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ADD SM-5000: £3599.95

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ML&S £479.95

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FREE MBF-4

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ML&S ONLY £1199.95

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ICOM IC-7851

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Built to order like its predecessor, the new IC-7851 is set to be a master-class transceiver of the highest order. Based on the Limited production run and very exclusive IC-7850, the IC-7851 is available today to order. Top prices paid on all trade-ins.

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ML&S: £574.95

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The Icom IC-7610 is a complete redesign of the former IC-7600 following on from the huge success of the IC-7300. 100W, Dual band receive and a huge widescreen display.

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HF through to 23cms Base Transceiver.

UX-9100 23cm Module £623.99
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NEW PRODUCT

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ML&S: £475.95

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Peter Hart says; "An excellent fully-featured and high performing SDR transceiver, the current top of the range model from Apache Labs."

HF & 6M 200W SDR
Available from stock and on demonstration at our London Showroom.

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Dual-Tuner wideband full feature 14-bit SDR, 1kHz to 2GHz, 10MHz of spectrum visibility. Simultaneously monitor 2 separate 2MHz bands of spectrum between 1kHz and 2GHz. 3 software selectable antenna inputs, & clocking features ideally suited to industrial, scientific, Ham & educational applications. Windows 10.

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ATU option now standard - you cannot buy these without ATU now as it is included as standard.

WITH AUTO ATU! £4899.95

Click!
www.HamRadio.co.uk/mb1

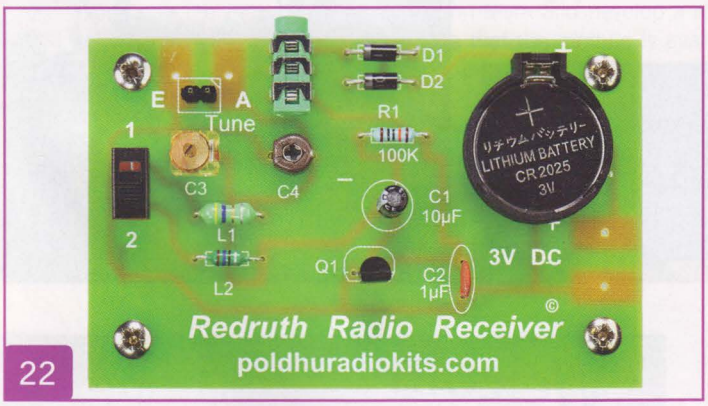
Contents

October 2018

News and Reports

Regulars

Reviews



22


66

Technical Features

Features

Cover photo by Richard Constantine, G3UGF; design by Kevin Williams, M6CYB

RadCom THE RADIO SOCIETY OF GREAT BRITAIN'S MEMBERS' MAGAZINE

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RadCom is published by the Radio Society of Great Britain as its official journal and is sent free and post paid to all Members of the Society. **The November 2018 edition of *RadCom* is expected to arrive with most Members by 27 October 2018** although this can take up to a week longer in some cases; international deliveries can take longer still.

All material in *RadCom* is subject to editing for length, clarity, style, punctuation, grammar, legality & taste. Articles for *RadCom* are accepted on the strict understanding that they are previously unpublished and not currently on offer to any other publication. Unless otherwise indicated the RSGB has purchased all rights to published articles. No responsibility can be assumed for the return of unsolicited material. See tinyurl.com/radcompix for info on taking photos for publication.

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RadCom Plus is available to RSGB Members online at www.rsgb.org/radcom-plus
RadCom Basics for Members new to the hobby can be found at www.rsgb.org/radcom-basics/
Abbreviations and acronyms we use are listed at http://tinyurl.com/RC-acronyms

The RSGB is on Twitter @theRSGB
Find us on Facebook at www.facebook.com/theRSGB

Growing and developing amateur radio

The RSGB's five-year strategy includes the strategic priority of 'Growth – grow and develop amateur radio'. This is a very broad, all-encompassing statement which the majority of RSGB activities could fit within.

I believe that to truly grow and develop amateur radio we need to fully embrace and support new ideas, promote the hobby at every opportunity, whilst also encouraging new and existing licence holders to explore all the wonderful attributes the hobby has to offer.

The RSGB has already undertaken a very large number of activities that promote and develop amateur radio. Recent examples include:

- The coverage of Tim Peake going into space and the associated school contacts
- The UK hosting of YOTA in 2017 (our media coverage potential reach was 4.6m people)
- Our YouTube channel (over 186,000 views!)
- Social media presence (our Facebook page reaches people in 45 countries, for example)
- Attendance at STEM events and Maker Fairs

"explore all the wonderful attributes the hobby has to offer"

The RSGB National Radio Centre (NRC) is an excellent example of an RSGB initiative that has seen huge numbers of the general public gain an exposure to our hobby in a well-structured and organised way. RSGB Members may visit Bletchley Park, and thus the NRC, for free – just download an entry voucher from www.rsgb.org/bletchley-park-voucher. So if you haven't been on a visit, I sincerely encourage you to do so – it is a magnificent flagship for our hobby.

Over the coming months we will be developing and launching a new scheme that is designed to accompany individuals along their amateur radio journey from Foundation through the licence classes and beyond. It will encourage and nurture interest in the hobby through recognition and reward. We'll be sharing more details about this in the coming months and into next year so do look out for that.

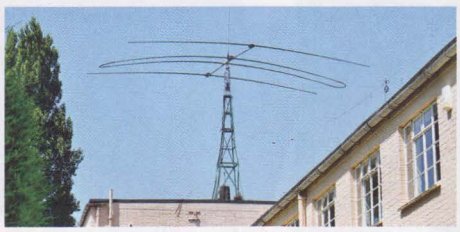
I have developed several measurable objectives that we can use to judge our success against our Strategic priority 'Growth'. Whilst they will never be all-encompassing and there will always be excellent activities not specifically listed, I propose to focus initially on:

- Further development of world-class promotional material
- Hosting buildathons for novice constructors (see page 22 for details of our first Buildathon at the National Hamfest)
- Youth appeal and YOTA
- Development of a recognition and reward scheme to accompany an individual throughout their amateur radio journey
- Further development of the NRC including an 'engagement zone'

Further details of the objectives are published on the next page.

As I talk to people about 'Growth' at Rallies and other events, I am often told that the RSGB isn't doing enough. Very rarely am I offered any suggestions about what more we should be doing. Please believe me when I say I am open to suggestions from any source, no matter how conceptual or advanced they might be – do please get in touch with me and help to develop and grow our fantastic hobby.

Mark Jones, G0MGX, Board Director
g0mgx@rsgb.org.uk



Volunteers sought for NRC

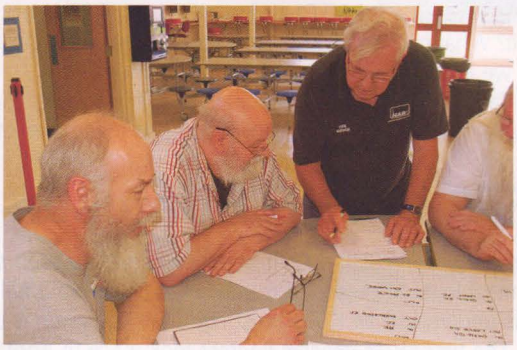
With significantly increased visitor numbers, the RSGB National Radio Centre (NRC) is once again seeking to recruit volunteers, specifically to assist at weekends.

NRC volunteers should be licensed amateurs, RSGB Members and be prepared to work a minimum of one weekend day per month (or preferably two days). It is important that volunteers enjoy engaging with the visiting public first and foremost, as well as operating the state-of-the-art amateur radio station GB3RS.

You will be joining a team of enthusiastic, friendly and dedicated volunteers and full training will be given. Travel expenses are paid for people living within a reasonable travelling distance, and NRC volunteers enjoy numerous benefits associated with volunteering at Bletchley Park.

Please apply in the first instance to nrc.support@rsgb.org.uk or gm.dept@rsgb.org.uk to discuss the role.

Growth – an RSGB strategic priority



1. Develop world class promotional material covering at least ten unique aspects of the hobby and achieve this through collaboration with special interest groups. Each item produced shall target a specific demographic and purpose. Publish and promote this material through social and other media and complete by June 2020.
2. Encourage participation and accessibility to the hobby though the promotion of home construction; hold a Buildathon for inexperienced constructors at the National Hamfest each year, commencing 2018. Provide supervision and tutoring at the event by members of TEC, Youth and Regional team. Ensure that the activities are utilised fully for promotion of the hobby both during and after the event by publishing reports on the activities across the Society's communication channels.
3. Participate each year in the YOTA Summer Event through RSGB sponsorship and ensure an appropriately selected team from the UK attends.
4. Continue to promote YOTA month each December and ensure at least two schools are actively involved in the events annually.
5. Each year publish a plan for Youth-related activities that will include a clear set of measurable objectives to be achieved.
6. Develop an awards scheme for newly-licensed individuals, executed by clubs but managed centrally, to promote and encourage progression through the licence structure. Provide a mechanism to nurture individuals on their journey in amateur radio and encourage participation in many diverse aspects of the hobby. Ensure the RSGB provides support throughout an individual's amateur radio journey from Foundation through to Advanced and beyond. Fully launch the project by mid-2019.
7. Develop best practice guidance materials for clubs to enable sharing of concepts and promotion of a welcoming environment for new and established amateurs and enthusiasts. Material to be completed and available by mid-2020.
8. Promote amateur radio through attendance at STEM events each year. Participate in four public STEM events each year starting in 2018.
9. Develop suitable marketing material to enable active participation in Maker Faire events. Have the material available by mid-2019 and attend a minimum of one event per year.
10. Re-develop the "Future Zone" at the NRC as an "Engagement Zone" where visitors can get a hands-on experience with different aspects of the hobby and ensure that entry level and homebrew radios are featured. Include promotional material on the RSGB in the area and show visually how the amateur radio licence structure progresses from Foundation to Advanced. Complete this new venture and open it to the public no later than the end of 2020.
11. Work with the Bletchley Park Education team and develop a radio-based training module that can become an option available to school groups visiting the site. Ensure that the module is available for delivery by the BP Education team and a hands-on radio experience at the NRC is included as part of the module. Have the training option complete and available on the Bletchley Park school visit programme by the end of 2019.
12. Continue to provide practical one-day courses for RSGB tutors, taught by radio amateurs who are also professional teachers, through the Train the Trainers (TtT) scheme. Ensure major themes continue to include inclusivity and the promotion of a welcoming environment. Deliver a minimum of 2 TtT events each year from 2018.
13. Establish active links with the Men's Sheds Association (https://menssheds.org.uk), develop a promotional talk with demonstration targeted for delivery in Men's Sheds and for the Regional Team to deliver it in at least one shed in each Region before the end of 2019.

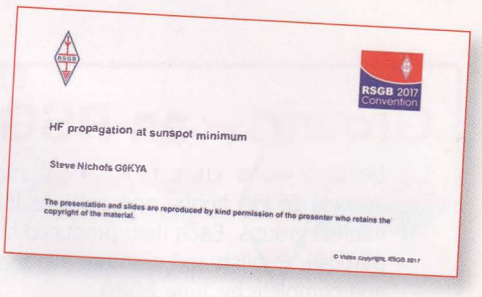
Region 5 vacancies

Martyn Vincent, G3UKV, Regional Representative for West Midlands (Region 5), is on the lookout for two new District Representatives (DR) to cover the north Staffs plus eastern Warwickshire (DR 51) areas, as well as Shropshire and north Worcs sides of the region (DR 53). The volunteers must be enthusiastic radio amateurs, willing to promote our unique hobby and the RSGB, through occasional visits to a modest number of local radio clubs (currently about 7 per area), taking ideas and opinions of individuals and groups back to the Regional Representative, as well as offering guidance or relevant information where appropriate. A brief report to the RR is expected by the persons taking up each appointment, about three times a year, plus informal liaison. Training and support will be available to the appointees, together with reasonable expenses. For further information, or just a chat about what the appointment entails, contact Martyn by email to rm5@rsgb.org.uk or phone 01952 255 416.

New ESC appointment

The RSGB is pleased to announce that Mike Bruce, M0ITI, has been appointed to the RSGB Examinations Standards Committee (ESC) with the role of Examinations Systems Review Manager. The responsibilities of this new role within ESC will be to manage the syllabus review and future updates; manage the question bank and interaction with Testreach; and keep the RSGB exam web pages up to date with the changes. Mike obtained his full licence in 2013. He has been a committee member of the Radio Society of Harrow since March 2013 and has served on the RSGB Examinations Group from June 2016 to date. Mike has had experience in education administration having served as a school governor at both primary and secondary schools since 1992. He is currently a director of the Danes Multi Academy Trust.

New RSGB Convention video released



The RSGB has released another presentation from last year's RSGB Convention into the Members' area video portal at www.rsgb.org/video In his talk, *HF Propagation at Sunspot Minimum*, RSGB PSC Chair Steve Nichols, G0KYA asks – and answers – the questions 'When is it? What can we expect? How can we make the most of the HF bands for the next few years as we approach and pass sunspot minimum?'

Take a look at the presentation and if it inspires you to come along to the Convention this year, go to www.rsgb.org/convention and make sure of your booking now.

FT8 in VHF Contests

Recently, the RSGB's Contest Committee has seen some FT8 QSOs being claimed within contest logs. At present it is difficult to complete a full contest exchange using FT8, although it is understood an EU contest compatible version is under development.

The first MGM-specific contest took place in April this year with a set of rules structured to support all MGM modes with varying and limited exchanges. The initial reaction to this contest was positive and the Contest Committee looks forward to more activity in the second event in December.

However, they are concerned about the ability of FT8 to completely change the look and feel of contesting and rapidly drive down activity on SSB / CW while not necessarily adding to the number of stations active. They are also concerned about the impact of contests using FT8 – a major contest taking place on one or more of the common FT8 frequencies would lead to huge levels of QRM.

So, without trying to be 'Luddite' in their approach, at this time they feel that FT8 and similar fast MGM modes should be kept inside a separate, more experimental contest framework. However, they propose increasing the number of these MGM contests during 2019.

The need to clear up contestants' use of MGM was sufficiently pressing that the Contest Committee issued clarification of the rules before the September 2m contest. Consequently, from 1 September onwards, the allowed modes for RSGB VHF contests (except for the dedicated MGM events) will be SSB, CW, FM, AM, JT6M, ISCAT and FSK441. This list will be kept under regular review.

Andy Cook, G4PIQ, VHF Contest Committee chair

Apology

In the article on the new examination syllabus article in September *RadCom* we omitted to give credit for the photo used. It was taken by Gina, KI6UQP at the Advanced exam that took place at the ML&S Training Academy in July 2017. Our apologies to both Gina and ML&S for this omission and our thanks for allowing us to use the photo in the first place.

Sad News

The RSGB regrets to inform Members, especially those in Region 5, that the District Representative 53, Jim Wakenell, G8UGL passed away peacefully as a result of cancer that was only diagnosed recently. It was a great loss to his family and friends, to whom the RSGB offers its condolences.

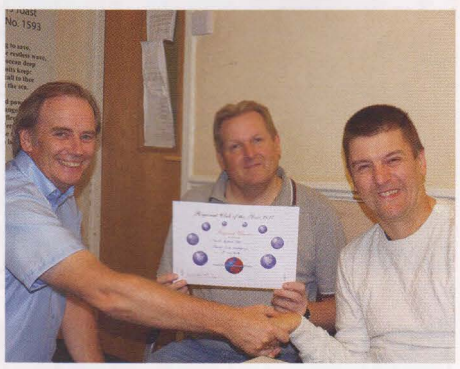
QSL Matters

A new Sub Manager is wanted for the Isle of Man as long-time volunteer sub manager, Martin Parnell, GD3YUM wishes to retire. There's now an opportunity for another island resident to provide this valuable Membership service. In the first instance, and for practical reasons, we are seeking to appoint an island resident. Interested? Please email the bureau via qsl@rsgb.org.uk

The GM callsign groups have now been consolidated. Clive O'Hennessey, GM4VVX, the most northerly sub-manager, is also retiring after for many years of valuable service handling cards for GM2 and GM3 calls. Fred Roe, GM0ALS has very kindly agreed to combine these groups with his own to form a new sub-group GM0-3. Outstanding cards and envelopes are being transferred. See details on the QSL bureau section of the RSGB website.

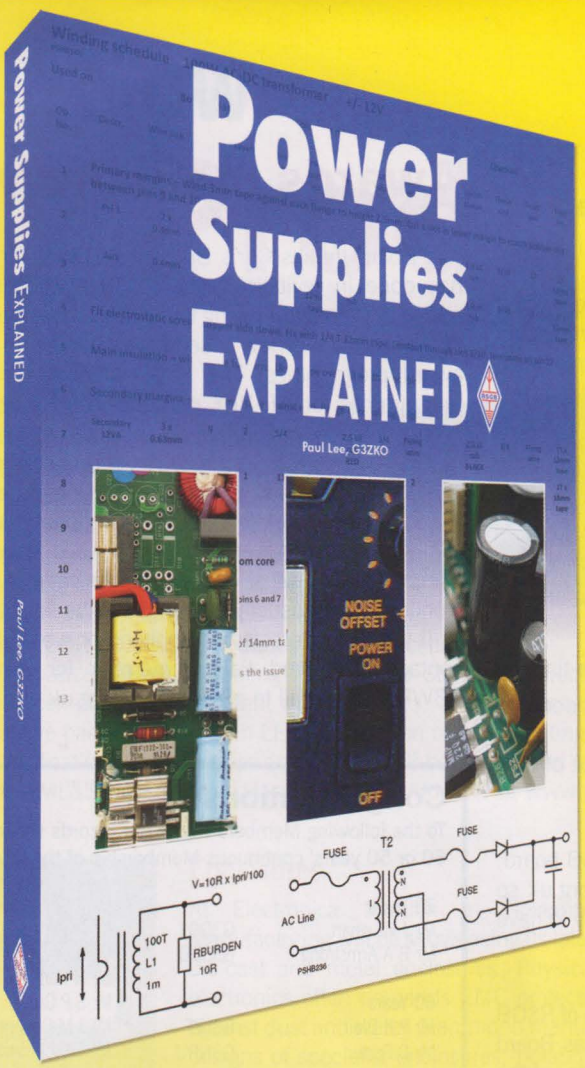
Thank you to all those who now regularly include used stamps with their outgoing cards. Special thanks to SWL Gunter Gartner, in Germany, for including some excellent examples with his recent cards. This year to date and with your help the bureau operators have been able to recycle some 3000+ stamps to help hospice charities.

Finally, a large package of cards arrived at the bureau having attracted the attention of the Home Office Border Force, a real first for us. Maybe they were just looking for pirates!



Region 11 Club of the Year

On 19 July, at the South Bristol ARC annual Summer BBQ, RSGB District Rep Andy, G7KNA (left) presented the 2017 Club of the Year Regional Small Club Winners Certificate to Steve, G0UQT (right) and Chris, 2E0TBS. The Club of the Year national winners will be announced at the National Hamfest on 28 and 29 September. The competition is sponsored by Waters and Stanton, whom the RSGB thank for their continued sponsorship.



NEW BOOK

10th Anniversary Show

National Hamfest

Fri 28 Sept & Sat 29 Sept

FREE* Hamfest 10th Anniversary Polo Shirt

IF YOU SPEND OVER £20

*(Whilst Stocks Last)**

Power Supplies Explained

By Paul Lee, G3ZKO

A power supply is something that is often overlooked by radio amateurs, as for many it is simply the box, that at the flick of a switch, provides stable DC voltage. A modern power supply is though much more, combining theory that dates back to the nineteenth century incorporating the latest techniques in digital control, with a wealth of electronics practice in between. *Power Supplies Explained* sets out to do exactly this - explain in understandable terms what that little box is doing, right through to designing your own bespoke power supply.

Some believe there is a little magic in power supply design; beginners especially are wary of the challenging mixture of digital, analogue, magnetics and control loops, with cooling, EMC and safety to contend with as well. Whilst many books deal with the theory in depth, they often give little guidance on the practical aspects of achieving working designs - *Power Supplies Explained* is different. This book seeks to detail how circuits are chosen for the application and how circuits are designed including their inductors and transformers. Calculations are outlined in a simple way so that the reader can use them as a basis for their own designs.

Readers will find chapters that include descriptions of 'linear' supplies and a wide range of 'switched-mode' types from simple buck converters to the latest off-line high-efficiency topologies. The worked examples are based around typical radio amateur requirements and in many cases are versions of commercial products that the author has successfully designed. There are also chapters on magnetics theory, control loops, EMC, practical construction techniques, test equipment and much more. High voltage power supplies are included with comprehensive guidance on safety.

Power Supplies Explained sets out to dispel the mystery and encourage readers to 'have a go' with their own designs and get the satisfaction of being able to say, 'I made that'.

Size 174x240mm, 320 pages
ISBN: 9781 9101 9364 8

Non Members' Price: £14.99

RSGB Members' Price: £12.74

Also available on amazonkindle

E&OE (*All prices shown plus p&p*) * See p21 for T&Cs

RSGB SHOP

Radio Society of Great Britain

www.rsgbshop.org

3 Abbey Court, Priory Business Park, Bedford, MK44 3WH.

Tel: 01234 832 700 Fax: 01234 831 496

FROM FREE P&P on orders over £30. See Page 78

Changes to the way RSGB Nominated Board Directors are appointed

The RSGB Board has decided to make changes to the way in which Nominated Board Directors are appointed.

The RSGB Board is made up of 8 Directors – one is the elected President and four are directly nominated and elected by Membership ballot. A further three Directors are nominated by the RSGB Nominations Committee (NomCom) for endorsement by the Membership at the AGM.

The role of NomCom is to identify areas where the knowledge and skills of the Board members may need further support and to find suitable candidates; primarily NomCom is looking for business skills and not those directly associated with amateur radio.

The Nominations Committee is chaired by the Company Secretary and comprises two Board Directors (one elected and one nominated), a Regional Representative and a Committee Chair or Honorary Officer – so it represents the wider RSGB volunteer structure.

The main changes to the existing process are associated with timing:

1. We are asking Members to put themselves forward for consideration by NomCom now;
2. The timings are adjusted so any selected candidates can be offered for endorsement by the Membership at the 2019 AGM.

Can you help the RSGB?

If you feel you have skills that could be of benefit to the RSGB board, please get in touch with me via company.secretary@rsgb.org.uk so we can explore your suitability further. Unsure? I will be happy to have a discussion with you.

What's involved?

The Board meets monthly and each member holds a portfolio of RSGB Committee or Honorary Officer activities for which they act as Board liaison. Board members also have responsibility for the delivery of the RSGB strategic aims.

What's in it for you?

Board members are not paid but can claim reasonable expenses. A strong RSGB is important for the growth and continued existence of our hobby; and that itself is a reward which should justify the time you will need to put into the role.

Stephen Purser, GW4SHF, RSGB Company Secretary

Awards manager vacancy

The Board thanks Chris Burbanks, G3SJJ for the sterling work he has done in revitalising the RSGB Awards scheme, refining the admin system and making the awards more attractive to newcomers.

A vacancy has now arisen for a volunteer to manage the Society's award programmes. The RSGB administers a number of award programmes for HF, VHF plus the recently updated and enhanced special awards for Foundation and Intermediate licence holders.

The Awards Manager receives and checks claims for the various levels of award, then passes the information electronically to RSGB HQ for it to be validated and the appropriate award issued.

To carry out this role you will need good administration and computer skills. Most of the communications will be by email. The workload is not usually high and can be flexibly managed.

If you are interested in applying or would like to find out more, contact the Board liaison member for Awards, Keith Haynes, G3WRO, via email to g3wro@rsgb.org.uk

Congratulations

To the following Members whom our records show as having reached 70, 60 or 50 years' continuous Membership of the RSGB.

70 Years

Mr J Vaughan	G3DQY
Mr B A Armstrong	G3EDD

60 Years

Mr P K Blair	G3LTF
Mr D Foster	G3NRU
Mr A J Hobbs	G3OJX
Mr R I Buckby	G3VGW
Scarborough ARS	G4BP
Prof J D Last	GW3MZY

50 Years

Mr H Mattacks	G3EKJ
Mr V J Ludlow	G3JLZ
Mr R A Huntsman	G3KBR
Mr T Downing	G3MXH
Mr G H Wren	G3XQJ
Mr G Smith	G3ZOD
Mr N Kenyon	G4AYU
Mr S P Grove	G4BSM
Mr J M Chennells	G4CIJ
Mr T Lockwood	G4HZN
Mr J Pether	G4JGG
Mr B J Dennis	G4UTM
Mr P R Hollis	G8BPY
Mr R E Robinson	G8BWH
Mr P Ebsworth	G8CKB
Mr D W Storey	G8CYX
Mr K Jones	G8CZM
Mr R D Meakins	G8HKN
Mr D Taylor	GM8ARV
J Credland	PA3AHV

The RSGB welcomes to the RSGB family the following new Members who have joined their voice to ours, helping to keep the RSGB strong.

Mr A Royds, 2E0HFE
Mr N Gooding, 2E0IHN
Mr A Benfell, 2E0OHR
Mr I Dukes, 2E0VTW
Mr G Birch, 2E0WBI
Mr J Wrightson, 2E0WON
Mr R Westgarth, 2E1FPY
Mr R Dinnage, 2E1GPO
Mr S Kelso, 2M0IXT
Mr S K Rogers, 2W0CYX
Mr D Flewin, 2W0FLW
Mr M Ky, AI4BJ
Mr G Jacob, G0HSV
Mr N Hamilton, G1DRR
Mr J Lambert, G1NZO
Mr A Newby, G3NSJ
Mr J Cordell, G7PXM
Mr J Snell, G8SEI
Mr N Cook, G8UCL
Mr C Jones, GI8FGD
Mr D Wines, K5DW
Mr U Carlsson, KC3EJS
Mr J Ammons, KC4HKE
Mr W Voltz, KD5YPH
Mr K A Bull, M0KAB
Mr J Beardwell, M0VRF
Mr P Green, M0WPG
Mr T Smith, M0WPI
Mr D Mason, M0ZDM
Mr L Browning, M1FDY
Mr M Rabl, M6EEA
Mr C Charles, M6EVI
Mr A Walker, M6IHM
Mr J Tasker, M6NKU
Mr D Knowles, M6OFW
Mr J Fox, M6OIU
Mr A Kazmi, M6ONU
Mr S Harrison, M6OQJ
Mr R Ayers, M6OQW
Mr A Musgrave, M6OWV
Mr S Holt, M6OXD
Mr M Thompson, M6OXR
Mr D Ellis, M6OXZ
Ms A Santese, M6OXZ
Mr M Curran, M6OYP
Mr S Bushnall, M6OYZ
Mr J Ratcliffe, M6URD
Mr C Breen, M6WVZ
Mr M Williams, M6XPO
Mr P Roberts, M6YRA
Mr K Gunn, M6ZKG
Mr T Truesdale, MM6SZK
Mens Sheds RC of Pembroke Dock, MW0IPL
Mr P Matthews, MW0PTY
Mr W Thomas, MW6WPB
Mr G Hopper, N4ICG
Mr J Wilson, N4XBF
Sgt D Whiteside, N9BSA
Mr H Hofbauer, OE1HHB
Mr J Kidman, RS319019
Mr A Chang, RS319041
Mr A Butler, RS319047
Mr D Driver, RS319083
Mr D Lawson, RS319123
Mr R Westrup, RS319127
Mr T Littlebury, RS319130
Mr C Fletcher, RS319148
Mr Z Biorka, RS319149
Mr S Stebbings, RS319159
Mr H Turrall, RS319164
Mr M McQuillan, RS319165
Mr H Jones, RS319194
Mr A Jones, RS319197
Miss C Jones, RS319198
Mr A Snell-Pym, RS319253
Mrs A Clarke, RS319264
Mr S Lovell, RS319274
Mr D Clarke, RS31933
Mr C Brooks, RS319332
Mr R Jones, VA7FB
Mr R Wilson, VK2ER
Mr T Magon, VK2IC
Mr I Baty, VK4AFC
Mr T Cordwell, VK7ZAC
Mr R Pavlak, W3XV
Mr M Cawthon, WA8YBV
Mr D Hodges, WB2BWC

The RSGB would like to welcome back the following Members who have rejoined the Society.

Mr L A Barnes, G0FAJ
Mr I Hawkins, G0TAI
Mr N J Spring, G1LUC
Mr R Webb, G1WYA
Mr M Gallon, G3KTT
Mr S M Newbold, G3VQN
Mr P Bradbury, G4EXK
Mr B Guy, G4OJD
Mr M J Sargent, G4SCB
Mr M Soars, G4TCI
Dr W P Brown, G4ZMG
Mr R A Baldock, G6AXV
Mrs M D Davy, G6SWZ
Mr P Allen, G6ZLF
Mr C Vance, G7HPI
Mr C Taylor-Edwards, G8LNR
Mr G Miskimmin, GI6SFO
Mrs C A Perry, GM0EFD
Mr M D Brett, GW7AHR
Mr M Whitaker, M0NXP
Mr M J Couchman, M0SAC
Mr M Coulthurst, M1AEC
Mr J Tyers, M1JTA
Mr S Sharpless, M3HKU
Mr H R Foot, M3OPW
Mr L Brace, M6LGK
Mr A Feldmeier, N0XP
Mr K Winograd, N1NEG
Mr A Woodley, RS170741
Mr S C Head, RS172880
Mr R Schwenk, W2XL

New Products

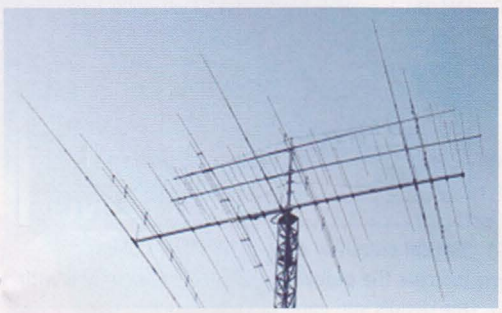
More details on the FTDx101 series

Martin Lynch & Sons has more detailed information about the FTDx101 series HF+6m transceivers, comprising the FTDx101MP (200W output power) and the FTDx101D (100W output power). The radios were displayed at the 2018 Tokyo Ham Fair. The advanced design is homage to Yaesu Musen's founder Sako Hasegawa, who founded the company in 1956. Both transceivers share the same core features utilising the latest SDR technology. Features include excellent close-in dynamic range performance, 9MHz IF roofing filter, hybrid SDR with direct sampling and narrow bandwidth SDR, completely independent dual receivers, a large touch-panel precision colour display and an active band indicator with LED illumination of the operating band.
Full details and final specification, first deliveries and pricing will be announced later in the year. For further details see the ML&S website www.HamRadio.co.uk/ftdx101 or www.yaesu.co.uk

Enclosures

At Electronica Munich in November, Hammond Manufacturing will be showcasing its latest small plastic, die-cast and metal enclosures. Physical protection of electronics often demands EMC protection and sealing against dust and water. Hammond manufactures several designs of specialist enclosures, notably the 1554 and 1555 IP66 polycarbonate and ABS range and the 1550 and 1590 die-cast enclosures giving excellent EMC and sealing up to IP67.
For details of the range of enclosures, go to www.hammondmfg.com

A long 50MHz/70MHz dual bander



The new 6-4-20 is an 11.1m computer-optimised tapered boom and 10 elements on both 50MHz and 70MHz with a single feed point.
Innovantennas says that the 6-4-20 provides excellent performance on both bands with 14.46dBi free space gain on 70MHz and 13.41dBi free space gain on 50MHz. Placed 12m above average conductive ground, gain increases on 70MHz to over 20dBi and on 50MHz to almost 19dBi. In addition, the 6-4-20 has been optimised for FT8 frequencies as well as the traditional operational areas of the band so the SWR is flat through both bands. www.innovantennas.com
The photo shows the 6-4-20 at EA5GF's QTH between an HF Yagi and long-boom 2m Yagi.

Heavier duty guying accessories

Following on from the successful launch of the Tactical 7000hds telescopic mast, SOTABEAMS has designed some new guying hardware to complement the mast. The range consists of two guying rings and a special top insulator. They are laser cut from dark green 5mm Perspex for to match the mast and for better durability. See www.sotabeams.co.uk for more information.

A hybrid Android radio

Moonraker is delighted to announce the new Boxchip S700A and S700B.

The S700B Boxchip S700B is an advanced professional handheld 4G LTE radio. All-round means of communication, real-time control for the industry customers to bring a strong business ability, stable and reliable real time communication response, and more excellent integration experience is the best communications partners for industry customers!

The S700A/U is a hybrid android radio including all the features of the S700B that also allows 100% coverage via 3G/4G/LTE/WiFi/VHF or UHF FM analogue and DMR Tier II. Also available in VHF (S700A/V).
Full details at www.moonraker.eu

New SWR meter video

There are many myths around SWR and the use of SWR meters. In this Electronics Notes video, viewers are given some basic concepts of using SWR meters and how to interpret the results.

The presence of a high SWR may mean that an antenna is not working as it should. It can lead to issues like damage to a transmitter power amplifier, or a reduction in power output caused by the protection circuits coming into action to protect the transmitter PA, it can even result in damage to a feeder in some extreme cases.

However, even a low SWR may not mean everything is working well. There are times when the feeder performance can mask a high level of SWR at the antenna.

Find out all about these issues and how to use an SWR meter in this video from Electronics Notes, which you can find at https://youtu.be/qSea5FjcTDE

New VOACAP tool

Existing charts

Although RSGB has been running propagation predictions in *RadCom* for many years, we do tend to get the same comments, generally along the lines of "I get better/worse results than the predictions because I run more/less power and have better/worse antennas" (delete as applicable!)

The *RadCom* predictions are currently produced by Gwyn, G4FKH and are calculated on the basis of an average station using 100W SSB to a dipole at 10 metres above ground level. Gwyn does a sterling job and the assumptions he uses are reasonable, but there are as many variables as there are amateur stations and unfortunately *RadCom* just doesn't have the space to cater for them all.

The RSGB Propagation Studies Committee (PSC) is currently looking at possible different treatments and presentations for propagation predictions in *RadCom*. In due course several variations will be shown and a consensus sought from Members.

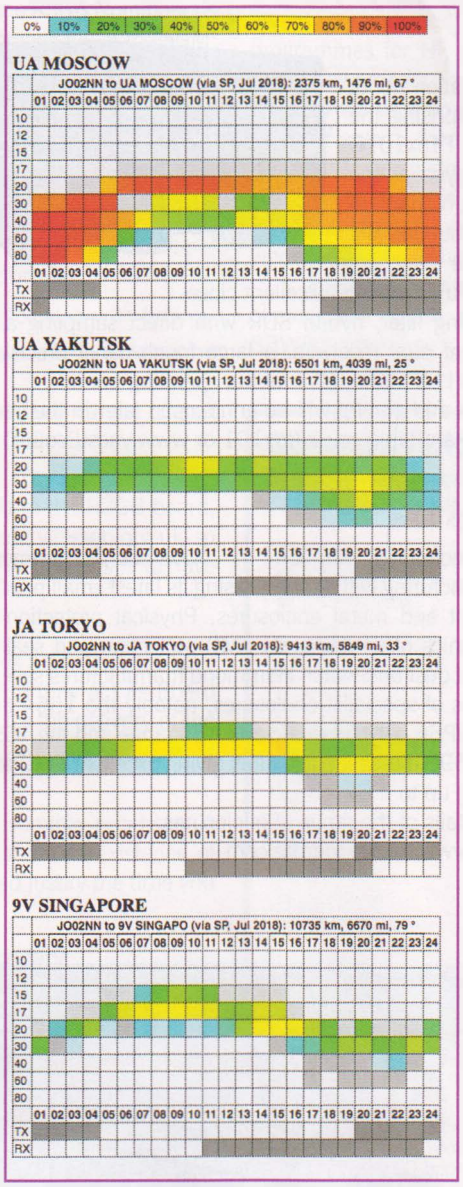
Online extras

As part of the ongoing development work, RSGB Members now have an exciting alternative to the one-size-fits-all chart in *RadCom*: a new, fully configurable HF propagation prediction tool that takes into account *your* power, *your* mode, *your* antenna and *your* exact location. It's the brainchild of Jari Perkiomaki, OH6BG, one of the programmers behind VOACAP Online. VOACAP is a well-established HF propagation prediction program that is the result of 50+ years of HF research and development in the USA.

What Jari has done is take the destinations listed in the *RadCom* predictions and let VOACAP produce monthly hour-by-hour predictions to each of them. The added benefit is that you can set your location (entered as a Maidenhead locator **[1]**), your power, mode and antenna setup for each band. You can set the mode to CW, SSB, AM, FT8 or WSPR. This automatically selects a different required signal-to-noise ratio for the calculations. If you don't specify a locator it will default to central UK.

There are also a wide range of antennas that you can select, from a 1/4-wave vertical, through various dipoles (at different heights) to Hexbeams, Yagis and much more. You can also select a different antenna at the DX end.

You can also tick a box to enable the program to use any potential Sporadic-E (Es) layer as well. This is obviously just an indication: we don't know exactly when and where any Es may occur.



Typical output of a prediction run. Colours indicate the probability of success, weighted with the details you enter of your station setup.

Once you run the program it will calculate the probability of a contact using the smoothed sunspot number for the current month and you will be presented with a series of coloured charts for each location showing every HF band for every hour.

The colours range from white (zero probability of a contact) through all the colours of the (reversed) rainbow until you get to red, which represents a 100% probability. You can then use your web browser software to save these as an HTML file for later use. Alternatively you can 'print' them to a PDF file. You can save your antenna setup to make it easier next time you run the software **[2]**.

Why not ITURHFPROP?

Some Members may question why we are using the ITURHFPROP software for the *RadCom* predictions, but VOACAP for the more detailed, configurable predictions, particularly when the two different approaches yield different results.

First, I think it is inevitable that there will be some differences between results because a different ionospheric model is being used in each package. But we have to put this into context: the results are only monthly median predictions and may be better or worse on any given day. They certainly shouldn't be taken as a 100% guide as to what you are going to hear.

