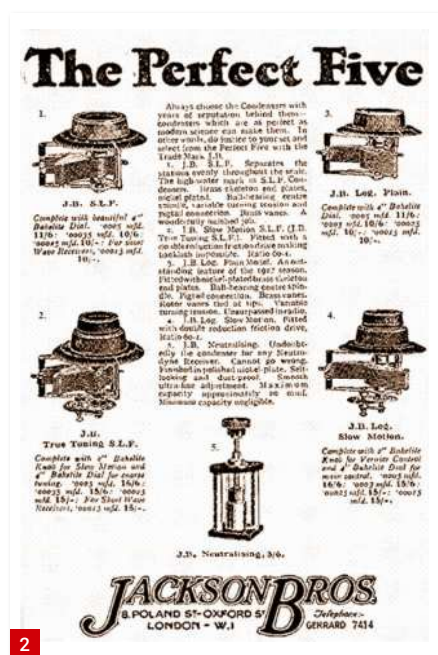
## Westward Television: 60<sup>th</sup> Anniversary

Westward Television was the first ITV franchise holder for the South-West of England. It first held the franchise 60 years ago from April 29<sup>th</sup>, 1961, until December 31<sup>st</sup>, 1981. After a difficult start, Westward TV provided a popular, distinctive and highly regarded service to its region, until public boardroom squabbles led to its franchise not being renewed by the IBA. Westward TV launched the career of many broadcasters who became well-known nationally, won numerous awards for its programming, and heavily influenced its successor, TSW.

With its headquarters in Plymouth, the station broadcast to Devon, Cornwall, South Somerset, Taunton Deane, West Dorset, and West Somerset with transmitters located at Stockland Hill, Huntshaw Cross, Caradon Hill, Redruth, and Beacon Hill.

The company's first chairman was Peter Cadbury who had left the board of Tyne Tees Television to set up the company and bid for the southwest franchise, which he won against eleven competing bids. He named the company after the golf course at Westward Ho! in North Devon, where he

Enter our competitions at [www.radioenthusiast.co.uk/competitions](http://www.radioenthusiast.co.uk/competitions)



1. J.B. S.L.F. Separates the stations evenly throughout the scale. The high-water mark in S.L.F. Condensers. Brass skeleton end plates, nickel-plated. Ball-bearing centre spindle, variable turning tension and pigtail connection. Brass vanes. A wonderfully finished job. Complete with beautiful 4" Bakelite Dial. 0.0005 mfd. 11/6; 0.00035 mfd. 10/6; 0.00015 mfd. 10/- For Short Wave Receivers, 0.00015 mfd. 10/-.
2. J.B. Slow Motion S.L.F. (J.B. True Tuning S.L.F.). Fitted with a double reduction friction drive making backlash impossible. Ratio 60-1. Complete with 2" Bakelite Knob for Slow Motion and 4" Bakelite Dial for coarse tuning. 0.0005 mfd. 16/6; 0.00035 mfd. 15/6; 0.00025 15/- For Short Wave Receivers, 0.00015 mfd. 15/-.
3. J.B. Log. Plain Model. An outstanding feature of the 1927 season. Fitted with nickel-plated brass skeleton end plates. Ball-bearing centre spindle. Pigtail connection. Brass vanes. Rotor vanes tied at tips. Variable turning tension. Unsurpassed in radio. Complete with 4" Bakelite Dial. 0.0005 mfd. 11/6; 0.0003 mfd. 10/6; 0.00025 mfd. 10/-; 0.00015 mfd. 10/-.
4. J.B. Log. Slow Motion. Fitted with double reduction friction drive, Ratio 60-1. Complete with 2" Bakelite Knob for Vernier Control and 4" Bakelite Dial for main control. 0.0.0005 mfd. 16/6; 0.0003 mfd. 15/6; 0.00025 mfd. 15/-; 0.00015 mfd. 15/-.
5. J.B. Neutralising. Undoubtedly the condenser for any Neutrodyne Receiver. Cannot go wrong. Finished in polished nickel-plate. Self-locking and dust-proof. Smooth ultra-fine adjustment. Maximum capacity approximately 20 mmfd. Minimum capacity negligible. 3/6."

ALL PICTURES: THE KEITH HAMER+GARRY SMITH ARCHIVE COLLECTION

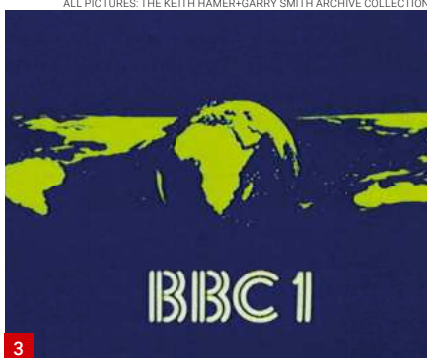


Fig. 1: Oliver Heaviside FRS, discoverer of the ionised layer in the upper atmosphere.

Fig. 2: The original Jackson Brothers' *Perfect Five Condensers* advertisement of 1927 (text below).

Fig. 3: The iconic BBC-1 'Rotating-Globe' symbol, shown 'live' between programmes, occasionally juddered to a grinding halt. Fig. 4: BBC-2 radiated a complex mechanical, two-tone (and rotating) figure of '2' between its programmes.

Fig. 5: The mechanical BBC *Open University* symbol, devised by John Aston. Fig. 6: The colourful BBC-1 Christmas Globe used in 1975.

Fig. 7: The BBC-2 Christmas Ident used in 1985.

played. Ironically, *Westward Ho!* was part of the region that found the reception of the television signal most difficult, until the construction of the Huntshaw Cross relay transmitter in 1968. The *Westward TV* region was surrounded on three sides by the sea, which was strongly reflected in their output and its company logo, a silver model of the 'Golden Hind'.

In early January 1969, plans were drawn up for a merger between *Westward TV* and the music publishing company, Keith Prowse, as Peter Cadbury was chairman of both. By January 17<sup>th</sup>, 1969, the deal had been completed. EMI purchased Keith Prowse Music Publishing from *Westward TV* in the latter part of 1969.

Before too long, the *Westward TV* board was in continual disagreement and in January 1970, Peter Cadbury was sacked, but re-hired within days as the chairman of the *Westward TV* board after he made outspoken remarks against the levy imposed by the IBA on advertising revenue while also withholding a *Westward TV* corporation tax bill to the Inland Revenue over the same matter. By July 1980, he was finally removed from the *Westward TV* board and over the following six months, he tried to regain control.

*Westward TV* began broadcasting in colour in 1971, initially from the Redruth transmitter and a few months later, colour was extended to the Stockland Hill and Caradon Hill transmitters. To mark the occasion, the *Westward TV* logo was re-photographed in glorious colour.

<http://www.78rpm.co.uk/westward.htm>

## Graphic Design Pioneers: John Aston

Our mini-series, detailing the careers of four of the most authoritative graphic designers in radio and television, continues with John Aston (The doyen of television graphic design, John Aston, was born in Shrewsbury on the border between England and Wales. He trained as a photographer and graphic designer and, whilst at college, met and



married the illustrator, Martina Selway. He started his career as art editor for the magazine, *Photographic Review*, before joining the BBC's publishing division. From the publishing house, he moved to the BBC Television Graphic Design Studios and became Manager.

The studios were considered to be the world leader and, as a result, John was in great demand as a lecturer on graphic design development in television at design and broadcasting conferences around the globe. He was a natural speaker (and indeed storyteller) and the wonderful cadences of his voice revealed his Welsh ancestry and love of that country. Whilst at the BBC, he gave up endless hours of his time to assist students and young designers and went to enormous trouble to ensure that all those he interviewed came away feeling that the experience had been a positive one. John and his team devised many mechanical on-screen classic graphic designs which, even today, are etched into viewers' memories.

To give just a few examples, BBC-1 had their time-honoured rotating Globe Symbol (Fig. 3), which occasionally juddered to a grinding halt, and BBC-2 radiated a two-tone striped '2' between programmes. This consisted of an incredible series of mechanical wheels and cogs (Fig. 4). When this caption was discontinued, it was mischievously modified to accept a 1p coin which

could be inserted into a slot to activate the mechanism. Meanwhile, *The Open University* Symbol, devised by John, was also mechanical (Fig. 5). This, too, occasionally refused to fully revolve! We cannot, of course, forget all the amazing mechanical BBC-1 and BBC-2 Christmas Ident Symbols used from the late Sixties until 1985. Fig. 6 shows the BBC-1 Globe radiated in 1975, and Fig. 7 the BBC-2 Ident used in 1985. The BBC Graphic Design section had a field day each Christmas devising all the intricate models, some of which presented headaches when they occasionally stopped working! All the BBC on-screen Ident Symbols were scanned by a television camera and transmitted 'live'. The final ill-fated BBC-1 Christmas Symbol to be shown 'live' was featured in the January 2021 column. All subsequent BBC Christmas Idents were safely committed to film or video where nothing could go wrong!

<https://www.ico-d.org>

### A Personal Connection

In December 1990, we launched our own magazine called *TV Graphics Review*. John was very supportive of our venture and immediately offered to write the magazine's first editorial; he was always very willing to help. In return, the authors relieved some of the pressure from the BBC, and John in particular, by dealing with the many university students who clamoured for photographs

and detailed background information about the BBC's graphics output.

John's love of sharing and learning led him to take early retirement from the BBC and he became Director of the *Bedfordshire College of Art and Design*. He also became Chairman of the Steering Committee for the *International Council of Graphic Design Associations' (Icograda)* London Seminar and oversaw the 25th-anniversary celebrations of this event. The Icograda was established in London on April 27th, 1963 and has since mushroomed to have members, and events, throughout the world.

John Aston will always be remembered by so many people throughout the world (including the authors) for his generosity and good humour. By his own admission, he was devoted to the concept of "international professional collaboration, friendship and togetherness". He attended his first Icograda Congress in Vienna in 1969 when he received an award from their president.

John Aston, FSIAD (Fellow of the Society of Industrial Artists and Designers), died on December 28<sup>th</sup>, 2000, at his home in London.

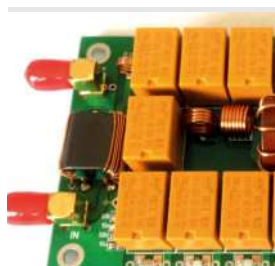
### DX-TV & FM News

The latest DX news, plus details of changes to broadcast television and radio services, is always available - and updated online - on the *Radio Enthusiast* website:

[www.radioenthusiast.co.uk](http://www.radioenthusiast.co.uk)

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**AN ANTENNA SWITCH:** Dave McAlpin GM8UPI describes how to build a remote antenna switch.

**REVIEW – THE VC999:** Tony Jones G7ETW investigates the VIVI VC999 DMM.

**BUYING A BOUTIQUE RADIO:** Steve Ireland VK6VZ/G3ZZD surveys some of fascinating transceivers now available from small, specialist manufacturers.

**VALVE & VINTAGE:** Philip Moss M0PBM describes the classic R1155 wartime receiver.

There are all your other regular columns too, including HF Highlights, World of VHF, What Next, Making Waves, Kits & Modules, The Morse Mode Notes from a Small Station, and Data Modes.

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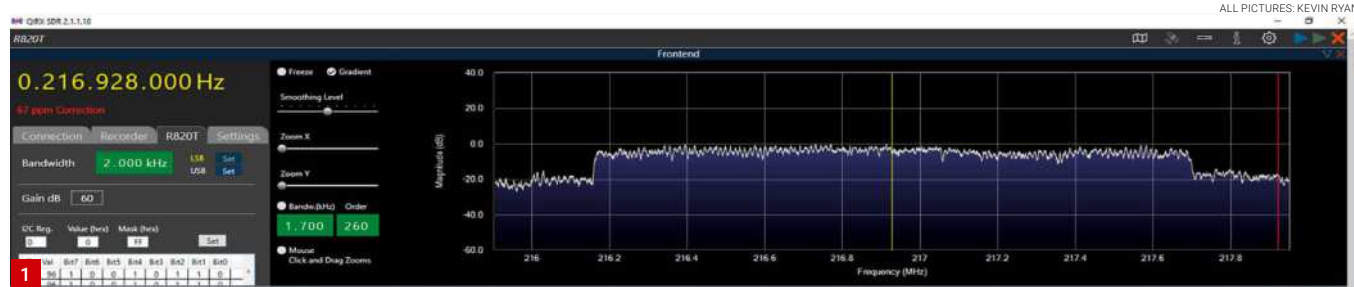
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The publishers reserve the right to change content according to circumstances.



Kevin Ryan

kevin@radio-digital.co.uk

**Y**ou cannot beat a decent receiver to listen to digital radio but there are times when a desktop app adds more interest and reveals some of the complexities of digital radio. Both DAB and DRM have decoders that run on Windows. The latest DAB decoder to receive an update is QIRX with the launch of Version Three (V3) of the software. In combination with a software defined radio (SDR) and a DAB aerial, you can simply use QIRX as a DAB radio. However, it has other features worth exploring.

### Do Not Rush In

I plunged straight in and installed V3 on my PC. It worked but did not produce any audio because some key files were missing.

Therefore, I decided that the quickest way to fix the problem was to remove it from my PC, install Version 2 (V2) first and load on V3 after that to restore the missing files.

The installation of V2 is straightforward, provided you install the database engine before the app itself. The website guide is very detailed and has many screenshots and some troubleshooting tips if the installation fails. I should have read it right through before I started to save myself some time.

<https://qirx.softsyst.com/Download>  
<https://qirx.softsyst.com/QIRXInstall>

### QIRX V2

It's worth spending some time working with V2 because it just concentrates on DAB; V3 incorporates decoders for other modes not associated with digital radio. Apart from that, the DAB functionality is the same.

QIRX needs to connect to the RTL-SDR receiver. At the top right is a small menu bar with various icons. They are *Show Map*, *View Raw NMEA data*, *Shrink/Expand Frontend display*, *About*, *Settings wheel*, *Start I/Q stream* (blue triangle), *Start I/Q Recording* (green triangle) and *Stop I/Q stream* (red X).

There is more on NMEA/GNSS online:

<https://qirx.softsyst.com/QIRXOperate>

# The QIRX of DAB Radio Revealed

Kevin Ryan considers QIRX, a new listening option and analytical tool. It allows you to receive DAB radio and to dig much deeper into the origins and quality of the signals you are obtaining.

### Control Panel

The V2 control panel is extremely busy. However, most of the panes can be collapsed if they are not of interest. There are three main sections to the control panel.

Working from top to bottom, these are the front end configurations, with technical details of the connection to the RTL SDR on the left-hand side, and the spectrum of the tuned-in multiplex on the right-hand side (Fig. 1).

The second panel is a map of your local area showing details of the transmitter you are tuned into, along with the other transmitters that the software detected. More on this later (Fig. 2).

The transmitter map will not appear until you click on the atlas page at the top of the screen. Your location defaults to a place outside Frankfurt-on-Main in Germany and I dragged the red dot to my approximate location outside London.

After that, it is a process of gradually refining the map's precision.

The third panel has many sections; from left to right, they contain the all-important station list from the tuned-in multiplex, service quality information and configuration options, and, on the far left, graphical displays of the Constellation Spectrum, the Channel Impulse Response (CIR), the Transmitter Identification Information (TII), the carriers found in the received multiplexes, and finally IQ Data (Table 1; Fig. 3).

### QIRX as a DAB Receiver

I minimized everything except the DAB receiver panels. These panels reveal, from left to right (Fig. 4), the list of stations (Services) in the multiplex (Oxfordshire 10B), the Service Quality, and the Service tab. The latter shows the short data messages (called the 'Dynamic Label Segment' or DLS) displayed on the small screens of a DAB radio.

The Service Quality has six indicators on a 'traffic light' system, so they can flash green, amber and red quite frequently. The Signal-to-Noise (SNR) expressed in decibels is of interest and you will notice a degree of 'bubbling' of the audio when the box turns amber.

### A DAB Scan

Performing a DAB scan is easy. I recommend that you just accept the 'default' options. The DAB Scan button is under Options and the DAB Scanner screen lists the multiplexes above a threshold that it finds. Scan on different days may produce different results (Fig. 5).

Press *Start* to get the DAB Scanner to step through the channels, then select *OK* to save the data into the database. Otherwise, it will just stay at the end of the list. Note that stations found during a scan may not result in anything to listen to.

This is because the station list is contained in a part of the DAB data stream that is less prone to data loss.



Fig. 1: The front-end panel shows the frequency and spectrum of the DAB signal, which can be re-recorded for later playback. Fig. 2: The transmitters in the Berkshire multiplex. The green icon shows the received transmitter; grey means 'listed but not detected'; other, weaker, transmitters are coded red. Fig. 3: It is possible to minimize many of the panels in this busy dashboard and use QIRX 2 (or 3) just as a DAB receiver. Fig. 4: I minimized as many of the panels as I could to create a DAB receiver that provides all the information usually shown on a physical radio. Fig. 5: The scanner has a few options; these should be left on the 'default' values. I found that a simple 'start', 'save' and 'stop' worked best. Fig. 6: Setting a low threshold detects transmitters other than the main one. The distance (in km) is calculated from the *OpenStreet* map data, not through the measurement of the signal. Fig. 7: QIRX 3 controls three different SDR receivers. If you have a single SDR, this is most likely to be 'No. 1', and the decoder should be changed to DAB.

## The Front End Panel

The topmost panel has two sections (Fig. 1); the first one offers details of the tuned frequency in Gigahertz, possibly to accommodate any L-Band frequencies that might use DAB. The first section has four tabs. The *Connection* tab contains details of the network-link to the RTL-SDR receiver; the *Recording* tab stores 30 seconds of raw data, using 126MB of disk space; the *R820T* tab (with low-level data on the chip) extends the frequency range of the main 2832U chip; and finally, the *Settings* provides a useful gain control option.

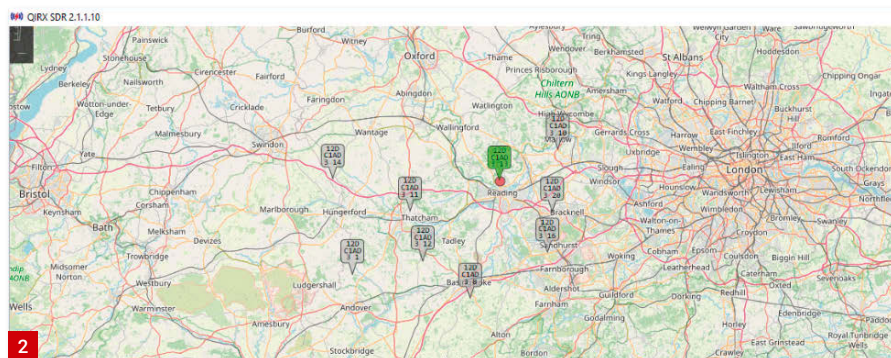
The recordings are stored in a file called: `C:\User\user name\AppData\Local\qirx\Raw`

You might have to enable the display of 'hidden files' in Windows Explorer.

The right-hand sides panel shows the spectrum of the received signal and includes several controls to alter the display. Midway down, there are two green boxes with '1.700' and '260' on display. They are labelled *Bandw (kHz)* and *Order*. I forgot that on the Continent '1.700' equates to '1,700' in the UK. This is the bandwidth of the filter that is slightly bigger than the nominal bandwidth of the multiplex (1,538kHz).

I can only think that the '260', therefore, relates to how 'sharp' the filter is, but I am not sure.

If you check the small radio button (the round checkbox), the bandpass filter is switched in – with a noticeable effect on the display. It looks like you can alter the bandwidth, but you cannot. Hovering the mouse over a digit makes tiny red bars appear above



and below the number and clicking on the digit has no effect. There would be no reason to do this, since, with DAB, it could corrupt the signal.

The final radio button needs to be used with caution. I enabled it and moved to mouse cursor onto the spectrum display managing to retune the front end. If you do this, the quickest way to recover is to select another multiplex briefly from the drop-down list and subsequently once again select the one you want.

## The Multi-Tab Display

This panel (Fig. 6) contains information and offers selectable options. For example, *Sync* provides information on the tuned frequency that may be of interest. The Transmitter Identification Information (TII) is probably the key feature in this app because it provides the information for several displays.

See the Infobox (Table 1) for more information on TII.

The settings in the *TII* tab control the

threshold level, which determines how many transmitters are displayed on the map (*OpenStreet*). In the *TII* tab, there is a *Threshold-slider* and an *x10-Multiplier*. Setting a Threshold of 0.020 and using the multiplier should show several of the DAB transmitters in the local SFN.

On the map, the transmitter used by the receiver is colour-coded as green, and any others detected above the Threshold are in red. By ticking on *Show all entries for EID (Ensemble ID) on the map*, the remaining transmitters in the database are displayed.

The *Audio* option comprises details of the audio in the service, but I noticed that the mono/stereo indication was only correct for DAB and not DAB+. My radio indicated that talkRADIO was using stereo, but QIRX listed it as mono. The error was repeated in the AAC tab, which showed that talkRADIO was using parametric stereo (this is correct).

In conjunction with the record button directly above the panel, you can choose to store the audio as either a .wav or .aac file. The file gets a long name in this format:



(date)+(time)+(mux name)+(station ID).wav/aac.

It is stored in this directory:  
C:\User\user name\AppData\Local\qirx\DABAudio.

You can see these details by hovering over the file name and directory.

Moreover, the *Service* tab reveals the text usually displayed on a DAB radio, and the genre, such as 'varied' or 'news'. It is better than a radio because the tab displays all the messages in the carousel on one screen.

Moving on to the *Options* selection, this is where you can calibrate the SDR, initiate a DAB scan or Update the database (DB). There is a radio button called *SNR Tone*, which inserts a 1kHz tone into the audio.

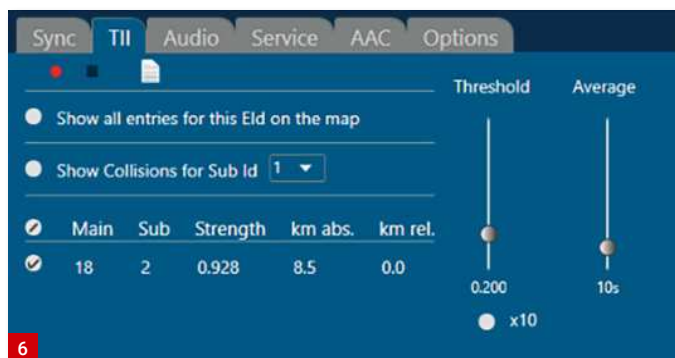
## Channel Impulse Response (CIR)

The CIR display shows the relative delays of a signal, when it has taken either different paths along its way to the receiving antenna, or when it originates from different transmitters.

The scale is either in time delay (in  $\mu$ S), distance-difference (in km) or samples. I took the main transmitter, which is 1km away, to be at the biggest peak; but I measured 2.84km on the graph (there was also a mysterious yellow dot at 1,96km). The second transmitter is 15km away and those measurements matched up. The main Berkshire transmitter here is at Hemdean. This is down in a dip, making me wonder if the signal is bouncing off something else.

Armed with this knowledge, I tried my theory on the Oxfordshire Woodcote transmitter. This is 8.6km away from my location, but the main peak showed 2.33km on the graph, which made no sense. To be honest I was confused by this because I could not consistently relate the peaks or the coloured dots to the list of transmitters in the TII tab.

Eventually, I worked out that my problem stemmed from the fact that I had not calibrated my SDR (it is a button in the *Options* tab). Once I did this, the main transmitter



moved to '0', and the distance to the others more or less matched the display in the TII tab as the documentation said it would.

## The Constellation

The 'constellation' is a diagram showing how good the reception of the DAB signal is at your location. Each dot is one of the data subcarriers, and each horizontal line represents one of the four phases that the carrier can have. For best reception, the dots will be mostly horizontal – degraded reception will have dots. If you move a mouse cursor onto the display, a vertical red line appears, and the mouseover text gives the number of the carrier. The display can be expanded by dragging the separator bar away from its default position. This is a very interesting feature.