The *RadCom* predictions used to be based on VOACAP, but we now use ITURHFPROP as it is a newer model and Gwyn, G4FKH (when he was on the Propagation Studies Committee) was keen to develop further uses of the software. This ultimately resulted in his excellent Predtest software suite **[3]**.

It would be remiss of me to omit a mention of the terrific Propquest real-time F2 critical frequency tool **[4]** by Jim, G3YLA.

I feel that it is a good idea for PSC to keep abreast of developments and embrace both VOACAP and ITURHFPROP as propagation prediction tools. But at the end of the day the fact is that Jari offered to produce the tool free of charge for the RSGB (and actually did so in less than 24 hours, as it re-uses some code that he already had). I think we would have been foolish to turn down such a generous offer and we are very grateful to Jari for his hard work.

Where to find it

The new VOACAP tool is available at **[5]** and joins the range of prediction tools now available to UK amateurs, including [3] and [4]. I hope you find them useful.

Websearch

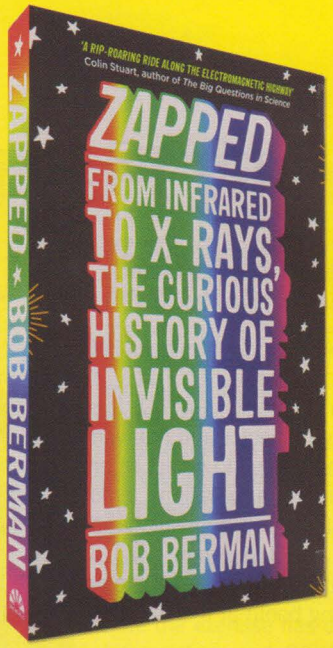
[1] Maidenhead locator calculators are available online, eg www.whatsmylocator.co.uk (provided *pro bono* by 2M0SQL)
[2] www.voacap.com
[3] www.predtest.uk
[4] www.propquest.co.uk
[5] www.voacap.com/radcom

Steve Nichols, G0KYA
psc.chairman@rsgb.org.uk

ZAPPED

From Infrared to X-rays, the Curious History of Invisible Light

By Bob Berman



NEW BOOK

The universe is literally made of light. As you read this you are being swarmed by radio waves; step outside and you'll get a dose of ultraviolet and infrared from the sun. *ZAPPED'* written by popular science writer Bob Berman, tells the story of all the light we cannot see, tracing infrared, microwaves, ultraviolet, X-rays, gamma rays, radio waves and other forms of radiation. This highly accessible book provides a view of the historic, world-altering discoveries in the 19th century through to their central role as invisible light in our modern way of life, and even the consequences of our newest technologies.

An appealing blend of narrative history and science, *ZAPPED* tells the story of the unseen energies all around us. Bob reveals what microwaves from smartphones do to our brains, how birds use ultraviolet light to track prey, why gamma rays are the most powerful form of light, and so much more. Replete with amazing characters and mindboggling quantum leaps, *ZAPPED* offers a teasing peek into the future and some of the startling technologies we might yet live to see. The book even spends time with scientists attempting to detect broadcasts from extra-terrestrials and notes that in 1974 we sent a message to star cluster M13. If any aliens respond promptly, we'll hear from them in 52000

With a unique talent for making science relatable and fun, Bob Berman provides a lively, informative book, packed with "eureka moment" stories, that will delight anyone interested in gaining a deeper understanding of the Invisible light spectrum.

Size 190x198mm, 272 pages
ISBN: 9781 7860 7373 0
Non Members' Price: £9.99
RSGB Members' Price: £7.49 (25% OFF)

NEW

RSGB T-Shirts

Do you love or hate FT8?

The digital mode FT8 is a real Marmite mode for most; you either love it or hate it. Now you can express your preference as never before with these new RSGB T-shirts. Produced as a limited edition and only available for a short period, these t-shirts make a real statement.

The shirts are made from rich combed softer cotton that is 100% ring spun yarn which makes for the perfect fitting classic tee. These 165-170 GSM t-shirts come with double needle stitching for durability and are taped shoulder to shoulder. All of which makes these screen printed t-shirts comfortable to wear whilst making your statement.

Prefer to operate CW? You might like to express that with the option of our 'May the Morse be with You' T-shirt. Produced to the same high standard as our FT8 shirts, these also make a great gift.

All shirts are available in Large, X Large and XX Large but only whilst stocks last. So be quick, as when they're gone, they're gone!

Only £4.99 each

E&OE *(All prices shown plus p&p)*

Planning Permission, an updated guide

The RSGB's Planning Advisory Committee (PAC) will be launching its latest *Planning Guide* for Members at the National Hamfest on Friday 28 September. Now in its 9th edition and edited by PAC Chairman John Mattocks, G4TEQ, this popular guide draws on John's many years as a professional Planning Inspector and the work of the RSGB Planning Advisory Committee.

The guide has been updated to reflect recent changes in the planning system and includes advice on making planning applications, enforcement notices and also appeals for amateur radio aerials and masts. It will be available on the RSGB website from 28 September as a downloadable pdf (for RSGB Members only) via www.rsgb.org/pac

A limited number of printed copies of the new RSGB Planning Guide will also be available from the RSGB Planning booth at the National Hamfest.

Visitors to the NRC

Mervyn Foster, G4KLE (RSGB National Radio Centre volunteer) is seen here giving an explanation of amateur radio to a group of visually impaired visitors and, in particular, the use of Morse code for radio communication. The visit for students from the Spanish National Organisation for the Blind (ONCE) to Bletchley Park and the National Radio Centre was organised by the Milton Keynes based charity VICTA. (For more information about the charity, contact Luke Wakefield via email to admin@victa.org.uk).

VERON Convention

On 3 November, the 58th Ham Radio Convention (Dag voor de RadioAmateur, DvdRA) will again take place in The Netherlands. The organiser is VERON, the Dutch radio society. Besides the official part, several lectures will be given. There will be a homebrew exhibition, amateur radio equipment sales and, of course, the VERON components market (flea market). The Ham Radio Convention opens at 9.30am and will last until 5pm. Selling of the entrance tickets will start at 9am. Entrance fee will be €9 per person. As last year, entrance is free for youngsters under the age of 16, with identification. Parking at the hall will cost €5 per vehicle. More at www.veron.nl under the Events heading.

Essex RAYNET

August was a busy month for Essex RAYNET, with the team providing comms services for the Chelmsford Bubble Rush, the Maldon Smoke & Fire Festival, and the largest event, the Clacton Airshow. Amateurs in Essex interested in putting their radio skills to good use for the community can find more information at www.essexraynet.co.uk

Special Event Stations

Scarborough ARS will be operating **GB2YMR** (North Yorks Moors Railway) at Pickering War Weekend from 12 to 14 October from the North Yorks Moors Railway Station in Pickering. Operations will include some modern and military radios. A warm welcome is extended to all visitors and those they contact on the air.

This year will see the 37th year of operating special event station OR4CLM. It commemorates the Canadian Liberation March, a 33km hike by Canadian troops in 1944 from the town of Hoofdplaat in Holland to liberate Knokke. They have been granted **OR4CLM** between 31 October and 15 November. More information at www.qrz.com/db/or4clm

The organisation now known as the Royal National Institute of Blind People (RNIB) was founded on 16 October 1868. As part of the celebration of their 150th anniversary, Terry Robinson, GM3WUX will run a special event, callsign **GR150NIB,** from 1 to 28 October. Activity is planned on SSB and CW across all permitted HF bands (excluding 60m), plus some (possibly limited) activity on 4m and 6m. Special QSLs will be available. There'll be a log search at www.g3swh.org.uk/gr150nib.html where all QSL requests should be made via OQRS only.

Between 22 and 31 October, **OE100ES** will be on the air to commemorate the 100th anniversary of the death of Austrian Artist Egon Schiele. QSL and other info is on QRZ.com

New shop

Martyn Lindars was a very active contributor to many radio magazines over the decades and was heavily involved in the HAC (Hear All Continents) company back in the 70s as a consultant engineer. The receivers used to come in kit form and were top sellers in their day. In October, his son, Justin, is opening a rather unusual second hand amateur radio shop in Yeovil, Somerset to go alongside the company's online website. (www.AmateurRadioSales.co.uk). He will be selling all types of modern and vintage equipment to the hobbyist – Morse keys, transceivers, receivers and all types of accessories. Lindars Radios shop will be at 2 Buckland Rd, Pen Mill Trading Est, Yeovil BA21 5EA (01935 474 265).

More newcomers on 5MHz

The Ecuadorian telecoms regulator, ARCOTEL, has authorised operation on 5MHz under the new WRC-15 Secondary Allocation 5351.5 – 5366.5kHz with a maximum power of 25W EIRP.

Bosnia & Herzegovina have also been authorised by their regulator, RAK, for 5MHz operation under the new WRC-15 Secondary Allocation 5351.5 – 5366.5kHz, with a maximum power of 15W EIRP.

70th Anniversary of Shefford & DARS

Shefford & District ARS is preparing to celebrate the 70th Anniversary of their inauguration in 1948/49 by radio and radar military servicemen following their demobilisation after WW2. Organised by Claude G2DPQ (SK), early meetings were held in the Old Wharf Building by the River Flit but soon moved to the more spacious Shefford Community Hall, Ampthill Road in Shefford, Bedfordshire where they have remained throughout the subsequent years. The club is thought to be among the oldest of leisure organisations in the Shefford area and, unlike many such leisure groups these days, maintains a remarkably high percentage of regular attendance and activity. *A Brief History of SADARS* by Brian Farey, G8GHR is due for publication in October at the planned celebration party to which past and present members and wives are to be invited. www.sadars.co.uk has more details.

Exercise Blue Ham

For the second time this year, during the weekend of 13 and 14 October, the Combined Cadet Forces will be operating on the UK 5MHz (60m) band using the allocated frequencies for the purpose of Exercise Blue Ham 100. They will have all the usual live logging and map plotting taking place on the Alphacharlie web portal. This will allow participants to see up to date information of contacts and callsigns on the air. Upon conclusion of the exercise amateurs who have met the requirement for the number of contacts can apply for a certificate by sending their log sheet via email to blueham@alphacharlie.org.uk. Please note the exercise has different QSL exchange information, and PSK31 will be in use on 5.363MHz. All the details can be viewed at https://alphacharlie.org.uk/exercise-blue-ham

Torbay ARS course

Torbay Amateur Radio Society (TARS) invites applications for its next Foundation course from the end of September. Further information is on the the 'Training Team' pages on the club website, www.tars.org.uk

The course will be held over the weekend of 7-9 December and will cost £67.50 including exam fees, which must be paid in full in advance to the club treasurer. The course runs from Friday evening through to Sunday afternoon, culminating in the Foundation exam itself. TARS currently has a pass rate of over 99%, using their in-house written training package. TARS does not require Foundation candidates to join the club in order to undertake training, but hopes they'll consider doing so anyway!

The club meets from 7pm every Friday at Teignbridge District Scout HQ, Woolborough St, Newton Abbot. All are very welcome.

NRC volunteer SK

The RSGB regrets to inform Members that former National Radio Centre joint co-ordinator Graham Parry, G7OSR, passed away at the end of August. He had a sincerity and passion for ensuring the NRC was properly managed and was justly proud of his many achievements in life and amateur radio. The RSGB and RCF offer their condolences to his family and friends.

News for 6m band

The latest edition of *Six News* is now available to download in PDF format from the UK Six Metre Group's website www.uksmg.org

The group's AGM will take place online from 1600 on Sunday 21 October.

RSGB Trophies Move Home

On a very warm August day, three RSGB Members arrived at RSGB Headquarters.

They were part of the re-organisation of the RSGB Trophy process. Over the years the RSGB has amassed over 100 trophies of various shapes, sizes and ages, and there was no longer enough space at RSGB HQ to store them all. Some of these trophies are 80 years old and need a bit of TLC, whilst others are very ornate and need a stable place to live rather than being squeezed into either the conference room or the server room, or any other spare space in the office.

After discussion it was agreed that the trophies should be handed over to a small team of RSGB volunteers to look after them in a different 'home'. This would give HQ some badly needed space plus the added benefit to HQ staff, in that they had more time to perform their usual roles.

The trio that have taken on the task of Trophy Management are Jacqui Goodey, G6XSY (Contest Trophy Administrator), Ian Pawson, GOFCT and Mike Goodey, G0GJV. All three are RSGB volunteers working on the various Contest Committees and have been involved in adjudicating contests as well as participating in them for the past 40+ years.

Now that all the contest trophies have been returned by the holders, there comes a very busy period when they are taken to engravers. During this time, notifications are sent to this year's winners informing them that trophies will be presented by the RSGB President at the RSGB Convention in October. The trophies will then be checked, polished and generally made ready for transporting to the RSGB Convention. There are over 90 contest trophies, so this takes quite a bit of time and elbow-grease. Only the trophies that are going to be presented to attending winners are taken to the Convention, where they are unpacked and sorted into presentation order, given a final buff and laid out on tables.

It takes three long tables to hold all the trophies (split into HF and VHF) and it takes the team the whole of Saturday to sort and arrange them. After the presentations on the Sunday, those trophy winners who are Members of the RSGB will be allowed to take home the trophy and keep it for a year. The trophy holders must then return their trophy to the team by end of July, at the latest, so that there is enough time to turn round all the trophies and get them ready for the next Convention.

Now don't for a minute think that the team will be idle for the rest of the year. This is not the only period of high activity that the team expect. They also have the job of looking after the trophies that are presented at the RSGB AGM, which takes place in April.

Some of the trophies in their storage cases at RSGB HQ awaiting transportation to their new home.

Trophies ready for presentation at the RSGB Convention.

Trophies stored in their new home.

Jacqui Goodey, G6XSY

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Antennas

Antenna measurement

When considering an antenna's performance, this usually relies on the manufacturer's published specification. However, when building an antenna, often computer antenna prediction applications have to be relied upon to provide an indication of the antenna's performance. Therefore, this month we examine how an indication of an antenna's performance can be obtained as a polar plot using actual measurements.

PHOTO 1: Protractor and pointer arrangement used.

Near- and far field antenna regions

Before attempting to characterise an antenna's performance, an important aspect to consider is the effect of the *near-* and *far fields* related to the antenna.

The antenna's *near field* comprises the local electric (E) and magnetic (H) fields that are 90° out of phase in time that arise from the RF signal flowing within the antenna. These near field E and H fields are responsible for establishing new in-phase E and H fields away from the near field, forming the *far field*. It is these new in-phase E and H fields that launch a power-bearing electromagnetic wave (termed a TEM wave) that radiates away from the antenna at the speed of light (C) that is able to transfer energy [1].

In the near field, coupling between the antenna and any adjacent conductive objects (eg cables, metal structures or other antennas) is significantly greater compared to within the far field. Consequently, conductive objects within the near field of an antenna can seriously affect both its radiation performance and its input impedance. Therefore, when making performance measurements for an antenna, these are made in the antenna's far field region to minimise any effect that the measuring equipment may have upon the antenna's operation. Moreover, measurements made in this way allow the antenna's performance to be assed as would be experienced by a station situated in the far field. The approximate near/far-field boundary is defined using:

$$R \simeq \frac{2L^2}{\lambda}$$

where R is the distance, L is the length of the antenna and λ is the wavelength (all quoted in the same units, eg metres), as illustrated in **Figure 1**.

For most domestic situations, measuring HF antenna performance tends to be impractical due to the wavelength. However, measuring the radiation pattern for VHF/UHF antennas becomes a practical possibility. As an example, **Table 1** shows the approximate far field boundary for the bands in the VHF/UHF allocations for a λ/2 dipole. In practice, the measurement equipment should be set up at a distance well within the far field.

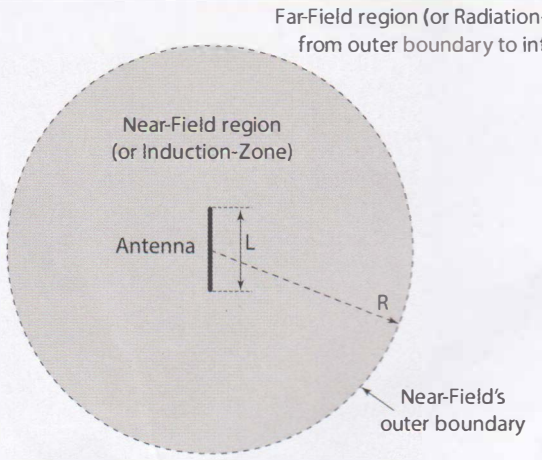


FIGURE 1: Concept of the near- and far fields associated with an antenna.

Measurement technique

The measurement setup to be described was used to assess the performance of the dual-band 6m/4m Yagi beam featured in the August Antennas column. However, the technique is applicable for other antennas that operate on the VHF/UHF bands.

The antenna was set up on a mast supported by a sturdy tripod to enable the antenna to be rotated through 360°. The antenna was horizontally polarised, kept well clear of close objects and was about 4.5m AGL, allowing the antenna to be manageable while still keeping it in the far field. 4.5m AGL is quite low, however this is representative of a 6m/4m antenna when used out working as a portable station for example.

A circular protractor was made up with reference points every 15°. This was situated on top of the tripod and a pointer was attached to the mast to enable the angle to be read as the antenna was rotated. The pointer consisted of a spring clip and a cable tie, as shown in **Photo 1**. **Figure 2** provides a template for the protractor used – it was plotted using Excel. The protractor was printed and attached to a card with a hole cut to enable it to be placed upon the tripod.

A switchable 50/70MHz low power signal source was placed at the same height as the antenna at around a distance of 12m from the end director of the beam antenna. This arrangement also used a tripod and mast to support the signal source. The concept of the signal source is shown in **Figure 3** and comprised a stable oscillator, buffer stage, filter, adjustable attenuator and internal battery to enable an extremely low level RF signal to be radiated

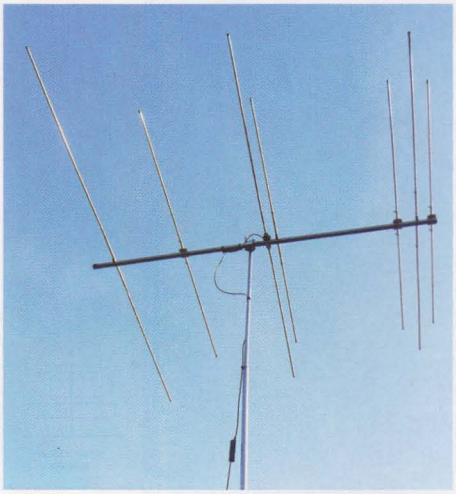


PHOTO 2: The 6m/4m dual-band beam under test.

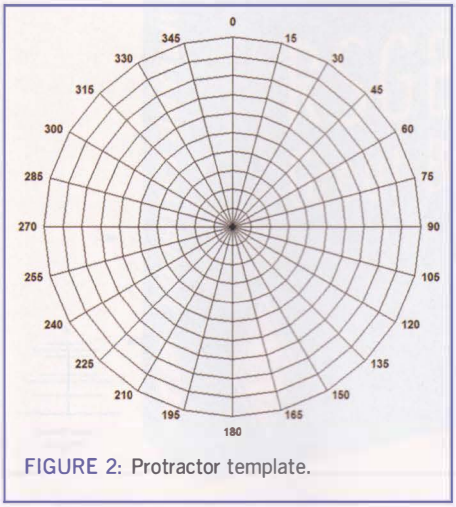


FIGURE 2: Protractor template.

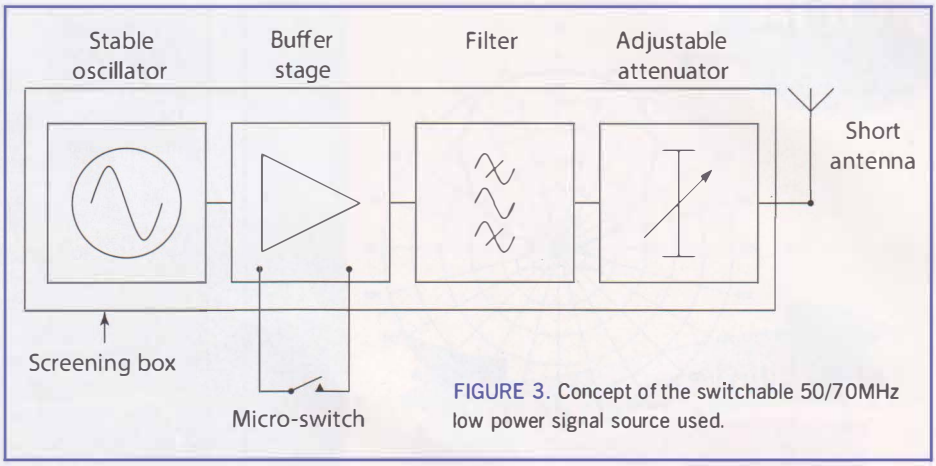


FIGURE 3. Concept of the switchable 50/70MHz low power signal source used.

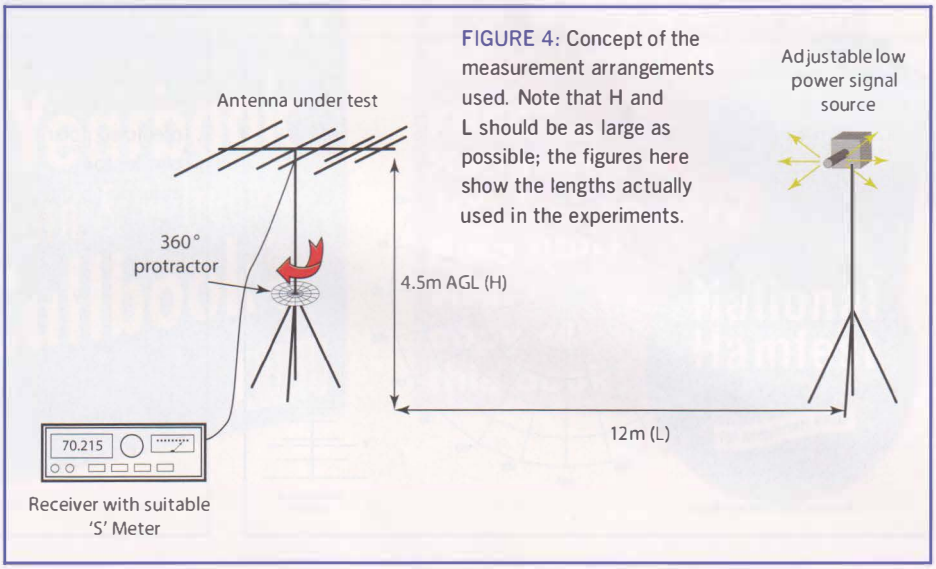


FIGURE 4: Concept of the measurement arrangements used. Note that H and L should be as large as possible; the figures here show the lengths actually used in the experiments.

from a short wire antenna of about 25mm in length. The power delivered to the antenna was about 5μW. The signal source also included the provision to manually key the RF signal using a microswitch to enable the test transmissions to be signed on/off in CW.

A coaxial cable was run from the antenna to a receiver situated in the shack. The receiver used had an S-meter that was calibrated in half S-point steps corresponding to 3dB per step. With the antenna pointing directly at the signal source (ie 0°) and connected to the receiver, the receiver was tuned to the RF signal source. The receiver's S-meter was read and the signal source adjusted to give a consistent reading of S9 (ie a strength corresponding to 54dB above the receiver's noise level).

The concept of the measurement setup is shown in **Figure 4**.

The antenna was then rotated through 360° and the receiver's S-meter reading recorded at intervals of 15°. Several measurement runs were made to ensure the consistency of the results gained.

To enable the S-point results to be plotted, they were translated into decibels (dB) using the following equation:

$$\text{Reading in dB} = ((S_{measured} \times 6) - 54)$$

Where $S_{measured}$ was the actual S-point result obtained from the receiver's S-meter. Using this equation, S9 equates to 0dB and other readings translate to a relative dB level (dBr) referred to 0dB.

Results and predictions

The results obtained were entered into an Excel spreadsheet and plotted using the application's 'Radar Plot' option to provide polar plots. **Figure 5a** illustrates the results obtained as a polar plot for the antenna for the 6m band. As a comparison, **Figure 5b** illustrates the predicted polar plot for the antenna made using the MMANA-GAL antenna analysis application **[2]** with the antenna modelled at 5m AGL. As can be seen, there are similarities between the two polar plots. However, the measured polar plot's forward lobe is narrower and there is a much smaller rear lobe when compared to the predicted polar plot. Consequently, the measured front/back ratio was better compared to that predicted. Even so, the measured and predicted polar plots follow the same general pattern with the measured polar plot thus providing a

TABLE 1: Approximate far field boundary for the bands from 6m to 70cm.

Frequency used in equation	Band	Wavelength	Approximate far field boundary
50.0MHz	6m	6.000m	3.00m
70.0MHz	4m	4.286m	2.14m
144.0MHz	2m	2.083m	1.04m
430.0MHz	70cm	0.698m	0.35m

Mike Parkin, G0JMI
email2mikeparkin@gmail.com

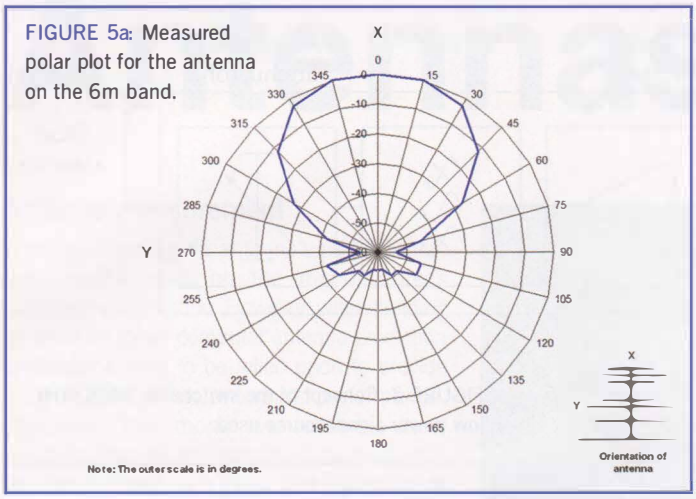


FIGURE 5a: Measured polar plot for the antenna on the 6m band.

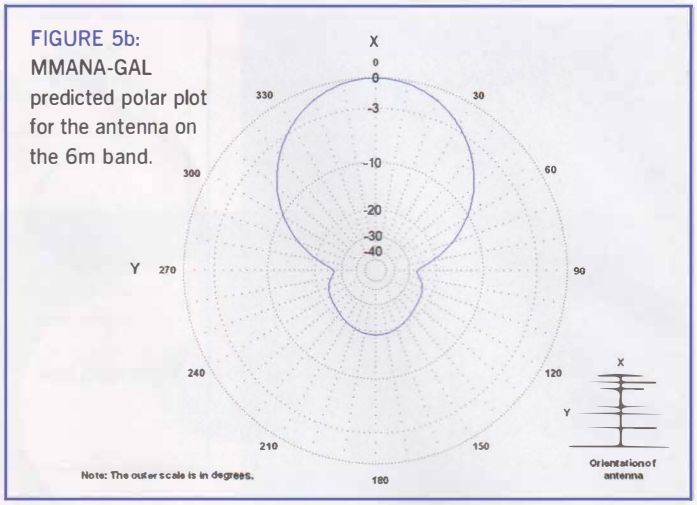


FIGURE 5b: MMANA-GAL predicted polar plot for the antenna on the 6m band.

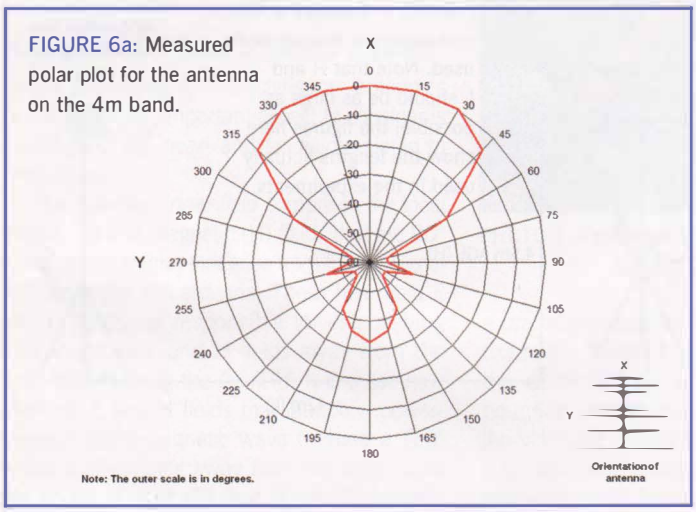


FIGURE 6a: Measured polar plot for the antenna on the 4m band.

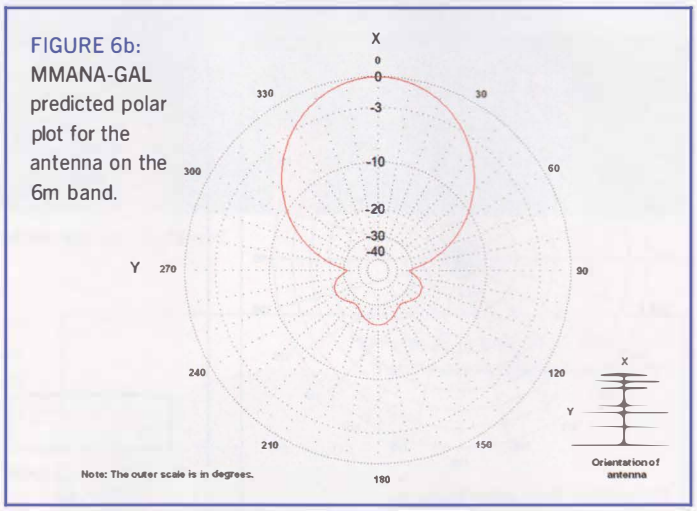


FIGURE 6b: MMANA-GAL predicted polar plot for the antenna on the 6m band.

reasonable indication of the performance of the antenna on the 6m band.

Figure 6a illustrates the results obtained as a polar plot for the antenna for the 4m band. In a similar manner, Figure 6b illustrates the MMANA-GAL predicted polar plot for the antenna when modelled at 5m AGL. As can be seen, there are similarities between the two polar plots. However, the measured polar plot's forward lobe is broader. There are similarities between the measured and predicted rear lobes that follow the same general pattern. The measured primary rear lobe had side lobes either side of it and these were also indicated in the predicted polar plot although their extent was broader. For the 4m measurements, the measured front/back ratio was closer compared to that predicted. In a similar way to the 6m polar plots, the measured and predicted polar plots follow a similar general pattern with the measured polar plot providing a reasonable indication of the performance of the antenna on the 4m band.

Note: the measured polar plots used a linear dB axis, while the MMANA-GAL predicted plots do not. Therefore, care is needed when examining the measured and predicted results.

Antenna transmit and receive reciprocity

The two sets of results obtained for the 6m/4m dual beam were obtained using receive measurements. However, an antenna's gain can be considered as the same for both the transmit and receive modes of operation and this is termed *reciprocity*. Therefore, when considering the radiation pattern of a beam, this can be examined either when transmitting or receiving, whichever is the more convenient.

Conclusion

This month an indication of the performance for a 6m/4m dual-band Yagi beam has been summarised using polar plots. The measurement technique described may provide a useful means to obtain an indication of the performance and operation for a VHF/UHF antenna at a given height.

Smith Charts: reader feedback

Following the recent Smith Chart overview in this column, Tom Thompson, W0IVJ has kindly sent in details of the SimSmith software application written by Ward Harriman Jr, AE6TY [3].This is a Smith Chart application and there are also a series of online YouTube SimSmith videos outlining how to use SimSmith produced by Larry Benko, W0QE [4]. These are aimed at anyone who is interested in further exploring the use of the Smith Chart in matching networks, linear circuits or antennas in general.

Many thanks for the information, Tom.

[Editor's note: we are in the process of preparing a separate article on the Smith Chart that we hope to publish in the next few months].

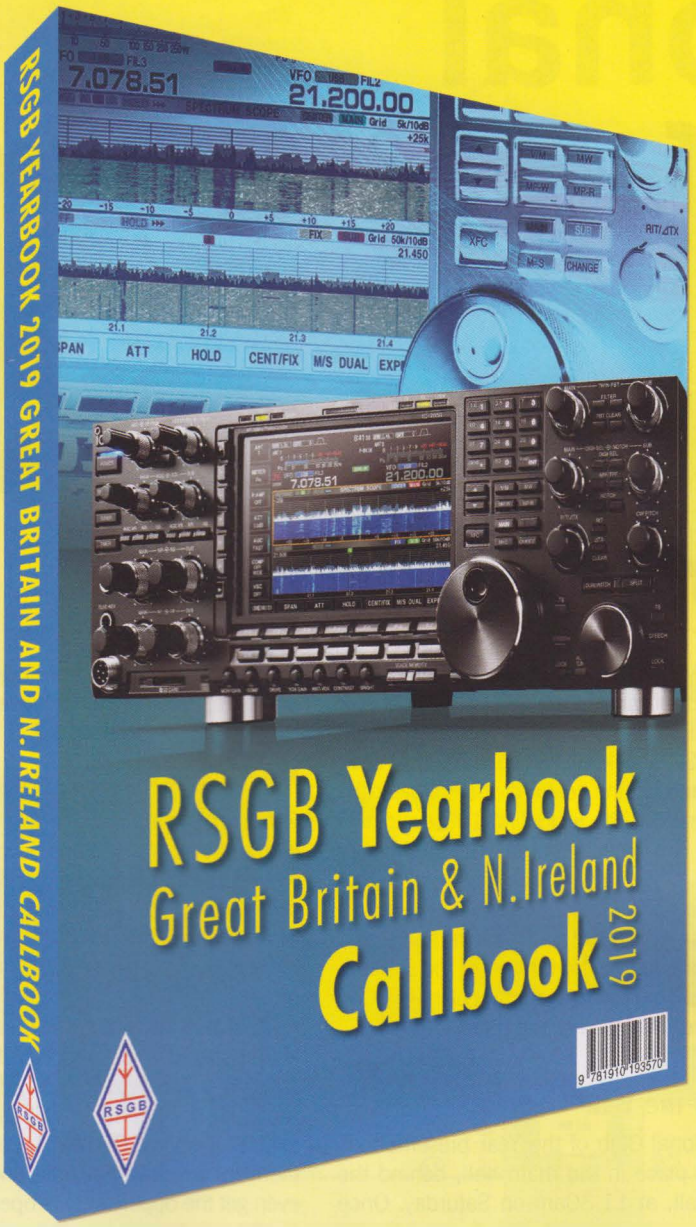
Websearch

[1] *RSGB Radio Communication Handbook*, 13th edition, edited by Mike Browne, G3DIH. Section 13, Antenna Basics and Construction, page 13.1

[2] MMANA-GAL basic V3.0.0.31, freeware antenna analysing application. Original code by Makoto Mori, JE3HHT. MMANA-GAL basic and MMANA-GAL Pro by Alex Schewelew, DL1PBD and Igor Gontcharenko, DL2KQ. 1999 onwards.

[3] SimSmith PDF overview (PDF) by Ward Harriman Jr: www.ae6ty.com/papers_files/qrparticle.pdf

[4] SimSmith videos by Larry Benko, W0QE: www.youtube.com/channel/UCKSyLSu4fm_1RHo03Jvk4YQ/videos



NEW BOOK

10th Anniversary Show

NH Fri 28 Sept & Sat 29 Sept
National Hamfest

FREE* Hamfest 10th Anniversary Polo Shirt with every copy of this book

National Hamfest
28-29 September 2018
10th Anniversary Show

RSGB YEARBOOK 2019

Edited by Mike Browne, G3DIH

There are more Great Britain and Northern Ireland callsigns on issue than ever and they are all included in the *RSGB Yearbook 2019*. With thousands of changes and updates included, this book contains the very latest details available with around 88,000 callsigns in its massive 528 pages.

The *RSGB Yearbook 2019* is also the most comprehensive guide available to amateur radio in the UK and worldwide. Starting with the latest information about the RSGB, its committees and services you will find also find local information about our regional representation, affiliated clubs, contest groups and repeater groups. There is a huge section on operating, which covers from operating abroad, through Special Contest calls, RSGB Trophies, RSGB Awards to HF propagation forecasts for 2019. It doesn't stop here either - there are the very latest Band Plans, comprehensive information about repeaters, beacons and much more. Broken into 50 sections there is a massive amount of the latest material from across the amateur radio world incorporated into the over 170 pages of the information section.

Providing much more than a simple list of callsigns, the *RSGB Yearbook 2019* is an essential purchase for every amateur radio shack. Simply put, the *RSGB Yearbook 2019* puts at your fingertips the best source of amateur radio information available.

210x297mm 528 pages, ISBN: 9781 9101 9357 0
Non Members' Price £17.99
RSGB Members' Price £15.29

* Only available at National Hamfest for the first 100 customers each day who purchase a copy at the show. Or with orders over £20 *(Strictly Whilst Stocks Last)*

E&OE *(All prices shown plus p&p)*

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FROM **FREE P&P**
on orders over £30. See Page 78

National Hamfest 28-29 September

National Hamfest

10th Anniversary Show

The National Hamfest, the premier event in the rally calendar, is only a few weeks away.

This year will be the 10th anniversary of the event and the organising team have been working hard to ensure that it's a must-attend show.

Marking the 10th anniversary will be three fantastic raffle prizes, each consisting of a complete 'station in a box'. Each prize will include a high quality radio kindly donated by Yaesu, Icom and Kenwood; the lucky winners will also receive suitable power supply, an ATU, a SWR meter and cable. It really *is* a 'shack in a box' and contains everything you need to set up from scratch. All you need to do is attend: your entry ticket is part of the free entry for the draw. Friday will see two draws, at 12 noon and 2pm; the third draw will be on Saturday at 2pm.

The National Hamfest takes place on Friday 28 and Saturday 29 September. The gates open at 9.30am each day to give you the chance to browse the busy flea market and Bring & Buy stalls, where bargains await the early bird, before the main hall opens at 10am.