## Showing TII Carriers

The TII Carriers display is divided into four sections by dashed yellow lines to show where the TII is repeated. Moving the red vertical cursor over the turquoise carrier will reveal an *Infobox* with data like 172,0.126, SubId:13. Carriers in blue are the wanted ones, pale grey means those from other transmitters. There is a way to line up this display with the IQ Data display that is detailed in the online documentation.

<https://qirx.softsyst.com/QIRXTutorials>

## QIRX V3 Beta

At the time of writing my column, the latest version of the software is still a *Beta* (i.e. under development but stable) version. However, I found it more stable and offering better sensitivity than V2. Installing

V3 proved to be fairly easy, and I expect upgrading from V2 helped in that process. There are full step-by-step instructions (just four, starting with downloading QIRX V3, to clicking on the desktop icon that you can opt to create) on the website. Controlling up to three receivers (Fig. 7) is one of the main features of QIRX3. I did not explore this much, because I have stumbled here in the past while attempting to connect more than one RTL-SDR to a single PC.

## Clicking the Icon

After installation, the control panel launches with a blank panel showing three receivers (1-3) with modes of WFM, ADS-B and DAB (Fig. 7). The documentation mentions a special SDR called *Kerberos* that houses four RTL-SDR dongles. However, Receivers 2 and 3 can be devices like the SDRPlay RSP1A or Airtys Mini. The blue triangle starts a data stream from the receiver that may not be the one with the pre-configured DAB option. Changing receiver 1 to DAB connected to my RTL-SDR receiver.

## Using QIRX V3

QIRX is a great analytical tool if you want to learn how a DAB signal gets to your radio, especially where many transmitters are forming a network called a Single Frequency Network or SFN. If you have experimented with V2 then you might have a list of DAB multiplexes already stored in a configuration file. If not, you will need to do a DAB scan from within the *Options* tab. A word of caution: Do not accept the default settings until you get familiar with



The coverage area of the **Single Frequency Networks (SFN)**, like the *BBC* and *SDL National*, in the UK is very large. Many local multiplexes are also large, and Berkshire uses nine transmitters; Oxfordshire has five. The idea behind TII is that some of the information carried in the multiplex may not be relevant for the whole area of the SFN. The Transmitter Identification Information (TII) signal enables receivers to distinguish the individual transmitters in a network. Every transmitter sends a unique TII signal during the gaps between the packets of data (called the Null Symbol) by using a pre-defined number of the 1536 data carriers. The identifier comprises two parts; a main (*MainId*) and a sub (*SubId*) identifier for every transmitter in the SFN and adjacent transmitters use different carriers. Every transmitter switches on specific carrier pairs during the Null Symbol but the TII signal is only transmitted in every other frame. The structure of the TII signal is based on a block of 384 carriers. This block of carriers is organized as 24 "combs" and each comb uses 8 carrier pairs. In Mode I, the structure is repeated four times in the frequency domain, to match the 1536 available carriers. The allocation of *MainId* and *SubId* to a transmitter determines which of the patterns of the carrier pairs in the comb it will transmit. There is a finite limit to the number of combinations available; however, combined with the Ensemble Identification (EID), there are enough unique codes at the moment.

**Table 1: Explainer: Transmitter Identification Information (TII).**

this software. Otherwise, the results can be quite unpredictable.

## New in V3

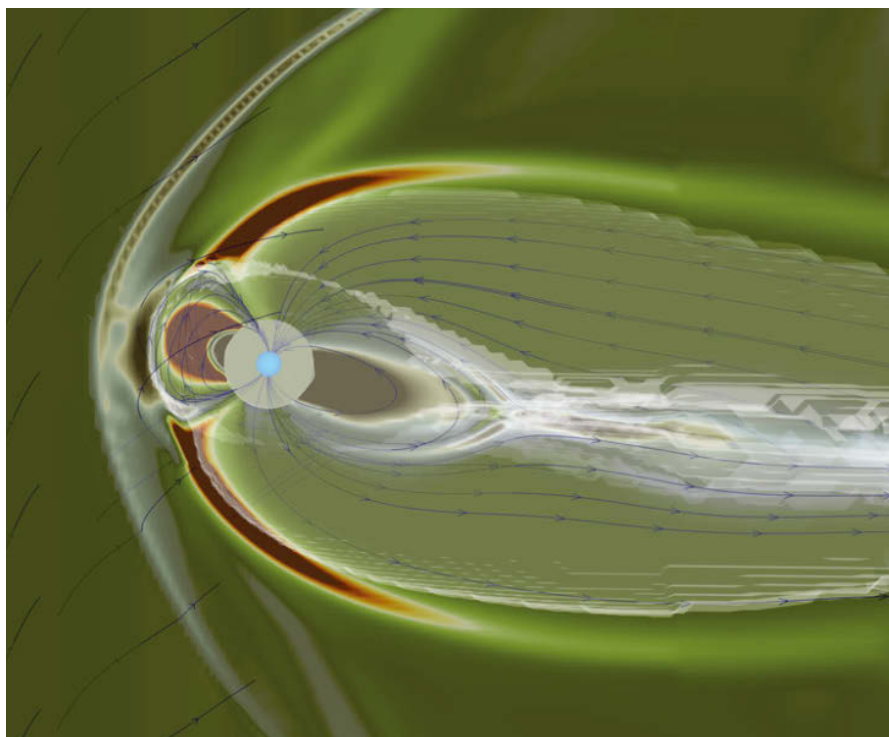
The new functionality in V3, which, I think, needs a special SDR like Kerberos, lies in the front end section. Here, the controls for the spectrum display now include a waterfall option, controls for the rendering of the display (FFT), and a simplification of the bandpass filter.

<https://www.rtl-sdr.com/ksdr>

There is a new display showing the audio spectrum. I quite like this feature, and I was surprised to notice that the DAB+ signal of talkRADIO occasionally lost the data that converts the baseband mono signal to stereo.

This is a regular event in DRM via short-wave. V3 is still in beta, and the panels and their layouts may change in the future.

Take care and enjoy your digital radio listening.



## Radio News

### SPACE WEATHER MODELING FRAMEWORK GOES OPEN ACCESS:

Just as the light from the Sun drives Earth's seasons and day-to-day weather, streams of plasma and other particles from the Sun interact with Earth's magnetic field and upper atmosphere, creating aurorae and other phenomena referred to as space weather. Solar wind-induced magnetic storms also cause current surges in electrical power lines, disruptions in telecommunications, and radiation damage to satellites. Severe space weather could disrupt critical elements of the nation's infrastructure, with highly damaging effects on commerce and national security. This hazard was recognized in the recent US Promoting Research and Observations of Space Weather to Improve the Forecasting of Tomorrow (PROSWIFT) Act, signed into law on 21 October 2020.

Because space weather affects systems in space and on the ground—and communication between the two—developing protective measures requires understanding relevant physical processes in the space environment. The University of Michigan's Space Weather Modeling Framework (SWMF) not only contributes to a scientific understanding of space weather processes but is also used for space weather forecasting and issuing hazard alerts.

The SWMF is the product of a large multidisciplinary collaboration among model developers and users, and this community is now preparing to become even more inclusive by releasing a major part of the SWMF as a full-fledged open-source distribution [...]. You can read more about this exciting development for radio enthusiasts at the URL, below (Source: EoS Science News | Citation: Pulkkinen, T., T. I.

Gombosi, A. J. Ridley, G. Toth, and S. Zou (2021), 'The Space Weather Modeling Framework goes open access'; Eos No. 102 [AGU].

<https://tinyurl.com/tukt9msd>

<https://tinyurl.com/ur4ps>

**TIMES RADIO:** Times Radio has increased Matt Chorley's Monday to Thursday morning show to go five days a week from next week. Matt was part of the Times Radio line-up when it launched on 29 June last year and has built a loyal following for his expert analysis, incisive wit and innovative approach to making sense of life within the Westminster Bubble. His guests on the show have included David Cameron, Julia Gillard, Ed Balls, Prue Leith, Mary Beard, Alan Titchmarsh and Dick and Dom.

In February, Matt was nominated as *Audio Broadcaster of the Year* in the Broadcasting Press Guild Awards for his *Times Radio Show*. It follows his *Red Box Podcast* – which showcases the best of his daily output on the station. He won in the *Best News Podcast* category, at the *Society of Editors' Press Awards* and was also named *Digital Journalist of the Year* by the *London Press Club*.

(SOURCE: *ontheradio*)

<https://tinyurl.com/4z9bcdkh>

**RADCOM PLUS:** *RadCom Plus* is the RSGB's technical supplement for radio amateurs who want more in-depth information. The latest issue contains the following range of features:

- Driving relays over a network
  - An Automation System for WSPRLite
  - Sporadic-E – where we are now?
  - piWebCAT: a CAT software system for transceiver control
  - Developing a Wireless Temperature Sensor
- RSGB members (only) can read the issue on the Society's website:

[www.rsgb.org/radcom-plus](http://www.rsgb.org/radcom-plus)

Enter our competitions at [www.radioenthusiast.co.uk/competitions](http://www.radioenthusiast.co.uk/competitions)

**Chrissy Brand**

chrissyLB@hotmail.co.uk

**A**s we head into summer, I find myself seeking out music radio stations that play tracks with a blissed-out, laid back vibe. I consume music radio stations wherever I can; cruising along the highway listening to the in-car entertainment system, jogging along the prom with headphones on, or simply tuning to or streaming radio at home.

During the recent BBC's mourning period for the Duke of Edinburgh, I enjoyed the alternative music offerings on BBC Radio Six. The public service broadcaster's leading music station was restricted to playing a range of ambient and lo-fi music. There is more of this to be found in the *Ambient Focus* programmes on the BBC sounds app. "Ethereal tones and ambient drones to aid relaxation" and several other programmes were on the app when I last checked, bringing listeners many timeless hours of other-worldly music.

In a similar vein, reader Graham Smith noted that BBC Radio One now streams a channel called Radio 1 Relax. This aims to help listeners cope and stay motivated in these uncertain times. Head of BBC Radio One, Aled Haydn Jones, stated, "The challenges of the last year have meant more young people than ever are seeking out content centred around well-being and relaxation."

Along with chill-out music, Radio 1 Relax gives mindfulness sessions plus tips from athletes and musicians on how to maintain mental fitness.

<https://tinyurl.com/BBC6AmbientFocus>

<https://tinyurl.com/pjdy242h>

<https://tinyurl.com/ykjwm3k>

### Motivating Music Radio

Andy Medlock's *Wind Down Show* can be heard on Thames FM, London Soul Radio, on Wednesdays at 1900 UTC. He plays a mix of new releases and vintage downtempo sounds, Balearic beats and chill-out music. Previous shows can be found on Mixcloud. "Tune in, drop out. Only on Thames FM."

The station started in the summer of 2019, having seen how existing radio stations, "weren't bringing you the music we felt was needed by London's listening public. Bringing together DJs, some with little or no previous broadcast experience, others with more years than they would care to remember under their belts; some



## Seeking Summer and Scottish Sounds

**Chrissy Brand** looks at music-based radio that aims to get you moving. She also dips into Moroccan radio, savours programmes with a Scottish flavour and examines the radio coverage of the Tokyo Olympics.

regulars on the club circuit well-known in their own right as quality purveyors of fine music, all sharing the same vision of bringing London some sweet soul music."

[www.ThamesFM.net](http://www.ThamesFM.net)

<https://tinyurl.com/4yecw5xn>

If you prefer your music to be a little spikier, have a listen to Eva Lunny's *Another*

*Side*. It is a programme of alternative, psychedelic and post-punk music, aired on Fridays from 1100 to 1300 UTC on Platform B in Brighton. The station is directed by, "a new wave of DJs, producers and presenters who are re-imagining and diversifying the medium with music and youth programming from a studio based



Fig. 1: Meknes, the home of Medina FM.

Fig. 2: Tune to the summer sounds and sights of Scotland, both on FM and online.

Fig. 3: The *Pulse Psychodelic Psupper* plays acoustic, metal, oddities, and rock music.

Fig. 4: Odaiba Island in Tokyo, ready for the Olympic Games, just like NHK and the podcasters.

in the green door store, a music venue underneath Brighton station."

[www.platformb.org.uk](http://www.platformb.org.uk)

Radio Klara in Belgium offers *All That Jazz* with Karel Van Keymeulen and Tine De Thunder. Some classic jazz interspersed with reflective commentary on jazz pioneers and greats. Sadly, my Flemish is poor, meaning that much of the chat evades me; nevertheless, it is a creative and interesting show.

Undeterred, I headed for CBC's *Saturday Night Jazz* with Laila Biali, but copyright issues prevent many CBC music programmes from being streamed online beyond Canada. This is sometimes a problem when trying to listen online to radio stations' music programmes; it can be the case with sport and other programmes too. A proper listen to *Saturday Night Jazz* will have to wait for my next Canadian road trip.

Radio New Zealand's *Jazz on Concert*, on the other hand, doesn't appear to air that often but the web page has live recordings and commentaries. These make up a mouth-watering selection of cool jazz music, which I find ideal to listen to on long summer evenings.

[bit.ly/3gTov17](http://bit.ly/3gTov17)

<https://tinyurl.com/2u6fkcn>

<https://tinyurl.com/56tyec3c>

There is an interactive graphic on the FM DAB EU website that enables you to move a radio dial to stream stations. For instance, in Belgium, you can choose Crooze Radio's "jazz style of life" on 104.3MHz, "chill house and trendy grooves" from Ghent on Zen FM (104.5MHz) and many more. To explore the bands of other European countries, go to the homepage.

You will also see a radio dial marked with some of the offshore pirate stations. The dial is packed aplenty with famous station names, which are linked to audio, video and information about each of those blasts from the past.

[www.fmdab.eu/nrjbelgique](http://www.fmdab.eu/nrjbelgique)

[www.fmdab.eu](http://www.fmdab.eu)

I found myself listening to a few Moroccan radio stations over the past month (Fig. 1). Medi 1 from Nador can be heard on 171kHz on long wave and plays a



TOM SAM ON UNSPLASH



PULSE COMMUNITY RADIO

mix of local and European music.

Meanwhile, Yan FM concentrates on Moroccan music, with rhythm and sounds that can appear exotic to the western ear. A song from 2020, *Abouniye* by septuagenarian Berber singer and poet Raissa Rkia Demsiria, is playing from my laptop's speakers as I write this.

Turning to the Radio Garden app, I enjoyed a selection of traditional sounds on Medina FM, broadcasting live from Meknes (Fig. 1).

From 1800 to 0200 UTC, mellow vibes are streamed at La Confiserie sonore. This online station showcases Moroccan based electronic dance music. It is well worth spending an evening with the station's eclectic mix of music and DJs.

[www.yanplusradio.com](http://www.yanplusradio.com)

<https://tinyurl.com/t5fwbu2y>

<https://laconfiserie sonore.com>

### Scotland Speaks and Sings

One of the stations I listened to was marked on the dial as Scottish Free Radio (Fig. 2). It is also known as Super Sound

Scotland 69AM. This 24-hour a day, internet station is based in Edinburgh, although some of the presenters are based on the other side of the Pond.

Super Sound Scotland 69AM makes for pleasant enough background listening while you are doing other things, perhaps at the computer or in the kitchen. The Edgar Winter Group, Cozy Powell, The Eagles and Gary Boyle were amongst the musicians I heard on a Wednesday afternoon, but the station's music mix is much more than just jazz and rock.

Talking of a music mix, at least two songs I heard suffered from an echo-effect, similar to when an AM station signal appears twice on the same frequency, from two different transmitters. That is quite an achievement for an internet radio station, and I am unsure of the reason.

One of two female presenters at Super Sound Scotland is named Nedka. She is an accomplished musician and author who hosts *Soul Saturn*, which offers, "a galactic collage of spacey soulful sounds from all over the world. From Stax to fusion and from

| Date                 | Time (UTC)                                   | Station                          | Programme                                                    | Podcast                                                                                                          | URL/ Stream/ Frequency                                                                                        |
|----------------------|----------------------------------------------|----------------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Weekdays<br>Weekends | 0430 to 0500<br>0500 to 0530                 | NHK World Radio Japan            | News, features and Olympics, in English                      | NHK apps and podcast apps                                                                                        | <a href="http://www3.nhk.or.jp/nhkworld">www3.nhk.or.jp/nhkworld</a> and 7245, 7355 kHz                       |
| Monday               | 0806 to 0830<br>1232 to 1300<br>1906 to 1930 | BBC World Service                | The Climate Question                                         | BBC Sounds app                                                                                                   | <a href="http://www.bbc.co.uk/programmes/w13xtvb6">www.bbc.co.uk/programmes/w13xtvb6</a> and DAB              |
| Thursday             | 1500 to 1600                                 | Radio Reverb, Brighton           | Folkhampton, new folk and roots music with C J Thorpe-Tracey | <a href="http://www.totallyradio.com/shows/folkhampton/">www.totallyradio.com/shows/folkhampton/</a> episodes    | <a href="http://www.radioreverb.com/shows/folkhampton">www.radioreverb.com/shows/folkhampton</a> and 97.2 MHz |
| Saturday             | 0900 to 1100                                 | Spin 1038, Dublin                | The Bellissimo Files, real-life stories, TV and film         | <a href="http://www.spin1038.com/shows/bellissimo-files-22713">www.spin1038.com/shows/bellissimo-files-22713</a> | <a href="http://www.spin1038.com">www.spin1038.com</a> and 103.8 MHz                                          |
| Saturday and Sunday  | 2200 to 2300                                 | WVMO, Voice of Monona, Wisconsin | Down Home Dairyland, polka & Wisconsin music                 | Only available as a live stream                                                                                  | <a href="http://www.wvmo.com">www.wvmo.com</a> Plus 98.7 MHz and on Tune-In                                   |
| Sunday               | 1430 to 1500                                 | CKUT, Montreal, Canada           | International Radio Report                                   | <a href="https://tinyurl.com/InternationalRadioReport">https://tinyurl.com/InternationalRadioReport</a>          | <a href="https://ckut.ca/en">https://ckut.ca/en</a> and 90.3 MHz                                              |

ERIK SUNDER ON UNSPLASH

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

## Kingston to Havana."

Meanwhile, DJ Joan Moore lives in Staten Island and plays a wide range of music on her show, from Thelonius Monk to Sister Rosetta Tharpe. Another one of the team is Ray Nelson, who brings an eclectic mix of Canadian music in his *Atlantic Waves Show*.

[www.scotland69am.com](http://www.scotland69am.com)

[www.scotland69am.com/the-jocks](http://www.scotland69am.com/the-jocks)

*Scoff the Ball* is a BBC Radio Scotland programme that combines food and travel. Tam Cowan talks to the people who turned the country into a proud food nation. Take your pick from an Italian ice cream, a music-themed restaurant in St. Andrews and one of the country's most remote Indian takeaways. *Scoff the Ball* can be heard at 0500 UTC on Saturdays, and online.

Although BBC Radio Scotland gives good coverage of most national issues, you have to move away from the national broadcaster to find additional content. A good place to head for is *Stories of Scotland*, an award-winning programme looking at history, culture nature and folklore. A new series began in the spring, and the first episode investigated the Battle of Culloden, which is said to have been the last pitched battle on British soil, in 1746. *Stories of Scotland* is recorded in Inverness and hosted by environmental scientist Jenny and an archivist called Annie.

<https://link.chtbl.com/scotlandpod>

*The Lesley Riddoch Podcast* is a weekly programme that looks at Scottish politics, from a pro-independence stance. Award-winning broadcaster and journalist, Lesley Riddoch, "chews over the week's news with former media lecturer and Dundee United fan, Pat Joyce. If you like intelligent, quirky chat about Scottish society and culture,



and Scottish, UK and international politics analysed from a Scottish perspective; this podcast is for you."

<https://tinyurl.com/je672v4m>

Scotland's Community Radio scene is vibrant and *The Sunday Post* newspaper states that there are currently 28 community radio station on the air.

Pulse Community Radio considers itself to be Scotland's number one community radio station, although I imagine other stations would disagree. However, Pulse can be heard on 98.4MHz in the East Renfrewshire area, and online. Tune in on Thursdays at 2100 UTC and you will hear *The Pulse Psychedelic Pupper*, which sounds slightly surreal. (Fig. 3). *Arts on Air*, Mondays from 1200 to 1400 UTC, supports independent artists and production and covers film, theatre, music, art and other events.

<https://pulseonair.co.uk>

Another station with plenty to listen to is Bute Island Community Radio. Community radio playlists vary from station to station,

of course, each one adapting to serve the local listenership. Bute Island Community Radio's music is mostly mainstream and covers the usual genres of British music radio. In the programme schedule, you will find *Jimmy Mac's Scooter Show* and *Helen McLaughlan Sparkles*. Music programmes include *Big Fat Party Anthems*, *Spinning the 60s*, *Mystery Top 40*, *Country in my Veins*, *The Friday Rock Show* and Susan Weir's *Simply Classics*. To hear something from further afield, listen at 2100 UTC from Monday to Thursday, for *Ed Clark's American Old Time Radio*.

[www.buteislandradio.com](http://www.buteislandradio.com)

Dunoon Community Radio is online and on 97.4MHz, identifying on-air as 'DCR'. One Thursday morning, on the *Roads, Rails and Rivers show*, I was entertained by the Gunna Sound Ceilidh Band, and a reading from a locally published book, *Lunch with Jacques Cousteau and Other Stories*. The book was written by community elders from Cowal and Bute and published to celebrate a local organisation's quarter-



century of work with older people.

Another programme, entitled *Victor Live from The Bay*, also grabbed my attention.

<https://dunooncommunityradio.org>

Meanwhile, Celtic Music Radio is, to my mind, a Scottish institution. While some of its output relayed, on other stations, including DCR. It is also worth listening to in its own right. You will hear traditional and contemporary music alongside folk, roots, Americana and World Music. The Greater Glasgow community station is also behind the annual Celtic Connections Music Festival, which I attended a few years back and can wholeheartedly recommend.

[www.celticmusicradio.net](http://www.celticmusicradio.net)

Groove City Radio is a new Glasgow community radio station broadcasting on 88.6MHz. There are many live shows and some syndicated programmes. These include northern soul music in *The Lemonsole Show*, presented by Rab Bob Sinclair, every second Sunday from 1400 to 1600 UTC. While on Mondays at 1500 UTC and Saturdays at 0700, *Sun:Sets* is presented by Chicane (Nicholas Bracegirdle) a prolific dance music producer, composer and hit-maker.

[www.groovecityradio.com](http://www.groovecityradio.com)

[www.musicglue.com/chicane](http://www.musicglue.com/chicane)

[www.facebook.com/lemonsole123](https://www.facebook.com/lemonsole123)

## The Tokyo Olympics

Radio stations around the globe will, understandably, give a lot of airtime to coverage of the Olympic Games in Tokyo in July. NHK World Radio Japan will be worth tuning to, and the NHK World website will doubtless show video and interesting programmes about the Olympics, including the last time the games were held there, in 1964. See Table. 1 for the best frequencies to hear the English service on short wave.

*Japan Sports Stories* is a fortnightly podcast where hosts Noel and Mike, "chat to Olympians, Paralympians, Sumo Wrestlers, Historians and more to discover the most fascinating, surprising and untold stories from the world of Japanese Sport. The perfect podcast for Japan fans, sports fans and just about everyone in between."

[www.japansportstories.com](http://www.japansportstories.com)

A different side to Japanese life can be unravelled by listening to *Uncanny Japan*. Consisting of folklore, myths and language, the programmes, presented by Thersa Matsuura. Discover how *Sanzaru* (*The Three Wise Monkeys*) can help extend your life, hear about 'food-superstitions' and see what it is like to live in Japan.