The main hall will be supported by all the major manufacturers and traders – not only from the UK, but Europe and other international traders as well.

Regular visitors to the Hamfest will be familiar with the layout of the stands, as many traders try to have the same spot each year. Opposite is a map of the planned layout at the time of going to press, although obviously this is subject to revision.

Stand highlights

Most traders will have rally specials on offer and will be keen to make deals. The National Hamfest is the ideal time to purchase or upgrade. As an example, Martin Lynch & Sons will be exhibiting several new products. These include the new easy to program BoxChip S700A 2W 70cm DMR + LTE handheld with Android 6 and a 4" display, and the Nissei NS-1230D 30A compact PSU with PowerPole outputs.

The RSGB bookstall will be in its usual spot, nicely placed in the centre of the hall near the main entrance. The lucky first 100 customers each day can claim a special 10th anniversary polo shirt if they buy a *RSGB Yearbook 2019* or spend over £20.

Alongside the RSGB stand you will find booths with representatives from many of the society's committees and services, such as planning, QSL Bureau, regional teams, and more.

Club of the Year

The National Club of the Year presentations will take place in the main hall, behind the RSGB stall, at 11.30am on Saturday. Once again we are grateful for the continued sponsorship from Waters and Stanton. This is a major event for the RSGB affiliated clubs and societies that enter, highlighting their activities, training and achievements.

Miscellaneous

Refreshments are available in the main hall, with a choice of menu and beverages. Outside will be the usual burger van and ice cream seller. Plenty of seating space is available to rest up for the next venture around, and there's also a chance to socialise with many on-air friends.

Also outside will be a number of demos kindly staged and supported by the Vintage & Military Amateur Radio Society (VMARS). As usual, Camb Hams will be operating the special event call GB18NH. Pop over and see them for a warm welcome and chat – you'll even get the opportunity to operate the station (under supervision). The call is always sought-after on-air! A special QSL card will be available and logs will be sent to LoTW.

Hamfest Buildathon – BOOK NOW to secure your place

As announced in the September edition of *RadCom*, this year we are holding a special Buildathon at the National Hamfest on 28-29 September 2018 sponsored by the RSGB Legacy Fund. The activity will involve building a Redruth radio receiver kindly supplied by Poldu Radio Kits (https://poldhuradiokits.com). All the equipment needed for the build will be available and there will be plenty of help on hand to guide people through the construction.

There is a nominal charge made to those who wish to participate of just £5, which will be refunded in the form of an RSGB book voucher provided you successfully complete the project on the day – and you also get free admission to the Hamfest courtesy of the National Hamfest organisers.

The Buildathon runs both days of the National Hamfest so why not come and build a great receiver project and experience the National Hamfest at the same time?

Grand Raffle 'Station in a box' prizes

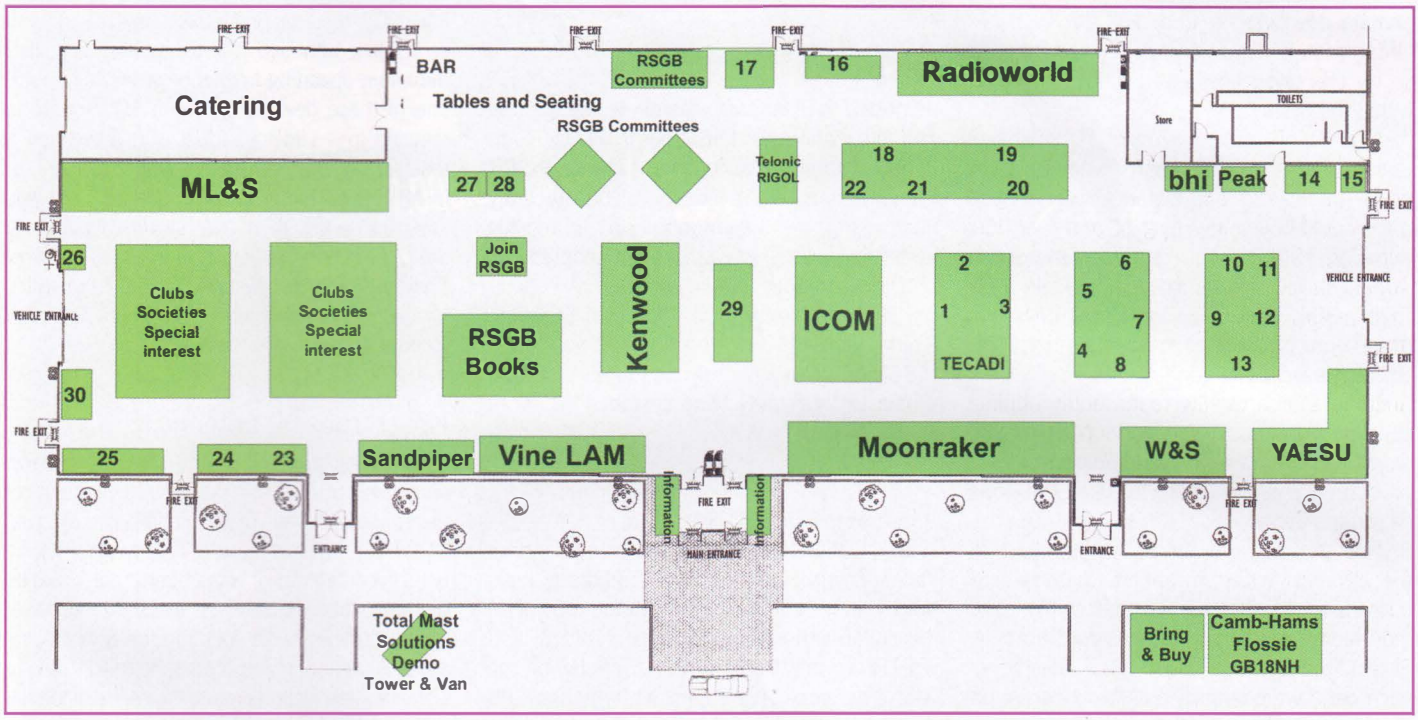
Yaesu FT-991A

Kenwood TS590SG

Icom IC-7300

Drawn at 12 & 2pm on Friday and 2pm on Saturday

NATIONAL HAMFEST 2018



Exhibitors

AM Tools (9)
bhi
Chris Woodward
DX Covers (2)
Ecosource Electronics (18)
G4LUE (16)
G6 Global (8)
GPTE International (5)
GS Electronics (19)
Icom UK Ltd
J Birkett (25)
Join the RSGB
John Dilks (12)
John Dosher (4)
Kenwood UK Ltd
LAM Communications
Linear Amp ULK Ltd (17)
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MOCVO Antennas (6)
MMOCUG Masts
MA Components (24)
Martin Lynch & Sons
Marts Brackets (3)
Mastrant (13)
Mickeys Electronics (23)
Mirfield Electronics (7)
Moonraker
Paul Staerck
Peak Electronic Design
PowerTech Computers (1)
Practical Wireless/Radio User-Warners Group (14)
Radioworld
RFinder (30)
RF Design UK ltd (28)
Richard Pegg (11)
RigExpert & MixW (15)
Sandpiper
SDRplay (10)
SOTAbeams (20)
South West Broking Ltd (27)
Tecadi
Telonic Instruments Ltd
Total Mast Solutions
Waters & Stanton (2)
Weatherquest (22)
Yaesu UK Ltd

Clubs and Special Interest Groups

807 Amateur Radio Operators
B.Y.L.A.R.A.
BATC
Birmingham Repeaters
British Railways Amateur Radio Society
Fists CW Club
International Short Wave League
Kirklees RAYNET
Lincoln Repeater Group
LSWC Books (30)
March and District ARS (26)
Ossett Amateur Radio Operators
RAFARS
RAOTA
Royal Signals ARS
UK Six Metre Group
VMARS
WAB Group
WACRAL

RSGB

RSGB Books
RSGB Committees
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RAYNET-UK
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Training
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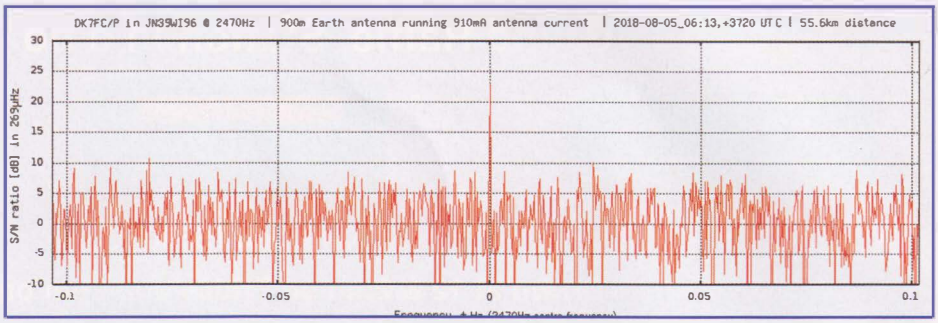
LF

This month we're looking at earth current communication.



Trace of Stefan's 2470Hz transmission as received 55km away.

Eike, DL3IKE recently unearthed an old CIA report on *VLF Earth-Current communication* published in 1960. It details the experiments done to test the range of communication possible with various designs of earth connection. It makes interesting reading and can be downloaded from the CIA website. Unfortunately it's a very convoluted address so try this short link if you want to read it: https://bit.ly/2w5DYTB

A table of results using a 100m 'base' (earth stakes 100m apart) and 5kW of power indicates that distances of tens of miles could be achieved at VLF and over 600 miles on 100kHz. This reminded me of the 73 and 136kHz experiments of the late John Taylor, G0AKN back in the late 1990s. He used some pretty large 'bases', almost 1km, and achieved some good results.

The 1960s tests were based on Morse code, so we should expect better performance using modern fast Fourier transform (FFT) programs and the man to take the idea forward is Stefan, DK7FC.

Not something I would recommend in the UK but, whilst travelling up a switch-back road in the scenic Pfälzer Wald, a mountainous area in South West Germany, Stefan noticed that around the outside of each bend were lengths of 'Armco' barrier on metal posts driven firmly into the ground. He wondered whether these could be used as earth connections for the ends of an 'earth-dipole'. These lengths of barrier were spaced at about 450m as the road snaked up the mountainside. By running a wire down to the next one he can drive RF into the ground between the two earth points.

For his first tests he used barriers 450m apart and some quite thin 0.4mm wire with a DC resistance of 63Ω. With 50.9V DC applied across the dipole he measured 447mA making the ground resistance about 50Ω, quite a low figure. At 8.27kHz he was able to drive 550mA into the dipole and easily detected the signal on his grabber back at base some 55km away. He also made successful 5170Hz and 2970Hz tests

On his next visit he extended the base to 900m by going down to the next Armco rail, and used some thicker wire to reduce the losses. His tests on 2470Hz and 1970Hz both crossed the far field border (which is 19.4km on 2.47kHz and 24.3km at 1.97kHz). Stefan's portable PA was running 100W DC input and was driving about 900mA into the earth dipole.

DX reports

EB8ARZ on Tenerife seems to be getting out well on both 136 and 472kHz: even I have managed to log his 472kHz WSPR transmissions on several occasions recently just using the Wellbrook loop as receive antenna. He has also been copied by PA0RDT on both bands.

The most impressive DX report this time came from VK4YB who copied WH2XXP's 136kHz WSPR-2 transmissions several times on 4/5 July. The distance is about 12,000km!

New grabber

The DL0AO club at Amberg enjoys a rural location with quiet receive conditions, ideal for LF and MF experiments. Marcus, DF6NM in collaboration with DF9RB, DK1IS and DL1FLO has set up a 136kHz grabber on the site. The receiver is a Perseus, which is GPS locked for accuracy, connected to Spectrum Laboratory software running in whole-band mode. Filtered audio is then passed to three further instances of Spectrum Laboratory and WSPR and Opera-32 decoders. On the web page you can view the whole band or see detail of the QRSS segments as well as checking for Opera decodes.

This is all in addition to the experimental MF grabber also running at the site. Quite a facility! Find it at https://lf.u01.de

Receiver protection

It is quite common for LF and MF operators to use separate receive antennas, which may pick up a high level of signal whilst the local transmitter is running, possibly leading to receiver damage.

Paul, N1BUG has recently improved his transmitter to the 0.5kW level and was a little concerned about the amount of pickup from his receive antenna, especially when he calculated that the receiver had been subjected to about 1.5W when his 200W Tx was in use!

After some discussion of receiver protection systems such as back-to-back diodes Roger, W3SZ suggested the DX Engineering DXE-RG-5000 receiver protectors. These work well at 136kHz although it is below their specified minimum operating frequency of 500kHz. With one of these devices in circuit 10W of RF is reduced to +13dBm (about 20mW), which a receiver should just about be able to tolerate. In ARRL tests the insertion loss at 136kHz was found to be less then 1dB, slightly higher than on 472kHz but not a problem in day to day use. They are quite pricey at over £100 but that's probably cheaper than having your expensive receiver repaired.

Novel transmit antenna

Ferrite rods are commonly used as receive antennas but losses make them unsuitable for transmitting. Always up for a challenge, Marcus, DF6NM decided to make a large ferrite antenna with the intention of transmitting on 136kHz. Could it actually radiate? He stacked a bundle of 9mm diameter ferrite rods to form a large 'rod' about 35mm long and 7 rods thick. 47 turns of Litz wire were wound around the centre of the rod and the system was resonated and matched with some high-Q ceramic capacitors. Under small-signal conditions the Q was 690 but applying only 0.5W caused the tuning to change. Marcus used another ferrite rod moved closer or further from the main stack to resonate it. When the power was increased to 25W the Q dropped to 45 and some heat was generated at the centre of the coil. A small fan was deployed to cool the antenna. Under these conditions Marcus calculated that the ERP would be around 25nW so the efficiency of this antenna was one part-per-billion!

He used the DL0AO grabber, 48km away, to look for his tiny signal and it soon appeared on the waterfall. He then sent a 4-character EbNaut transmission, which was easily decoded. So it is *possible* to use a ferrite rod antenna to transmit on LF, but don't count on working any DX.

Dave Pick, G3YXM
daveyxm@gmail.com

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HF

The summer doldrums should be receding now with more DX about on 18 and 21MHz. Longer nights should improve things on LF as well.

The equinox in mid-September marks the peak for G-ZL propagation on 160m for those with reasonable antennas, and long path propagation to VK in the morning should also be improving as the sun moves south.

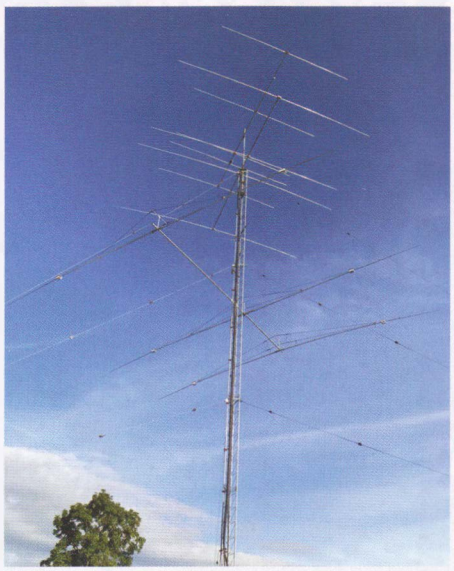
The Worked All Europe CW Contest provided an opportunity to test propagation back in August. 20m was humming with DX as always and 15m produced some surprises with loud signals around 0900UTC from E20HHK, YB1AR and BA7QT. Japanese signals were mostly absent on 15 but JE6RPM was in and out of the noise for a while.

The TX5T expedition to Raivavae (OC-114) in the Austral Islands was heard in the UK on 15m in the evening, and was worked at about the same time on 12m by stations in Spain and Portugal. But, overall, there were fewer QSOs with the British Isles than I would have expected – just 36 according to Club Log. There were two QSOs on 15 and two on 80. 40m was the best band with 26 QSOs. This part of the world is an easy path from the UK even with zero sunspots so there should be a lot of QSOs on the higher bands with the large VP6 Ducie expedition in October.

The Russian group on Idlidlya Island (AS-065) near the Bering Strait put some good signals into the UK. On 20m they were louder and came in for much longer than the propagation models suggested.

A few weeks ago Col, MM0NDX wrote a piece on the *DX World* website asking what had happened to activity (other than the beacon) from the 4U1UN station in the UN building in New York. The building is a separate DXCC entity and is #34 in the Club Log Most Wanted listing – making it about as rare as Conway Reef and Chesterfield Island. The last activity was from the UN gardens for a couple of days in 2015. The article produced an immediate response from James, K2QI the President of the UN Club who observed that the days of a shack on the top floor of the building were over but that following prolonged negotiations work was under way to set up a remote station on the roof, controlled from a booth elsewhere on site. Remote operation from outside the UN will not be permitted. It seems the work is just about complete as there is now a BigIR vertical linked to a K3 and Acom2000 amplifier all controlled by a network connection to another K3 donated by N2UN (SK). The work was done by Adrian, KO8SCA (veteran of several recent DXpeditions) and Dima, RA9USU as well as by K2QI. Current plans are for the beacon to be disabled when the station is active but it may be possible for the two to co-exist. There was a 30 minute test operation on 22 August.

There are developments on the FT8 front with a new version of WSJT-X due in a few months which will support contest exchanges. Another group is working on a free format chat version. One UK amateur has produced a 'DXCC Robot' that will use FT8 to automatically find and work new countries.



Antennas at HS5SRH, used by E20HHK in WAE CW, put a great signal into the UK on 15m.

DXpeditions

HA3JB will be QRV as 8Q7IP from the Maldives Islands (AS-013) from 19-30 September. He plans to be on 80-6m CW, SSB, RTTY and FT8 including the CQ WW RTTY Contest.

Kenneth, LA7GIA will be QRV from Chad from 9-21 October. See la7gia.com/chad for more information.

JO7GVC and JK7LXU will be on Norfolk Island (OC-005) as VK9/home calls from 9-14 October. They will use a 100W FT-891 and CrankIR vertical on 7-28MHz on CW, FT8 and PSK.

The Italian DXpedition Team, which will be active from Rwanda on 26 September to 10 October, have added a second callsign and will use 9X0Y exclusively on FT8 DXpedition mode. The call on other modes will be 9X0T. See http://www.i2ysb.com/idt/ for detailed instructions.

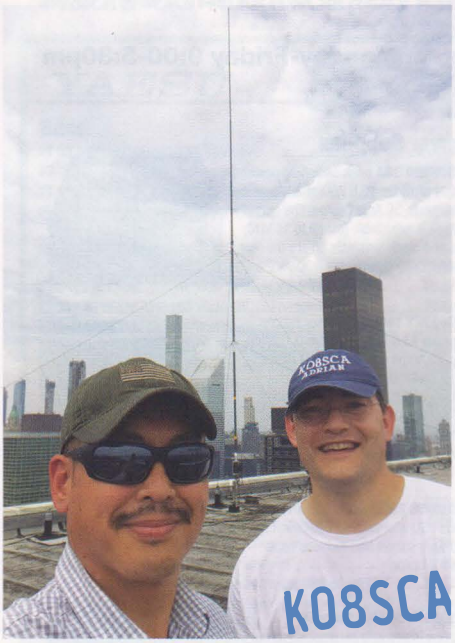
The Czech DXpedition Team will be active as TO6OK from Mayotte (AF-027) between 20 September and 6 October. They will operate CW, SSB, RTTY and FT8 on 160-10m, with a focus on the low bands. See http://www.cdxp.cz/

Jacek, SP5APW will be active as 3W9JK from Cham Island (AS-162) on 15-22 September, and then as 3W9JK/P from mainland Vietnam on 22-27 September. He will operate SSB on 20-6m.

Alex, IW5ELA will be active from Malawi as 7Q7ELA from 17-26 September, mainly CW.

A reminder that before going to Port Vila, Efate Island (OC-035), Vanuatu with OM5ZW and OK2WM, Stan, LZ1GC plans to operate from Apia, Upolu Island (OC-097) Samoa as

The antennas at YB1AR also put a good signal into the UK.



James, K2QI and Adrian, KO8SCA on the roof of the UN building with the BigIR vertical in the background.

5W0GC from 28 September to 14 October. Complete details on both 5W0GC and YJ0GC can be found at www.c21gc.com

Throughout October the callsigns OL100A, OL100C, OL100E, OL100N, OL100R, OL100S, OL100T and OL100Y will be on the air for the centenary celebration of Czechoslovakia. There is an award available for contacting these stations on any HF band or mode. The suffix letters of those stations form 'RCS CENTENARY'. Any of those that you miss can be filled in with the 'joker stations' OL100RCS or OM100CSR. Each of those two can be used, but each can be used only once.

TABLE 1: 2018 Worked DXCC Entities (ranked by All). Showing Top 4 from RSGB or British Isles table in Club Log plus submitted scores or Club Log scores of recent correspondents where available.

Call	CW	SSB	Data	All
M0NKR	151	192	168	255
G4TUK	144	132	204	251
G0DWV	167	160	159	240
G3TBK	223	114	96	226
G3PXT	102	111	195	214
CT7AGZ	179	1	149	201
G8APB				198
G3SVD	110	124	0	179
GI4DOH	160	6	80	176
G4IDL	163	0	0	163
G4XEX	72	75	119	152
G3HQT	144	0	0	144
G3SVK	101		117	117

E20HHK operating from HS5SRH.

The certificate will be a downloadable PDF file, free of charge. See https://ol100.okdxf.eu

Correspondence

Chris, G8APB seems to have been mainly on FT8 apart from a couple of hundred RTTY contest QSOs. His FT8 DX included: 10m – *TA2K, CU2DX, A92AA, 4Z5OZ*; 12m – *Z68M, Z68HZ, CO8LY, WP4JLU*; 15m – *ZP6ARO, LU5VV, HS0ZIV, EA9ACF*; 17m – *YV5KAJ, HK4L, PJ2Y, CO2II, VR2XMT, VP2ETE, XE1MW, EK4JJ, XE1H, CE1OEB, EX0DX, 4K6MAR, 4S7VG, 3B8CF, 9K2BM, 3B9FR, FR4OO, DU1IVT*; 20m – *9M2TO, VU2EKJ, YB9AY, EK3GM, HS5NMF, EK1EK, 9K2OF, 7X3WPL, CE2SQE*; 30m – *Z35Y, TA1HZ, XP3A, ZS1TTZ*; 40m – *9W2SAF, YB7SKM, YG8DX, A45NZ*.

TABLE 2: DXpeditions.

Until early October	RI0B Arctic Islands
Until 1 Oct	T32AH
Until 30 Sept	3DA0AO
15-22 Sept	3W9JK (AS-162)
16-28 Sept	3DA0AO
17-26 Sept	7Q7ELA
18 Sept – 19 Jan	YJ0AFU
19-30 Sept	8Q7IP
20-25 Sept	JW by DLs
20 Sept – 6 Oct	TO6OK Mayotte
27 Sept – 12 Oct	9X0T
28 Sept – 14 Oct	5W0GC
2-29 Oct	WH8/DL2AH
6-16 Oct	E6Y
9-14 Oct	VK9N by JAs
9-21 Oct	Chad by LA7GIA
15 Oct – 4 Nov	YJ0GC
16-30 Oct	VK9X by 6Gs
19-29 Oct	4V7R (Haiti)
20 Oct – 3 Nov	VP6D Ducie I
22-31 Oct	VP9 by US ops
3-6 Nov	VK9XQ
6-10 Nov	VK9CH
10-17 Nov	VK9XQ
21-28 Nov	J8NY
August 2019	St Paul Island
2020	Sable Island

Peter, G3HQT says his antenna got a little more excited last month with: 20m – BG8WKX, KH6/DL8UI, HV/R1AR; 30m – JH1HDT; 40m – HK7AAG. (There has been some online discussion about whether the Vatican has signed up to CEPT. If not, the HV QSO may not count for DXCC.)

Peter, G4XEX spent a little time each day on 10 and 12m and usually found some Sporadic-E QSOs including the USA. On the lower bands he worked: 15m data – JA4DND; 17m data – YV5MBI, HI8PLE, VP8LP; 20m data – BD2RJ, BH1TSU, JAs, KV4FZ, YV5DRN, RI1ANL, VU2EKJ, HP1AVS, HK3JJH, VK7XX, ZS6UB, 9G5AR; SSB – EL2BG, VP8LP; CW – 9M61MR, TL2GN, 9Z4Y. He observed that Japan and China were usually quite strong on 20m around mid-day.

Andy, G0SFJ had a quiet August and commented "Best DX out of Europe was 5E5A (the King of Morocco Day), EO90L (Kharkiv) and EO27U celebrating Ukrainian independence day. On the same theme of national anniversaries, the OM and OL 100CSR stations were strong on 17, 20, and 30 metre bands. Other European celebrations included E725HRB, HG480UD, EG8HKT, SP100N and DK200MARX. All on CW."

Ken, CT7AGZ says that thanks to FT8 he has already exceeded his 2017 DXCC in total and on each band! He found: 10m – HZ1TT, *EA9BCD, A41ZZ*; 12m – *ZD7GWM, Z68HZ, A92AA, 4K6FO, YI3WHR, ZP4KFX*; 15m – *VP8LP, CP6GR, S01WS*, FY5KE, VP9I, BG8NKX, E2A, BA7QT, HZ1TT, *9Z4A, UN9L, 3B8/OK2ZI*; 17m – *OJ0C*, YB1BML, *CX4BAN, Z21MH, C31MF, CP6GR*; 20m – RI1ANL, TX5T, *TX5T, C31BP, RI1ANL*, CP4BT, NP4BW, PY's, LU's, FY5KE, D4C, HZ1FI, E20HKK; 30m – *OD5ZZ, TF1A*; 40m – TX5T, *ZD7BG, C31MF*, UN7LZ, UN9L, PY's, VP9I, ZM4T, *HB0WR, DS3DNT, DU1IST*; 80m – UN9L.

Gordon, G3PXT is up to 165,000 QSOs for the year to date – with a high proportion on FT8. His grid square total is around 1056 according to his log. His log included: 10m – *ZD7BG*; 17m – J69Z, *CP6UA, 9G5AR, JAs, FR4OO, ZD7GWM, HS0ZIV*; 20m – *NL8K, VP2EIH, VK6LC, A92AA, CE1OEB, CO2QM, HC5DX, YS1CJA, FO5QS, KH6U, FG4NO, VR2XMT, VUs, JAs, 5A1AL, FR5CB, HS0ZMS*; 40m – *CO2KL*, ; 80m – *RI1ANL, LU2DSL, CO2II, YB0COU, ZS6UT, BV1EK, HS0ZEE, NP2KW*.

Finally

Thanks as always to my correspondents, to DX-World, 425 DX News and Daily DX.

Martin Atherton, G3ZAY
g3zay@btinternet.com

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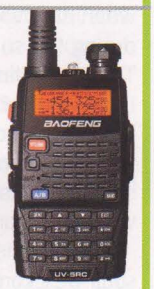

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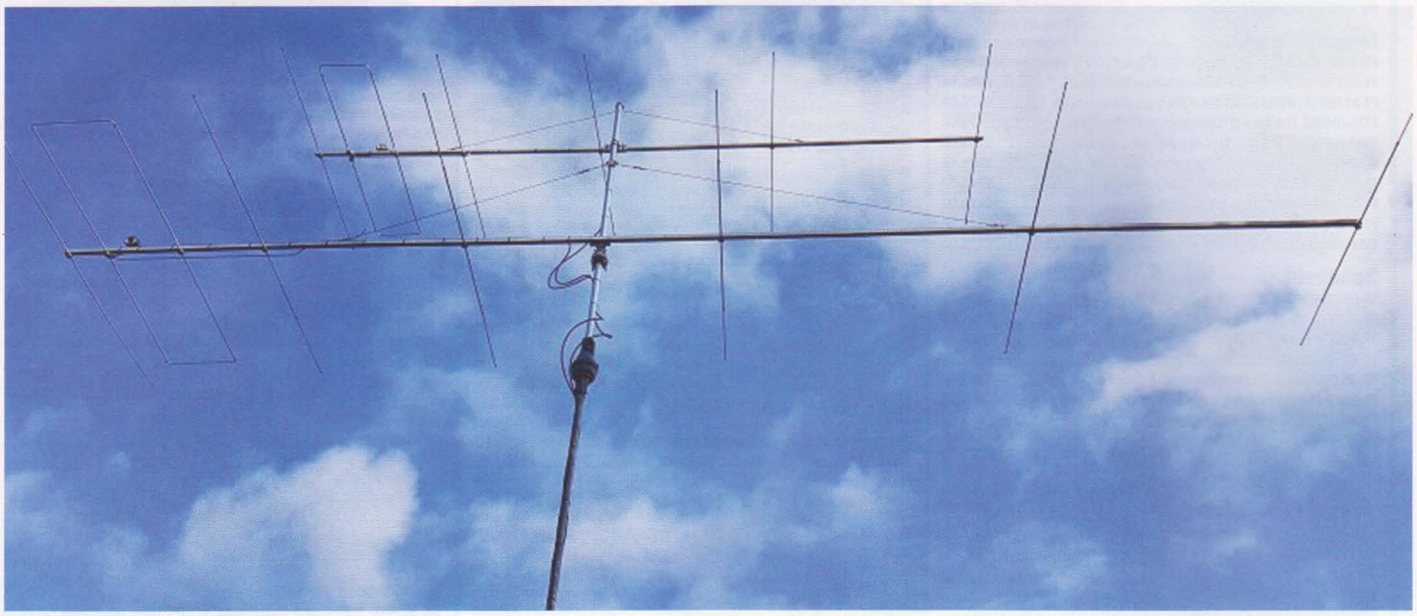

The 4 and 6m band antennas at the home of Curt, SM7CAD.

IARU Region 1 records broken on 2m plus tremendous activity on the lower VHF bands.

It's hard to remember over recent years when the VHF bands have been so good during the summer months for working DX. The continuing hot weather with associated lingering high pressure systems made for interesting combinations of propagation media that only come together once a decade or so to allow serious long distance DX to be worked.

From EI, GM, GI, right down to the southwest corner of the UK, DX watchers could see the potential build up for a combination of conditions. Tools such as the excellent tropo forecast map produced by Pascal, F5LEN can give indicators of what's to come and any potential for ducting [1].

Sporadic-E, in a very sporadic manner on 2m during the month, provided limited short openings. However, the lower bands fared much better with 6m being the main band of interest. There were openings to the Middle East, North America, Africa and Caribbean, with the FT8 part of the band being particularly busy. There were stations also QRV on CW from WP/KP4, which was a pleasant change.

The Persieds meteor shower peaked during 12/13 August and whilst being acclaimed on a number of TV channels, the reflections rates were considered poor.

New Region 1 record on 2m via TRAMS

There was another record-breaking 2m QSO via a mode of propagation being tested extensively by G4SWX, PA3BIY and EA8TX in the Canary Islands. Tropo Assisted Meteor Scatter (TRAMS) tests have been ongoing for a number of years, with the basic principle of good tropospheric ducting combined with high peak of reliable meteor showers. The extended high pressure from the south west provided excellent ducting with the following result.

On 7 August a Tropo Assisted MS record breaking QSO was completed by Fernando, EA8TX (IL18qi) and Dieter, DJ6AG (JO51eq) at a distance of 3428km. This beats the previous best, established by EA8TJ and S50C by 51 km. The sked to complete was a lengthy affair however Fernando received an amazing burst of FSK441 at 820/17dB from DJ6AG during the QSO and completed via the super duct that lay from EA8 to just off the Portuguese coast and pre Persieds peak meteor reflection.

Congratulations to both and also to John, G4SWX who has been a champion of these kind of tests and has worked EA8TX on many occasions using this method.

New tropo record from GM on 2m

David, GM4JJJ reports on another new record established on 2m during the month of August. On Sunday the 5th, Scottish 2m operators had a very long distance tropo duct into EA8. Chris, GM4ZJI was the first to work Domingo, EA8TJ using FT8 in locator IL18RJ. Chris contacted Jim, GM4FVM who, after correcting a rotator error, was amazed to complete the QSO. This was a new DXCC, Square, ODX and Continent for Jim who then contacted me and I very quickly put out a CQ on 2m using FT8. EA8TJ came straight back and reports were exchanged as Sent -16 with -01 received. I was running 400W at the antenna an IC-7600 + HB transverter + Gemini SSPA.

GM tropo records on 2m were as far as I know as listed in **Table 1**.

TABLE 1: GM tropo records on 2m.

QSO partners	Mode	Date	Distance
GM0KAE (IO86CD) with EA8BML (IL27GX)	SSB	1988-09-09	3264km
GM4COX (IO85JX) with EA8BML (IL27GX)	SSB,	1988-09-09	3260km
EB8BTV (IL18QI) with GM4JJJ (IO86GB)	SSB	1998-08-08	3252km
GM8COX (IO85BS) with EA8BML(IL27GX)	SSB	1988-09-09	3223km

Anders, SM4KYN checking the 4m antenna.

The computed distances for the recent FT8 contacts between the centres of the locator squares are GM4JJJ (IO86GB) 3247.13km, GM4FVM (IO85WU) 3261.69km, GM4ZJI (IO86KE) 3268.30km – a new 2m GM tropo distance record!

The band remained open to EA8 until midnight, but no other stations were heard or worked. There was no sign of the D4 beacon or station up in GM. That's the next target.

More records

Dave, G7RAU reports on the amazing events, which over a period of days from 1-5 August culminated in another record. It all started to build on the 1st when from IN79, Dave worked EA1, 2 and EA8 on 2m and 70cm. QSOs of this type were regular over the next 4 days particularly with an EA 2m contest scheduled for that weekend, activity was good. Tropo kept building and he worked 82 EA stations on 6, 4, 2, 70 & 23, 31 of which were in EA8 on 6, 4, 2, 70cm. Dave also heard IL38, a very rare square, but had just turned the amplifier off and was going QRT.

During the afternoon of the 4th, Dave started to hear the Cape Verde D4C beacon in HK76MU. Spotted as locator HK76MV as it sends 76MV but, as he found out from Andrea, D41CV it is not correct and one day they will reprogram it! From 1800UTC on the 4th to 0500UTC on the 5th the beacon varied in signal strength considerable as ducting changed. Finally at around 1805UTC on the 5th, station D4Z was activated and worked using CW/SSB. At 1820UTC they were CQing in CW and peaked at 599 +20dB, an amazing signal. They worked Tim, G4LOH, Terry, M0VRL (IO70) and also Mark, EI3KD (IO51) who clinched the overall distance record at 4148km measured once again to the centre of each square.

How D4Z got on the air is truly the stuff of legend. Dave recounts the events: "Tim LOH and I went on to ON4KST Chat on the 4th asking if anyone could contact the D4 beacon keepers and see if anyone was QRV. On Saturday evening Andrea, D41CV appeared on ON4KST chat and said they were trying to arrange for the beacon to be activated as Mark, ON5FF (EA8FF) was on Las Palmas Grande Canarias. A flight was arranged for him the next day to the main D4 island then a 2nd flight and taxi to as close as possible to the D4 beacon site. He didn't stop at all, as time was the important factor and I think he ran places.

"There is no road to the site so he had to 'hotfoot' it up the mountain. Mark arrived at the D4C/B shack, turned off the beacon and went on SSB and worked me and Tim LOH with 14W! Then he turned power up to 100W, which made a huge difference in signal, and worked Mark, EI3KD (CW), and Terry, M0VRL (SSB). Others called but it got very messy on 144.300MHz with many G, GW, EA1, 2, 8 stations on the frequency. Tim and I were on 432 FM ear wigging at it all and cheering when Terry and Mark completed QSOs. I asked for 70cm but D4Z said another day maybe. 23cm would probably have worked too if they had any kit for the band. Amazing for Tim and I to compare signals with D4C being loudest on the 4th and at my QTH and on the 5th with Tim. Tim had huge signal on D4 on the 5th and I had huge signal on the 4th but all the time things were changing. Here at IN79JX – The Lizard – I had an FT-847 6m/4m 12-ele 6+6 G0KSC Innovantenna and 85/80W, FT-757GX+MuTek transverter on 2m 12-ele M2 and 400W (8877) and on 70cm FT-847 40W 70cm and a 16-ele I0JXX Yagi."

Since the move from IO90 Dave has all the antennas now on a 30m tower (many thanks Mike, G8TIC and the Blacksheep Contest Group).

Solar panel noise at a bearing of 240° is an issue even in this rural location but only on 2m and 4m; 70cm is clear.

Tim, G4LOH also added a footnote to the D4C beacon story that the beacon was spotted by GI6ATZ (IO74) and GI4SNA (IO64) who posted a video of it on Facebook, he would have easily worked D4 if the station had been activated hours earlier... nearly 4500km.

C37MS Andorra 2 & 6m expedition

C37MS were QRV on 6m and 2m operated by Jacques, ON5OO, Jean-Jacques, ON7EQ and Hans, ON5AEN. With specific thanks to the Unió de Radioaficionats Andorrans (URA) for supporting this 2nd Andorran activity to give this rare DXCC to more on VHF. They operated for 24 hours to coincide with the Persieds meteor shower, with two stations working simultaneously.

UKSMG Summer Marathon

This yearly event running from 5 May and closing on 5 August gives any operator the chance to work as many 4 digit locator squares as possible over the period. Any mode can be used but they must be of a terrestrial nature. The final log upload date was 13 August and showed 14 UK stations in the total of 36 entries. Activity was boosted by the use of FT8 operation and also excellent conditions over the Atlantic. Top of the standings overall was PA2M (JO21) working an amazing 614 locator squares with best DX at 10,544km. To complete the top five in the standings, 2nd IZ5EME (JN52) 595 squares, 3rd KP4EIT (FK68) 555 squares, 4th G3TXF (IO71) 547 squares and 5th G0GGG (IO81) with 528 squares. Other UK stations in the standings were G3PXT, G0MBL, G0LGS, G6GWX, G4APJ, M1SLH, G4HGI, G0CER, G4AYU, G0GDA, G4DYA, and G4RHR.