[www.uncannyjapan.com](http://www.uncannyjapan.com)



The China National Radio Headquarters in Beijing.

## Radio News

**RADIOS AND ECLIPSES:** Eclipse Festivals are worldwide citizen science campaigns in which hams and shortwave listeners measure Doppler shift from their home stations, using their regular HF receivers:

(SOURCE: Bob Houlston G4PVB)

[www.tinyurl.com/eclipsefest21](http://www.tinyurl.com/eclipsefest21)

<https://tinyurl.com/vpj3c8t2>

**FREQUENCY NEWS:** Graham Smith from Bury St Edmunds, Suffolk wrote in to our columnist Chrissy Brand, to share the following news: "Firstly the Italian Radio Relay Service is said to be using 207kHz and 918kHz from 1700 to 2100 UTC, although I haven't heard it yet. 918kHz was once used by Slovenia, and 207kHz is one of two frequencies used by Iceland. BBC radio is closing its MW stations in Northern Ireland, I gather. I have heard a closure message on 1341kHz. If 792kHz closes too, I might be able to hear the Czech brass band station Radio Dechovka again. There was a programme on television recently about the Woodpecker, which you may have heard once on the short waves. Apparently, it was called the Duga, and it was located near the

Chernobyl nuclear power station, and then it was abandoned after the accident there. Finally here are some stations I have heard recently. I use a Sony ICF-SW600 radio with a telescopic antenna."

- **Time:** 0030 **Frequency:** 4875 **Station:** Mystery Radio **Language:** English **SINPO:** 34434
- **Time:** 1230 **Frequency:** 17690 **Station:** China National Radio **Language:** Chinese **SINPO:** 34434
- **Time:** 1239 **Frequency:** 17760 **Station:** Radio Romania **Language:** Chinese **SINPO:** 34434
- **Time:** 2230 **Frequency:** 7505 **Station:** China National Radio **Language:** Chinese **SINPO:** 24434

### RSGB NATIONAL RADIO CENTRE TO REOPEN:

The RSGB's National Radio Centre (NRC) will reopen on Friday 28 May 2021 and be open each day, other than Wednesdays, until further notice. Whilst the radio room will be open for the demonstration of amateur radio, visitors will not be allowed inside the radio room, and only NRC volunteers will be permitted to operate the GB3RS station. The RSGB reserve the right to close the National Radio Centre at short notice, should the COVID-19 situation change, so do check our website before travelling. Visitors to Bletchley Park need to pre-book and pay via their website, so we are unable to offer our free entry voucher to RSGB members while that system is in place.

Follow us on Facebook @radioenthusiasts and Twitter @REnthusiasts

**Keith Rawlings**

Keith.g4miu@gmail.com

**T**his month, I have had the opportunity to review three *Sharman* aerials, courtesy of Chris Taylor at Moonraker. The models under review are the *Sharman Storm 100*, *Storm 200* and *Storm 500* base aerials (Figs. 1 and 2).

All three aerials are mechanically very similar and share a common design, with just the length of the vertical element changing between the models.

The supplied parts consist of the main radiating element, which is fixed to a sturdy base hub, three radial elements, one of which has a matching section fitted to it, a 200mm tube/sleeve that fits onto the base secured by an M6 A2 stainless steel bolt, two clamps for mounting the sleeve to a mast, and two 2mm and 3mm AF Allen Keys (Fig. 3). There were no assembly instructions.

The aerials look well made. The vertical section consists of white GRP and the radials and fittings are made from stainless steel with the mast clamps made from aluminium extrusion.

Assembly is straightforward on the 100 and 200. Screw-in the three radials to the base and lock into place by tightening the nut; slide the mounting sleeve over your coaxial cable and fit a cable terminated with a PL259; then put the sleeve over the base and screw in the M6, which holds it in place; after this, fit the two aluminium clamps into place on the sleeve and tighten the Pozi screws; fit the two 'U' bolts and attach the whole array to your mast.

The 500 is slightly different, as the vertical element has been spilt into two sections, and there is a join where the two halves of the radiating element are fixed together, secured by a 2mm grub screw. Users of aerials such as the tri-band Diamond V2000 will be familiar with this.

The element in the top section may need to be pulled down the tube to expose the wire. It is a simple matter to tighten the grub screw once both pieces are together. The top GRP tube is then pushed into the ferrule; following this, the locking ring and compression washer on the top section are screwed into place to secure the two sections and make it watertight (Fig. 4).

## The Aerials in Use

The next operation is to tune the aerials. This is done by loosening the grub screw at the end of the matching section and



# Some CB Storms and EMF Measurements

**Keith Rawlings** evaluates three CB base station aerials from the *Sharman Storm* range and offers some background information on the new Ofcom EM-Field Exposure Regulations.

adjusting for minimum SWR by sliding the radial in or out. This can be done through 'trial and error', whilst raising and lowering the aerial as needed (Fig. 5).

I do not have any equipment capable of transmitting on the CB bands. Nonetheless, I tried each aerial in turn and spent several hours listening, spread over a couple of months, making my evaluation with the

aerials clamped to my temporary mast.

CB activity around here is not great but there were a few 'regulars' that could be heard.

I found that out of the three, the *Storm 500* was, understandably, the better model. One operator, known to me only as 'Mike', was consistently around S2-3 on the 100, a steady S3 on the 200 and S5 on the



ALL PICTURES: KEITH RAWLINGS



Fig. 1: The Sharman Storm 100 model on the ground. Fig. 2: The Sharman Storm 500 CB aerial during assembly. Fig. 3: The hardware packs included Fig. 4: The joint on the Sharman Storm 500 CB aerial. Fig. 5: My mounting arrangements and the tuning stub.

## Specifications

Frequency: 26-28MHz  
 Max Power: 30W (100) 50W (200&500)  
 Length: 1M(100) 1.5M(200) 2.2M(500)  
 Gain: 100 0.5 dB 200 1.5 dB 500 2.5dB  
 Max radial length: dependant on matching  
 RF Connector: SO239.

### Tools Required

AF spanners: 8, 10, and 24mm.  
 Pozi screwdriver.  
 2mm Allen key (supplied).

Table 1: Technical Details and Tools.

500. Another more local – and therefore stronger – station reading over S9 was consistently the same strength on each model.

I found all three to be very lightweight. The 100 and 200 models are certainly suitable for mounting on modest supports, while the 500 may need something a little

more substantial.

Adjusting for best SWR was easily achieved on the 100 and 500 using my FA-VA5 Analyser. I found that the minimum SWR was as follows: 100=1.6:1, 200=3.3:1, 500= 1.2:1. As you can see, the 200 minimum was rather high (Fig. 6 [middle plot]).



## Conclusions

Unless space or visual impact is an issue, I would go for the 500. However, whatever model you choose, all are well made, easy to assemble, and should last for years. I feel that the omission of any instructions needs looking at. Experienced hands will have no problems, but newcomers may be

left wondering what to do.

Other than that, I think that all these aerials represent great value. The Storm 100 costs £39.95, the Storm 200 retails at £49.95, and the Storm 500 will set you back £69.95. Table 1 offers details of specifications and tools required when putting these together. My (and the editor's) thanks go to **Chris Taylor** at **Moonraker**, for the extended loan of the review items.

## Ofcom EM Field Exposure Regulations

Readers may be aware of OFCOM's introduction of regulations limiting the amount of RF exposure to members of the public based on guidelines set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

<https://www.icnirp.org>

This affects all users of the radio spectrum. Coming into force on frequencies above 10MHz in May 2021, and below this by May 2022, all users including radio amateurs are affected. CB is 'exempt' as power is (legally) limited to 4W. Ofcom states that, "All spectrum users that are subject to an Electro-Magnetic Field [EMF] condition, and whose radio equipment is currently authorised to transmit at powers higher than 10 Watts Effective Isotropic Radiated Power [EIRP] or 6.1 Watts Effective Radiated Power [ERP], are required to take this Guidance into account, in order to ensure they comply with the EMF condition. A failure to take this Guidance into account can constitute a breach of an EMF condition and may result in Ofcom taking enforcement action."

<https://tinyurl.com/4vntfv3s>

This is not the place to go into the arguments or technical detail.

However, as the aerial type and its position will influence resulting EM fields, I think I would be remiss if I did not cover the subject, if only briefly:

## Summary of the Rules

First, for those of you who *only listen*, you will not be affected. I think, however, that it would be useful for listeners to be aware of the regulations so they are well informed should they have to face questions from a neighbour or other party that may believe that an aerial used only for receiving presents a radiation hazard.

For the licensed radio amateur, steps will have to be taken to ensure that the station is 'compliant'. Remember that UK license conditions already state that licensees take safety precautions against RF radiation. The RSGB presently has a simple spreadsheet

**Fig. 6: SWR Plots: Top: Storm 100; Middle: Storm 200; Bottom: Storm 500. Span 27-30Mhz.**

**Fig. 7: Extreme example of a 40m vertical next to the simulated screened metal wall of an industrial unit. Top: No screen with typical radiation pattern; Bottom: screened (deformed) pattern.**

available, based on the OFCOM one (currently limited to 10MHz and above), to calculate compliance.

Details of frequency, transmit power, mode, per cent of transmit in six minutes, cable loss and aerial type are entered. Then a compliance distance will be calculated, and the amateur must ensure that no 'members of the public' can be within this distance from the aerial (the 'exclusion zone'). 'Members of the public' includes family members, visitors, neighbours, workmen, idle passers-by – in fact, anyone who is not a radio amateur!

Calculations need to be made for each band/station configuration.

Once done, keep records of the calculations and hopefully forget about them, at least until a change in station configuration, at which point a new evaluation will have to be made.

## Aerial Types

At present, the calculator includes only a few aerial types. If an aerial type is not currently listed, an operator has two choices: either to change the aerial to one of the types listed in the spreadsheet or to undertake some calculations and modelling of their own aerial and enter the details into the spreadsheet.

I understand that models made with the *EZNEC Engine* software suite are acceptable.

<https://www.eznec.com/eznec.htm>

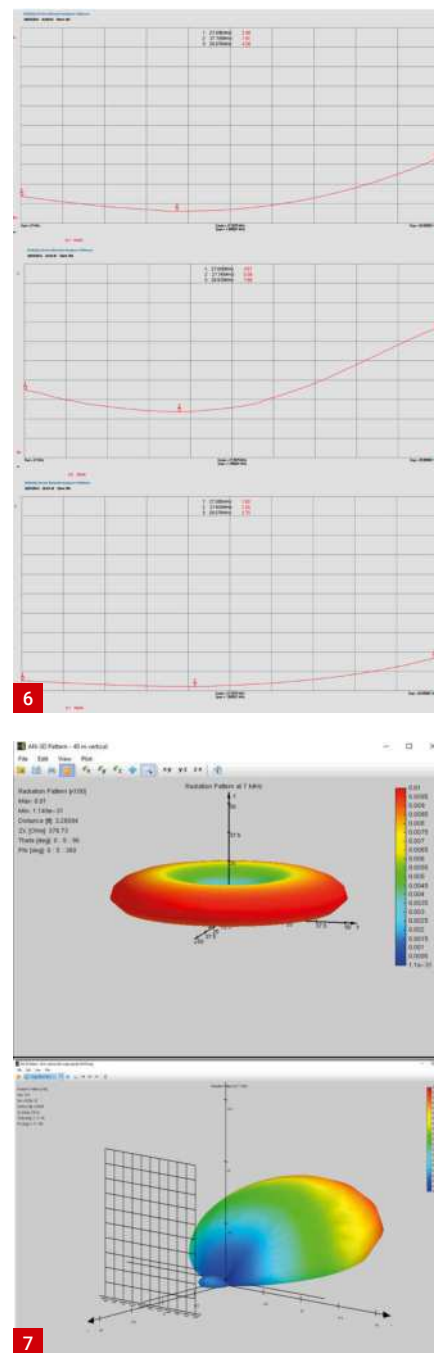
<https://tinyurl.com/xn4rfp9w>

If a station is found to be non-compliant, changes will have to be made.

As this was being written I have seen little guidance for mobile operation. Passengers in cars will most likely be within an exclusion distance, and how does an amateur operate when stuck in traffic jams? Mobile operation is essentially a 'dynamic' operation so how does an amateur demonstrate compliance?

I have seen concerns that the introduction of these measures may give local authorities more leverage to refuse planning applications for amateurs based on RF emission levels, and that it might make things easier for neighbours to take legal action against an amateur on the grounds of 'damages' caused by exposure to RF fields.

My view is that, by the use of a spread-



sheet, an amateur is now able to demonstrate that their station is within the exposure limits set by Ofcom and so there *should* not be any issues. Ofcom is the UK regulator, and if a station is within the limits set by it, one would hope that there would be no case to answer.

RF field strength is *not* a local authority planning issue, but if an applicant can show that their station conforms to the regulator's requirements then it should kill off any objections to a planning application based on emission level. However, some amateurs may have to make alterations to their sta-



tions, to keep within the limits. To achieve compliance, this may mean reducing power, changing aerial type or position, setting up 'exclusion-zones', altering operating habits, or a combination of all of these things. For example, at the moment, my sloping 66ft doublet, ending at my boundary fence at 6ft high, is unlikely to comply when running 100W. However, raising it to a horizontal position will make it compliant (on 20m and above).

I imagine most amateurs running 100W or so on HF should be able to comply.

Another note is that, up to now, unless an amateur was pushing powers around the legal limit, accurate power measurement was not necessarily a concern. Now, however, demonstrating that you are running the power you say you are, can make all the difference if a 'visit' ever takes place.

### Measurement and Further Resources

Calculating EMF levels can be difficult because nearby objects can and do affect an aerial's properties. See the extreme case model in Fig. 7, where power is concentrated in one direction from a 40m Vertical. Accurate 'real-world' assessment, as would be made by Ofcom, requires expensive test equipment – probably using a calibrated antenna with a known gain curve. It will follow a predetermined measurement method, which, I imagine, is out of the reach of most amateurs.

Avoid cheap handheld 'EMF detectors' from e-Bay, Amazon, and so on.

I hope that, by using the Ofcom/RSGB spreadsheet, amateurs can show they have acted in 'good faith'.

If a station inspection did take place, and the levels based on the spreadsheet were found to be over by real-world measurement, we would hope, Ofcom would take the same 'pragmatic' approach which – if the statement on the Royal Yachting Association (RYA) is to be believed – is being offered to that group, in terms of potential enforcement action.

- Calculator-tool  
<https://tinyurl.com/353e6948>
- ICNIRP  
<https://tinyurl.com/2czju2m2>
- Ofcom  
<https://tinyurl.com/7kwbya5>  
<https://tinyurl.com/hykkueny>
- Rogers, J. (M0JAV), White, I. (GM3SEK), and Zollman, P. (G4DSE): 'Demonstrating EMF Compliance' (*RadCom*, May 2021: 24)



## Radio News

### BBC LAUNCHES OPEN MUSIC TRAINING INITIATIVE

The BBC has unveiled *Open Music*, a new training scheme for creatives and musicians of all genres, styles and backgrounds from across the UK. It is part of the BBC's investment in creative diversity and builds on its commitment to ensuring that the creative teams making BBC content reflect all audiences it serves. Successful applicants will participate in a tailor-made programme, designed to develop new collaborations, exciting ideas and reflect today's audiences for live orchestral music.

*Open Music* will offer paid training and development opportunities to participants across four areas: making music, presenting, radio & event production, and sound recording & engineering. Participants will be provided with training sessions, hands-on experience, masterclasses and mentoring to develop their skills and ideas. The scheme allows candidates to work with the BBC Concert Orchestra and BBC Proms in building, shaping, delivering (and possibly performing in) a concert at the world's greatest classical music festival, the *BBC Proms*, in 2022.

Applicants do not need to have any qualifications or experience of working with orchestras or orchestral music but must have a desire to learn and collaborate, with an interest in the creative industries.

The scheme is open to all and the BBC is particularly interested to hear from those from Black, Asian or ethnically diverse communities. Each participant will receive bespoke opportunities to cater towards their area of interest, as well as a minimum of 12 paid days, spread across 12 months (plus travel expenses for those living outside London). They will also be given a mentor from across the four areas, who is already working with the BBC, with access to the unique skillsets across BBC Radio and Music. Alan Davey, Controller BBC Radio 3, said: "*Open Music* is an important way to engage people of all classes and backgrounds and to help them to develop their talents. It's not just a good thing to do, it is a real investment in the future of music and radio. At BBC Radio 3, the Orchestras and Choirs

and the BBC Proms, we want to broaden and deepen the music we play, the people who play it, the audiences we play it for and the creative culture that underpins all of our work. Creativity – from people with different backgrounds, who bring different ideas through such initiatives – can help us with this. The result will be even better content for our audiences." Trevor Nelson, an *Open Music* 'ambassador', added, "*Open music sounds like a great initiative for aspiring radio talent. It's an opportunity that the younger me would've jumped at. The chance to get mentored or crucial tips at an early stage in your radio career is priceless.*" Applications open from Tuesday 8 June on the *BBC Careers* website, and the deadline is 8 July.

(SOURCE: BBC | RadioToday)

<https://tinyurl.com/8cvayfar>

### HOT RADIO IN PARTNERSHIP WITH LOCAL BUS COMPANY

Poole's community radio station Hot Radio, along with its new digital brand extension *Hot Gold*, are appearing on local buses in a new commercial deal. Yellow Buses, which covers roads in Bournemouth, Christchurch and Poole, has partnered with the services to sponsor the events guide. David Squire, Managing Director at Yellow Buses, explained, "*We are delighted to support Hot Radio and Hot Gold with this tie-up between Yellow Buses, the areas locally owned and locally operated bus company and Hot Radio and Hot Gold, the areas local community radio station. We are sponsoring the Hot's On Guide, and we have our commercial bus rap playing on the station, plus we will be running competitions and partnering outside events.*" Kevin Scott of Hot Radio added: "*Hot Radio and Hot Gold are delighted to partner with this locally owned company that shares a community-focused attitude mirroring the one we have at Hot. These two brands working together with dual marketing makes total sense and means we can reach more of the community. I believe we can actively support each other and our wider community long into the future and we both endeavour to make the BCP Conurbation better for all.*"

(SOURCE: RadioToday)

<https://tinyurl.com/2jcc73fe>



# Listening to Jupiter

**Tim Kirby**  
tim@livingland.wales

**This month, Tim Kirby travels further than ever before, investigating how to receive radio signals from the planet Jupiter. In doing so, he relates the fascinating story of the scientists who first discovered the signals.**

Typically, in the 'Signals from Space' column, I write about signals from man-made sources, travelling to space and back again. This month, I am looking at signals which have their origins far from Earth, on the planet Jupiter (Fig. 1).

Back in 1955, no radio signals had ever been received from a planet beyond the Earth, or at least if they had, no one had realised what the signals were. Then two American radio astronomers and authors, Bernard Burke (1928-2018) and Kenneth Franklin (1923-2007, Figs. 1 and 2) installed themselves in a 96-acre field about 20 miles to the northwest of

Washington DC (Fig. 2). The antenna they were using was known as the '96-Acre-Antenna-Array', operated by the Carnegie Institution of Washington. The array consisted of two arms in an 'X-shape', with each arm 2047 feet in length and made up of 66 wire dipoles (Fig. 3). Around 8km of wire was used in the array, all connected up to an army surplus truck that contained the receiving equipment.

The array was designed to work at a frequency of 22.2MHz. At that frequency, it had a beamwidth of around 2.5 degrees.

It was steered by changing the phasing of the feeds to 'point' at the area of sky which was of interest (Fig. 4).

## Pointing to the Sky

As the receiver was continuously worked on, Franklin and Burke wanted to gauge whether improvements were made, so they 'pointed' the array towards the Crab Nebula. This is a very strong radio source in the constellation of Taurus. They compared the *before* and *after* results. Both decided

to scan the region of the sky near the Crab Nebula to build up a picture of that part of the sky, and they changed the beam heading of the array accordingly.

Their records showed the peak of a signal as the Crab Nebula passed through the beam of the array, taking around 15 minutes to transit. This was followed by a smaller hump, lasting the same 15 minutes, which the scientists attributed to the object IC443. They also noticed, from time to time a feature which they felt was interference, occurring a little later than the passage of these two known sources.

The team then felt that they ought to investigate the interference sometime but joked that it was most likely down to the faulty ignition system of a car belonging to a farmhand returning late from a date!

Preparing their results to present at the Princeton meeting of the American Astronomical Society in April 1955, they set aside their results containing the interference and concentrated on the two-thirds remaining. Bernard Burke noticed a gentle rise and fall of signals, which was present sometime after IC443 had crossed through the beam width of the array.

Curious about this, Burke went back to

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Fig. 1: The Jovian moon Io contributes significantly to the radio emissions from Jupiter.  
 Fig. 2: A sign commemorating the site of the 96-acre Array in Maryland.  
 Fig. 3: A close-up of the numerous dipoles used in the 96-acre Array.  
 Fig. 4: An overview of the 96-acre Array, the site used to first identify radio emissions from Jupiter.  
 Fig. 5: The *RadioJupiterPro3* software suite.  
 Fig. 6: This book by Bernard F. Burke and F. Graham Smith is highly recommended.  
 Fig. 7: Steven Arnold's title is one of the latest additions to the radio astronomy catalogue.

the previously discarded slides, containing the interference and discovered that the interference was only present during the time of the gentle 'rise and fall' that they had observed. Then, he noticed that the 'interference' was occurring at almost the same sidereal time each day (the time reckoned from the motion of the Earth relative to a distant object).

By this stage, they realised that the signal was not 'interference' and was in some way attached to the sky, so they looked in an atlas to see if there was an object which might prove to be the source of the signal. Although there was a galactic cluster and a planetary nebula around the 'right place' these were ruled out, as the source seemed to drift westward compared to the two other known sources.

### An Incredible Possibility

Coincidentally, the late Howard Tatel was present in the same laboratory as Franklin and Burke, working on some seismic records. He and Dr Tuve were working on the distribution of hydrogen in the galaxy and had looked at Jupiter a few nights previously, using the Hydrogen-line equipment. They had seen nothing.

Jokingly, Tatel suggested to Franklin and Burke that perhaps Jupiter was the source of their signal. There was great amusement at the suggestion ("preposterous" is the word used, in Franklin's account) and to disprove the 'ridiculous' suggestion, Franklin looked up Jupiter's position in the *American Ephemeris and Nautical Almanac*. To his great surprise, he discovered that Jupiter was in just about the right place and so was Uranus.

This was something to investigate further. As twilight came that evening, there was an exceptionally bright object, almost on the meridian of the array. You've guessed it, Jupiter!

The next day, Kenneth Franklin, started looking at the motion of Uranus to see if it could be attributed as the source of



the transmission, but the movement of the planet did not correspond to the data recorded.

Next, Franklin looked at the motion of Jupiter. He wrote as follows: 'As I plotted each point, Burke, who was watching over my left shoulder, would utter a gasp of amazement. Each point appeared right between the boundary lines representing the beginning and end of each event! The meaning was exquisitely clear: these events were recorded only when the planet Jupiter was in the confines of the narrow principal beam of the Mills Cross.

"Not only did this source have the same direction in space as Jupiter, but it also exhibited the same change of direction as Jupiter did during its retrograde loop of 1955. No other object could satisfy the data: the source of the intermittent radiation was definitely associated with Jupiter!"