Han, JE1BMJ (QM05) had the best DX in the standings with a QSO at 12,534km. Check out the UKSMG website for details of the Winter Marathon [2].

Richard Staples, G4HGI
g4hgi@live.com

The remote shack installation for Anders, SM4KYN in Sweden.

Band reports

The DX keeps rolling in at G3PXT (JO02). Gordon has worked no fewer than 350 stations during last month, a mixture of SSB, FT8 and CW. The 2-ele quad is providing sterling service and on the day of reporting an excellent opening gave 22 DXCC in one day. A selection of the month's DX: KV4FZ, KT8V, W4UDH, NG4C, N4QWZ, K4JJW, K3AJ, WP4G, KP4SX, KP4EIT, 9K2BM, 4Z5PJ, 4Z4KM, FG8OJ, not to mention 25 Ukrainian station of varying prefixes. Gordon's DXCC entity count for this year so far is 88 and he would really like to get the magic 100 on the magic band this year. He is a very keen participant in the UKSMG Summer Marathon and finished in 3rd place in UK, 8th in Europe and 10th worldwide. Only one dry square in Europe has evaded Gordon's RF so far – JN51, with only one amateur in this predominantly National Park Conservation Area. Contrast that with his own locator JO02, where there are 1387 amateurs listed in the advanced search feature of QRZ.com.

John, G4SWX (JO02) didn't have a huge number of QSOs in the last month but did have some real dynamite DX. Many new squares in Russia via EME: RD3B (LO01), RV6AKA (KN94), RA3VGV (LO06), RC4HAA (LO51), UR4LQ (KO80), RG4F (LO33) plus a very rare but not new QSO with FR5DN (LG78) Reunion. Meteor scatter has also been good, working TK/F1MZQ (JN42) (his first ever MS QSO), TF3T (HP94), C37MS (JN02) and ZB2GI (IM76). I was his 2nd ever MS QSO. During the Persieds, QSOs with EA8TX (IL18) were on the 6th, 13th & 14th, 9A/S540 (JN74), E77OD (JN93), C8SQS (JN60XR), UT8AL (KO61) at 2207km was worked and he was only running 25W. All in all a pretty good month in JO02RF.

Paul, G3YDY (JO01) was very active on 6, 4 and 2m during July with some excellent DX worked and amassed a QSO total of 375 across all bands. Headlines for the month are: (All FT8 6m) 18 July EA8MT (IL27), D41CV (HK26), CT3HF (IM20); 19 July heard BH4IGO (OM86xt) Shandong Province, China who was working MDOCCE. Many others heard the BH4 but no one else worked him. 20 July CU8UM (HM68), 23 July 9K2BM (LL49). On 4m: 21 July the band opened just after 2030UTC to Finland and OH7TE (KP30) and OH2MZA (KP21) were both worked with very strong signals. A non FT8 4m QSO was completed with SM4KYN (JO69) on 4m during the Persieds meteor shower for a rare new activation. Paul managed to catch one the fleeting 2m Sporadic-E openings this year and on the 27th worked IK7LMX (JN80).

Brian, M0BHG (IO70) was very interested and pleased to read the report from Dale, MM0INH in the September *RadCom* regarding a recent 6m QSO. Brian was one of the Cornish stations that heard Dale. He made contact with Dale with reports of 57/51 exchanged before propagation changed. He was unable to find MM0INH in his CallSeeker database so was please to get the confirmation through *RadCom*. The rig at M0BHG in Saltash comprises an FT-897d running 50W on 6m into a horizontal wire dipole in the bungalow roof space running East West. Brian has worked good DX on a north/south path using the dipole with Iceland being an excellent QSO. He also monitors the Mid Cornwall 6m Beacon GB3MCB about 50 miles away and access to a local 6m repeater GB3GC, which sadly has little activity.

4m activity in Sweden

There has previously been some activity in SM on 4m, for example in 2017 at the VHF meeting in Tjorn Sweden, which was active with a special permit for the event. Currently only Anders, SM4KYN (JO69) and Curt, SM7CAD (JO77) have applied to try 70MHz. The application form is sent directly to PTS (Swedish Post and Telecom Authority) and has nothing to do with the national radio society, SSA. It seems the view from the regulatory authority is the application is like an 'ordinary' user of radio communication and they gave them a frequency intended for 'testing radio equipment'. Sorry to say but there is no indication from PTS about any permanent allocation on 70MHz in Sweden. The national radio society, SSA, will continue to discuss with international coordination of 70MHz with PTS but we can only hope for the best. The licenses issued to each station entails a fee and is valid for 6 months with restrictions: one frequency, 70.137.5MHz, max antenna height 7m and 25W maximum ERP. Split frequency working is used, with SM4KYN Rx on 70.162 and SM7CAD Rx on 70.167MHz. Both stations will try to keep the information about their 70MHz activity updated on QRZ.com. Look out on ON4KST Chat for updates as well.

EME Conference 2018

Once again Europe hosted the bi annual EME conference, which took place in The Netherlands over the weekend of 16-19 August **[3]**. With lectures on many moonbounce topics and an excellent programme of visits (to the Dwingaloo Radio Telescope facility organised by CAMRAS) **[4]**. This is the go-to Conference for all EME operators. The next Conference (in 2020) will be held in Prague so look out for more details as they are released in 2019.

RSGB Convention

Looking forward now to the RSGB Convention in October. Once again the VHF/UHF stream has an excellent array of lectures that are very on-topic considering the conditions on the bands this year – there are theoretical and practical ideas on how to make the most of your station to really get the best from conditions.

As always thanks to all contributors new and old, at home and far afield and look forward to a good storm-free autumn!

Websearch

[1] https://tropo.f5len.org/forecasts-for-europe/
[2] http://uksmg.org/
[3] www.eme2018.nl/
[4] www.camras.nl/

GHz Bands

New Region 1 Tropo 2.3GHz record

As mentioned on page 12 last month, on Sunday 22 July, Mans, 9H1GB and Chris, 4X1RF made a staggering 2-way 13cm QSO across the Mediterranean Sea from Malta to Israel. The path from JM75fu62ae to KM72ls78rj on 2320.250MHz was confirmed as a record at 1914km, beating the 2013 record of 1830km held by EA8AVI and EA1BLA. Mans and Chris had QSOs on SSB, CW and JT56c using sea duct tropo propagation. As well as being a record, this was a 9H-4X 'first' on the band. Recordings of the QSOs can be found at [1] [2] and [3].

These sea ducts can produce super-tropo. The 13cm world record stands at 4024km between California and Hawaii; I'm writing this a few days after the 144MHz Region 1 Tropo record fell with a 4163km CW QSO between Southern Ireland and Cape Verde. I discussed this with RSGB Propagation Studies Committee meteorologist Jim Bacon, G3YLA, who me that these maritime ducts are remarkably commonplace. The various prediction sites [4] [5] show extended ducts in the eastern Mediterranean. The recent 144MHz record was via a sea duct across the 'Azores High', usually at its strongest in July. It exists almost all the year round and will support propagation well in to the GHz region. Wikipedia describes the Azores High, "also known as the North Atlantic (Subtropical) High/Anticyclone or theBermuda-Azores High, as a large subtropical semi-permanent centre of high atmospheric pressure typically found south of the Azores in the Atlantic Ocean. It forms one pole of the North Atlantic oscillation, the other being the Icelandic Low." The system moves north in summer and has a major impact upon the climate of Europe. In summer, as it shifts towards 35°N across the Iberian Peninsula, a ridge might even build across France and the southern UK. The Azores High is related to the position of the jet stream and could well have contributed to the July and August's heatwave. Jim told me, "There can be marked departures of the jet stream position on short timescales, but it's the mean position that determines the overall state of the summer. In a sense, the extension of the Azores High is a result of steering by the jet stream". There is the potential of a 1.3GHz world record from North Cornwall down to Cape Verde using the Azores High system, if only the difficult last few land miles across Cornwall can be overcome.

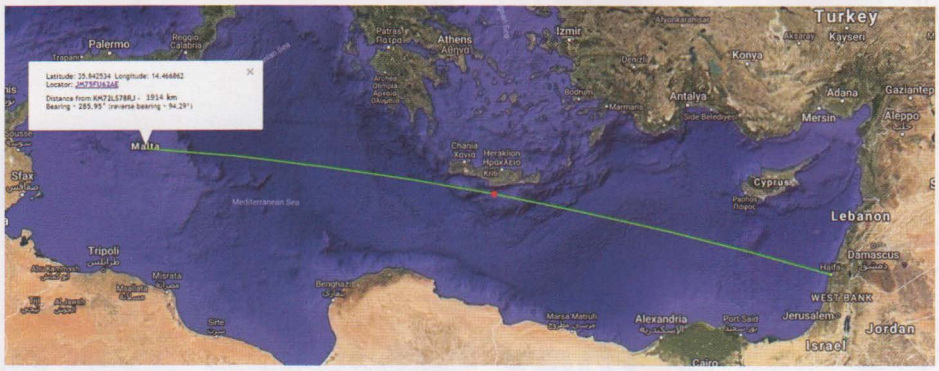

FIGURE 1: 2.3GHz record path from 9H to 4X. Image supplied by 9H1GB (using Google Earth; map data © 2018 AND, Google, ORION-ME, Basarsoft).

Beginners' corner

If you're reading this column for the first time or have never dipped your toe in to the GHz bands, it's often hard to see why we get so excited about our aspect of the hobby when activity is seen to be low compared to other bands and 'DX' can be just working across the North Sea. It really boils down to this. Unlike HF contesting or DXCC chasing it's *not* about QSO numbers. The GHz bands are all about experimentation, 'making things work'. One of the many things my late father, a completely non-technical police constable taught me was to ask questions and to love making things. His 'things' were wooden toys; my 'thing' turned out to be electronics and radio hardware. Microwavers are into the unusual: they have a thirst to understand. Whether it be unusual propagation such as hearing a beacon from 50km away that we normally don't hear, having a regular 700km+ QSO by reflection off aircraft, detecting a signal from a probe around Saturn or having a line of sight QSO across the local lake on a ridiculously high frequency, these are the things that float our boat. Surely one of those examples lights a spark in other amateur radio operators?

In September 1962, then-US President, John F Kennedy delivered his famous "We go to the Moon" speech before a crowd of 40,000 people, many of them school children. It contained the line "We set sail on this new sea because there is new knowledge to be gained..." – well, that's the GHz bands for me and an aspect of the hobby that should be capable of attracting new licensees.

How to start?

Be a GHz SWL! Start with a cheap RTL dongle (eg from [6]), an old Sky dish with a WA5VJB PCB log periodic feed from G4DDK [7] then take it and your laptop to a local high spot to listen for beacons and contest activity on 1.3GHz using one of the many SDR PC programs such as SDR# [8]. Once you have the Sky dish, try using a satellite LNB with a cheap free-to air satellite TV receiver (both from eBay) for some satellite TV DXing. Use the LNB with your RTL dongle as a narrowband IF to listen on 10GHz. Such a setup will allow you to monitor the Es-hail 2 satellite narrowband 10GHz transponder (when it's launched). Build a 'Minitiouner' [9] digital ATV Rx to look for DATV on 23 and 13cm or satellite TV via your LNB. Make your first transmission using the 5.6GHz drone video equipment that has been written about several times recently in *RadCom*.

Is that enough to get you interested? Why not form a group at your local club so you have QSO partners? Contact the UKuG's technical support in your area [10] and have a chat. There is plenty to interest the technically-minded above 1GHz and some 'easy win' starting projects such as those I've described that don't tax the wallet too much.

Finally

Bit of a soap box this month I know, but I'm just trying to inject some new ideas in to old (and new) heads. If you have anything to say, Tweet @g4bao and @ukghz using the hashtag #GHz_bands or drop me an email.

Websearch

[1] www.youtube.com/watch?v=XoI7NqSLhr8&t=4s
[2] www.youtube.com/watch?v=OIAGA3ekqkA
[3] www.youtube.com/watch?v=JNZHOvePP3t0
[4] http://tropo.f5len.org/forecasts-for-europe/
[5] www.dxinfocentre.com/tropo_nwe.html
[6] www.rtl-sdr.com/buy-rtl-sdr-dvb-t-dongles/
[7] http://g4ddk.com/Products.html
[8] https://airspy.com/download/
[9] https://wiki.batc.org.uk/MiniTioune
[10] www.microwavers.org/support.htm

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2nd	Icom IC-R8600 (Receiver only)	£2,499.00
3rd	**Elecraft Transceiver K3S**	**£2,849.00**
4th	**Elecraft Transceiver K3S (2nd)**	**£2,849.00**
5th	**Elecraft K3 (upgrade)**	**Discontinued**
6th	Icom Transceiver IC-7851	£9,999.00
7th	Hilberling PT-8000A	£12,000+
8th	**Elecraft KX3**	**£1,149.00**

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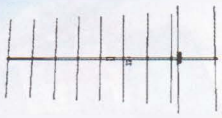

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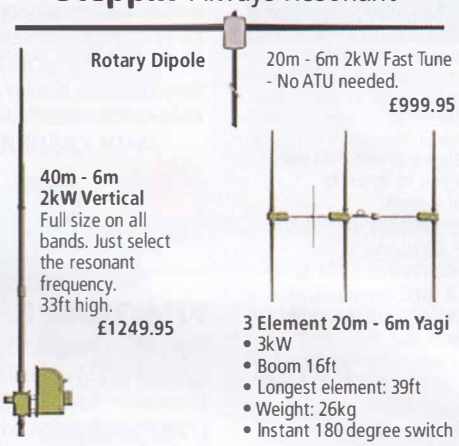
* These headsets need adaptor leads £25.95 each
Please quote radio model

SteppIR 'Always Resonant'



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All antennas include the remote controller box

Total "Spot On" Resonance!

The control box that comes with every SteppIR antenna is a smart unit that gives you "Spot On" resonance. That means that you can resonate the vertical or Yagi, anywhere in the band. It always operates as a full size resonant antenna. A neat trick with the Yagi is that you can reverse it 180 degrees in less than 3 seconds. With the vertical you can also operate it as a 3/4 wave on the higher bands. And, the vertical you can also operate 80m with the optional 80m add on base loading kit.

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True Analogue
30 Amp PSU

- Variable voltage power supply
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2 YEAR WARRANTY

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4BTV
40m - 10m 4 Band vertical that will handle full legal power and can be ground mounted
Height is 6.52m. **£209.95**

5BTV
The ever popular 5-band model that covers 80m to 10m. This is a great backyard antenna that can be ground mounted. The height is 7.64m
.....**£269.95**

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All antenna are rated at 1kW.

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Here is a great ange of single band whips that have PL-259 bases and an easily adjustable upper tuning section for quick hand adjustment.

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HF-30FX.....30m whip 1.4m long **£63.95**
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This is a 3-way mount that is great for HF operation. SO-239 socket and 4.5m cable terminated in PL-259....**£39.95**

Mosley Mini Beam 5 Bands

- 10-12-15-17-20m
- 3 element on 10-15-20
- 1 Element 12m and 17m
- Boom approx 2m
- Longest El. approx. 6m

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MFJ-902B	3.5-50MHz 150W Travel Tuner	£121.95
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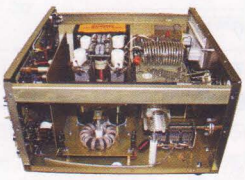
MFJ-994BRT	HF remote auto antenna tuner 600W	£440.95
MFJ-9982	HF 2.5kW antenna tuner	£771.95
MFJ-998RT	HF1.5KW remote auto antenna tuner	£848.95

Ameritron AL-811HXCE



Four rugged 811 tubes produce 800W output from one rugged desk top design. The pi-network easily copes with modes VSWR and the high voltage / low current configuration produces a clean low distorion signal. The tube replacements are not expensive and the cost is way below solid state designs.

£1099

- 800W PEP 600W CW
- Vernier Reduction Drive Tuning
- Input match tuning - adjustable
- 160m - 10m
- Dimensions: 8 ¼" x 13 ¾" x 15 ½"
- Weight 32 lbs

AL-811X 3 x Tube 600W Model £949

MFJ-939 Plug & Play Auto ATU

Here is an auto ATU with models dedicated for Yaesu, Kenwood, Icom and Alinco. Each one comes with a lead that plugs directly into your radio that provides power and operating signals back to the ATU. Tell us the model of your radio when ordering.

£176.95

Ready to go!

MFJ-991B Auto ATU

Similar to the MFJ-993BRT but without LCD display, antenna switch and balanced feed option. Ideal for coax or end fed wire.

£253.95

MFJ-413

Morse code tutor.

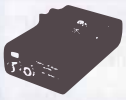
£55.95

MFJ-557 CW Trainer

This unit comprises CW key, oscillator and speaker unit. Great for CW sending practice.

£47.95

MFJ-403P Micro Keyer



Here is a little micro keyer with twin paddle and built in side tone. Ideal for QRP operators who want to travel light.

£79.95

MFJ-402 Nano Keyer

A very compact little electronic keyer. Just 2" x 3" it will generate CW with its paddle from 5 - 65 spm. You keyer can be powered simply by plugging into transceiver key socket. Video link on our site.

£77.95

MFJ-223 Antenna Analyser

This very compact and handy antenna analyser covers 1 - 60MHz. It has a full colour LCD which offers a very clear graphic display. Includes rechargeable battery with USB lead. A great little bit of test gear.

£299.95

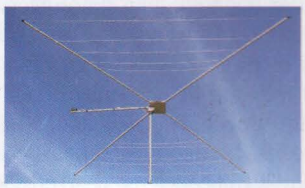
MFJ-225

1 -180MHz measures a wide range of parameters including, VSWR, Impedance, Return Loss, Phase, Capacitance, Inductance, Cable length external 12v or USB power.

£232.95

The Small Garden Solutions from W&S

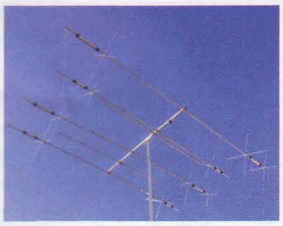
MFJ-1836H Cobweb



What is a cobweb? It's in effect a full size dipole bent into a square. This results in 1/8th wave sides. The antenna can be formed of multiple dipoles with a common feed via a balun. It is easy to support on a single mast and requires no rotating. This model covers 6 bands from 20m to 6m and will handle up to 1.5kW.

£269.95

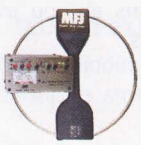
Cushcraft MA-6B



Here is a new exciting design that operates as a 3 element Yagi on all bands from 20m to 10m. It uses end loading to reduce the element length to enable it to fit into quite small gardens. End loading enables the high current region to flow through full thickness element sections. Bandswitching is automatic and the whole antenna offers a light weight antenna solution in a compacy array.

£699.95

MFJ-1786X



The MFJ-1786X covers 30m to 10m and handles 150W. Includes remote tuner and is around 1m in diameter. You also get low noise reception!

£539.95

MFJ-2389

80m - 2m 8.5ft! Heres a realy cool little vertical. Less than 9ft tall, all bands, counter-poise radials and handles 200W.

£279.95

MFJ-1799 Vertical

Here is a great design from MFJ. It gives you true all band coverage - 80 40 30 20 17 15 12 10 5 and 2m! All you need from just one antenna. It requires no radials and stands approx 6m high. Power rating is 1.5kW. So with an amplifier you are set to radiate a great signal.

£503.95

How True Are the Whispers?

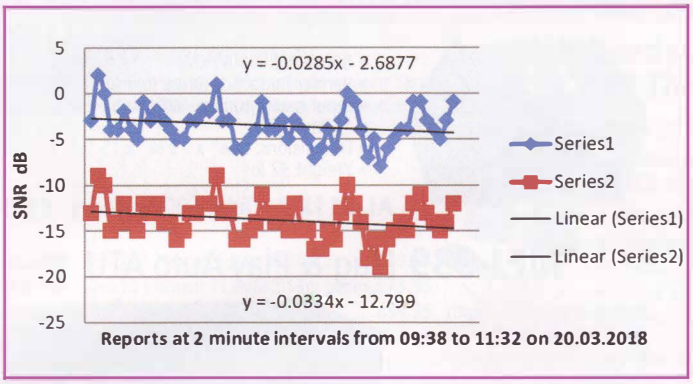


FIGURE 1: SNR reports from EA8BFK on G8JNJ's 5 and 0.5W signals on 40m. Median SNR Series 1 (5W) = -4dB, Series 2 (0.5W) = -14dB. The least square regression lines meet the y axis at -2.7 and -12.8dB.

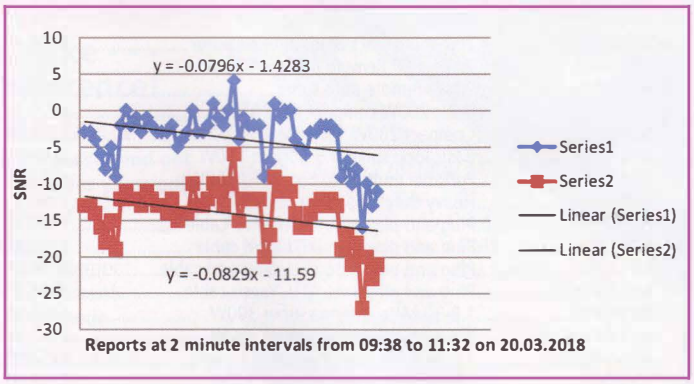


FIGURE 2: SNR reports from SA6BSS/RX on G8JNJ's 5 and 0.5W signals on 40m. Median SNR Series 1 (5W) = -3dB, Series 2 (0.5W) = -13dB. The least square regression lines meet the y axis at -1.4 and -11.6 decibels.

Sooner or later most enthusiasts for the Weak Signal Reporting Network (WSPR) consider using it to compare one antenna with another.

Instead of a direct signal strength report, the WSPR network provides a signal to noise ratio (SNR) that relates signal strength to the noise floor at the receiving end. Local interference or an adjacent signal that activates receiver gain control will alter this noise floor and affect the SNR report. For this reason many are inclined to use for comparison a measure based on distance [1] rather than the more tempting SNR.

Even under ideal conditions one might wonder just how closely a reported SNR relates to power output at the transmitter.

An experiment

To answer this question, Martin, G8JNJ recently carried out a simple test. Two WSPR programs were set up with separate callsigns on slightly different frequencies in the 30m WSPR section. He was able to run them simultaneously through the same transmitter and antenna system, so that one signal was at 5W and the other at 0.5W, a 10dB difference verified with a spectrum analyser. Transmissions were made over a two hour period.

Examining the paired data from several different reporters he was impressed to see how often there was a near 10dB difference in reported SNR for the two transmitted signals (**Figure 1**).

A similar difference was found (**Figure 2**) for another reporting station, despite a greater fluctuation in signal strengths over time.

Martin's results suggest that, under certain conditions, reported SNRs can reflect transmitter power output very accurately indeed. Several extremely important caveats will be discussed later, but it led on to the question of whether under more 'real world' conditions, reported SNRs could be useful in assessing aspects of aerial performance.

In a practical test setup, unless you have two separate transmitters with identical power output, it is necessary to alternate the two antennas at intervals of at least two minutes. Obviously, signal strengths can fluctuate rapidly and this was the case with one of Martin, G8JNJ's reporters, Kai Gerber, DL1KAI.

In **Figure 3**, reported SNRs (for just the 5W signal) in alternate two minute periods are displayed as separate series, pale and dark blue. The pattern and similar regression lines suggest that even with a two minute time gap, paired readings might give a meaningful idea of comparative signal strengths for two aerials. At the very least, it looked hopeful.

Taking the EA8BFK series and only looking at a 5W transmission in one frame then a 0.5W transmission two minutes later and so on, we lose half the original data and accept that there will be more fluctuation of both signals. Actually, the graph looks like **Figure 4**.

If we simply want to know which of two antennas was better at putting a signal into EA8 (Canary Islands) there should be ample information here to form a view.

Statistical methods

In the examples given here, the median, rather than average (mean) value is favoured because we do not know the precise distribution of the variables (SNRs). The median simply indicates the middle value of each series. It is less upset by the presence of outliers (values that are suspiciously far from the ones on either side) than the average would be. Excluding the outliers is still an option. The least squares regression lines ('lines of best fit') will be affected by outliers but they are conveniently drawn in Excel and are shown on the diagrams here. When differences between two series are less well marked, significance is best checked with a non-parametric test that makes no assumptions about the population from which the reported SNRs are drawn. This has been well discussed by Owen Duffy in his blog [2]. We have the great advantage that all the data here are collected as matched paired observations. Wilcoxon's signed rank test for pair differences is a non-parametric test that makes good use of this fact and there is even an easy online calculator provided by Prof Richard Lowry [3]. Incidentally, his *VassarStats* textbook explains all you ever need to know about statistics.

Graphs in Excel

Graphics are easy for those who know Excel and, radio apart, those who don't would be well repaid by learning to use it. WSPR data can be retrieved in Excel format from GM4ISM's spreadsheet [4], which makes processing of information a great deal easier. If spots are arranged by callsign in time order

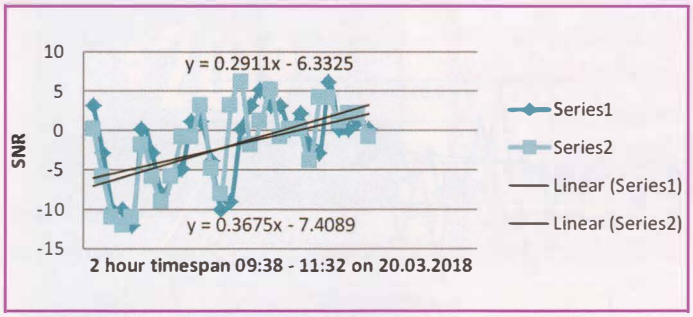


FIGURE 3: Alternate 2 minute reports from DL1KAI of G8JNJ (5W transmission only). Pale and dark blue spots show alternate 2 minute SNR reports of G8JNJ's 5W (37dBm) signal by DL1KAI.

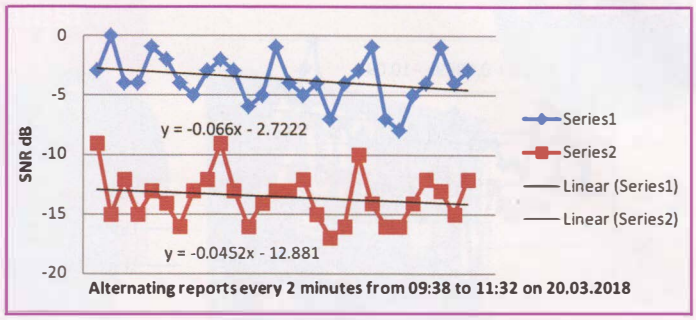


FIGURE 4: Reports from EA8BFK as in Figure 1, but looking only at alternate pairs of 5 / 0.5W reports 2 minutes apart. Median SNR Series 1 (5W) = -4dB, Series 2 (0.5W) = -13.5dB. The least square regression lines meet the y axis at -2.7 and -12.9 decibels. Remarkably close to the original 10dB difference. Wilcoxon's signed rank test for pair differences: p (2-tail) = <0.0001.

on a new sheet, stations giving longer runs of consecutive reports can be selected. Alternating SNR reports can be separated into two adjacent columns using an Excel 'formula': for example, to take alternate values from column A and put into separate columns B and C: In B1 write =INDEX ($A:$A,ROW(A1)*2-1) then drag down to see the full column of values. In C1 write =INDEX ($A:$A,ROW(A1)*2) and drag down as before. Data from the paired values in B and C can then be plotted as a graph. The steps to make the graph are in Table 1.

Confounding factors

In raw data from his two hour WSPR transmission, Martin found several sources for confusion. These included reporters who missed every other spot for a period, multiple reports in the same time frame with discrepant SNRs; a reporter who spotted only the weaker transmission and even rare instances where there was no apparent difference between the two signals. The commonest explanation was likely to be the presence of a stronger WSPR signal overriding the test one, or a sufficiently strong signal or local interference affecting receiver gain. Some stations, particularly those with numerical suffixes, were definitely carrying out tests of their own; perhaps alternating receiving antennas or directional systems. This was sometimes explained in the WSPR user's forum, but like me, not everyone will have said exactly what they were doing. The reports compared here are all from individual stations to minimise error from different antennas and noise floors. It is as well to check out potential reporters by noting their reports to other WSPR stations over a few two minute time slots to verify that they are reasonably consistent. Martin points out that if reports are selected in the range +10 to -25dB, this should avoid errors due to gain compression and signal variation near the noise floor. A specific problem when using two separate frequencies is that one test transmission could be affected more than another or even that one frequency might be entirely outside the receiver's 200kHz pass band. Although otherwise a compromise, the use of alternating signals on a single frequency avoids the last two risks.

A second experiment

Martin's findings with a 10dB power difference encouraged me to investigate smaller power differences. The first test was done on

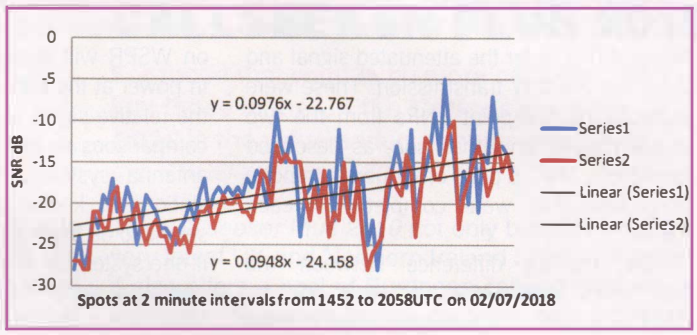


FIGURE 5: Paired SNR reports from MW0KGP on 160m 200mW (blue), via 3dB attenuator (red). Median series 1 = -18.5, series 2 = -20. Wilcoxon p (2-tail) <0.0001.

the 160m (1.8MHz) WSPR band on 02.07.2018 from 1452 to 2058UTC (Figure 5). The transmitter was a U3S from QRP labs [5]; the antenna a horizontally polarised loop approximately 58m long x 1.5m wide supported 33cm above ground on a fence running E-W. Power output was 200mW with a 3dB attenuator switched in at alternate two minute intervals (Figure 7).

Mid-summer conditions provided the happy chance to receive an almost complete 6 hour sequence of reports on both signals from MW0KGP just 37km away from my QTH. The only absent report (from series 1 at 1738UTC) has been replaced in Figure 5 by an estimated value midway between the two on either side in the series. Signal strengths picked up slowly through the evening, notably after 1600UTC with changing propagation. Interestingly, separation between SNR reports of the attenuated and direct signal held even at the low levels seen with powers of 100-200mW used here.

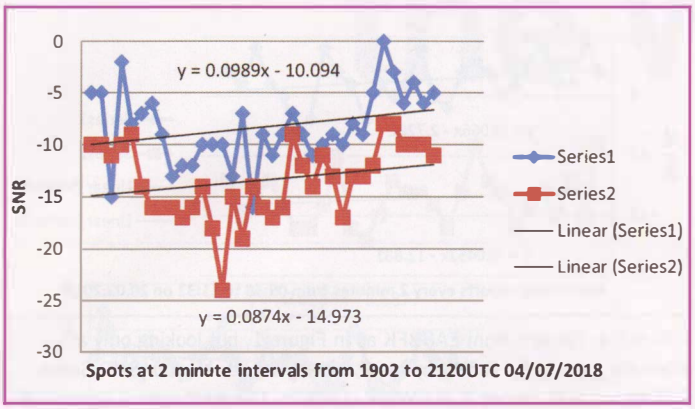
Two days later a second test was done using a 6dB attenuator on the 60m (5.2MHz) WSPR band. The aerial this time was a doublet running roughly E–W. Power output was again 200mW switched as before either direct to the matching unit or via the attenuator every two minutes.

Figure 6 shows results for two reporting stations from opposite directions, but at similar distances: G4ZFQ in the Isle of Wight and

TABLE 1: Drawing a graph in Excel.

To plot a graph in Excel: in 3 adjacent columns assemble the time sequence and paired values of SNR. Click on the Insert menu. Choose 'line chart' or 'scatterplot with straight lines and markers'. With chart highlighted, hover over a serial point, right click and select 'Add Trendline' to show Least-Squares Regression Line. Check the box 'Display Equation on chart'. Click 'Close'.

John Seager, G0UCP
jseager2009@btinternet.com



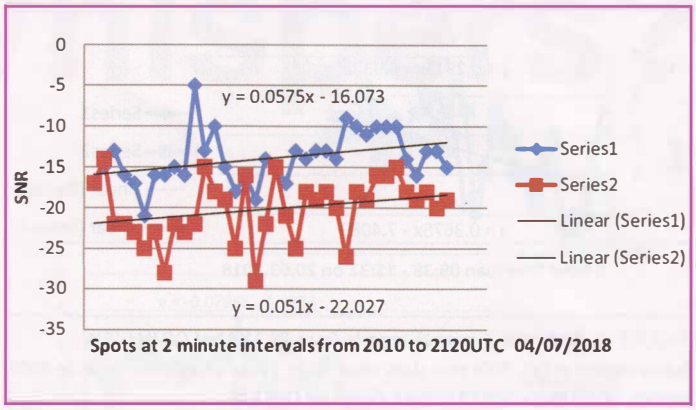


FIGURE 6: Paired reports from G4ZFG (above left) and GM4SFW (above right) on 60m. In each case reports for the 6dB attenuated signal are shown in red.

GM4SFW near Inverness. From 1902 to 2120UTC there were 13 missed reports from G4ZFQ, 6 for the attenuated signal and 7 for the 200mW transmission. These were replaced by mid-point SNRs from the two in each series on either side, as described previously. The 36 pairs of sequential reports from GM4SFW were complete for each series.

The median difference between the two series for G4ZFG was 4dB and for GM4SFW 5dB. Differences between least square regression lines were 4.9dB and 6dB respectively. Perhaps a reasonable result for the nominal 6dB of the attenuator.

Conclusions

This article does not compare one antenna with another. Its aim is to draw attention to Martin's results, which clearly show that under certain circumstances SNR reports on WSPR will accurately reflect differences in power at the transmitter, and by inference the relative signal strength at the receiver. If comparisons are to be made between different antenna systems, then choosing specific stations at known bearings and distances seems to be the way to go; perhaps to decide if one system or another is more effective at putting a signal into Europe or over to the USA. The same method could equally well be used to assess receiving antennas. Some of the pitfalls are listed and it does involve a fair amount of data processing which could possibly be automated to some extent. There is still plenty of room for experiment. Do the whispers tell the truth? Generally they seem to, but bear in mind that some of them are answering questions that we did not ask.

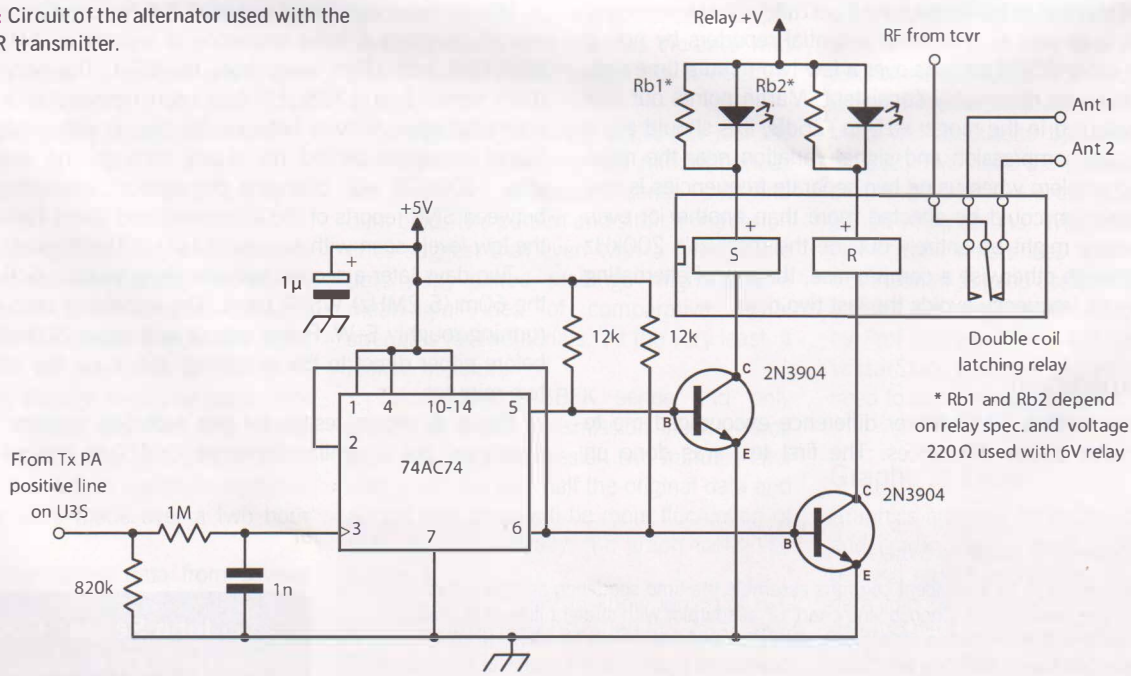
Acknowledgements

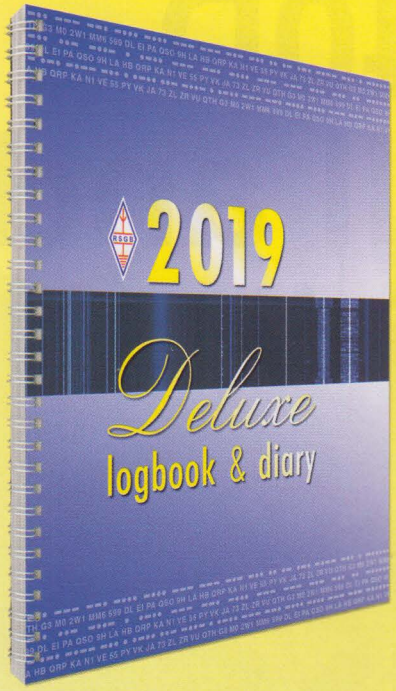
Martin Ehrenfried, G8JNJ for sharing his original data on the RSGB Tech group [6]. Dr Carol Milazzo, KP4MD for advice on extracting and using WSPR data with Excel. Dr Brian Austin, G0GSF for many helpful comments.