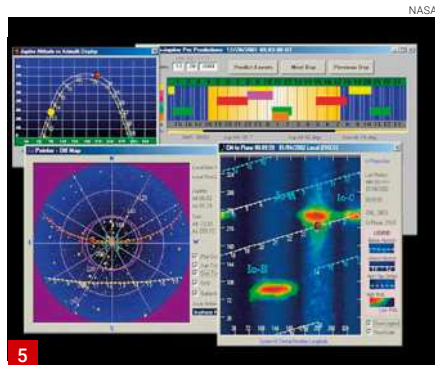
Following their discovery, Franklin and Burke wrote to other colleagues around the world, working in the same area of astronomy. C.A Shain in Australia started work immediately and was able to make observations that confirmed the findings. Shain also searched old records and found that he had received noise from Jupiter in 1950 but had attributed it to interference. Kenneth Franklin concluded his paper with these words: 'Our identification of Jupiter

as a radio source is not based directly on reasoning, but more on luck. (Professor Herbert Dingle once described this as the real scientific method, in a talk before the National Science Foundation.) We were led into it by the nature of our equipment: a very narrow pencil beam. Shain had a broad beam which was suited to his needs, but which enabled him to overlook the celestial source of "interference" appearing on his records.

"Another curious bit of chance shows up when we reviewed our arbitrary southward redirection of the pencil beam: we were inadvertently following Jupiter southward as well as if we had planned it! (Incidentally, we never did learn the cause of the rise and fall which started all this).

"A further favorable attribute of much of the radiation from Jupiter is its intensity. It can be very powerful, even more intense than Cassiopeia A, the strongest source in the sky at this frequency, around 20MHz. Only the active sun is apparently stronger, at times.

"Thus, when Jupiter is acting well, it is not difficult to observe, as radio sources go. It is well, however, to recall that any radio source is very weak compared to the general amount of noise entering the antenna system, and even sometimes produced in the equipment itself' [...].



You can read the full account written by Kenneth Franklin, published in the March 1959 edition of *The Astronomical Journal* at this URL:  
<https://tinyurl.com/h4zj9nfx>

## The RadioJove Project

As it turns out, this is not the first time that Jupiter's radio sources have been discussed in *RadioUser*. Back in 2009, Whitham Reeve discussed a project on how to receive Jupiter's Radio Storms for yourself, using rather simpler equipment than the original 1955 observing team had used. You can read the two articles here:

<https://tinyurl.com/65yxf8pv>

If the idea of receiving radio signals from Jupiter appeals, you may also be interested to learn that NASA runs a project called *Radio Jove*, which is aimed at individuals and the educational community at large.

There is a chapter on the *RadioJove* project in the book *Radio and Radar Astronomy Projects for Beginners* (2021), by Steven Arnold (Chapter 12 - reviewed in *RadioUser*, March 2021: 52).

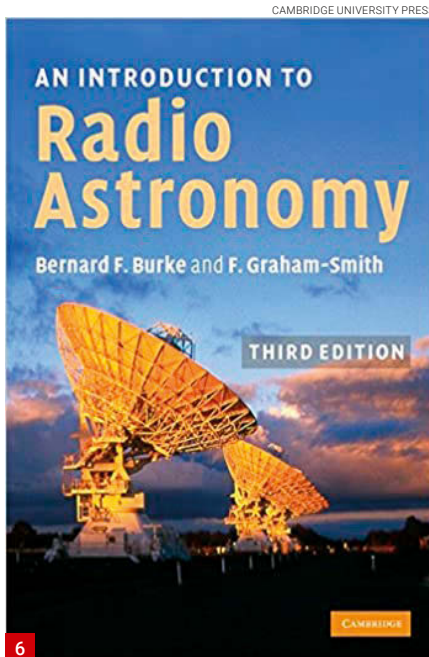
You can find the home page of the project at this site:

<https://radiojove.gsfc.nasa.gov>

It may well be that you already have equipment that is capable of receiving radio signals from Jupiter. For example, if you are a radio amateur and have an HF transceiver and perhaps beam antenna for 15m, then this should work very well indeed. A smaller antenna, such as a dipole, will probably work to some extent as well, although will not give such good results as the beam antenna, allowing you to hear stronger solar bursts and the very strongest of activity from Jupiter.

The *Radio Jove* project recommends the use of two dipoles, configured as a phased array, which will provide better sensitivity. You can read the instructions on how to build both a single dipole as well as the two dipole array here:

<https://tinyurl.com/3ec733h8>



Kits are available from the *RadioJove* project, although armed with the information provided, you would almost certainly be able to build a suitable aerial from parts you may have yourself.

*RadioJove* also offers the opportunity to buy a *RadioJove* Receiver Kit, which is designed to be simple to construct. To decide whether it is a project that you might like to try to build, you can read about the receiver and how to build it at:

<https://tinyurl.com/4zu29btt>

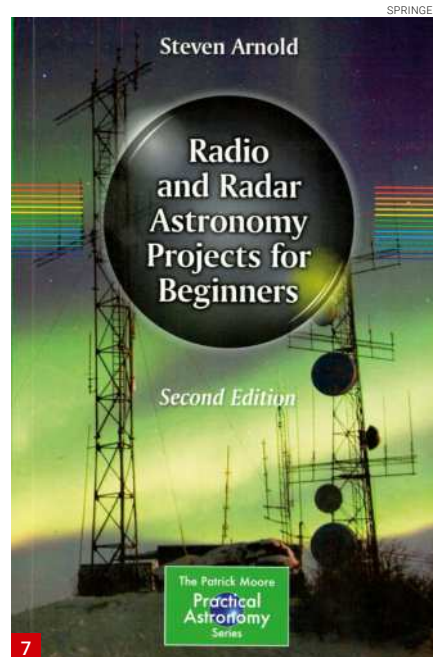
You can read more on how to order the kits here:

<https://tinyurl.com/6xw79d8>

## Receiving the Signals

However, it is probably worth saying that you might already have a suitable receiver that you could use. For example, an SDR receiver would allow you to see the signals visually in the waterfall without the use of any external software, which might otherwise be required. As ever, the aerial will be the most important part of the receiving system.

It is worth bearing in mind that you will not necessarily hear signals from Jupiter all the time that it is in the sky at your horizon and in the beam width of your aerial. In his article entitled 'Amateur Radio Astronomy Projects – Radio Signals from Jupiter', Richard Flagg AH6NM writes, "If the Jovian moon Io is in the right place in its orbit, the probability of receiving signals is greatly enhanced. The moon Io happens to be within the tidal force's limit of Jupiter, and it is literally being torn apart by gravi-



tational forces with tides as large as 100 meters (about 300 feet!). Io crosses the magnetic field of Jupiter and is thus able to release charged particles into the field. These charges are accelerated to very high speed and spiral along magnetic field lines and generate synchrotron radiation, which manifests itself as the radio signals detected here on Earth. There is additional data that suggests that Ganymede and Europa may also contribute to the radio emissions".

You can read Richard's article, in full, here:

<https://tinyurl.com/cstdwxuj>

To determine whether Io is in the appropriate place to 'enhance' the signals from Jupiter there is some software available, *RadioJupiterPro3* (Fig. 5). This should help you plan good times to listen. From the screenshots on the website, the software looks a little old, so it may be best to test it on your computer using the 30-day trial to establish whether or not it will work on your operating system, as otherwise, the software has a cost of US\$20.

<http://radiosky.com/rjpro3ishere.html>

Of course, you will want to know what signals from Jupiter sound like. In the article referenced earlier, Whitham D. Reeve explains that it is very tempting for beginners to attribute every crack and whistle heard on the receiver to the planet whereas, of course, this is not the case. Some of the signals you hear may be genuine interference from your neighbour's thermostat or a noisy VDSL installation.

There are two main types of signals heard from Jupiter, L-Bursts and S-Bursts.



## Further Resources

- Arnold, S. (2021) *Radio and Radar Astronomy Projects for Beginners* (Springer; *RadioUser*, March 2021: 52)
- Burke, B.; Graham-Smith, F.; Wilkinson, P.N. (2022) *An Introduction to Radio Astronomy* (4th ed., Cambridge: CUP)
- Fielding, J. (2010) *Amateur Radio Astronomy* (RSGB)
- Flagg, R. AH6NM and Wallace, J. (2010) '[...] Radio Signals from Jupiter'; QEX – May/June 2010  
<https://tinyurl.com/3ttw5t3d>
- Graham-Smith, F. (2013) *Unseen Cosmos – The Universe in Radio* (OUP)
- NASA INSPIRE Project (USA)  
<https://theinspireproject.org>
- Jupiter on a 'DIY-Radio'  
<https://tinyurl.com/c2hbxw3j>
- Lashley, J. (2010) *The Radio Sky and How to Observe It* (Springer) (Chapters 2 and 11)
- McAnally, J.W. (2008) *Jupiter and How to Observe It* (Springer) (Ch. 5)
- RadioJove Project (see also books)  
<https://radiojove.gsfc.nasa.gov>
- Reeve, W.D. (2010) 'Listening to the Sun's Radio Storms' *RadioUser*, March 2010: 34
- Reeve, W.D. 'Listening to Jupiter's Radio Storms' *RadioUser*, September 2009: 32 (Part One); October 2009: 34 (Part Two)
- Society of Amateur Radio Astronomers (SARA, USA)  
<https://www.radio-astronomy.org>
- Thomas, A. (2021) 'Radio Astronomy for Amateurs'; *RadioUser*, February 2021: 34-37 (includes further resources)
- United Kingdom Radio Astronomy Association (UKRAA)  
<https://www.ukraa.com>
- Verschuur, G. (2015) *The Invisible Universe: The Story of Radio Astronomy* (Springer)
- Whitham Reeve's website  
<http://www.reeve.com/index.htm>

You can hear examples of both of these at:  
<https://tinyurl.com/25etmt7b>

Having listened to these, I can see why back in 1955 Franklin and Burke thought that what we now know was an S-burst was, in fact, the ignition system of a car!

I hope you have enjoyed reading about the origins of Jovian radio astronomy and perhaps it will inspire you to take a listen for yourself.

Figs. 6 and 7 show the covers of the two user-friendly introductions to this subject, mentioned in the text. They both include many practical experiments and projects.



Kele Le Roc will be appearing at KISSTORY Festival this September.

## Radio News

**A NEW AMATEUR RADIO CLUB:** At the time of writing, a new amateur radio club, the *East Ardsley Radio Society*, planned to hold its first meeting at 7 pm on Friday, 25th June 2021. Founded during the pandemic of 2020, the East Ardsley Radio Society is a modern, forward-thinking club for enthusiastic radio amateurs. The Society aims to provide a club that caters for everyone, regardless of ability or interests. They hope to meet twice a week with the main meeting being on a Friday evening. Providing the Government does not change the schedule of lifting the restrictions on June 21, they will be opening their doors at the East Ardsley Cricket Club on Friday, June 25, at 7 pm. (Source: EARS Ham Radio Podcast)  
<https://ears.radio>  
<https://twitter.com/GX3EAR>

### KISSTORY FESTIVAL LINE-UP ANNOUNCED:

The line-up for this year's KISSTORY Festival has been revealed by Jordan and Perri on KISS Breakfast. Taking place on Streatham Common, the two-day event will feature multiple stages with DJ Luck & MC Neat, Oxide & Neutrino and Judge Jules plus live performances from KISSTORY legends Lisa Maffia, Kele Le Roc, Fatman Scoop, Another Level, Artful Dodger, Damage and many more. KISSTORY Festival will also feature Old Skool sets from KISS DJs Anton Powers, Majestic, DJ Q, Tinea Taylor, Scott Garcia, Wideboys and loads more. KISS DJ, Anton Powers said, "After the past year we've all had we can't wait to get back on the stage and bring the KISSTORY party back for two huge days of non-stop Old Skool & Anthems, we'll be coming back bigger and better than ever!"

The event is happening on Saturday 25th and Sunday 26th September 2021.

(Source: RadioToday)

<https://tinyurl.com/4pvb5yyc>

Enter our competitions at [www.radioenthusiast.co.uk/competitions](http://www.radioenthusiast.co.uk/competitions)

COURTESY OF LOVE BUSINESS



1

**Robert Connolly**  
gi7ivx@btinternet.com

**I** am beginning this month's column with an appeal for help: Reader Eamon, from Ireland, sent me the following query: "Hi Robert, I enjoy your Maritime Matters column in Radio User, which I access as an mp3 download, via the Radio Amateur Invalid and Blind Club (RAIBC) website. Membership is open to anyone with an interest in radio, who has a visual impairment. I can get around without using a white cane or guide dog, but do not have enough vision to read print or see a computer screen.

"I have no experience in decoding data, and wonder whether plain text could be read by Windows Narrator? Narrator is Microsoft's built-in screen reader, allowing a blind person to navigate a computer screen. It may be found in the Ease of Access Centre or toggled with CTRL-Windows key-Enter".

I have asked my regular contacts for advice on this but, unfortunately, to date have not received any positive advice. I am sure there must be a suitable work-around for those who have visual impairments and therefore if any reader can assist, I would appreciate receiving any advice that I can pass on to Eamon.

# Radio, Rowing and Rescues

**Robert Connolly** describes regular radio equipment inspections, follows the latest communications trends from the ITU Online Seminars, looks at radio in transatlantic rowing and shows how submarines in distress can communicate.

## Paris MoU: A Maritime Inspection Regime

All commercial vessels are subject to regular spot inspections that are normally carried out by local authorities while the vessel is in port. These are normally unannounced and carried out to ensure the safety and seaworthiness of vessels. With maritime laws becoming more stringent with each passing year, sea-going vessels must go through a series of inspections in order to meet minimum requirements to continue sailing.

Such inspections cover a range of topics including vessel condition, crew safety, documentation, radio and navigation equipment, and so on. Some deficiencies detected during an inspection will prohibit a vessel from sailing again until they are fixed. In some cases, serious defects may be so restrictive that a vessel could be banned from entering a region's waters.

In Europe, the Paris MoU organisation has 27 member states that regularly carry out annual vessel surveys and spot vessel inspections. Its **mission** is to eliminate the

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**Fig. 1: The end of the *Atlantic Dash*. Fig. 2: An Indonesian submarine. Fig. 3: *MS Satoshi* (formerly the cruise ship *Pacific Dawn*).**

operation of sub-standard ships through a harmonized system of port state control. Each year, more than 17,000 inspections take place on board foreign ships in the Paris MoU ports, ensuring that these ships meet international safety, security and environmental standards, and that crew members have adequate living and working conditions. The website lists annual survey details of vessels. It identifies those that have been detained due to failing spot inspections, and it provides the reasons for any detention.

[www.parismou.org](http://www.parismou.org)

Recently the Paris MoU issued a chart detailing the 'top twenty radio communication deficiencies, along with the number of those that subjected vessels to detention. At the top of the list for 2020 was *Radio Logs*, with 215 deficiencies detected; four of those were detainable.

By comparison, the 2018 figures for that category were 250, of which 3 were detainable faults. In other areas of inspection, the general trend over the last couple of years has been downward, indicating that these inspections are doing what they set out to do, namely improve the safety of ships and their crews.

Table 1 shows the results for all radio communication deficiencies detected by inspections during 2020.

## Return-Link-Service (RLS) Transmissions

In December 2020, the 29<sup>th</sup> ITU World Radiocommunication Seminar on modern maritime communication was held online. Regarding any recent trends in maritime communications, the report issuing from this event indicated that there is a study regarding VHF voice digitalisation.

<https://tinyurl.com/2xe5ccct>

In this context, the Medium Earth Orbiting Search and Rescue (MEOSAR) system is the relevant Space segment. Search and Rescue (SAR) repeaters are placed on the satellites of the Global Navigation Satellite Systems (GNSS). This system will offer a new capability to provide a Return-Link-Service (RLS) transmission to a distress beacon. This provides the user with a confirmation that the distress message has been received. The 2019 event (WRC-19) had identified frequencies for use by Autonomous Maritime Radio Devices (AMRD) on 156.525 MHz (Channel 70),



161.975 MHz (AIS 1) and 162.025 MHz (AIS 2). These may be used by AMRD Group A.

The system enhances the safety of navigation using DSC and/or AIS technology.

The frequency of 160.9MHz may be used by AMRD Group B.

Under this group are to be found signals and information, which do not concern the navigation of the vessel and do not complement vessel traffic safety in waterways using AIS technology.

Members of the AMRD Group B are limited to a transmitter-equivalent of isotopically radiated power (EIRP) of 100mW and an antenna height not exceeding 1m above the surface of the sea.

## Radio - Rowing - Regattas

I am sure that many of you are aware of the various types of maritime races that take place regularly. They range from the *Tall Ships* races to the around-the-world yacht races. The amount of radio and navigation equipment that may be carried under race rules varies. For example, *Tall Ships* will carry VHF, along with MF/HF radio equipment. Some vessels may carry satellite communications. There is also the *Golden Globe* yacht race, where competitors are only permitted to use radio and navigation equipment that was used in Sir Robin Knox-Johnston's historic 1968/9 world first solo non-stop circumnavigation. Competitors in the *Golden Globe* do carry a sealed safety box containing a GPS and satellite phone but if the seal is broken, they are deemed to have retired.

However, what about rowing across the Atlantic?

A few weeks before writing this column, I was very interested to read an article in

our local newspaper. The son of a local acquaintance of mine was about to take part in an unsupported four-man team East-to-West Atlantic row, named *Atlantic Dash*, and it made me wonder just what radio and navigation equipment they would be able to carry in a relatively small rowing boat.

Participants row in pairs, in two-hour shifts – two hours rowing, then two hours break getting some much-needed food and sleep. They needed to carry the 1.08 million calories (6,000 calories each per day) of entirely meat-free food with them from the start line! They would be living and sleeping on their 8.8m (29ft) custom boat made in the Avon Marina, Christchurch for their journey of between 35 and 45 days.

An 'unsupported' row means an undertaking *without any form of assistance from other persons*. This includes accepting a beer or a tin of beans from anyone. The carriage of satellite phones and laptop computer does not constitute 'support' and is permissible. The ocean rowboat may only be propelled by the effort of crew rowing and the natural action of the wind and currents.

## Comms and Argos Beacons

In the *Atlantic Dash*, it is not permissible to accept a tow; however if a crew member requires emergency evacuation, the 'unsupported' status of the row remains intact. The boat must be either self-righting or capable of being righted in the event of a capsize, and it is recommended that a fully-loaded boat should be tested for this before departure.

Apart from the required equipment, such as navigation lights, and so on, the craft should carry a suitable life raft, radar reflec-

tor, sea anchor, life jackets and harnesses, fire extinguishers, flares, charts and grab lines.

Communication and distress equipment includes an EPIRB distress beacon, GPS, a marine VHF transceiver (normally portable) along with a charger, and a satellite phone (optional). The marine VHF transceiver and the operator must be licensed as per the relevant legislation.

Another piece of kit often carried by ocean rowers is an Argos beacon. This is a satellite tracking beacon that avoids any question regarding when and where the ocean rowboat arrives. It also acts as an emergency locator beacon in the event of a rescue at sea. It is tracked by *Service Argos* and can be recovered later.

Both the Argos beacon and EPIRB must not be stowed in the forward compartment of the boat, as this section could ship water during rough seas.

For more information on the requirements of ocean-rowing boats, you can visit the website at the end of this section. The team of four, referred to above, departed Lanzarote on 6 March 2021. After spending 50 days, five hours and seven minutes rowing the 3,200 nautical miles across the Atlantic Ocean, they completed the epic challenge on 2 May 2021, when they made landfall on the coast of Antigua in the Caribbean (Fig. 1).

<https://old.oceanrowing.com>

## An Indonesian Tragedy and the role of ISMERLO

In late April 2021, an Indonesian submarine disappeared (Fig. 2), sparking a major international search and rescue mission. Submarines are designed to operate underwater but only to certain depths before the water pressure crushes the vessel. Also, submarines make regularly scheduled contacts with their operations base to ensure the safety of the vessel. However, in peacetime occasionally something can go very wrong with the submarine preventing it from being able to surface. In an emergency such as this, the submarine will try to contact its operations base but if submerged this may not be possible. In that situation, another couple of options remain open.

A submarine rescue buoy is a floating buoy attached to a submarine, and released in the event of a serious accident or sinking. The buoy remains affixed to the submarine by a cable. Once on the surface, it can indicate to rescuers the position of the submarine and may include a facility for



communication with the trapped crew.

A similar system is a SLOT buoy (*Submarine-Launched One-Way Transmitter Buoy*). This has an onboard radio transmitter for sending a message from a submerged submarine to a surface unit. The basic purpose of a SLOT buoy is to establish a line of communication from a single, submerged, submarine to their onshore military or civilian command structure or surface units.

Due to the design of the buoy, communication through this kind of buoy can only run from the submarine to the surface asset and not the other way around. The submarine records a message on the buoy and launches it. The device is about the size of a baseball, through a four- or five-inch tube while submerged. The buoy ascends to the surface, and the message is then picked up by a communication satellite or other friendly forces and relayed to the final addressee. It may be used for operational messages or to indicate the submarine has a serious emergency.

When a submarine is reported missing, in most cases an international search and rescue operation swings into operation. The International Submarine Escape and Rescue Liaison Office (ISMERLO) is an organisation that aims to facilitate an international response for a distressed submarine and to improve the ability to respond to a call for assistance through its coordination role. Although established by NATO, ISMERLO supports all nations and pursues the involvement of global submarine-operating nations.

ISMERLO is a military organisation operating in an international environment focused on the humanitarian objective of saving lives at sea. More information is available on its homepage:

<https://ismerlo.org>

If – as in the recent case of the Indonesian submarine – no form of communication is received from the submarine in distress, all search vessels will observe silence for three minutes twice per hour, on the hour and half-hour. This is to allow the possible detection of the submariners tapping the hull of their submarine in an attempt to assist in being rescued.

Sadly, when a submarine sinks, there is a time-limiting factor to rescue operations, due to the availability of the oxygen supply. When the submarine's power fails, it is unable to produce oxygen; therefore, the crew carry out as little activity or talking as possible to make the available oxygen last longer, in the hope that they will be rescued before it runs out. Tragically, the Indonesian submarine was found on the seabed broken into three pieces with the total loss of the crew.

This month's photo (Fig. 3), kindly provided by Kev Hewitt, shows *MS Satoshi* (formerly the cruise ship *Pacific Dawn*) leaving Gibraltar to join several other former cruise ships at one of the breakers' yards in India, after a plan to turn it into a floating residence and tech hub failed. Many cruise ships have gone for recycling in recent months, following the suspension of cruising due to the global Covid-19 pandemic.

Until next time "Fair Winds".



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# The Battle of Britain

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### 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.

As for the outbreak of war in September 1939, there followed eight months of what became known as the 'Phoney War'. 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 the BEF, a large Air Component was supplemented by an Advanced Air Brigade. In total, there are forces amounted to six squadrons, six of which were Hawker Hurricane-equipped. The remainder of the RAF force in France comprised largely light bombers and Army Co-operation squadrons. Eventually, however, the 'sitting' became the 'fighting'.

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 moved inexorably towards the English Channel and while the French and British tried desperately to stem the advance, the situation became ever more desperate.

**Predicted Catastrophe**  
When the fighting had broken out in France, the BEF's Air Component were in almost certain trouble, and it was not to be long before they were to be sent to the Channel, and then to the sea.

### BACKGROUND TO BATTLE

Left: A Hurricane of 501 Squadron, sent to France for an operational sortie at Bethune, France, May 1940. An RAF Hurricane High Dive bomber (right) was sent to France to deliver bombs to the German coast. The Hurricane High Dive bomber was sent to France to deliver bombs to the German coast. The Hurricane High Dive bomber was sent to France to deliver bombs to the German coast.



### THE RAF FIGHTER PILOT



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Right: As the anticipated approach of German military might advanced across Europe, the steady stream of Hurricanes sent to France to deliver bombs to the German coast. The Hurricane High Dive bomber was sent to France to deliver bombs to the German coast. The Hurricane High Dive bomber was sent to France to deliver bombs to the German coast.

Right: As the anticipated approach of German military might advanced across Europe, the steady stream of Hurricanes sent to France to deliver bombs to the German coast. The Hurricane High Dive bomber was sent to France to deliver bombs to the German coast. The Hurricane High Dive bomber was sent to France to deliver bombs to the German coast.

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