Websearch

[1] www.dxplorer.net/wsprlite
[2] WSPR for A/B tests – A discussion. Owenduffy.net
[3] VassarStats: Statistical Computation Website - Ordinal Data. http://vassarstats.net/index.html
[4] GM4ISM WSPR Download Spreadsheet. http://www.qsl.net/kp4md/wspr_analysis.xls
[5] U3S kit: www.qrp-labs.com/ultimate3/u3s.html
[6] see https://rsgb.org/main/technical/forums/

FIGURE 7: Circuit of the alternator used with the U3S WSPR transmitter.





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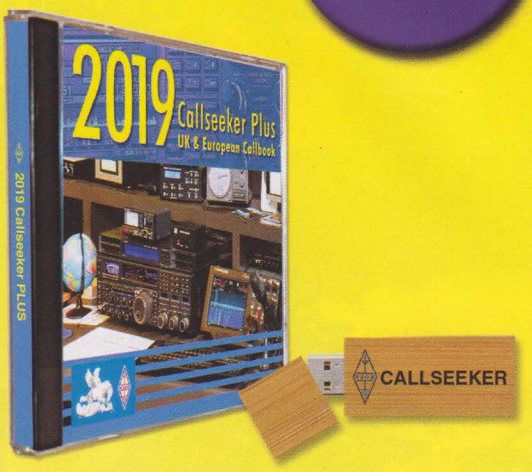

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H44R & H40D from Russell and Duff Islands

A welcoming group watches as we approach the very remote Tahua island, in the Duff Islands Archipelago (OC-179).

Located southeast of Papua-New Guinea, the Solomon Islands include over 900 islands within an area of 1,650km in NW-SE direction and 180km perpendicular to it.

This sovereign country and DXCC entity is divided in nine provinces. The province of Temotu, at the southeastern end of the archipelago, is a separate DXCC entity in itself. While these islands have been inhabited for three millennia, they were first documented in 1568 by the Spanish navigator Álvaro de Mendaña and named after King Solomon, under the mistaken assumption that they held large riches.

Wanted!

Temotu ranked #43 DXCC by Club Log, while Solomon Islands was #82. Temotu also ranked #23 in SSB world-wide, as well as #26 and #30 at Mixt in western EU and eastern NA, respectively. The Solomon Islands and Temotu include eight and five island group references for the Islands on the Air (IOTA) Programme. The rarest IOTA groups in each DXCC are Russell (OC-168) and Duff Islands (OC-179), last on the air 17 and 25 years ago, in demand by 94 and 97% of the IOTA membership.

Bernhard, DL2GAC/H44MS generously shared his unique knowledge of the area and used his logistical expertise to assist me in planning a trip to Duff and Russell. After a 42-hour voyage, which included an 8-hour delay in Brisbane, I was relieved to finally meet Bernhard on the airport in Honiara, and see that my 67kg luggage also made it!

Bernhard arranged the purchase and delivery of a pair of 100Ah batteries, then we toured Honiara. I was fascinated to see some 5-10% of the dark-skinned locals had blonde hair, which is due to a homegrown gene rather than outside influence.

Mbanika Island

Russell (OC-168) is a group of volcanic islands situated over 90km west of Honiara. It includes the 10x6km Mbanika Island, formerly home to the country's largest coconut plantation. A labour dispute brought everything to a halt in 2003 and production never resumed. Locals and outsiders occupied the land and facilities. They're reluctant to invest in fixing up houses they don't own; things are in bad repair. There is no electricity or running water in the group.

Bernhard scouted Mbanika in advance. We went together for the actual operation, allowing me the maximum time on air. We boarded *Kosco*, which visits Russell weekly. After almost 6 hours we docked at Yandina, its first stop on Mbanika. John Mairiri hosted us from 22-25 April. I operated as H44R, using an Icom IC-7000 with an AL-500M solid state amp, plus a multi-band vertical wire antenna a few meters from the ocean. Power came from my new 100Ah batteries, charged by a 5kW generator. Unfortunately, the amp failed after 200 QSOs. Subsequent tests confirmed that it had overheated; it never recovered on site.

A total of 3,352 QSOs were logged with 2,563 stations in 74 DXCCs on 6 continents. I expected 30 and 40m would provide some openings to western EU and eastern NA, but these were very short. Instead, 17m was open much longer than anticipated. Almost 55% of all contacts were on 20m, 36% on 17m, 8% on 30m, and just 1% on 40m. Some 63% of the QSOs were in CW, the rest in SSB. The distribution was 46% EU, 31% AS, 20% NA and 2% OC. SA and AF were less than 1%. Top five DXCCs by QSOs were JA, K, UA, I and DL, accounting for almost 68%, followed by SP, UR, UAO, F and SM.

With Bernhard (left) and John Mairiri (right).

Arrival in Yandina, Mbanika Island, OC-168.

I had trouble from some eastern EU ops who called intensely out of turn; eventually I worked them but confirmed they will not be issued QSL cards. Meanwhile, my thanks go to all the JA operators for their sportsmanship in following up my instructions at all times.

With *Kosco's* return scheduled, we attempted to stay an additional day and looked for a private boat, but stormy weather and rough sea rendered our search unsuccessful. A powerful storm flooded the back yard, making band-changing challenging as it required taking the mast down in 20cm deep water.

The ocean was a little bumpy when we left Yandina, which lengthened the return a bit. My flight to Lata was on April 27, so I decided to try a short operation from Tulagi Island. However, by the time we returned to Honiara, all the motor canoes heading there were long gone. We were lucky that a very late boater heading west of it agreed to a detour!

Tulagi

Tulagi, IOTA reference OC-158, is just 3.5 x 0.6km and in demand by 84% of IOTA members. It is part of the Florida group, named after Pascua Florida or 'flowery festival' by the first Europeans who sighted it during the Easter season. The town of Tulagi, the present capital of Central Province, was the capital of the British Solomon Islands before 1942, prior to its move to Honiara (on Guadalcanal Island, 40km SW).

We arrived after sunset but Bernhard had visited the island before and we easily found our way to the Provincial Guesthouse in darkness. I signed H44R/P, using the same rig and antenna, barely fitting inside the fenced compound. AC was available, but the noise level was noticeable after nightfall. The radio operation lasted a day and a half, with two nights on the island. Tulagi is a great retreat, with several small but cozy hotels. Houses with breathtaking views dot the limestone hills.

The log contains a total of 1,123 QSOs with 916 stations in 51 DXCCs on 6 continents. 51% of all contacts were on 20m, 25% on 17m, 15% on 15m and 9% on 40m. Almost 85% were in CW. The distribution was 41% AS, 31% NA, 23% EU, 4% OC, 1% SA – and only one contact with AF. The top five DXCCs were JA, K, UA, VK and DL, accounting for over 81%, followed by UA0, I, UR, SM and F.

Back to Honiara in the late afternoon of April 26, I had to pack things up for the voyage to Duff. Even leaving the amp and some clothes at the guesthouse, the remaining luggage still weighted 47kg!

To Duff

I met Ben Hepworth at the airport. He was in charge of the logistics for my trip to Duff. He and his family just returned from New Zealand, and I soon learned how lucky I was.

Ben owned a small resort on Pigeon Island, built by his parents in the 1960s. He assured me that everything was ready for my trip. Upon reaching Lata, it was apparent that nothing was prepared – and it started pouring! But Ben's presence energised things and when the rain stopped we moved quickly to the docks where a motor canoe was waiting for us.

The Duff Islands form IOTA group OC-179, which ranks #9 on the Most Wanted IOTA List (out of 1124 groups activated to date). Without regular transportation links, my only option to reach these islands was a 23ft open motor canoe. I travelled the distance of 175km from Lata in two stages: Lata to Pigeon Island (72km) and from there to Tahua Island (103km). It took Stanley two hours to drive us to Pigeon, where we arrived at nightfall. The island and its lodging amenities seemed from a fairy tale. I woke up very early next morning, barely holding my excitement. But for various reasons we had to wait until the tide rose in early to mid-afternoon.

It was a gorgeous day, with sparkling blue sky and intense heat under a scorching sun. After a while, I squeezed inside the shaded bow. But that moves the strongest into the waves and, since I didn't have anything soft to lie on, my entire upper body received a rough massage. I had really had enough of it after four hours when Duff islands finally became visible in the distance.

We landed on Tahua Island just before sunset and were warmly welcomed by Chief Abros Miki and many locals. Tahua is a tiny island of 1.5ha (145 x 105m). It is the most important of five similar islands built by the locals on the coral reef surrounding Taumako, the main island in the group, whose volcanic cliffs rise to 400m. Construction lasted generations, but was completed before the first Europeans visited the islands in 1606. Tahua, 160m west of Taumako, is home to 90 people – a fifth of the group's population.

Named after a missionary ship that visited in 1797, the Duff Islands had been populated for 3000 years. In the 1950s, all inhabitants lived on Tahua, which offered the best protection against mosquito-borne diseases. Locals are Polynesians and pursue traditional fishing and subsistence farming. School-age children are boated daily to the only school, located in Taumako. Small solar panels were introduced in 2014 and are popular.

After landing, I setup the multi-band vertical antenna quickly, to have it in place

Cezar Trifu, VE3LYC
ve3lyc@hotmail.com

before dark. Shortly, H40D was on the air and the pileups were fierce. I only used the rented 3.3kW generator to charge the 100Ah batteries in daylight because of the proximity to the houses. The temperature was 33°C daytime and 24°C at night, with high humidity. There was a breeze at times, which – along with periodic rains – generated an enjoyable cooling.

I presented Chief Abros Miki with a box of medical supplies and other gifts for the local kids, for which he thanked me. I also had a small gift from Bernhard for Thomas Taisea, his host on Tahua back in 1993, who now is living on Taumako. The Chief took me to him, and we had an emotional encounter. Following this, he took me further north, to the local cemetery, a place of remembrance, peace and serenity.

The log includes 3,454 QSOs with 2,383 stations in 76 DXCCs on 6 continents. Propagation was very different from Mbanika and Tulagi, making central and western Europe, eastern NA and SA harder. I tried to find every possible opening to these areas, at times changing the band every 10-15 min. The results weren't always rewarding, despite the sleep deprivation. Over 40% of contacts were on 17m, 35% on 20m, 13% on 30m, 7% on 40m and 5% on 15m. Almost 79% were in CW. The distribution was 42% AS, 37% EU, 16% NA, 4% OC, with the sum of SA and AF close to 1%. The top five DXCCs were JA, K, UA, DL and I, accounting for almost 72%, followed by UA0, UR, VK, SP and SM.

The first 20km of the return from Duff had an ocean swell of 1 to 2m, with white crests every 50 to 100m. Stanley went slow and kept the boat mostly on top of the waves. After that, a serious rainfall started, which rapidly calmed the ocean. With poor visibility and everything looking grey all around us, Stanley navigated by GPS.

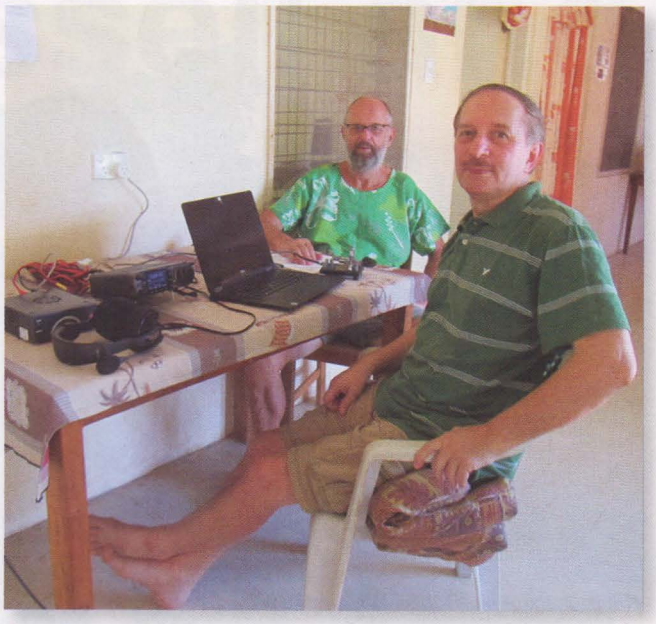
Heavy rain continued until mid-morning. I wasn't surprised when Ben informed me that the afternoon flight was cancelled because Lata airstrip was flooded. I tried to work on converting the logs into electronic format, but ended up sleeping most of the day.

With the flight rescheduled next day, Stanley told me that the ocean was rough and it may not be possible to reach Lata, but I was determined to catch that flight. Once we reached the open ocean I understood exactly what he meant! Waves of up to 2.5m were pushed by currents and wind in various directions and it was difficult to keep the boat atop them. White crests were every 30-50m, forming wide foam when hitting each other. It was absolute, utter madness. At times, the canoe ended off the wave top, and Stanley slowed down to avoid rolling. The boat would slide down the big wave, engine first. This slight rotation gave me a strange feeling that the vessel could end up perpendicular to the wave and potentially capsize. Stanley paced it against the swell, accelerating just in time to bring it back on top. It took us almost twice as long to reach Lata, with no time to spare before the flight! But I made it.

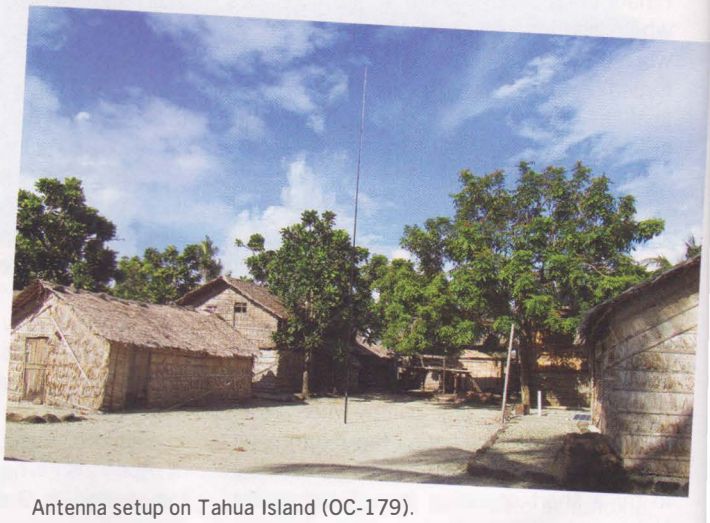
Thanks

I remain indebted to Bernhard, DL2GAC/H44MS for his extended logistical support. My thanks to Bill, K9RR for providing the amplifier, George, VE3GHK for technical support, Maury, IZ1CRR for website assistance and John Mairiri for his hospitality on Mbanika. I wish to acknowledge Ben Hepworth for his close collaboration, and Stanley for his skills and fortitude. Chief Abros Miki is graciously thanked for facilitating this project and his warm hospitality on Tahua.

My appreciation to the International Radio Expedition Foundation (IREF), German DX Foundation (GDXF), DX News, RSGB, ICOM, Clipperton DX Club, European DX Foundation (EUDXF), Swiss DX Foundation, CDXC: The UK DX Foundation, Mediterranean DX Club, and Daily DX for their strong sponsorship of this complex and ambitious project. I am grateful to Rei, DL6DQW, Sten, SM3NXS, Max, WB8FLE and Doc, N4WW for their exceptional support, to the top donors DL4KQ, DL6EBE, JE1DXC, JF4VZT, JM1PXG, K9RR, KD1CT, KO8SCA, N4II, N6VR, OE3SGA, ON4IZ, PA3EXX, PT7WA, SM3EVR, SM6CVX, VE7DP, VE7QCR, W5PF, W5ZPA, W6RLL, WB2YQH and WC6DX, and to the many others who offered financial assistance.



Operating as H44R/P.



Antenna setup on Tahua Island (OC-179).

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Count on us!

Sport Radio

With autumn well and truly upon us, band conditions are likely to be at their most favourable for HF contests.

The RSGB DX Contest evolved from the 21/28MHz Contest and had its second running last year, when it also included 3.5MHz and 7MHz. The traditional five HF contesting bands remain for this year, on the 7th. There are several sections; each can be entered for 12 or 18 hours. After that the 80m Autumn Series continues, with CW on the 8th and datamodes on the 17th. The second of this year's Rolling Locator (RoLo) contests is CW, on the 21st. Then it's back to the Autumn Series, with SSB on the 25th.

The 2m FM Activity and UK Activity Contests are on the 2nd. There are coinciding UHF and microwave contests the following weekend, all starting together but ending at different times. The 1.2GHz and 2.3GHz Trophy contests each run for eight hours, while the 432MHz-245GHz Contest runs for 24 hours. The following two weeks are the domain of the Activity Contests, with the 70cm FMAC and UKAC on the 9th, the 6m FMAC and UKAC on the 11th, the 23cm UKAC on the 16th and the 4m FMAC and UKAC on the 18th. The first of this year's Super League series of contests is 6m AFS, on the 21st. The SHF UKAC is on the 23rd.

The UKEICC 80m series continues, with an SSB session on the 3rd. The Oceania DX SSB Contest takes place on the weekend of 6-7th. Participants want your age as part of the exchange, *not* a serial number. The IARU 432MHz-245GHz Contest coincides with RSGB UHF-microwave contests on 6-7th, but due to new data protection regulations you now have to submit your own entry. The Worked All Britain HF Phone contest runs for 18 hours on Sunday 7th. The Oceania DX CW Contest takes place on the weekend of 13-14th, with the same exchange as the SSB session. The IRTS (Irish) 40m Counties contest is on Sunday 14th. Multipliers are the 32 Irish counties. The Worked All Germany Contest takes place for 24 hours over the weekend of 20th-21st. It's a big event in Germany, but usually attracts few entries from the UK. The UK Microwave Group has a 24-76GHz contest on Sunday 21st.

Even though HF conditions are not expected to be exciting, at times there should still be lots of DX on the bands during the CQWW DX SSB Contest that runs for the entire 48 hours of the weekend 27-28th. Finally, the UKEICC has a CW session of their 80m series on Wednesday 31st.

Steve White, G3ZVW
steve.g3zvw@gmail.com

RSGB HF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Sun 7 Oct	DX Contest *	0500-2300	CW, SSB	3.5-28	RS(T) + SN
Mon 8 Oct	80m Autumn Series	1900-2030	CW	3.5	RST + SN
Wed 17 Oct	80m Autumn Series	1900-2030	Data	3.5	RST + SN
Sun 21 Oct	RoLo 2 *	1900-2030	CW	3.5	RST + Rolling Locator
Thu 25 Oct	80m Autumn Series	1900-2030	SSB	3.5	RST + SN

RSGB VHF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Tue 2 Oct	144MHz FMAC	1800-1900	FM	144	RS + SN + Locator
Tue 2 Oct	144MHz UKAC	1900-2130	All	144	RS(T) + SN + Locator
Sat 6 Oct	1.2GHz Trophy +	1400-2200	All	1.2/2.3G	RS(T) + SN + Locator
Sat 6 Oct	2.3GHz Trophy +	1400-2200	All	1.2/2.3G	RS(T) + SN + Locator
Sat-Sun 6-7 Oct	432MHz-245GHz	1400-1400	All	432-245G	RS(T) + SN + Locator
Tue 9 Oct	432MHz FMAC	1900-2130	FM	432	RS + SN + Locator
Tue 9 Oct	432MHz UKAC	1900-2130	All	432	RS(T) + SN + Locator
Thu 11 Oct	50MHz FMAC	1800-1900	FM	50	RS + SN + Locator
Thu 11 Oct	50MHz UKAC	1900-2130	All	50	RS(T) + SN + Locator
Tue 16 Oct	1.3GHz UKAC	1900-2130	All	1.3G	RS(T) + SN + Locator
Thu 18 Oct	70MHz FMAC	1800-1900	FM	70	RS + SN + Locator
Thu 18 Oct	70MHz UKAC	1900-2130	All	70	RS(T) + SN + Locator
Sun 21 Oct	50MHz AFS §	0900-1300	All	50	RS(T) + SN + Locator
Tue 23 Oct	SHF UKAC	1830-2130 ~	All	2.3-10G	RS(T) + SN + Locator

Best of the Rest Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange (info)
Wed 3 Oct	UKEICC 80m	2000-2100	SSB	3.5	4-character Locator (eg IO85)
Sat-Sun 6-7 Oct	Oceania DX SSB	0800-0800	SSB	1.8-28	RS + SN
Sat-Sun 6-7 Oct	IARU 432MHz-245GHz	1400-1400	All	432-245G	RS(T) + SN + Locator
Sat-Sun 7 Oct	WAB HF Phone	0500-2300	Phone	14-28	RS + SN + WAB area + Book No
Sat-Sun 13-14 Oct	Oceania DX CW	0800-0800	CW	1.8-28	RST + SN
Sun 14 Oct	IRTS 40m Counties	1200-1400	CW, SSB	7	RS(T) + SN (EIs & GIs also send county)
Sat-Sun 20-21 Oct	Worked All Germany	1500-1500	CW, SSB	3.5-28	RS(T) + SN (DLs send DOK)
Sun 21 Oct	UKuG 24-76GHz	0900-1700	All	24-76G	RS(T) + SN + Locator
Sat-Sun 27-28 Oct	CQWW DX SSB	0000-2359	SSB	1.8-28	RS + Zone (UK=14)
Wed 31 Oct	UKEICC 80m	2000-2100	CW	3.5	4-character Locator (eg IO85)

* HF Championship event. + VHF Championship event. § Super League event. ~ Different bands at different times. For all the latest RSGB contest information and results, visit www.rsgbcc.org Note: in the case of differences between this calendar and the website, the website takes precedence.

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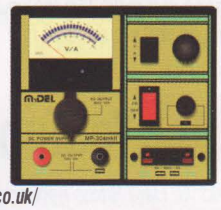

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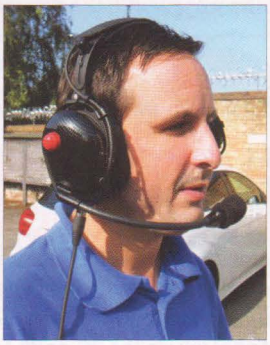

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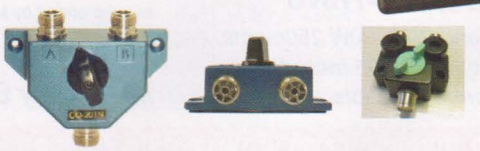

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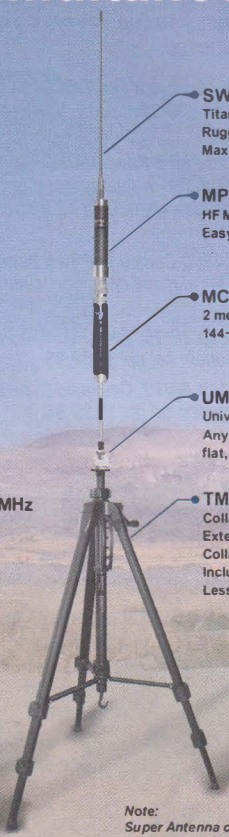

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MX-3000N	2/70/23 Triplexer	£69.95

Switches

CX-210A	2-way, SO-239 Die Cast	£46.95
CX-210N	2-way, N-Type, Die Cast	£54.95
CX-310A	3-way, SO-239, Die Cast	£59.95
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The Yaesu YA-30 is very simple to use. Just open the box, roll out the antenna outside where you want to erect. Snap in the supplied spreaders, connect the high quality coax cable assembly (terminated with PL-259's so you don't even have to fit any plugs).

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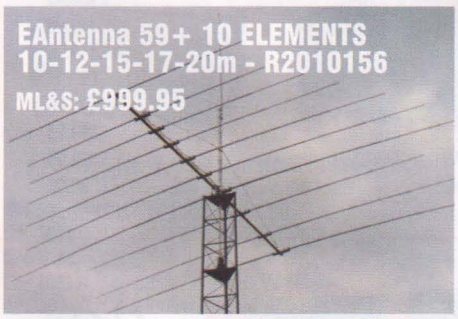

LFA Antennas built to a high specification re-engineered using quality materials

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The new EAntenna 59+ is a 5 band, 10 element beam antenna with superb performance for a boom length of only 5.75 metres. Computer optimized design to attain the best performance from an antenna of this size. Start chasing DX now!

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R2010109	50LFA3 3 ele 6m beam	£139.95
R2010121	70LFA3 3 ele 4m beam	£84.95
R2010139	432LFA15 15 ele bea	£119.95
R2010251	ea270zb94/5 ele 2m/70cm beam	£64.95
R2010253	ea642zb72+2+3 ele 6m/4m/2m beam	£129.95

V/U Verticals

R2010800	ea270j dual band vertical j pol	£39.95

HF Antennas

R2010013	dbz40 double bazooka 7mhz wire antenna	£53.95
R2010048	ea1015204080dxs 5 band HF dipole	£133.95
R2010904	5 band cobweb 500W antenna	£284.95
R20109043	5 band cobweb 3kw antenna	£369.95
R2010050	ea101520dx dipole 3band HF dipole	£95.95

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The RSGB Convention

Whatever your interest in amateur radio there is almost certainly something for you at the RSGB Convention.

The RSGB Region 12 team at the entrance. Courtesy Pete, MOPSX.

The Convention takes place from 12-14 October and we are delighted that, once again, the event is sponsored by Martin Lynch & Sons, whom the RSGB would like to thank for their continued support. The Kents Hill Park Training and Conference Centre is well signposted from the A421. Its full address is Kents Hill Park Training and Conference Centre, Swallow House, Timbold Drive, Kents Hill Park, Milton Keynes, Buckinghamshire MK7 6BZ. An alternative postcode for satnav is MK7 6TT.

We will be using five large lecture rooms as well as various side rooms for exams, workshops and forums including two social areas where you will find Special Interest Groups, displays from Kenwood and Icom and, of course, there is plenty of equipment to purchase from ML&S. In addition, as mentioned in last month's *RadCom*, this year we have introduced a 'Partners' Room', which will be available as a quiet area.

Arriving on Friday?

Why not take the opportunity to visit the National Radio Centre (NRC) at Bletchley Park? (If you're using satnav, enter Sherwood Drive, Bletchley, MK3 6DS). The NRC will open during the day on the Friday (and throughout the weekend) from 9.30am to 5pm. Meet the NRC volunteers who will explain the various displays and, in particular, the recently installed Voluntary Interceptor interactive display and memorial plaque. Two special events have been organised for RSGB Members visiting on the Friday:

At 3pm there will be a Private Visitor Guided Tour of the Bletchley Park museum site dedicated to RSGB Members.

At 4pm, there will be a practical introduction to making an FT8 QSO (suitable for those who wish to see FT8 in action) using the GB3RS station.

The NRC is located at the historic Bletchley Park museum (Home of the Code Breakers), just a few miles from the Kents Hill Conference Centre. Admission to the NRC and Bletchley Park is **free** to RSGB Members by downloading the entry voucher from the RSGB website www.rsgb.org/bletchley-park-voucher

If you want to time to explore the full Bletchley Park museum, it is recommended that you allow a minimum of four hours. Bring a copy of your licence and, if there is sufficient time, you can operate the state-of-the-art GB3RS station.

Keynote speaker

The Keynote lecture will be by the well-known contester Tim Duffy, K3LR. Tim has been a very active contest operator for over 46 years. He has hosted over 130 different operators as part of the very well-known K3LR Multi-Multi DX contest efforts since 1992 – making over 700,000 QSOs. He served on the ARRL Contest Advisory Committee as a member and multi-year Chairman and has been an active member of the CQ Contest Committee for 28 years. Tim was moderator of the Dayton Contest Forum for ten years and of the Hamvention Antenna forum for 35 years.

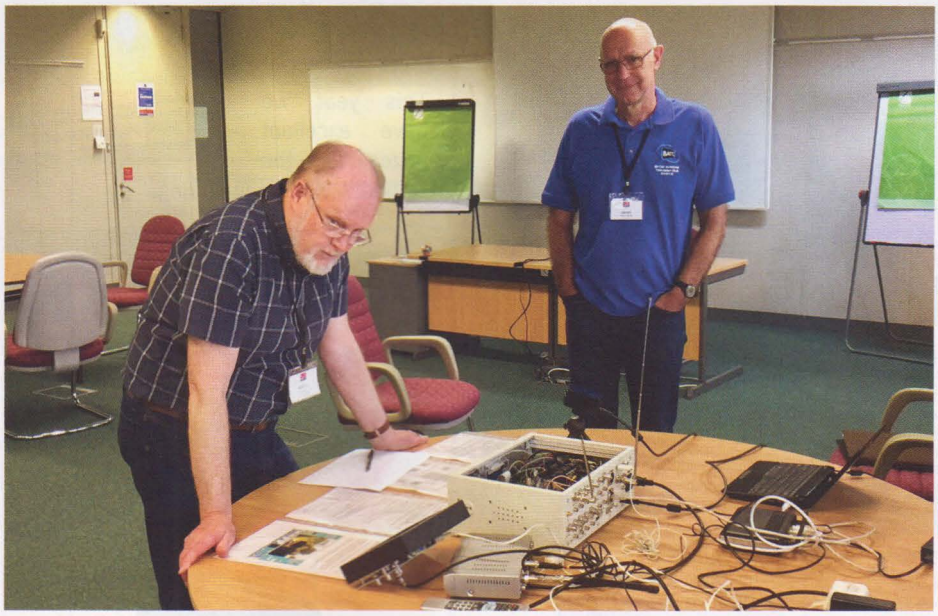
Lectures

The programme is shown on page 57 and the RSGB website contains more detailed descriptions of the lectures at www.rsgb.org/convention

There's only space here to mention a few of the highlights as there are over 50 different talks taking place over the weekend – check the website for all the other details.

Many of you will have tried (and some succeeded!) in working the Baker island DXpedition earlier this year. We are delighted that Don Greenbaum, N1DG will be with us to talk about *KH1/KH7Z, The Baker Island DXpedition*. Baker Island is an uninhabited atoll about 2000 miles south-west of Hawaii. Until recently it was one of the top ten most wanted DXCC entities on the planet. Don, one of the team leaders, will describe the planning process, setbacks, solutions and outcomes from the July 2018 DXpedition that made around 70,000 QSOs and tested the new FT8 data mode under DXpedition conditions for the first time. The expedition also commemorated Amelia Earhart, the aviation pioneer who disappeared near Baker Island in 1937, and the Hawaiian students who attempted to found the settlement of Meyerton on Baker in 1935.

Once again this year the AMSAT-UK Colloquium is combined with the RSGB Convention and, amongst other space and satellite talks, we are delighted that AMSAT President Joe Spier, K6WAO will be talking about *50 Years of AMSAT and Beyond*. Joe will cover the beginnings of AMSAT, the successes, failures, lessons learned, partnerships, and regulatory processes from North America. He will include the recent



The RSGB's construction competition is again being sponsored by Martin Lynch & Sons.

We will be using five large lecture rooms as well as various side rooms for exams, workshops and forums.

Buildathon

Try something different with your dinner

This year we are trying something a bit different with the Buildathon. It will take place on the Saturday evening and includes a buffet meal. The kit for this year's Convention Buildathon will be a useful piece of test equipment for any SSB operator: a Two Tone Tester. Kanga UK are about to launch a number of kits using surface mount components and this is one of that series. The main aim of using this kit is to allow those who do not already use surface mount components to have a go with helpful mentors around. Taking away a useful bit of test equipment is a secondary 'bonus'. There will also be a 'get you going' clinic with Kanga UK on the Sunday should anyone run into difficulties during the Saturday evening session. A seat at the Buildathon to include the kit, expert advice and guidance and the meal will be £25. Please note, the workshop will be filmed as we hope to release this as the first in the series of "How to..." videos to help Members and Affiliated Clubs try new things. If you do not wish to be filmed, just let us know on the day. **To book a place, just go to the Convention booking web page and add the Buildathon to your convention package:**

www.rsgb.org/convention

success of the FOX CubeSat program and the outlook for GOLF (Greater Orbit, Larger Footprint). Joe will also include where and what amateur radio in space may be able to achieve, looking towards the future.

Irrespective of which part of the spectrum you are interested in, Chris Tran, GM3WOJ has a subject that will be of interest: *Transmit / Receive switching times – why they matter.* As a DXer calling in a pileup or working a pileup, as a contester or as a datamodes operator, the time taken for your equipment to change from Rx to Tx (and back) will have an impact on the efficiency of your operation. This applies both from an operating point of view, eg missing the first character of a calling station's callsign on CW, and from a technical point of view, eg damaging an amplifier by 'hot switching'. This presentation covers both the operating and technical reasons for minimising the T/R switching times and which peripheral devices may be responsible for lengthening these timings.

John Regnault, G4SWX will cover *Beyond 150 Countries on 144MHz – the science of extreme VHF DXing*. John has spent over 45 years chasing DX on 144MHz and is now one of the few stations in the world to have worked over 150 DXCC countries on the band. In the talk John will address the range of key technical issues that are important to working 144MHz DX, ranging from how to select the right equipment and antennas, through understanding your site to tools and operating techniques for both terrestrial modes and moonbounce. The talk is aimed at those who have some experience of weak signal VHF working and are interested in what it takes to go to the limits of propagation.

IOTA chasers will be intrigued by Dave Deane, EI9FBB's *Irish Islands IOTA Tour 2018*. Dave will give an illustrated talk about the 2018 tour of Irish IOTAs (Saltees, Blaskets, Arans, and Irish Coastal Islands) by the EI DX Group. In his inimitable style he will describe the history of the islands, the problems of landing and operating, and provide tips for future DXpeditions.

www.rsgb.org/convention

Exams

Both UK and US exams may be taken at the Convention. The Foundation and Intermediate exam will take place on Saturday and the Advanced on Sunday. Places must have been pre-booked via exams@rsgb.org.uk and are not available 'on the day'. The cut-off date for booking exams is 28 September. Please note that the practical element of the Foundation and Intermediate exam must have been completed and signed off before the Convention.

US exams should be available on Sunday at 1pm. It is essential to contact Martin, G3ZAY via g3zay@btinternet.com to confirm which exam elements you wish to take and receive information on the paperwork requirements.

The RSGB would like to thank the volunteers who are involved with invigilation and facilitating these exams.

In addition, on both Saturday and Sunday, there will be a demonstration of the new online examination system that was launched last year – come along and try it!

The social scene

On Friday evening, the ML&S Buffet takes place. It is a pre-booked ticket-only event with entertainment before and during the early part of the buffet provided by close-up magician Steve Dean – a great favourite of regular Convention delegates. In the bar we have guest ales on tap and the bar is open from 5.30pm on both Friday and Saturday evening. During the day there is a bottle bar with light 'tuck shop' snacks available in the social area along with tea and coffee during the breaks between lectures. Lunch tickets are available from Kents Hill on the day (£10 for a two course lunch) and these tickets must be purchased by 10.30am each day.

Gala dinner

The Gala Dinner is also a pre-booked ticket-only event and we have been assured by Kents Hill that the slow service last year will not be in evidence again this year.

We are delighted that Tim Duffy, K3LR has agreed to be the after-dinner speaker. Tim is amongst the leaders, if not the leader, in the contesting field of amateur radio. He will be talking about his contest station but also, as he puts it, focusing on 'keeping Ham Radio fun and alive'.

Tim says: "The very best part of this hobby is the people you meet and the long-time close friendships that happen as a result of the common interest in amateur radio. It is no surprise that nearly all of my best friends are amateur radio operators. There is no question in my mind that this is the best hobby in the world! I am thrilled to be a part of more than 95 multi-multi team operations from the K3LR station in the last 25 years. These extensive competitions test the capabilities of the K3LR station and its operators to communicate effectively with other amateur radio stations around the world. I am looking forward to meeting old and new friends at the RSGB Convention in October."

One of the two social areas where you will find Special Interest Groups.

As in previous years, AMSAT-UK is organising a Colloquium dinner for the satellite community at the nearby Hilton Hotel, which is a five-minute walk from Kents Hill Conference Centre. This must be booked in advance and details can be found online at http://tinyurl.com/y7x3862l

Construction competition

This year the competition is again being sponsored by Martin Lynch & Sons. Full details of the various categories and the entry form are on our website: www.rsgb.org/construction-competition

Trophy presentations

The main VHF and HF contest trophies will be presented on Sunday 14 October and this is in addition to the Contest Forums later in the day. The winners of the prestigious G5RP and ROTAB trophies will be announced by the RSGB President, Dave Wilson, M0OBW.

Tickets

Tickets are still available online and attract a discount over the ones bought on the door (in advance £15 Saturday, £10 Sunday and £20 weekend). On the door these tickets will cost £20 Saturday, £15 Sunday or £25 for the weekend.

Those under 21 can attend the Convention free of charge but those under 16 must be accompanied by a responsible adult. Tickets are issued on the door to those with a suitable proof of age.

Bookings for dinners, bedrooms, and packages are available until 8 October. Visit www.rsgb.org/convention to book all elements of the Convention.

Raffle

This year we have excellent prizes for the DXpedition raffle including:

- Icom IC-7300
- Yaesu FT-818ND
- Kenwood TH-D74E

With thanks to:

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Raffle

This year we have excellent prizes for the DXpedition raffle including an Icom IC-7300, Kenwood TS480SAT, two Yaesu FT-818s and a number of other prizes. Our thanks go to Icom UK, JVC-Kenwood and Yaesu UK for their kind donation of these prizes. Tickets will be on sale throughout the weekend from the usual range of enthusiastic sellers! All proceeds go to the RSGB DXpedition Fund, details of which are at https://rsgb.org/main/operating/hf-dxpedition-fund/

RSGB Convention 2018 - Saturday 13th October Timetable

	Lecture Room 1 (HF/DX)	Lecture Room 2 (VHF)	Lecture Room 3 (General)	Lecture Room 4 *(No videoing)*	Lecture Room 5 (AMSAT)	Other Activities
Start 9.00am	**Official Opening** Dave Wilson, M0OBW RSGB President **9.00 - 9.10**					
	The K3LR Super Station Tim Duffy, K3LR **9.15 - 10.00**	Beyond 150 countries on 144MHz – the science of extreme VHF DXing John Regnault, G4SWX **9.30 - 10.15**	An introduction to 3D printing for the radio amateur James Patterson, M1DST **9.15 - 10.00**	Network Radio Chris Rolinson, G7DDN **9.45 - 10.30**	ARISS and STEM outreach Ciaran Morgan, M0XTD **9.30 - 10.15**	RSGB Construction Competition Display **9.15 - 15.00**
Coffee 10.00 - 11.00	COFFEE	COFFEE	COFFEE	COFFEE	COFFEE	
	Transmit/Receive switching times and why they matter Chris Tran, GM3WOJ **10.30-11.15**	PI4 - the Digital mode for Beacons and why is it a success Bo Hansen, OZ2M **10.45 - 11.30**	The Story of SDRplay and RSP family Jon Hudson, G4ABQ **10.30 - 11.15**	Meet the Board RSGB Board members **11.00 - 11.45**	ESA Microgravity Research on Parabolic Flights and Drop Towers Neil Melville, PA9N **10.45 - 11.30**	UK Examinations **13.00 - 15.00**
	Designing an HF WSPR Transceiver Dan McGraw, M0WUT **11.30 - 12.15**	The Farnham WebSDR DC to Microwaves on your smartphone Noel Matthews, G8GTZ **11.45 - 12.30**	So what has the IARU ever done for us? Don Beattie, G3BJ **11.30 - 12.15**	The Worked All Britain Awards Dave Brooks, G4IAR **12.00 - 12.45**	50 Years of AMSAT and Beyond Joe Spier, K6WAO **11.45 - 12.30**	Prize Presentation RSGB annual construction competition **15.00 - 15.15**
Lunch 12.15 - 13.45	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	
	LF Forum Dave Pick, G3YXM & David Bowman, G0MRF **13.30 - 14.15**	The Dwingeloo Story Dick Harms, PA2DW **13:45 - 14:30**	FT8 Performance Secrets Neil Smith, G4DBN **13.30 - 14.15**	Youth Committee talk Mike Jones, 2E0MLJ **13.45 - 14.30**	Es'hail-2 and its amateur radio payload Peter Guelzow, DB2OS **13.45 - 14.30**	TEC Forum **13.30 - 14.30**
	KH1/KH7Z Baker Island DXpedition Don Greenbaum, N1DG **14.30 - 15.15**	Sporadic E revisited - is it any clearer? Jim Bacon, G3YLA **14:45 - 15:30**	Using drones to measure antenna radiation patterns Jenny Bailey, G0VQH **14.30 - 15.15**	Digital storage oscilloscopes their use and misuse Alan Messenger, G0TLK **14.45 - 15.30**	Jy1Sat and FUNcube Next The FUNcube Team **14.45 - 15.30**	AMSAT AGM (Members Only) **17.45 - 18.15**
Tea 15.15 - 16.00	Tea	Tea	Tea	Tea	Tea	Convention Buildathon Steve Hartley G0FUW **From 18.00**
	Magnetic Loop Antennas Rael Paster, M0RTP **15.45 - 16.30**	Iceni - a high performance 70cm transverter for the constructor Sam Jewell, G4DDK **16:00 - 16:45**	An Introduction to SDRs and GNU Radio Heather Lomond, M0HMO **15.45 - 16.30**	TBC **16.00 - 16.45**	Distributed Groundstations (InfoStellar) Naomi Kurahara, JE6GXN **16.00 - 16.45**	
	The struggle to defend HF against the rising digital tide Martin Sachs, G8KDF **16.45 - 17.30**	VHF Baluns – Fact and Fancy Ian White, GM3SEK **17.00 - 17.45**	Getting your ideas into print (via Skype) Eric Nichols, KL7AJ **16.45 - 17.30**	RSGB IARU HF championship HQ station planning meeting (GR2HQ) **17.00 - 17.45**	The avionics in the Copenhagen Suborbital Nexø II rocket A. Csete, OZ9AEC & P. Scott OZ2ABA **17.00 - 17.45**	

RSGB Convention 2018 - Sunday 14th October Timetable

	Lecture Room 1 *No videoing*	Lecture Room 2 (VHF)	Lecture Room 3 (HF/DX)	Lecture Room 4 (General)	Lecture Room 5 (AMSAT)	Other Activities
Start 9.15am	HF Awards Presentation **9.15-10.00**	FT8 Performance Secrets Neil Smith, G4DBN **9.15 - 10.00**	Hot news, announcement of new IOTA groups and the untold IOTA story Roger Balister, G3KMA **9.15 - 10.00**	Arduino, GPS, RF and the Si5351A for radio amateurs Bo Hansen, OZ2M **9.30 - 10.15**	Satellites for Beginners David Johnson, G4DPZ **9.30 -10.15**	10am UK Examinations 1pm US Examinations
Coffee 10.00 - 10.45	COFFEE	COFFEE	COFFEE	COFFEE	COFFEE	
	VHF Awards Presentation **10.30-11.00**	Troposcatter on the VHF Bands Palle Hansen, OZ1RH **10.30 - 11.15**	Irish Islands IOTA Tour 2018 Dave Deane, EI9FBB **10.30 - 11.15**	Syllabus Update Simone Wilson, M0BOX **10.45 - 11.30**	Cassini/Huygens Odyssey to Saturn and Titan Prof. David Southwood, Chair UKSA **10.45 - 11.30**	
	VHF Contest Forum **11.15 - 12.45**	The Wednesday Night Digifest John Worsnop, G4BAO **11.30-12.15**	H44R & H40D: A thrilling & unforgettable IOTA DXpedition (via Skype) Cezar Trifu, VE3LYC **11.30 - 12.15**	Tutor Open Forum Simone Wilson, M0BOX **11.45 - 12.30**	Goonhilly : Developing a global deep space communications network Matt Cosby **11.45 - 12.30**	
Lunch 12.15 - 13.45	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	
	HF Contest Forum **13.45 to 15.15**	Microwave Engineering From Death Rays to Dinner William Eustace, M0WJE **13.30 - 14.15**	The top HF propagation questions and some possible answers Steve Nichols, G0KYA **13.30 - 14.15**	FreeDV update Matthew Phillips, G6WPJ **13.30 - 14.15**	ESA ESEO Payloads Chris Bridges, M0IEB and Students **13.30 - 14.15**	
		Moving your Morse Code skills from 5NN TU to effortless casual rag chewing Ray Burlingame-Goff, G4FON **14.30 - 15.15**	An HF DXpedition to the Andaman Islands John Warburton, G4IRN **14.30 - 15.15**	Operating Advisory Service update Philip Willis, M0PHI **14.30 - 15.15**	Automated reception of FUNcube and Fox Telemetry Ian Young, G7III **14.30 - 15.15**	
	Raffle **15.30 -16.00**					

2018-2019 Super League Preview

The new Super League season starts this month and, after last seasons' results, the competing clubs all know there's just one team to beat.

The scope of the Super League series was expanded by one contest in the 2016-17 season. This is because of the newly-introduced Datamodes Affiliated Societies Contest (AFS), which took place in January 2017.

In the 6m AFS, Camb-Hams got off to a flying start, beating Bristol CG by a large margin. Some way further back, third placed Grimsby ARS and fourth placed Harwell ARS were very close to one another, while the Drowned Rats CG moved up from sixth place in 2016 to fifth place.

The 160m AFS underwent major changes last year, with CW included for the first time. Also there was a move away from bonuses, to a multiplier based scoring system. Camb-Hams won comfortably, with Bristol CG in second place. Norfolk ARC came third and the team from Wythall RC near Birmingham was placed fourth. Grimsby ARS came home in fifth.

It was the same old one-two in 2m AFS, with Camb-Hams first and Bristol CG second. Grimsby came third, but some way back from the top two. In terms of points the fourth and fifth placed teams – Tall Trees CG and Blacksheep CG – were close, but incredibly the Blacksheep effort was by just one person.

When the results of 80/40m CW AFS were published it was pretty obvious that Camb-Hams were set to win the series. In this event they beat Aberdeen ARS into second place. Brimham CG were third, Bristol CG fourth and Grimsby ARS fifth. There were few points separating the third, fourth and fifth paced teams.

The Hadley Wood Trophy is awarded to the winners of the Super League. Photo by G6XSY.

Camb-Hams also won 80/40m SSB AFS, this time from Cray Valley RS. Aberdeen ARS were second and the Camb-Hams' B team fourth. Norfolk ARC was fifth.

Norfolk ARC put a supreme effort into the new 80/40m Datamodes AFS, because they came first. Camb Hams were obviously taking it seriously as well, because their A and B teams came second and fourth, separated by Grimsby. In fifth place the Bristol CG team completed the Top 5.

Bristol CG took their one win of the season in the final event of the series, 70cm AFS, beating Camb-Hams into second place. Harwell made it into third place, their second Top 5 placing during the series, Grimsby ARS came fourth (despite not having a full team) and Tall Trees CG were fifth.

Overall, the Camb-Hams team never came lower than second place and scored 99.3% of the possible maximum score for the series. When the Super League series started the 95.4% that the second placed team – Bristol CG – made would have been enough to take the win, but not now. Grimsby ARS appeared in third to fifth place in all of the qualifying events, so it is entirely logical that they came third. Tall Trees CG appeared in the Top 5 three times and took fourth place. Sheffield & District WS only appeared in the Top 5 once, but entering all the qualifying events saw them arrive in fifth place.

This season

Starting with 6m AFS on Sunday 21 October, the same seven contests will form the 2017-18 Super League Series this season. Notice of all the events will appear in 'Sport Radio' and of course on the Contest Committee websites.

Now that we are moving towards the end of Cycle 24, solar (in)activity means that conditions on 80m and 40m for the January AFS contests are once again likely to be poor. They could be even worse than in 2018! 40m might be OK for short distance (NVIS) working at the start of these events, but I expect the skip will lengthen quite early on. Consequently 80m is likely to carry the bulk of the traffic, but even on this band the skip will lengthen before the end of the contest. Making short distance skywave contacts is likely to be a *real* challenge during the last hour (or more).

Steve White, G3ZVW
steve.g3zvw@gmail.com

TABLE 1: The top five teams in the 2017-2018 Super League series.

	1st	2nd	3rd	4th	5th
6m AFS	Camb-Hams	Bristol	Grimsby	Harwell	Drowned Rats
160m AFS	Camb-Hams	Bristol	Norfolk	Wythall	Grimsby
2m AFS	Camb-Hams	Bristol	Grimsby	Tall Trees	Blacksheep
80/40m CW AFS	Camb-Hams	Aberdeen	Brimham	Bristol	Grimsby
80/40m SSB AFS	Camb-Hams A	Cray Valley	Aberdeen	Camb-Hams B	Norfolk
80/40m Data AFS	Norfolk	Camb-Hams A	Grimsby	Camb-Hams B	Bristol
70cm AFS	Bristol	Camb-Hams	Harwell	Grimsby	Tall Trees
Overall	**Camb-Hams**	**Bristol**	**Grimsby**	**Tall Trees**	**Sheffield**
Points (% of max)	6954 (99.3%)	6678 (95.4%)	6497 (92.8%)	5493 (78.5%)	5261 (75.2%)

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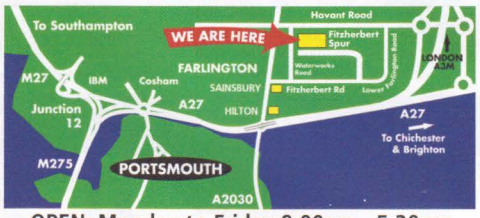

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FTDX-5000
HF/50MHz 200W Transceiver
Premium Class Transceiver with 2 independent receivers. Still holds its own against the competition!

GENEROUS PART EXCHANGE DEALS on your old radio
With £270 CASHBACK **£2929.95**

SAVE! £90
FT-991A
- Covers 160m - 6m
- Touch Screen
- AM/FM/SSB/Data

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SAVE! £45
FTM-400DXE
Dual Band 50W Mobile with GPS
With £45 CASHBACK **£434.95**

SAVE! £90
FTDX-3000D
HF/6m Transceiver
Great receiver and still very popular
With £90 CASHBACK **£1359.95**

FTDX-1200D
HF/6m Transceiver
- 4.3 in TFT full colour display
- 100W RF output

£939.95

NEW
FT-818
60m Band included
9.6V 1,900mAh Battery
Freq stability improved
RF output increased to 6W!
£599.95

FT-450D
HF/6m Transceiver - hurry they will not be this cheap much longer!
£579.95

SAVE! £90
FT-857D
HF/VHFUHF Mobile
- Modes: AM, FM, LSB, USB, CW DATA

With £90 CASHBACK **£639.95**

FT-891 HF/6m
mobile/base transceiver
- 3kHz roofing filter
- All mode operation

£589.95

More Yaesu

FT817ND	Original Portable HF/VHF/UHF £529.95
FT891	HF + 6m mobile £589.95
FT7900E	Twinband 145/433MHz mobile £249.95
FT-65E	NEW 144/433MHz Handheld £89.95
FT-70D	Dual band digital TX Handheld £189.95
FT2DE	C4FM/FM 144/430MHz digital H/H £389.95
FTM100DE	New C4FM 50W Dual Band mobile £299.95
G2800DXC	Extra heavy duty rotator £929.95
G5500	Azimuth/elevation rotator £654.95
G1000DXC	Varispeed heavy duty rotator £499.95
G450C	Rotator £319.95
STA77	Stereo headphones £79.95

SKY 5W SDR Transceiver

NEW

A superb receiver with direct conversion, razor-sharp adjustable filters, noise reduction, noise blanker, audio equalizer and band scope. Speech processor, audio equaliser and hand mic included.

- All Modes
- 160m - 6m (incl. 60m)
- 7 LP & 7 Bandpass Filters
- Electronic key
- Size: 147 x 60 x 107mm
- Weight: 580g

£699

AMERITRON

AL-811HXCE
800W HF Amp
~~£1199.95~~ **£1099**

AMPS

AL-811XCE	600W HF amp £949.00
ALS-500MXCE	500W Solid State £1128.00
ARB-704	Amp to rig interface £65.00

REMOTE SWITCHES

RCS-4X	4 Way 2.5kW £169.95
RCS-4LX	4 Way w/lightning pr £216.00
RCS-8VX	5 Way 5kW £183.00
RCS-10X	8 Way 5kW £194.00
RCS-10LX	8 Way 5kW (lightning) £237.00

DUMMY LOADS

ADL-1500X	1.5kW (no oil supplied) £59.95
ADL-2500	2.5kW w/cooling fan £237.00

SWR/POWER METERS

AWM-22	200W 1.8-200MHz £96.95
AWM-30B	3KW 1.8-200MHz £159.95

SHOWROOM OPENING HOURS: MON - FRI 9AM - 5:30PM **CLOSED SATURDAY**

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Sept 69 - Sept 18

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ACOM

Full range available - see web!

SOLID-STATE AMPLIFIERS - NEW!
Acom A1200S....1.2kW (1.8-54)MHz.....£2895.00
Acom A600S.....600W (1.8-54) MHz.....£2399.95

VALVE AMPLIFIERS
Acom 1500S.....1.5kW PEP (1.8-54)MHz.....£2999.95

NEW

ACOM ATU-04AT
Remote ATU - 1.5kW
Covers 1.8-54MHz

Auto Tuner and 4-way antenna switch.
For use with A1200s & A600S only.
Controlled via coax

£1099

AOR

DV-1
Decodes virtually ALL popular digital modes: DMR, D-STAR, Yaesu Fusion & lots more!
- 100kHz-1300MHz Wide band reception
- Multi-mode digital demodulation

£1299.95

AOR AR-DV10
Advanced Digital Handheld Scanner 100kHz-1300kHz
£999.95

AOR AR8200 MkIII
Professional style fully featured wideband scanner/ receiver
£459.95

PALSTAR

EASY TO TUNE

AT-500
- Covers 6-160m • Power 600W PEP
- 'Peak Hold' cross needle meter

SPECIAL OFFER ~~£599.95~~ £549.95

AT-2K .....2kW manual tuner 6 to 160m.....£599.95
AT-5K .....3.5kW manual tuner £1249.95
AT-4K .....2.5kW manual tuner £1024.95

AT-2K
- Covers 6-160m
- Output: 2000W PEP

• Optional 4:1 Balun for balanced wire feeders
£599.95

DL-1500 ...1500W high power dummy load.....£199.95
BK4C/1:1..4kW 1:1 ratio current balun £99.95
BK4C/4:1..4kW 4:1 ratio current balun £99.95

CN-901HP
Professional Quality Cross Needle Meter
- 1.8- 200MHz, Power 20/200/2kW
- Reads Average & PEP power

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DAIWA SWR Meters

CN-101L
- Freq: 1.8-150MHz
- Power: 15/150/1.5kW

£89.99

CN-501H2 .....1.8-150MHz 20/200/2kW.....£89.99
CN-501VN.....140-525MHz 20/200W N type.....£89.99
CN-901.....1.8-200MHz, Power: 20/200/2kW...£129.95

High Quality Switches
CS-201A .....2Way 600MHz, 1kW SO239.....£24.95
CS201G11 .....2 Way 1.3GHz, 1.5kW HF N type.....£39.95

More Daiwa

CN-801VN .....140-525MHz 20/200W N type.....£119.95
CN-103LN.....140-525MHz 20/200W N type.....£89.99
CN-501H .....1.8-150MHz 15/150/1.5kW.....£89.99

CUSHCRAFT

NEW

MA6B
2 element 6 Band Beam
- 20/17/15/12/10/6m
- 7ft Boom
- Power: 1,500W

£699.95

HF Beams
A3S .....10/15/20m 3 el. 1.5kW.....£629.95
A-743 .....40/30m add on kit for A3S.....£209.95
A3WS .....12/17m 3 el. 1.5kW.....£599.95
A-103 .....30/40m add on kit A3WS.....£229.95
A4S .....10/15/20m 4 el. 1.5kW.....£749.95
A-744 .....30/40m add on kit for A4S.....£219.95
TEN-3 .....Skywalker 3 el 10m 1.5kW.....£329.95

PRO Antennas

Dual Beam Pro
Covers:
20, 17, 15, 12, 11, 10 plus 6m (with a suitable ATU)
- Power: 1kW 600W 30/40m)
- Turning radius: 2.5m
- Overall span of main element: 5.0m

£249.99

I-Pro Home
Very efficient Vertical covering: 20, 17 ,15, 12, 11, 10 plus 6m (with suitable ATU)
- Height: 5.0m
- Span of end elements: 2.5m
- Weight (inc matching unit) 4.5kg
- Power: 1kW PEP

£259.99

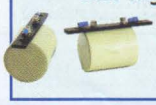
Anytone

AT-588
- 200 memories
- DTMF microphone
- Power: 10W/20W/50W

50W 70MHz transceiver
£159.99

Hari

1kW High Power traps



1kW (CW/SSB) 500W (FM/AM)
TR-1000 - 3.6MHz.....£89.95
Full range of 200W traps in stock too - see web!

NEW

KENWOOD

TS-890S
100W HF transceiver inc 4mtr with ATU
- 7" Colour TFT display
- Down conversion
- Roofing Filters

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TS-590SGE
160- 6M Transceiver with ATU. Cracking performance for the money!
£1299.95

IN STOCK!

Kenwood TH-D74E
Dual Band Handheld with APRS and Digital (D-STAR) capability
- Built in GPS

Soft Case....£29.95
£599

More Kenwood

TS-480HXE.....200W mobile 160-6m.....£899.95
TS-480SAT.....100W mobile/base HF-6m.....£849.95
MC60A.....Classic desktop microphone £122.95
MC90M.....Deluxe desktop microphone £189.95

HS-6M.....Lightweight Headphones.....£35.95
HS-5W.....Deluxe Headphones £69.95
SP23M .....Mid-Size external speaker.....£68.95
MC43S .....Handheld Microphone – 8pin £24.95

ALINCO

HF transceiver (SDR capable)

DX-SR9
- 160m to 10m (plus 5MHz)
- 100W SSB/CW/FM, 40W in AM (low power setting for QRP)

£599.95

DJ-G7E
Tri-band Radio, die-cast chassis
- 2m/70cms/23cms
- 1000 memory channels
- Full duplex

£299.95

DM-30E
Lightweight 30A Switch Mode Digital Volt/Amp meter
£89.95

DM-330MW MkII
30A Deluxe Supply variable voltage, low noise, extra filtering
£129.95

DR-735E
Twin Band Mobile 'Rainbow' display, VHF/UHF transceiver
- Extended RX 108-174MHz, 400-479MHz
- Power 50/20/5W output

£299.95

Morse Keys

Bencher
Bencher BY-1 .....£189.95
Bencher BY-2 .....£239.95

Vibroplex Keys
Iambic Deluxe Single lever Chrome.....£239.95
Iambic Standard Single lever Black.....£179.95
Iambic Standard Paddle Black.....£179.95
Iambic Code Warrior Junior Black.....£169.95
Iambic Code Warrior Junior Satin.....£189.95
Vibrokeyer Standard single lever Black.....£189.95
Vibrokeyer Deluxe single lever Chrome.....£239.95
Hand Key Standard Eco Black.....£179.95
Hand Key Deluxe Chrome.....£229.95

Hi Mound
HK-705.....Affordable Hand Key.....£42.95
HK-708 .....Quality Hand Key.....£69.95
HK-709.....Deluxe Hand key with heavy base.....£79.95

MetroVna

DELUXE Network Antenna Analyser
with Bluetooth connectivity

- Frequency: 1-250MHz
- Measures: SWR, R, Z, X, phase, filters, return Loss Transmission Loss Bluetooth & USB

£279.95

PRO Model.....Covers 1 - 180 MHz.....£259.95

nevada Telescopic Masts

33 ft...Aluminium 7 ft. retracted £99.95
26 ft...Aluminium 5.5 ft. retracted £89.95
20 ft...HD Fibreglass 5.5ft retracted.....£179.95
30 ft...HD Fibreglass 7.5ft retracted.....£249.95
50 ft... HD Fibreglass ...8ft retracted..... £349.95

Cables & Wires

CABLES

Ecoflex 15
per metre.....£6.45 price per 102m drum £579
PL259 connector (Part: 7350).....£8.95
N type connector (Part: 7395) £9.95

Ecoflex 10
per metre.....£3.79 price per 102m drum £345
PL259 connector (part: 7378).....£5.95
N type connector (part: 7367) £6.50
BNC type connector (part: 7379) £6.50

Aircell 7
per metre.....£2.99 price per 102m drum £269
PL259 connector (part: 7390).....£2.65
N type connector (part: 7392) £5.25
BNC type connector (part: 7391).....£5.25

Aircell 5
per metre.....£2.75 price per 102m drum £247
PL259 connector (part: 7760).....£2.25
N type connector (part: 7700) £3.95
BNC type connector (part: 7720) £3.25

OTHER 100M DRUMS
Westflex 103 .....Ultra low loss.....£159.95
RG-213 (Cabnex) .....Low loss high quality £99.95
RG-213U.....Mil spec £116.00
RG-Mini 8.....Super XX.....£59.95
RG58/CU.....Mil spec.....£39.95
450 Ohm .....Twin feeder £89.00
300 Ohm .....Twin feeder £76.50
Coated flexweave.....Antenna wire £59.95

NEVADA ANTENNA WIRE
Nevada 28....2.8mm 2kW ....per metre.....£0.99
Nevada 28D .2.8mm 2kW ....100m Drum.....£89.95
Nevada 32 ...3.2mm 5kW ....per metre.....£1.20
Nevada 32D .3.2mm 5kW ....100m Drum.....£99.95

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Both the FLEX-6600™ and FLEX-6600M™ offer the ultimate performance SDR technology and the best value for the serious HF/6m operator. The FLEX-6600 model is designed for the Ham who wants to operate the radio exclusively as a server from PC, laptop, Maestro, Mac, or iOS clients – whether local or remote.

Flex-6600M
Top of the range for those who want absolute performance and versatility.

- 100W 1.8 - 54MHz
- 8" Touch Screen
- 4 Receivers 30kHz - 54MHz
- Spectrum Dynamic. 155dB
- Contest Pre-selectors
- Diversity Reception
- Panadaptor Zoom

£4999.95

Flex-6600
As above but without the Maestro front panel. Control from your PC, Flex Maestro, Laptop, iPad or iPhone

£3999.95

Flex-6400
With improved receiver performance, 2 slice receivers, a preselect & new modular design offers outstanding value for money. Control it from Flex Maestro, PC, Laptop, iPad or iPhone

- 100W 1.8 - 54MHz
- 2 Receivers 30kHz - 54MHz
- Spectrum Dynamic 144dB
- Contest Pre-selectors

£1999.95

Flex-6400M
As above but with the addition of the Maestro front panel

£2999.00

Flex Maestro
An intuitive, plug-and-play control console that directs the operation of any FLEX-6000 Signature Series transceiver without needing a traditional PC.

- Internal 2W mono speaker
- Display Type: Large 8.0" In Plane Switching (IPS) display with 10-point touch
- 17.1cm (H) x 35.6cm (W) x 4.5cm (D)
- Weight: Approximately 1.8kgs

£1299.95

Matt from Flex with Nevada MD Mike G3SED

nevada®

BUY WITH CONFIDENCE!

steppIR

UrbanBeam
Covers: 40 to 6m

- 20m-6m 2 element beam, 40/30m rotary dipole
- Small footprint: 15.5ft turning radius, 4ft boom
- Supplied with the SDA-100 controller
- 180-degree direction change, bi-directional mode
- Full element retraction for stormy weather

£1869

More SteppIR

Dipole (20 – 6m) with controller	£1099.95
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2 Element Yagi (40 – 6m) 3kW	£2024.95
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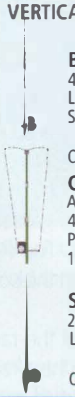
3 element Yagi (40 – 6m) 3kW	£2899.90
DB-18 Yagi (40 – 6m) reduced size	£3424.95
DB-18E Yagi (40 – 6m) 3 loops	£3924.95
DB-36 Yagi (40 – 6m) 3 loops	£5499.95
DB-42 Monster IR (40 – 6m)	£7249.95

VERTICALS The only true ¼ wave continuous coverage for the HF bands



Big IR Mk IV
40m-6m continuous coverage
Length: 10.05m • Power: 3kW
SDA 100 controller included

£1249.95

Optional 80m Coil £459.95

CRANK IR
An extremely portable vertical
40m-6m continuous coverage
Power: 1.5kW
16 ft fiberglass pole (2ft collapsed)

£429.95

Small IR MK III
20m - 6m continous coverage
Length: 5.4m • Power: 3kW

£999.95

Optional coils available for 80m/40m

COMET

HF BASE ANTENNAS

H-422 Trap Vee Dipole 7/14/21/28MHz	289.95
CHA-250BX11 3.5 - 57MHz (RX: 2.0 - 90MHz)	349.00
CWA-1000 Multi Band dipole 3.5/7/14/21/28MHz	124.95

VHF/UHF FIBREGLASS BASE ANTENNAS

GP-15N 50/144/430MHz, length 2.4m N Type	99.95
GP-1M 144/430MHz length 1.2m (SO239)	49.95
GP-3M 144/430MHz, SO-239 Lgth 1.78m (SO239)	59.95
GP-6M 144/430MHz, SO-239 Lgth 3.07m (SO239)	99.95
GP-93N 144/430/1200MHz, Length 1.78m N Type	99.99
GP-9M 144/430MHz SO-239 Lgth 5.15m (SO239)	149.95

VHF/UHF BEAMS

CYA-1216E 6 Element 1200MHz, N Type	99.95
CA-52HB 2 Element HB9CV for 50MHz	79.95
CA-52HB4 4 Element HB9CV for 50MHz	129.95

HF MOBILE ANTENNAS

UHV-4 Whip 28-29/52/145/430MHz	89.95
UHV-6 Whip 7/21/28/50/144/430MHz	99.95
L-18 18MHz Coil for CA-UHV/UHV-6	25.95

VHF MOBILE ANTENNAS

CA-28S 50/144 MHz, 1.32m 300W	25.95
CSB7900 144/430MHz 5.1/7.7dBi 1.56m 150W	69.95
SB-15 50/144/430MHz 2.15/4.5/7.2dBi 1.53m 120W	49.95
SBB-2 144/430MHz, 2.15 / 3.8dBi 0.46m 60W	29.95
SBB-4 144/430MHz, 3.0 / 5.5dBi 0.92m Black	39.95
M-24M 144/430MHz Magnetic Mount c/w Coax	36.95

ANTENNA TUNER

CAT-300 1.8-56MHz, 300W (PEP)	199.95

BALUNS

CBL-1000 1.7-30MHz, 1kW/CW	34.95
CBL-2500 1.8-56MHz, 2.5kW/CW	39.95

LOW PASS FILTERS

CF-30MR 1.8 - 32MHz, 1kW/CW	59.95
CF-50MR 1.8 - 57MHz, 1kW/CW	59.95

DUPLEXERS

CF-360A 1.3-30/49-470MHz 2xleads SO239 socket	49.95
CF-416OB 1.3-170/350-540MHz SO239 N Type, SO239	39.95
CF-416A 1.3-170/350-540MHz SO239 + 2 x PL259 leads	39.95
CF-416B SO239 + 1 x PL259/N leads	39.95
CF-503C 1.3-90/125-470MHz, PL259 lead, 2xSO239	49.95
CF-530 1.3-90/125-470MHz 2x SO239,PL259 lead	49.95
CF-530C 1.3-90/125-470MHz, SO239 2 x PL259 lead	49.95
CF-706 1.3-57/75-550MHz,SO239, 2 x PL259 leads	49.95
CF-706N 1.3-57/75-550MHz, SO239 N type, PL259 leads	49.95

CROSS NEEDLE SWR/POWER METERS

CMX-200 1.8-200MHz, 30/300/3k	79.95
CMX-400 140-525MHz, 30/60/300W	89.95

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We hold HUGE STOCKS!

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6 Band Cobweb 20m-6m 1.5kW

£269.95

MFJ-1836 Cobweb 20m-6m 300W	£229.95
MFJ-1838 Cobweb 40-6m 1.5kW	£419.95
225 1-180MHz graphic analyser	£349.95
226 Graphic analyser (1-230) MHz	£399.95
259C HF/VHF portable antenna analyser	£329.95
266C New style HF/VHF/UHF analyser	£424.95
269C HF/VHF Digital Analyser	£399.95
385B Deluxe Comms. Speaker	£47.95
407D Deluxe CW Keyer	£88.95
461 Morse Reader-pocket sized	£99.95
492-X CW Memory Keyer	£148.95
550 Popular Morse code practice key	£19.95
557 Morse code key with oscillator	£47.95
826B Digital SWR/Wattmeter	£198.95
912 Remote 4:1 balun box	£77.95
921 2m Antenna Tuner	£99.95
923 2m Tuner & SWR/Power	£219.95
931 Artificial ground unit	£121.95
934 300W Tuner + artificial ground	£231.95
941E 300 Watts max Versa Tuner II	£159.95
945E 1.8-60MHz 300W manual tuner	£145.95
948 300W PEP reading antenna tuner	£187.95
949E 300W tuner + Dummy load	£199.95
959C Receive antenna tuner + pre-amp	£145.95
969 300W tuner 160-6m	£253.95
971 Portable Ant. tuner 1.8-30MHz	£143.95
986 1.5kW HF tuner	£399.95
989D 1.5kW HF tuner	£451.95
993B Auto Tuner 150W/300W	£297.95
994BRT 600W remote Auto Tuner	£440.95
998 1.5kW Auto Tuner 1.8-30MHz	£771.95
998RT 1.5kW remote AutoATU	£848.95
1020C Tunable Active Antenna	£110.95
1025 Noise canceller/signal enhancer	£199.95
1026 QRM eliminator + active antenna	£220.95
1118 High Current DC Multi outlet	£94.95
1700C 6 Way coax switch	£132.95
1701 6 Way coax switch 2k W (SO239)	£89.95
1704 (P) 4 way coax switch 2.5kW (SO239)	£94.95
1704 (N) 4 way coax switch 2.5kW (N type)	£99.00
1705H RF By-pass switch	£32.95
1707 Auto RF sensing Ant switch	£99.95
1708 RF Sensing T/R Switch	£89.95
1708SDR Transceiver SDR switch	£89.95
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1775 Rotary dipole 6 band	£275.95
1782X Super Loop 10-30 MHz	£479.95
1786X Loop (10-30)MHz 3ft dia.	£529.95
1788X Loop (7-21)MHz 3ft dia	£589.95
1789 Rotary dipole 9 bands	£399.00
1799X 9 Band vertical	£440.95
1848 Hexbeam 40-6m 1.5kW	£699.95
1868 Discone antenna with cable	£79.95
1886X RX loop 500kHz-30MHz	£206.95
2980 Wire vertical (40m-6m)	£99.95

SDRplay

RSP-Duo
Dual Tuner Wideband SDR Receives:
1kHz to 2GHz, with no gaps

2 Tuners with individual Antennas inputs
Ideal for:
- Direction-finding, diversity and noise reduction applications
- Cross band full-duplex reception, e.g. HF + VHF or VHF + UHF
- VHF ATC reception
- Simultaneous monitoring and recording of 2 bands

£239.00

SDRplay RSP-1A
HF/VHF SDR Receiver
New entry level model with great performance
1 kHz-2GHz

£89.95

SDRplay RSP2 ..1kHz - 2GHz 2 antennas.....£156
SDRplay RSP2 ..Pro as above w/Steel case ..£189.95

Free Delivery (UK Mainland)

SDR Receivers

AIRSPY HF+
HF/VHF SDR Receiver
One of the very best for weak signal reception and strong signal handling
- 9kHz- 13MHz
- 60 MHz - 260MHz

£229.95

AIRSPY Mini
High performance miniature SDR Dongle
- Covers: 24-1800MHz
- Use for monitoring, real time spectrum analyser, plus lots more!

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HEIL Headsets & Mics

Headset Microphones

Pro-Set 7 Black	£239.95
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Pro-Set 7 IC for Icom Black	£259.95
Pro-Set 6	£134.95
Pro-Set 6 IC for Icom	£169.95
Pro-Set Elite 6	£169.95
Pro-Set Elite IC for Icom radios	£199.95
PMS-6 Pro Micro Single headset	£85.95
PMS-6 Pro Micro Double headset	£99.95

Microphones

ICM Quality mic for Icom radios	£123.95
PR-35 Studio & commercial broadcast	£279.95
PR-40 Commercial broadcast	£289.95
PR-781 Commercial broadcast	£178.95
Heil PR-781G Gold Studio/Broadcast	£197.95
Heil PR-40 BG Black/Gold Studio/Broadcast	£295.95
Heil PL2-T Balanced Boom for Studio mics	£138.95
Heil SM-1 Shock mount for studio mics	£63.95
Heil PRSM Shock mount for PR40, PR30	£106.95

Full range of leads and mounts in stock!

SPIDERBEAM

Antennas & Telescopic Masts

UL-404L Ultra-lite Dxpedition antenna
Dipole covers: 40, 20, 17, 15, 12, 10.6m £109.00

Fibreglass Telescopic Poles

12mtr Heavy Duty	£89.95
18mtr Standard	£199.95
22m 'Long John' NEW	£399.95
26mtr Standard	£499.95
Base Plate for Fibreglass Poles	£28.95

Aluminium Telescopic masts

10 metre Standard (1.35m retracted)	£299.95
10 metre Heavy Duty (1.7m retracted)	£325.00
12.5 metre (1.65m retracted)	£329.95
14.5 metre Heavy Duty (2m retracted)	£425.00
15 metre standard (2m retracted)	£399.95

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QUALITY POWER SUPPLIES
2 YEAR WARRANTY!

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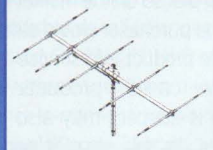

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EMC

PHOTO 1: A novelty sign with LED illumination.

Your name in (LED) Lights

A post on the RSGB Interference Problems forum [1] reports on a case of RF interference up to 50MHz. The source appeared to be in a shed at the end of the neighbour's garden and near the radio amateur's antennas. The RFI was present whenever the neighbour left the power to the shed on at night.

The neighbour allowed the radio amateur to visit the shed with a hand held receiver and loop antenna and the source turned out to be a novelty etched name plate sign with LED illumination hanging on the wall (see **Photo 1**).

There was an on-off switch on the low voltage DC output to the light and with the scanner tuned to 1.930MHz in AM mode, there was a loud buzzing even when the DC output to the light was switched off but LED driver was plugged into the mains and in standby mode. When the light was switched on, the buzzing changed frequency and became even louder, covering all frequencies from medium wave broadcast up to 50MHz or so. When the LED driver was unplugged from the mains, the RFI disappeared.

The neighbour was surprised and, fortunately, was very accommodating. He allowed the radio amateur to take the LED driver and try to make it quiet using ferrite clamps but these made no difference at all. The circuit board was in a plastic case with no RF shielding and there was also no CE mark anywhere on the product. **Photo 2** shows the LED driver dismantled.

The radio amateur provided a 12V cable with an on/off switch and a 17Ah rechargeable battery. This worked a treat, eliminating RF interference and the neighbour was happy as he could hang his illuminated name plate where he wanted (the original mains power cable was very short and restrictive).

Similar personalised illuminated home bar signs can be found online and can be ordered directly from Malaysia. In such cases, the products are not being placed on the market in the European Union but the purchaser would still be responsible for taking the product into service in the EU.

In some cases, products whose EMC compliance is suspect may also have electrical safety issues. In this case, it can also be seen that the mains plug is a 'cloverleaf' shape, which would not have room for a mains fuse in the plug. It appears similar to mains plugs that have been found on unsafe chargers for 'hoverboards' [2].

Marine LED light RFI

There was a news item on the ARRL website, 'US Coast Guard Warns of LED Lighting Interference to Marine Radios, AIS Reception' [3]. According to ARRL, "The US Coast Guard says it's received reports from crews, ship owners, inspectors, and other mariners regarding poor reception on VHF radiotelephone, digital selective calling (DSC) and automatic identification systems (AIS) when in the vicinity of LED lighting systems. This could include interior and exterior lighting, navigation lights, searchlights, and floodlights found on vessels of all sizes.

""Radio frequency interference caused by these LED lamps [was] found to create potential safety hazards," the Coast Guard said in an 15 August Marine Safety Alert. "For example, the maritime rescue coordination center in one port was unable to contact a ship involved in a traffic separation scheme incident by VHF radio. That ship also experienced very poor AIS reception. Other ships in different ports have experienced degradation of the VHF receivers, including AIS, caused by their LED navigation lights. LED lighting installed near VHF antennas has also shown to compound the reception.""

Another marine-related LED light interference problem was reported by the Netherlands Radiocommunications Agency, in their magazine *Ontwikkelingen in de ether*. The original article [3] is titled *Schepen erdwenen van de elektronische kaart* (ships disappear from the electronic map).

To summarise, ships were missing from the electronic map in the mouth of Waalhaven in the Nieuwe Maas, which is part of the busy Rotterdam port area. The problem was caused by interference to the AIS system that ships use to send their position and data automatically by radio.

Netherlands Radiocommunications Agency inspectors found that there was interference to the frequencies used for AIS signals [*161.975MHz or 162.025MHz – Ed*]. The source was found to be in a workshop where an artist had made a work of art with LED lights. When this was switched off, the interference disappeared.

50MHz mystery

A Member with a well-equipped amateur radio station at a quiet rural location noticed a new source of interference that was causing S9 interference on the 24, 28 and 50MHz bands and was also noticeable on other bands. It peaked when the antenna was pointing in a certain direction and it was only present at certain times of the day, typically starting in the morning.

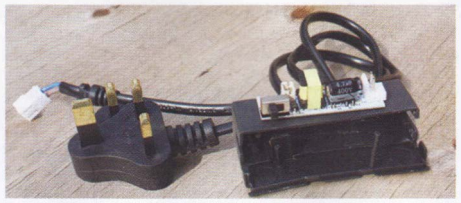


PHOTO 2: LED driver and mains plug for the LED sign.

Figure 1 shows a measurement using a conventional swept spectrum analyser. It was connected to the amateur's high gain 50MHz antenna that is on a tall mast. The trace covers 50-52MHz and it shows the background noise level and some weak signals on the band when the interference was not present. The measurements were made in mid-summer but there was no sign of long distance Sporadic-E propagation at that time. The noise floor is atmospheric noise from the antenna and it is significantly higher than the noise of the MMIC preamp that was used with the spectrum analyser. The amplitude units are dB relative to 1 microvolt and the gain of the preamp has been programmed in to the analyser.

Figure 2 was measured with the interference present and with the antenna pointing towards the source. The resolution bandwidth (RBW) of 100kHz is relatively wide in order to capture short impulses and to allow a fairly fast sweep time of 20ms. It can be seen that the impulses come in bursts at intervals of approximately 0.75ms and the duration of each one is approximately 0.1ms. If an SDR is used, it gives a completely different view. The interference characteristics are similar to something that was transmitting packets of data over mains wiring, possibly VHF powerline communications but a wider sweep showed no sign of 'notching' of the 50MHz amateur band.

Figures 1 and 2 were measured in Clear/Write mode whereas **Figure 3** is in Peak Hold mode after accumulating traces for a minute or two. This shows that with these particular settings, the peak level is about 30dB higher than the background noise level on the band.

The directional bearing pointed to a house about 200m away that was under construction and nearly complete. The house in question had just had solar panels fitted to the roof and at first these were thought to be the source. The neighbour who was having the house built was co-operative and allowed the Member to do some

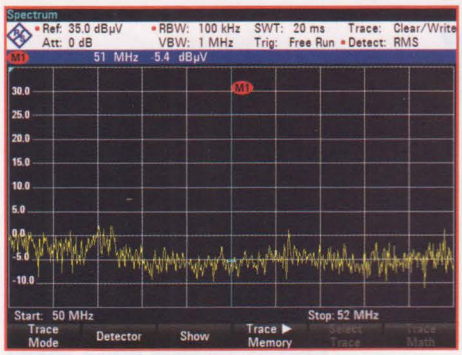


FIGURE 1: Background noise 50-52MHz at a quiet rural location.

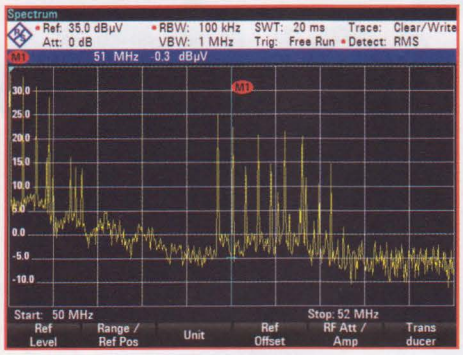


FIGURE 2: Mystery interference source 50-52MHz, Clear/Write mode.

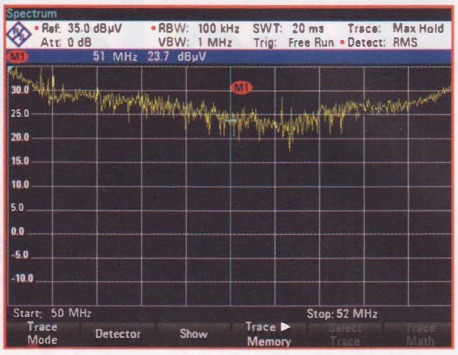


FIGURE 3: Mystery interference source 50-52MHz, Peak Hold mode.

direction finding with a portable 50MHz dipole antenna and a portable spectrum analyser. It was found that the solar panels were actually hot water panels rather than photovoltaic so the only possible source of RF interference might be the water circulating pump or the control circuitry.

Walking round the outside of the house showed that all directional bearings with a dipole pointed towards the house but when the power to the house was turned off at the main switch, the interference continued and all bearings *still* pointed towards the house. It appeared that the source was actually elsewhere and was coming into the new house via the underground mains supply.

Further portable measurements showed that there was a stronger signal in the hedge by the side of the road outside the house, near a telephone pole with overhead distribution. It appeared that the interference was propagating along the overhead phone wiring but it was not clear which house it was coming from.

Before the source could be identified, the interference went off and was not heard again so it remains a mystery. Has anyone else noticed anything like this on 50MHz band and has anyone found out what it is?

CCTV systems

The number of CCTV security systems installed in domestic and commercial premises is increasing and there are some potential EMC issues with CCTV.

Figure 4 shows a typical CCTV system. The recorder box may have a built-in mains PSU or it may be powered by an external 'wall wart' or similar style PSU, maybe like a laptop PSU but typically 12V DC output. There may also be a separate 12V DC PSU for the cameras. If the external PSUs do not meet applicable EMC standards, these can cause interference on the HF bands with the long wires to the cameras acting as radiating antennas. Some PSUs may also produce interference up to and including VHF, affecting the 50, 70 and/or or 144MHz amateur bands and/or the VHF/FM broadcast band.

Many existing installations use standard definition analogue PAL cameras with a composite video output via BNC connectors and RG59 75Ω coaxial cable. Modern CCTV systems normally use high definition 1080p cameras and many of these have BNC output that uses a standard called HD over coax. There are several variants of the standard that transmits analogue video, audio and data control signals over a single coaxial cable, often in tandem with a low voltage power cable.

Some cut-price CCTV installations used unscreened twisted pair cable instead of coaxial cable with so-called 'baluns' to connect the twisted pair to BNC. These are not actually baluns but a direct connection between a balanced and unbalanced cable. This results in poor immunity to signals from nearby radio transmitters. These could include strong local MW broadcast transmitters, which can cause patterning on the video. It also results in poor immunity to amateur transmissions in the 1.8MHz or 3.5MHz bands, which are within the passband of the PAL video signal. CCTV systems with standard definition PAL video cameras that use twisted pair instead of coaxial cable may also radiate a detectable signal on the PAL sub-carrier frequency, 4.43361875MHz. HD over coax often uses a faster line rate version of a traditional analogue signal, giving more lines per frame and better horizontal definition.

Some CCTV systems use internet protocol (IP) cameras that are connected via CAT5 or CAT6 network cable. These should use shielded twisted pair (STP) to reduce interference radiated from the cable but some installations use unshielded twisted pair (UTP). If STP cables are used then the RJ45 connectors have metal shells connected to the cable screen. These metal connector shells need to make contact with metal RJ45 sockets at both ends of the cable. Shielded cables are only effective at radio frequencies if the cable screen is grounded at both ends.

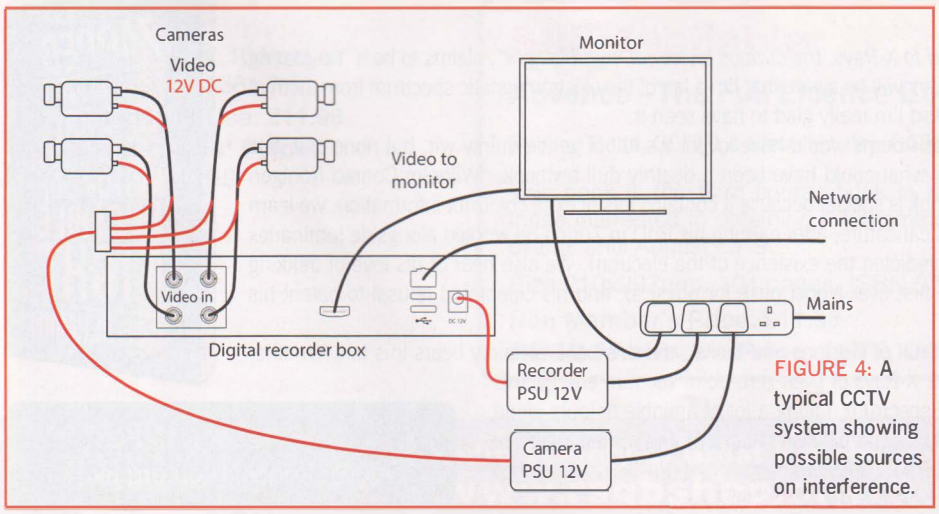


FIGURE 4: A typical CCTV system showing possible sources on interference.

Websearch

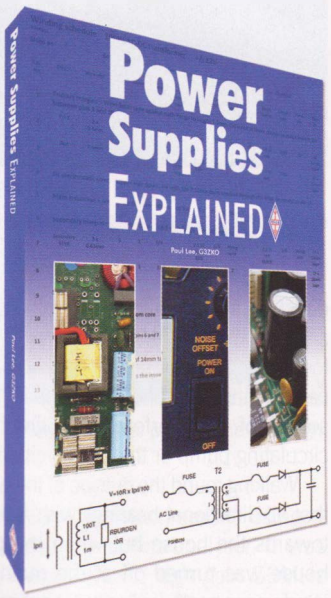
[1] www.forums.thersgb.org/index.php?forums/interference-problems/
[2] https://tinyurl.com/RC-EMC-1018-C or www.electricalsafetyfirst.org.uk/guides-and-advice/electrical-items/hoverboards-self-balancing-boards/
[3] https://tinyurl.com/RC-EMC-1018-D or www.arrl.org/news/view/us-coast-guard-warns-of-led-lighting-interference-to-marine-radios-ais-reception
[4] English version via Google Translate: https://tinyurl.com/RC-EMC-1018-B (original Dutch at https://tinyurl.com/RC-EMC-1018-A or https://magazines.agentschaptelecom.nl/ontwikkelingenindeether/2018/03/schepen-verdwenen-van-de-elektronische-kaart

Dr David Lauder, G0SNO
emc.radcom@rsgb.org.uk

Book Review

Power Supplies Explained

By Paul Lee, G3ZKO



What's in a power supply? Isn't it one of those things you buy, fit and forget? Well, not really, says Paul Lee, G3ZKO. All joking apart, every amateur knows that power supplies come in all shapes, sizes, voltages, power ratings and technologies, so this book takes a good look at them with a healthy mix of practical and theoretical explanations.

This is a well-researched, clearly written, informative and authoritative book that contains pretty much everything anyone needs to know about power supplies in all their various incarnations. The author's talents include professional power supply design and his wide ranging experience shines through. Not only does his book have a sound technical base, clear illustrations and a very readable style, it is also packed with the sort of gold-dust information that you only get from someone who *really* knows what they're talking about.

Perhaps a good way to consider the book's coverage is to *précis* the contents list. After considering what a power supply actually *is*, we embark on an exploration of the various topologies and elements – linear, isolated and non-isolated switch mode, off-line converters, control loops, EMC issues, high voltage supplies, battery backup supplies, monitoring & sensing, reliability, cooling, transformer construction, test equipment and much more. That's a great deal more detailed than 'just fit and forget'! Safety is a theme that runs throught the book, with good attention to (and explanation of) things like creepage and clearance distances, choosing components conservatively, bleed resistors, wire diameters and many more very important but easily-overlooked design and construction parameters.

At over 300 pages, you'll appreciate that this is a serious reference work. I understand that it was inspired by the *Power Supplies Handbook* by John Fielding, ZS5JF (RSGB, 2006) and indeed it contains references to that earlier work, but technology has come on apace since then. In addition to the large amount of new material, G3ZKO has taken the best bits from ZS5JF's book, adapting and updating as necessary and, interestingly, including many of the anecdotes and reminiscences from the original.

Size 174x240mm, 320 pages, ISBN 9781 9101 9364 8
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All three T-shirts are available in a range of sizes that encompass the more substantial amateur and, at just £4.99 each, represent a real bargain. But supplies are limited, so get one while you can: I reckon they have the potential to become collectors' items.

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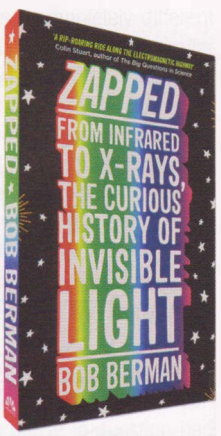
Zapped

by Bob Berman



Zapped, or to give its full title, "*Zapped: from infrared to X-Rays, the curious history of invisible light*", claims to be a "rip-roaring ride along the electromagnetic highway". Keen observers will be aware that I'm a fan of the electromagnetic spectrum from thermal infrared up to X-Rays, so this is right up my street. And I'm really glad to have seen it.

I think this is exactly the sort of book that Douglas Adams would have loved. It's full of gentle quirky wit, but none of it gets in the way of the main narrative; instead it enlivens what could have been a deathly dull textbook. "Wilhelm Conrad Röntgen discovered X-Rays in 1895" is true but boring; this book is special because it contains lots of extra colourful information: we learn that Röntgen was once expelled over someone else's caricature; after earning his PhD in Zurich he worked alongside luminaries such as Heinrich Hertz and Hendrik Lorentz (who predicted the existence of the electron). We also hear of his love of trekking (over and above all the science he did, winning the first ever Nobel prize for physics), and his celebrated refusal to patent his discovery of X-Rays so all mankind could benefit.

Berman says "Light possesses a magician's chest full of illusions and tricks" and this book certainly bears this out. Whether it manifests as what we call radio waves, visible light, X-Rays or even zero-point vacuum energy, this book covers it all. It is a fascinating trip through the spectrum, taking a lot of amiable detours along the way, resulting in a fascinating, very readable book that you just can't help learning something from.

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Giles Read, G1MFG
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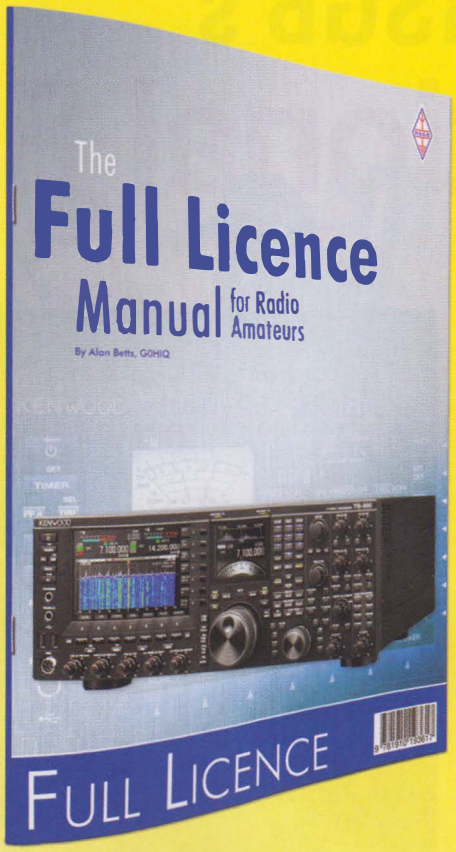

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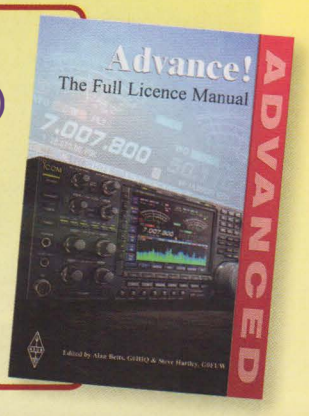

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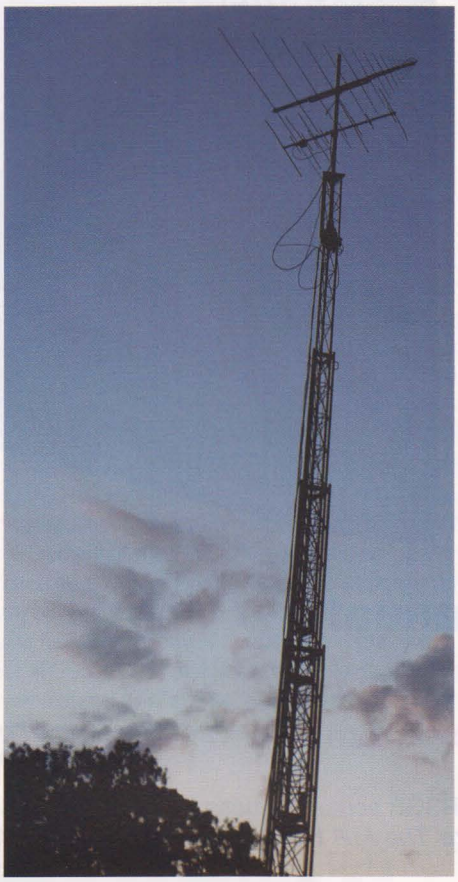
The RSGB's VHF National Field Day

The 2018 RSGB's VHF NFD took place on Saturday 7 and Sunday 8 July between 1400UTC and 1400UTC. Here's how some of the entrants fared.

Maidstone ARS and **Hilderstone ARC** made a combined entry for VHF NFD just on 144MHz as a trial of new site at Faversham. It became the building block of getting a Kent Contest Group going again. We gained a respectful score being 10th overall in the Open section of 144MHz. The antennas we used were 2 x 9-ele LFAs at 60ft on one of our trailer masts. The weather was very hot! We were missing one of our regular ops (Ian, G0PDZ) due to illness but Kev, G0PEK stepped up and worked quite late into the night to fill the slot. He normally only operates a small slot or helps setup as he generally does the Backpackers contest, which he did on the Sunday. Overall it was a good weekend with no failures with kit, unlike last year! We will be shortly making a application to affiliate a Kent based Contest Group on the back of recent outings and welcome any from the Kent or surrounding area, whether a member of a club or not. See www.invictacg.co.uk

Ian Hope, 2E0IJH



Lincoln Short Wave Club once again put on an impressive station for VHF NFD.

Lincoln Short Wave Club once again put on a station for VHF NFD with the intention of having a social event for all members and to allow those who have not participated in a contest to try things out in a relaxed manner. Having prepared the equipment the Wednesday before, Les, G1LQB, Stephen, 2E0SSM, Alistair, M0TEF and Steve, M5ZZZ were at the shack early on the Saturday morning to load up the equipment and headed to the old RAF bomb dump. They were soon joined by Fred, G4HNQ and Peter, 2E0FGA. The first task was to get the antennas mounted on the mast and the mast winched up into position. As the day progressed the contacts started to come in and, as the conditions improved, one contact was made with a distance of 700km on 2m. Who says the 2m band if for local contacts only? Pam, G4STO stopped by to provide Sunday breakfast. Alistair heard a station calling DA0FF; after checking the logging software to find we hadn't had them before he started calling back. After battling the conditions the QSO was completed at a grand total of 786km. It was a constant battle against the flies and bugs, especially while packing up. After getting the equipment back everyone headed home worn out and sleepy from the enjoyable weekend.

Pam Rose, G4STO

The operators of GM3HAM/P, **Lothians Radio Society**, operated near Gatehouse of Fleet in Dumfries & Galloway. In the Restricted Section we were the winners overall (Martlesham Trophy), leading station in Scotland (Cockenzie Quaich) and band leaders on 50MHz and 70MHz. In the photo you can see GM3PSP, GM6CMQ, GM4BYF, GM4DIJ, MM0FMF, GM4IGS, GM8BJF and GM3WUX.

Alan Masson, GM3PSP

South Bristol ARC's plans for VHF National Field Day followed the successful operations of previous years. There was a slight wrinkle in that we had to operate from a field adjoining our usual location as a result of

Maidstone ARS and Hilderstone ARC made a combined entry for VHF NFD just on 144MHz.

Operators of GM3HAM/P, Lothians RS, operated near Gatehouse of Fleet. See text for names.

South Bristol ARC. Sunday, operating is Joe, 2E0EIC (left), logging is Andy, G7KNA (right) and observing is Mark, M0SKV (centre).

restricted grazing for the farmers cattle, good grass being in short supply as a result of the prolonged hot and dry weather. However, in all practical respects, this made little or no difference to our organisation. The horsebox that was to provide our accommodation was brought to site by 10am and the main setup started around 11am when members arrived on site. Set-up was more or less problem free, the missing bolt from the tilt-over tripod mast was quickly replaced. We whiled away the time between the end of setting up and the start of the contest by eating and drinking and chatting to anyone who would talk to us on 2m SSB, this latter activity being very important to test out the station and to secure a frequency in time for the start of the contest. We felt that the early contact rate was down on previous years (England were playing Sweden in the World Cup, kicking off at 3pm, which might have accounted for a few absences). A small portable TV in the horsebox's catering and living area kept us up to date with England's performance for those who really couldn't live without the football. The contest activity started in earnest on the dot of 1400UTC, with our first contact logged one minute later. We made our first Scottish contact inside the first half hour, our first Welsh contact immediately afterwards followed by Guernsey in the Channel Islands. Our first continental contact came in the second hour into France and several others followed. Our first Northern Ireland contact came in the evening just before 1900UTC leaving only the Isle of Man and Jersey to collect a complete set of Regional Secondary Locators. We managed the Isle of Man on the Sunday but sadly missed out on Jersey, although this is as close as we have ever come to securing the full set of RSLs in a single operation. As the afternoon rolled on we became increasingly aware of a shortcoming in our setup. The horsebox had been parked facing East South East, which was fine throughout the morning and early afternoon. However as the sun moved round it was shining directly into the open back of the horsebox causing increased temperatures and some difficulty reading one or two displays. A makeshift curtain was rigged but – note for next year – park the wagon facing south! We shut down around 11pm having made 78 contacts, just under 60% of the final total. An early start was made with the first Sunday contact being logged at 0619UTC into France. By the end we had logged 131 QSOs including 21 (16%) European contacts on 2m SSB and felt that we had managed a good performance. Those taking part were: Andy, G7KNA, Mark, M0SKV, Julian, M0JCE, Joe, 2E0EIC, Steve (Foundation trainee), Paul, 2E0GHT and Fred, G7LPP. Thanks must also go to George our farmer host and Samantha for the loan of the horsebox over the weekend.

Andy Jenner, G7KNA

Salop Amateur Radio found the weather was perfect – sunny, and hot. We were using our usual field, just inside the Welsh border, approximately 8 miles East of Welshpool with GW3SRT. We had a little 'scare' on the Thursday before, as the trailer we had been promised the use of, failed to come to fruition. Luckily, a quick call to the son of Eamonn, M0MEB, and arrangements were made for the transport of some of the heavy equipment needed for the weekend. Thanks, James, for saving Field Day. The club made substantial progress in the 2m category, working over 200 stations, over 40 more than last year. The 70cm band was about the same as last year with around 60 contacts, and similar for 6m. I left the scene early on Sunday, but, by the time I went, Neil, M0KZP, with minimal assistance from myself, had racked up 42 contacts in the 4m category. Thanks to all who turned up, and made the weekend successful and entertaining. Thanks to my XYL, Titch, M6ODU, for the pics.

Eamonn Bias, M0MEB

Brian M0TXE, standing, and Ken, G3UDA operating the Salop Amateur Radio 2m station.

Wrexham ARS took part in this year's RSGB NFD event having been given permission to set up location high up in the village of Llanrhaeadr-ym-Mochnant, Powys. The location was just perfect at a height of approximately 1000ft ASL with the most wonderful views from this extremely magnificent location. The team all arrived by around 11.30am, which gave us ample time to set up camp and from then on it was all systems go to get everything just as we wanted. We were to run the club's 2m multimode and 70cm radio in to 10 and 19 element antennas using very low

Wrexham ARS took part from the village of Llanrhaeadr-ym-Mochnant.

Continued on page 72

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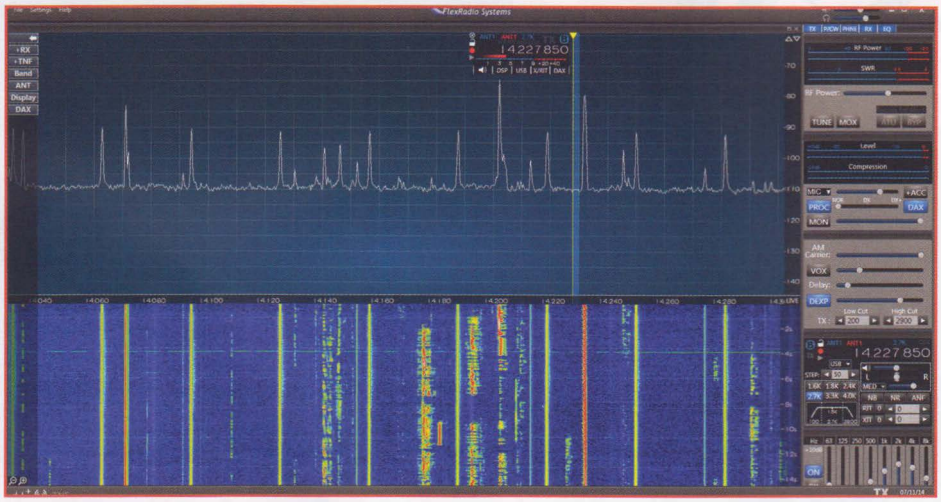
Software Defined Radio – a window to the world

The most immediately noticeable difference between conventional radio receivers and software defined radios is the panadapter display. This article explores the panadapter and what it can reveal.



FlexRadio Flex 6300 main tuning display.

At first glance, the panadapter display on one of the new SDR based transceivers looks the same as the band scope on some of the more expensive conventional superheterodyne (superhet) architecture radios. But there is a world of difference. A band scope displays signals above and below the frequency that the receiver is tuned to. It may be able to offset the display to show only the signals above or below the receiver's frequency. A panadapter can be made to emulate a band scope, but generally, they display a much wider range of frequencies. You can place one or more receivers at any point across the display. A simple click of the mouse or touch on the screen allows you to jump from signal to signal. Most panadapters and band scopes also include a waterfall display. A waterfall display indicates signals over a period of time. It can show you signals that have a short duration such as a station intermittently calling CQ. You can see the traces of signals that could easily be missed if you were tuning across a band using a conventional receiver.

The panadapter on 'black box' SDRs, the type that have no knobs and buttons, where the panadapter is displayed on a computer monitor, has the advantage of being and bigger easier to read. PC panadapter displays also have more flexibility, being able to display an even wider bandwidth and often supporting two or more receivers. For example, the FlexRadio transceivers can show up to seven receivers on seven bands with a maximum panadapter bandwidth of 14MHz. The band scopes in the top end conventional radios and the new SDR transceivers only display a maximum span of 1MHz. Most of the small box and dongle type SDRs only support one panadapter and one receiver but you can still see the activity across a wide band of frequencies. The maximum panadapter size varies from 48kHz up to more than 10MHz.

In a direct sampling HF SDR receiver, the analogue to digital converter (ADC) samples the entire HF spectrum, so potentially the entire spectrum can be displayed on the panadapter. Some SDR software can display the whole HF spectrum as a low resolution image, but generally, the maximum panadapter bandwidth is reduced due to the requirement to handle very high data speeds. Radios that have on-board digital signal processing, like the FlexRadio range, are able to display a wider panadapter than radios that require an Ethernet or USB connection to a PC or SBC (single board computer).

You might wonder what advantages a band scope or panadapter gives you. The answer depends on how you operate. If your radio is always used for chatting to locals or on your favourite net, the panadapter offers little value. But for those chasing DX or participating in contests, a band scope, or panadapter is rapidly becoming indispensable. During a contest can see each contest station and click on the screen to work each one without having to tune slowly across a noisy band. It is easy to avoid stations that you have already worked without having to waste time listening for their callsign each time you tune up or down the band. You can see weak stations that are very close to strong stations and use the SDR's variable 'brick wall' filters to pull them out of the noise. When you are trying to beat the pile-up and work a rare DX station, you can see and hear both the DX station and the stations in the pileup. This allows you to work out how the DX station is working. Is it sitting on one receive frequency? Or is it moving higher or lower after each call? It also allows you to choose a transmit frequency that is in a quiet spot in the pile-up, or a frequency that the DX station is moving towards. These techniques can give you a significant edge. Increasing your contest score or working that rare DX station that you might otherwise miss. The ability of some SDRs to show two or more bands at the same time can be useful if you want to monitor a frequency while working stations on another band. For example, you might check out the 20m band while waiting for a friend to pop up on the 40m band. You could watch beacons frequencies on 6m to see when the band opens while operating FT8 on another band.

The panadapter has other uses as well.

It is essentially a spectrum analyser display and it can be used in that role. The Y axis, showing the level of the incoming signals is usually calibrated in dBm rather than S-points and it is normally quite accurate. The X axis displays the range of frequencies that you have selected. The noise level seen between stations as 'grass' on the bottom of the screen indicates the level of the background RF noise level in the area that you live in. Rural locations typically have a noise floor better than -110dBm, while an urban location will be closer to -100dBm. On a panadapter, you may be able to see interference from ADSL routers, plasma TVs, power lines, lighting, or other sources. You can compare the signal level received from different antennas very accurately, or compare the signals received from different stations. The panadapter spectrum display can also reveal the quality of the signals that you are receiving. Splatter and over-modulation is immediately obvious because you can see the shape and bandwidth of the other station's transmission. You can even make a guess as to what digital mode is being transmitted. Each digital mode has a distinctive look on the spectrum and waterfall displays. The waterfall display will show the individual dits and dahs of a Morse code transmission and you can detect key clicks if you study the waterfall trace carefully. The slope across an SSB signal spectrum shows the flatness of the modulating audio. A higher level near the carrier frequency indicates more low frequency bass in the signal. You tend to see this where the station has been set up for rag chewing and local contacts. A higher level at the edge furthest from the carrier frequency indicates more high audio frequencies in the signal. You tend to see this where the station has been set up for DX operation. The width of the signal on the spectrum display and especially the waterfall indicates the bandwidth of the transmission. You can tell if the other station is transmitting a DX or contest grade SSB signal 2.4kHz wide or a wider bandwidth, 2.7 to 3kHz wide. If an SSB station is transmitting a bit off frequency, you can see that on the panadapter as well. You can also use the panadapter to monitor your own transmit signal to ensure that your transmissions are clean and legal.

Another feature of panadapters, as opposed to band scopes, is that most panadapters support computer mouse operation. It might feel strange at first but you quickly get used to clicking on the signal you want rather than turning a VFO knob. The SDR software makes operating your radio as easy as using any other computer program.

The first use of a spectrum display attached to a receiver is attributed to Marcel Wallace, a French engineer and radio ham, F3HM, who invented the idea around 1932. He filed his patent application on 17 March 1938. Similar cathode ray tube displays were fitted to some receivers used in WWII. Interestingly, Wallace used a motor driving a generator to produce the saw tooth sweep signal for the display. The term 'Panadapter' is apparently a contraction of 'Panoramic Adapter.' The first device to be marketed as a 'Panadapter' was the Model PCA-2, Type T-200 Panoramic Adaptor, made in the mid 1940s by Panoramic Radio Products of Mount Vernon, New York. It was a separate box that sat on or beside the receiver. From 1946, they produced the same unit under contract to Hallicrafters – where it was re-badged as the SP-44 (source: http://portabletubes.co.uk/boats/pca2.htm).

Some people wonder how the panadapter can display a much wider dynamic range than the quoted dynamic range of the ADC chip. They complain – wrongly – that this can't be true and that the SDR manufactures are faking the dynamic range quoted in specifications and shown on the panadapter display. The dynamic range of a software defined radio receiver is the difference between the noise level displayed on the panadapter display when the antenna is not connected and the level at which the ADC becomes overloaded and clipping occurs. The achievable dynamic range is affected by the number of bits that the ADC uses (eg 8, 14, or 16 bits), but in most SDRs, it is at least 100dB. That's much more than the dynamic range of superhet receivers, which must use AGC to compensate.

Narrow bandwidth receivers have better signal to noise ratio than wide bandwidth receivers. This is the main reason, for example, that CW signals received on using a narrow 500Hz filter are easier to copy than SSB signals heard on a receiver with a wider 2500Hz filter. Think of leaving a soup bowl and a beer bottle out in a heavy rain storm. After an hour pour the water out of the soup bowl into a second beer bottle and compare the water in each. The wide bandwidth soup bowl captures much more noise (rain water) than the narrow bandwidth beer bottle. The amount of air between the water level and the top of each bottle is the dynamic range of each device.

When you apply this theory to the panadapter there is an immediate problem. The panadapter has a very wide bandwidth. Not as wide as the spectrum being sampled by the ADC, but much wider than the 2.5kHz bandwidth of an SSB receiver. Oh dear! That means that the panadapter will have a poor dynamic range. The receiver will be more sensitive and have a better dynamic range than the panadapter. You would be able to hear signals in the receiver that are not visible on the panadapter and that is not what you want.

The trick to improving the dynamic range of the panadapter display is a manipulation of bandwidth. The panadapter is created using the same method as used in digital storage spectrum analysers. Instead of displaying the spectrum as a whole. The panadapter displays the level of a thousand or more narrow frequency 'bins' arranged side by side. Each frequency bin has a very narrow bandwidth, only a few hertz wide, so each bin has a high dynamic range. Put them side by side and you create a wide spectrum display with excellent dynamic range. This ensures that the panadapter can show any signal that you are able to hear in the receiver.

A fast Fourier transformation (FFT) is performed to turn a buffer full of I and Q data created from the ADC output data, into a buffer full of frequency bins. The value of each bin is used to light up a dot on the spectrum display. When all of the dots have been displayed you have a spectrum picture. As soon as the FFT mathematics is completed, it is repeated for the next buffer full of input data. The calculation is often performed at the same rate as the bandwidth of the panadapter for example, a 384kHz wide panadapter means 384,000 FFT calculations per second, but for the panadapter display, it only needs to be done at the refresh rate of the display. The method chosen varies between SDR applications. It depends on whether the FFT output is being used for the receiver(s) and the panadapter display, or just for the panadapter.

I should point out that the image you see on the panadapter spectrum and waterfall display is not the same as the signal that you are listening to on the receiver. Although both the receiver and the panadapter use the same I and Q data streams, the digital signal processing (DSP) software process is completely different. It is easy to be fooled by this. You may be able to see a signal on the waterfall that is too weak to be heard in the receiver. Again, the reason for this is the relative bandwidth. The receiver is wider than the bins used to create the panadapter, so the noise level will be higher within the receiver passband, reducing the dynamic range and the signal to noise ratio.

The waterfall display is created from the same data samples as the spectrum display and usually updated at the same rate. If we assume a panadapter screen that is 1024 pixels wide, the value of each of the 1024 FFT bins is recorded as a dot across the top line of the waterfall display. Large

Andrew Barron, ZL3DW
ZL3DW@outlook.co.nz

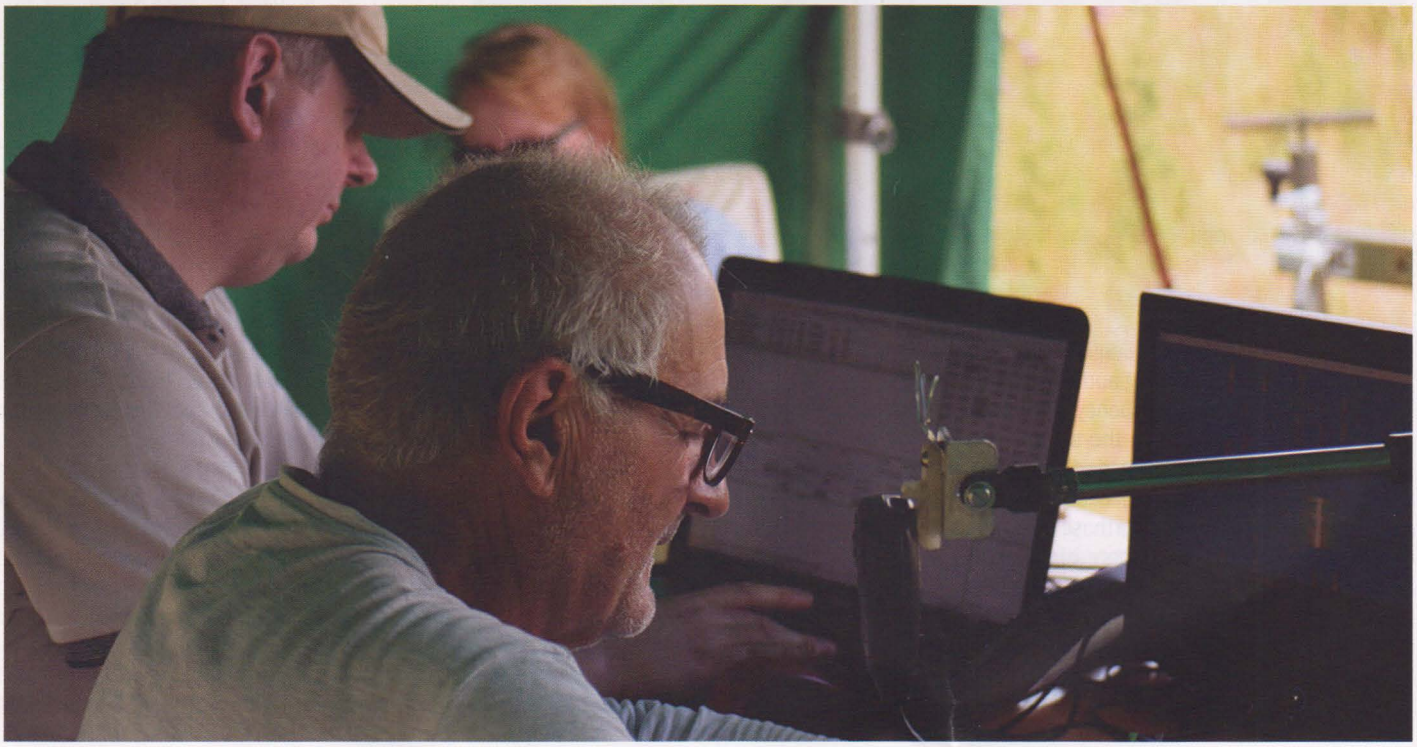
value numbers representing big signals are displayed as bright colours and small values, representing weak signals, are displayed as dark colours. Every time a line of spectrum information is displayed on the spectrum display, a new line is added to the top of the waterfall display. In PowerSDR, the waterfall is stored as an image file that is 1024 pixels wide and 256 lines long. Unlike the spectrum image, which is drawn across the panadapter dot by dot, like the trace on an oscilloscope, each waterfall line is added as a complete line.

In FlexRadio's SmartSDR, the waterfall is stored in a matrix that is much larger than the amount of lines that are displayed on the screen. You can drag the whole waterfall display up to see what the signals looked like as far as 10 minutes in the past. If you change the panadapter bandwidth or centre frequency, the whole displayed waterfall is recalculated so that the waterfall lines stay straight. Conversely, in PowerSDR and most other SDR applications, the lines once written to the waterfall image are not recalculated, so the vertical traces indicating active signals will appear to bend if you change the panadapter centre frequency or bandwidth.

I hope that this article has shown that the SDR panadapter is much more than a toy of limited interest. It can be used as a serious tool to help you find rare DX station, get a contact with a new country, or find the source of that horrible noise that keeps wiping out the 40m band. *RadCom* Editor willing, I plan to cover more SDR and digital mode topics in future issues.

Andrew Barron is the author of *SDR, Software Defined Radio for Amateur Radio Operators and Shortwave Listeners*, available from the RSGB bookshop, www.rsgbshop.org

RSGB VHF National Field Day, continued from page 67



Cambridge & District ARC – The two Davids (G0LRD logging & G6KWA operating) keeping an eye on the bandscope screen.

power. Jersey was the best DX. We were rewarded with a certificate from the RSGB for our efforts and we are all looking forward to trying our luck again next year. Operators were Eifion, 2W0ENA, Mark, MW1MDH, Simon, MW0XAD and Tom, 2W0OGT.

Eifion Parry, 2W0ENA

Cambridge & District ARC decided the best option would be the single transmitter MS category, picking to operate on 4, 6 and 2m. The equipment mustered was a modified IC-7100, on loan from G0LRD, with band scope via a RSP1 SDRPLAY and aerials on G6KWA's SCAM trailer mast. The mast arrangement was 2m 9-element Tonna sitting above a combined 4 / 6 metre beam with Yaesu rotator in a cage. Care was taken to keep within the 12m height limit for the top aerial. The club used a site on top of Barrington Hill, one of the few 'hill tops' in flat Cambridgeshire.

Another local club (**Cambs-Hams**) were located about 5 miles away, and both clubs were keen and generally succeeded in avoiding mutual interference. The very hot weather had scorched and dried out the long grass where we normally operate. In previous years the grass just gets trampled, but this year because of the fire risk G3PJT, G8CRB and G4AWP battled with mowers and a strimmer to clear the long grass. A trailer full of water was on hand as well as fire extinguishers – thankfully neither was required.

Prior to the contest 6m was wide open to Europe with Sporadic-E, but as the contest started this all faded. Whilst we were pleased to achieve second place in the 4 & 2m section, we were disappointed that our overall place dropped to 5th. Whilst 8 members operated (G6KWA, G4AWP, G0LRD, G0OPL, G8OFA, G3TFX, G4FZM and G4WSZ), a total of 13 members plus some visitors made it up the hill for the competition and socialising. Further details at www.cdarc.org.uk

Richard Parker, G4AWP

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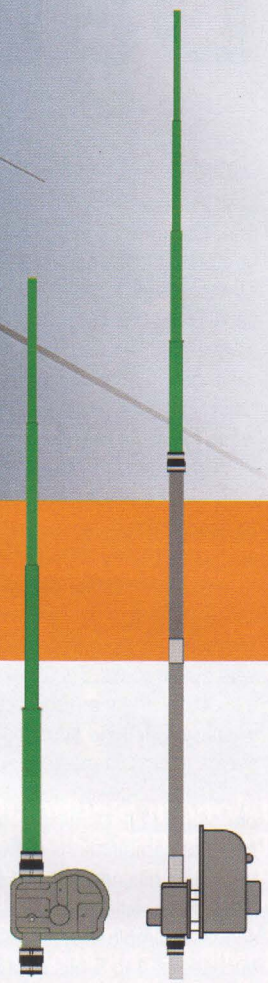

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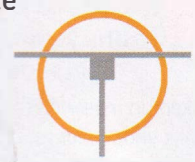
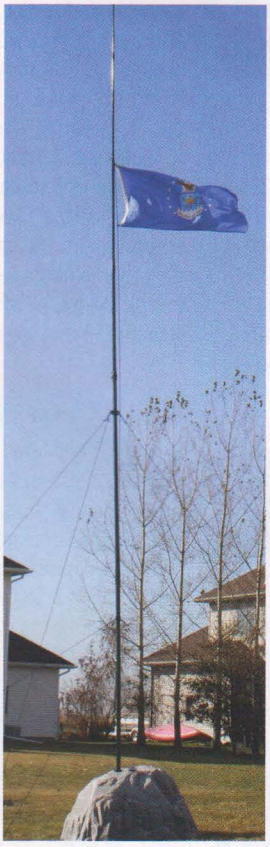
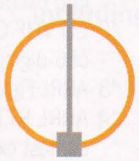


DIPOLE





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Data

Source compression

Last time we speculated on how the strong Forward Error Compression (FEC) and coding in FT8 could be adapted for a chat mode, conveying more than the compressed, preformatted messages normally allows and came to the conclusion that heavy source compression would be needed. So now we'll look at source compression techniques for plain text. After reading that, Michael, G1ZVN, wrote to say he had done some analysis.

"I read your article on using FT8 as a chat mode and did some calculations on creating a message containing snippets of a few characters, each concatenated. I did some rough text analysis to find common snippets, then ranked them into a list. With a list of 930 snippets, plus the alphabet and numbers, a chat message can be constructed with 10-bit codes. The most common character is a space, so there are snippets with letter + space or space + letter. I could do more analysis if this seems a feasible method for a FT8 chat mode.

"Then I looked into a form of Huffman encoding [1]. Making a table with the most frequent combinations of two letters reduces the number of bits needed. A 256-entry table with the letter combinations, plus 'a' to 'z' and ' ' [space] seems a simple way to test this. Each letter is encoded in 4 to 5 bits on average."

Michael's analysis suggests that he can reduce the bit count from the 6 bits for plain uncoded text, or the roughly 5 to 6 bits per (full ASCII) character of varicode. This is a reduction of 20 to 30%. Better, but not a massive improvement.

Perhaps another route may be to encode complete words. Several references suggest there are around half a million words in the English language. That number can be represented by a dictionary referenced by a 19-bit number ($2^{19} = 524288$). Adopting the somewhat arbitrary view used for Morse that the average word is 5 characters, that suggests around 30 bits. So it looks like a 50% reduction could be achieved; a result that at first sight looks very good. But it takes no account of the *word* frequency.

I wrote a bit of software that took a block of plain text from a non-technical document [2] and measured the frequency of the most popular words. Table 1 shows the top twenty. Clearly, the most popular words are just 1-3 letters. In the top 20, only one word has five letters. So using a 19-bit code for these is much worse than plain uncompressed coding. A Huffman encoding could be applied to this in the same way as described for letters but it sort of feels all wrong and going nowhere. Chat messages are, anyway, likely to contain proper names and, in our case, callsigns and reports that complicate a dictionary approach; these would have to be spelled out separately. The most popular words are mostly made up of the most popular letters, so going back to Huffman letter coding may even be better.

So we're not really getting very far forward. It does look like source compression on plain text chat messages may offer perhaps 30 to 50% compression, but as soon as we start chatting about something special, that can fail. It is starting to look like a chat mode with the speed and weak signal performance of FT8 won't happen soon.

TABLE 1: Most popular words in my document of 13502 words total with a vocabulary of 2115 different words.

Place	Word	Occurrences	Frequency
1	THE	699	5.177%
2	TO	385	2.851%
3	A	369	2.733%
4	AND	314	2.326%
5	I	302	2.237%
6	WAS	288	2.133%
7	OF	229	1.696%
8	THAT	173	1.281%
9	IN	168	1.244%
10	IT	166	1.229%
11	FOR	120	0.889%
12	HAD	120	0.889%
13	ON	109	0.807%
14	MY	105	0.778%
15	WITH	96	0.711%
16	AT	86	0.637%
17	BE	83	0.615%
18	WOULD	81	0.600%
19	BUT	75	0.555%
20	ALL	73	0.541%

WSJT-X Version 2

Since FT8 appeared and was taken up massively by the contest and DX brigade, its shortcomings have become apparent. The authors quickly added improvement fixes, but the result was never completely satisfactory. So the team decided to completely rework the coding of FT8 and MSK144 to meet the needs of the HF DX community. Joe, K1JT posted this on the WSJT Yahoo Group:

"K9AN, G4WJS and I have been developing enhanced versions of the MSK144 and FT8 protocols that extend the message payload to 77 bits. For a taste of what's to come, here's a brief list of things made possible by the extra bits:

"1 NA VHF Contest operation with full support of grid exchanges and "/R" (Rover) callsigns

"2 EU VHF Contest operation with the exchange of 6-digit grids, QSO serial nos, and /P callsigns

"3 ARRL Field Day ops with standard FD exchanges

"4 ARRL RTTY Roundup operation with standard contest exchanges

"5 Better and more user-friendly support for compound and nonstandard callsigns

"6 A special telemetry message format for exchange of arbitrary information up to 71 bits

"7 The existing FT8 DXpedition mode will be supported, and a more powerful DXpedition mode may be offered as well.

"All of these features work seamlessly and automatically. No 'contest mode' checkboxes are needed. In most situations decoding sensitivity will be slightly better than at present for FT8; for MSK144 it will sometimes be about 0.5dB worse. Occupied bandwidths will be the same as they are now, and false-decode rates will be significantly lower.

"Much of the necessary programming is finished. Many of the new features have been tested on the air, and we find them to work well.

"Don't rush to download something – these capabilities are not yet publicly available. There is more testing and code optimisation to do. With summer vacation plans, etc, our current plans call for a beta-testing period, probably starting in mid to late September. A full release should then be possible a couple of months later.

"In particular: we are planning to make WSJT-X Version 2.0 available in time for you to read its new documentation and practice using it before (for example) the ARRL RTTY Roundup and the ARRL VHF Sweepstakes in January 2019.

"THIS IS IMPORTANT: The new protocols cannot be backward compatible with the existing ones. We will probably provide some temporary 'bi-lingual' capability for FT8 but not for MSK144. It will be essential for users to upgrade to Version 2.0 in order to use the new features and communicate with others who have made the upgrade. We will provide plenty of advance notice about a transition interval and an essential 'must upgrade by' date."

The other modes, JT4, JT9, JT65 will remain untouched. So all the fixed beacons that use these will not have to be upgraded. Whew!

References

[1] Huffman encoding allocates different length binary codes to characters depending on their frequency of occurrence. Popular letters like 'E' have short codes while those like 'Q' have longer sequences. Varicode adopts this method, as does Morse; dit and dah-dah-di-dah respectively. Search online for 'Huffman coding'.

[2] Document used for Word Frequency Count: www.g4jnt.com/NukingTheTeabag.pdf

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andy.g4jnt@gmail.com

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RSGB Loanable tool kit

PHOTO 1: Terry Chipperfield, G3VFC (right) helping a YOTA team member use the RSGB tools at Gilwell Park.

Members will no doubt have seen reports of the Bath Buildathon events that have been running for over a decade now. The Bath team have also helped out at the G-QRP Club and RSGB Conventions, the RSGB Centenary Day and as part of the RSGB's support to the ARISS Principia events. Projects have included TRF, regenerative, direct conversion, superhet and SDR receivers, DSB transceivers, power meters and an ATU.

It was during the Principia mission that *RadCom* Technical Editor Giles, G1MFG suggested the RSGB could usefully assemble some sets of common tools that could be loaned out to Affiliated Clubs to make it easier to organise Buildathons. Steve Hartley, G0FUW submitted a bid to the RSGB's Legacy Committee and funding was approved, subject to the RSGB Training & Education Committee taking ownership of the kit and managing its use.

The tool kit was purchased in time to have its first outing at the YOTA 2017 Summer Camp and was used to good effect, with nearly eighty youngsters building the QRP Labs QCX 17m transceiver kits. The tool kit was used again at the 2017 G-QRP Convention at Telford, where the members built an Arduino-based power meter. In May 2018 the tools made a trip to the Scottish Amateur Radio Convention, where the CQ Scotland team hosted a building workshop. At the time of writing the tools are booked to go back to Scotland and then to Newark for the National Hamfest.

What's in the tool kit?

The tool kit comprises twelve complete sets of the basic tools necessary to tackle an average electronic construction project. There are Antex soldering irons and stands, sidecutters, pliers, wire strippers, solder suckers, screwdrivers, magnifying glasses and multimeters.

To overcome the common issue of not enough power sockets for a dozen soldering irons there are four 10m long four-way extension leads, with RCDs.

There is also one temperature controlled solder station and a PCB drill, should there be any requirement for reworking.

All of the gear is currently transported in two roll-along suitcases, providing convenient movement and storage.

Availability and booking

Having been thoroughly road tested, the RSGB tool kit is now available to any Affiliated Club to use on request. It is being managed by the Training and Education Committee to support hands-on learning through local Buildathons and other kit building events. Affiliated Clubs can book the kit, subject to availability and at least a month's notice, by completing the simple online application form [1]. If application dates clash, priority will be given to events that best support the RSGB's strategic priorities.

Clubs using the tools are only expected to provide the consumables, solder, kits, etc – and a report of the event for *RadCom*. Please see [2] for guidance on writing for us.

For the first year the full transport costs are being borne by the RSGB Legacy Fund; thereafter you should budget about £40 for return courier transport (although it may be possible to extend Legacy funding – we'll see how it goes). Of course, if there are cheaper ways of getting the kit from A to B in a timely manner, perhaps because people happen to be attending the same meeting, we will be very pleased to take advantage of any savings.

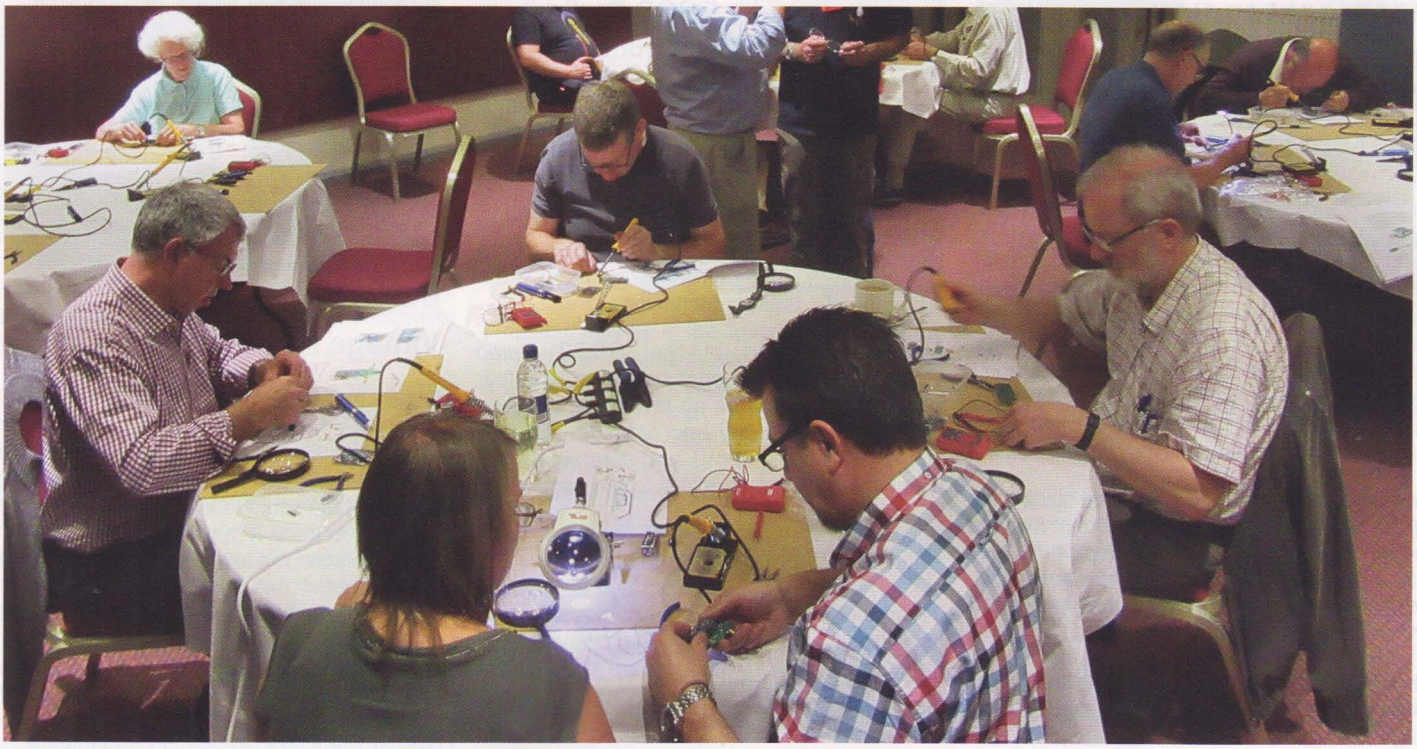


PHOTO 2: RSGB tools in use at the GQRP Club Buildathon in Telford (picture by John, 2E0EPY).

In use

Here's what David Searle, MM0HQD, said about using the tool kit:

"The main elements that make for a successful group building session are: a great venue, helpful volunteers, the kit they're building must be completed (and work!) within the time allotted, and of course you need suitable tools. At CQ Scotland we have run events using tools supplied by volunteers. Some were suitable for a beginner, some were definitely for professionals and one or two were in poor repair. That meant that some beginners would have different equipment in front of them. This was particularly evident with digital multimeters and soldering irons. Hence we could not create step by step illustrated instructions that all builders could easily follow. We were forever dealing with questions arising because our printed instructions didn't match the tool that the student was holding.

"The newly launched RSGB Tool Loan scheme largely overcomes all these issues and will definitely help you hold a successful Buildathon. All the right tools in as-new condition were provided, including some we hadn't thought of, such as enough eye protectors for the volunteers as well as the builders! Courier costs both ways were met. As always, we found Steve, G0FUW very helpful and responsive to our needs.

"The CQ Scotland team would like to thank the RSGB for making this service available and we're sure progressive clubs will use it to demonstrate to the public that today's hams still build useful projects and keen to share our skills with the young and old alike!"

Finally

Buildathons are great fun and support Intermediate practical assessments and general learning about radio construction. They also provide a great introduction to amateur radio for newcomers who love to make things for themselves or just 'tinker. If you want to know more about organising a Buildathon, there is a video available that was made for the Bath Buildathon Crew and if you need any further information, just email Steve Hartley, G0FUW via legacy.chairman@rsgb.org.uk

So, if your club has been keen to put on a Buildathon or radio construction workshop but has been foiled by a lack of tools there is no longer any excuse not to give it a go!

PHOTO 3: David, MM0HQD, of CQ Scotland, with Savannah (6) soldering an AM radio kit in Glasgow under the watchful eye of Margaret Liddell, wife of Sam, GM4BGS.

Steve Hartley, G0FUW
legacy.chairman@rsgb.org.uk

Websearch

[1] www.rsgb.org/TEC-tools

[2] https://tinyurl.com/RC-guidance

Technical book

Restoring Old Radio Sets

By Philip Lawson, G4FCL

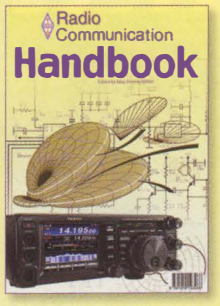
Nothing can be more charming than an old broadcast receiver glowing away in a wooden or Bakelite case. However these are now a rarity and it is much more likely that old radio sets will be non-working curios found at car boot sale in a dusty, unloved condition. *Restoring Old Radio Set* i sets out to provide a step-by-step guide to bringing an old set back to life, getting it working properly, and restoring its looks.

Restoring Old Radio Sets is a practical guide that explains what you need to do, and how to do it when bringing an old radio back to life. Topics include cleaning methods for electrical and mechanical parts, typical electrical repairs and the process for performing live tests.

Armed with this book, the reader should be able to tackle an old set, get it working safely and own an attractive piece of domestic furniture.

Size 174x240mm, 80 pages
ISBN: 9781 9101 9322 8

Non Members' Price £8.99
RSGB Members' Price £7.64



RSGB Radio Communication Handbook

Edited by Mike Browne, G3DIH

One of the most enduring guides in the world to amateur radio technology.

This new edition of the *RSGB Radio Communication Handbook* has been updated, rewritten and provides an invaluable guide to amateur radio theory and practice. 600,000 words, 2000 illustrations and diagrams in 25 chapters and two appendices in 864 pages.

From the basic components of amateur radio to semi-conductors through oscillators, amplifiers, mixers, transmitters, receivers and a complete transceiver project. Chapters also cover; design and practice in VHF/UHF, Microwaves, and frequencies below 1MHz. There are also chapters dedicated to propagation, antenna basics and transmission lines.

210x297mm, 864 pages,
ISBN: 9781 9101 9326 6

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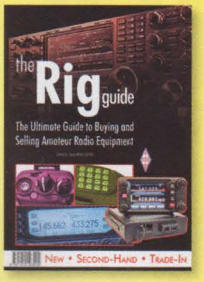
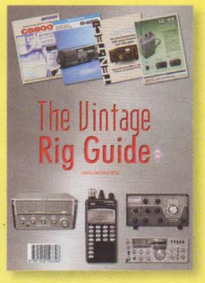




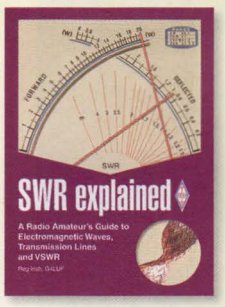
RSGB Rig Guide & Vintage Rig Guide

Edited by Steve White, G3ZVW

The *Rig Guide* is a unique publication that sets out to answer the question 'what is the right price for this radio?'. What will you get for a radio if you trade it in or try to buy or sell it on an online auction site? - The *Rig Guide* provides the answer.
Size: 210x297mm, 96 pages, ISBN: 9781 9101 9320 4

The *Vintage Rig Guide* focuses on amateur radio equipment from the latter decades of the 20th Century In the same format as the popular *RSGB Rig Guide*, describing basic information about the equipment, when it was first made and its worth.
Size 210x297mm, 80pages, ISBN 9781 9101 9330 3

Price: £5.99 (Each) or £9.99 for Both



SWR Explained

By Reg Irish G4LUF

Many are familiar with the concept of the Standing Wave Ratio (SWR) and the effect it has on transmission and reception. Few however understand much about it beyond the adjustment of an antenna tuning unit to reduce SWR. *SWR Explained* sets out to fill that gap and provide the context that makes electromagnetic Waves, transmission Lines and VSWR comprehensible.

Written by Reg Irish G4LUF, *SWR Explained* sets out by explaining what waves are, how they move in free space and how guided waves react. Steering clear of mathematical theory, the author brings personal experience to bear, so that the reader gets a practical feel for the topic.

SWR Explained provides a guide to the mysteries of electromagnetic waves, transmission lines and VSWR yet is light on heavy mathematics.

174x240mm, 64 pages,
ISBN: 9781 9050 8699 3

Non Members' Price £7.99
RSGB Members' Price £6.79

RTTY/PSK31 for Radio Amateurs

By Roger Cooke, G3LDI

This book is a practical guide to the two most popular data modes, RTTY and PSK31.

An expanded and fully updated 2nd edition of the popular RTTY and PSK31 for Radio Amateurs. 50% bigger that the 1st edition, there is no better guide to these data modes. Readers will find details of where to find data modes on the amateur bands, through getting started, to making the most from both these modes. DXpeditions and contests use these modes and there is information on how to get the best from these.

The free CD that accompanies this book has also been fully updated to provide a wealth of amateur radio data mode programs.

Size 174x240mm, 48 pages,
ISBN: 9781 9050 8688 7

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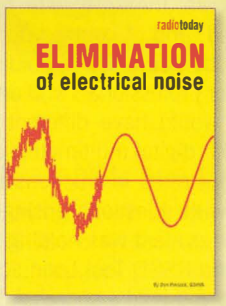
RSGB Members' Price £6.79



Elimination of Electrical Noise

2nd Edition

By Don Pinnock, G3HVA

Electrical Noise is a problem for most radio amateurs, and many are forced off the radio bands because of it. Don Pinnock, G3HVA, is a firm believer that radio amateurs not be forced from the air but should deal with the problems. *Elimination of Electrical Noise* tells of Don's personal experiences, and provides solutions to noise problems.

Various types of noise 30kHz to 30MHz, are detailed, from computers to electrical light fittings. Computers are almost an essential in a modern shack. New to this edition is a chapter on how to reduce or eliminate noise from the computer itself.

Elimination of Electrical Noise provides the help you may need to take charge and tackle that noise problem.

Size 174x240mm, 64 pages,
ISBN: 9781 9101 9314 3

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s, computing & EMC

RSGB SHOP

50 Projects for Radio Amateurs

Edited by Mike Browne, G3DIH

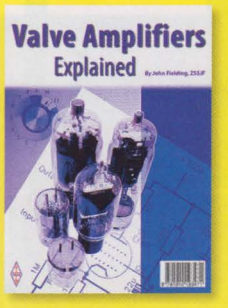
This book brings together a wide array of projects that the Radio Society of Great Britain (RSGB) has published. Projects as diverse as antennas, simple test equipment through to 70cm handhelds.

50 Projects for Radio Amateurs is broken into sections that cover Measurement & Filters, Morse, Antennas and a large section covering useful station accessories, peripherals and other projects. The projects included, range from complex DIY antenna analysers through to a simple electronic keyer and builds on simple strip board. There are two transceivers that you can build alongside antennas for bands from Microwaves to HF. There are also four handy reference guides explaining Using 10Ghz, Screening, Baluns and Aerial Maintenance.

This book has something for everyone whatever their level of construction ability and all will find something interesting to construct and build. All the projects stimulate and inspire you to get out the soldering iron and get building.

Size 174x240mm, 256pages
ISBN: 9781 9101 9352 5

Non Members' Price £14.99
RSGB Members' Price £12.74



Valve Amplifiers Explained

By John Fielding, ZS5JF

This book is for everyone who uses - or is considering using an HF or VHF linear amplifier. While some amateurs may be of the opinion that valves are an obsolete technology and semiconductors are a better way, John Fielding very definitely thinks otherwise! After reading this book you will be under no illusions that, in his opinion, valves are far superior to semiconductor devices for most linear amplifier applications.

Essential reading for anyone building a valve linear amplifier, the author guides the reader through the choice of valves for various purposes.

There is advice too for those considering purchasing a commercially-made linear. Those who use commercial linear amplifiers and want to understand more about how they work will not be disappointed.

After reading Valve Amplifiers Explained you will want to join that elite few!

Size: 174x240mm
200 pages
ISBN: 9781 9101 9347 1

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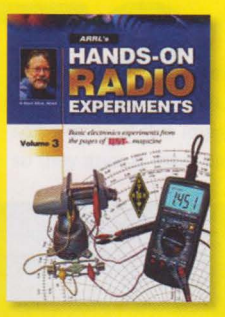


ARRL's Hands On Radio Experiments - Vol 3

Ham Radio: Where Hands-On Lives On!

By: Ward Silver, N0AX

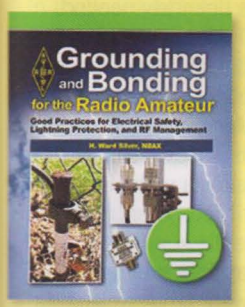
This volume covers material from the ARRL's 'Hands-On Radio' column published in their magazine *QST* from 2013-2017. The book guides you through a host of basic electronics experiments, designed to increase your understanding of radio fundamentals, components, circuits and design.

Broken down into eight different sections covering an array of topics. You will find sections covering experiments to get the best out of antennas and another on transmission lines and impedance matching. You will also find sections on electronic circuitry, electronic components and electronic fundamentals. Other sections included cover Tests and Test Equipment, RF Techniques and Practical Station Practices. All are written in a clear and easy to understand style.

ARRL's Hands-On Radio Experiments - Volume 3 is recommended reading for everyone interested in practical 'Hands-On' amateur radio experimenting.

Size 184x229mm, 128 pages
ISBN: 9781 6259 5079 6

Non Members' Price £22.99
RSGB Members' Price £19.54



ARRL Grounding and Bonding for the Radio Amateur

By Ward Silver, N0AX

Station Grounding is important and this ARRL book sets out to explain how to do it safely. The provides an intriguing insight into a different electrical system.

The book provides information on AC safety in the US. However many parts are useful regardless of supply differences. If you are interested in different electrical standards and how they affect station management across the globe *ARRL Grounding and Bonding for the Radio Amateur* provides a hugely interesting read.

Size: 184 x 229mm, 176 pages
ISBN: 9781 6259 5065 9

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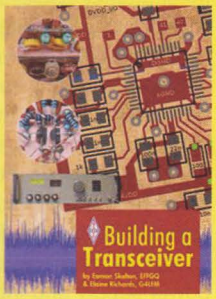
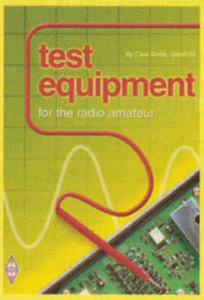
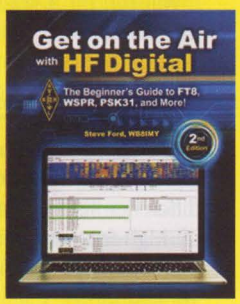
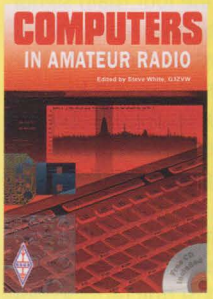
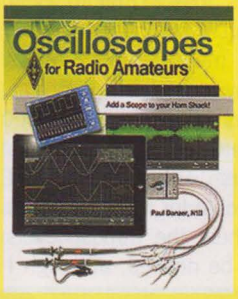
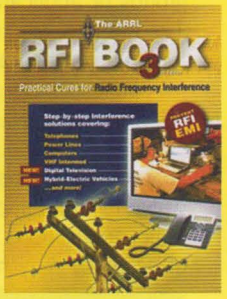












Red Pitaya STEMLab oscilloscope

I have been on the lookout for a convenient oscilloscope to use around the shack and also to make some website videos. The Red Pitaya STEMlab board acts as a multifunction test instrument and fits the bill.

STEMlab can be used with a PC, tablet or phone to provide the following instruments: 2-channel oscilloscope, 2-channel signal generator, 8-channel logic analyser, spectrum analyser, LCR meter, Bode analyser and, with an additional add-on module, it can become a vector network analyser.

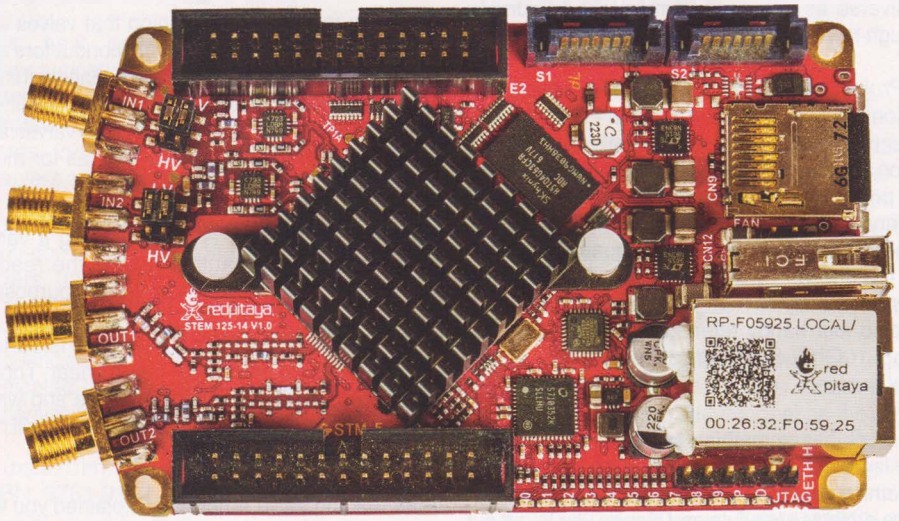
The STEMlab has a 50MHz bandwidth and 10- or 14-bit resolution (dependent upon the version bought). The 14-bit version gives a significantly greater level of resolution than many scopes costing much more. Additionally the STEMLab is compact and portable. Its Ethernet / Wi-Fi connectivity allows remote measurements to be made.

The other advantage is that unlike most test instruments and amateur radio software that only run on Windows based computers, it will run on a Mac, as well as many other platforms.

Versions of the STEMLab

STEMLab is available in two versions. Both offer the same functions and features; the difference is in the technical specification of high-frequency inputs and outputs (eg bit depth), RAM capacity, plus some other variations.

The two versions are aimed at different groups or applications. The STEMLab 125-14 has 14-bit input / output channels for highly accurate measurement results in professional environments, whereas STEMLab 125-10 has 10-bit input / output channels and is perfect for universities, students and 'makers'. Often, the 10-bit version will be applicable for many amateur radio applications where the utmost levels of accuracy may not be needed, although I suggest you think carefully about the long term as the flexibility of the board means that it can be used for many other amateur radio functions. More on that later.



The Red Pitaya STEMlab board. A lot of functionality is packed into a remarkably small space.

What is the STEMLab board?

The STEMLab kit contains a variety of items dependent upon what is bought. Obviously the box contains the STEMLab board itself, along with an accompanying power supply to provide the necessary 1.5A to required by the board.

The kit also includes the SD card and also the Ethernet cable that will be required to connect to your router.

The STEMLab board measures about 115 x 60mm and, as you can see from the photograph above, the board is packed with surface mount components. These include a high performance field programmable gate array (FPGA)-based processor, the high-speed analogue to digital converters and of course all the necessary 'glue' parts such as power supply and input matching circuits.

Around the edge of the board are a number of connectors. There are the four main signal input and output SMA connectors on a curved edge of the board at the front. The curve enables better access for coupling and uncoupling the SMA connectors. Although SMA connectors are not widely used for oscilloscope probes, simple adaptors can be bought quite cheaply.

At the rear of the board are the Ethernet connector, USB, and also the socket for the micro SD card and a micro USB for the power. Along the side of the board are the connections for applications like logic analyser, etc.

In use

The Red Pitaya STEMLab was easy to set up. The website provides easy to follow instructions on setting the board. As the board consumes around 1.5A the supplied external power supply is definitely needed. Ensure the supplied SD card containing the operating system is installed. Then connect up the Ethernet lead between the STEMLab board and the router – the router will need to be configured so that its DHCP settings are enabled – this should not be a major issue as this is the case in majority of routers for local area networks.

Turn the system on and then by applying the power, open the web browser and in the URL field type: rp.xxxxxx.local/ where xxxxxx is the number printed on the Ethernet connector on the STEMlab board. These numbers are the last 6 characters from MAC address of the board. With the MAC address entered as above, the selection options will be presented for the different instruments available. Select the one required.

The oscilloscope option is one of the main uses for the ham radio shack. With the 14 bit ADC on the board, this means that accurate, smooth readings can be taken. Systems with lower resolution can have a stepped appearance under some circumstances. The 14 bit resolution means that this is not the case for the STEMLab.

It is interesting to note that many boxed oscilloscopes costing more than the STEMLab

FIGURE 1: Part of the start-up desktop.

FIGURE 2: A waveform displayed on computer screen from the STEMLab oscilloscope. (NB some parts of this image have been enlarged so they appear more clearly here in print).

may only have 10 or 12 bit resolution – this puts the STEMLab ahead of many scopes costing much more. Certainly the STEMLab gave a good trace, even on a large screen. In this way the benefits of large screens can be realised rather than the smaller screens that were the norm some years back.

Also, the 65MHz bandwidth proves to be very useful, looking at signals certainly to the top of the HF bands. Even at what may be termed relatively low frequencies these days, care needs to be taken with the probe if accurate measurements are to be made at these frequencies, but this is the same for any scope. Make sure the probes are equalised for the particular scope input used.

Operation of the scope was straightforward and quite intuitive. The two channels and the trigger functions were available via an area in the top right hand of the screen. Channels IN1, IN2, OUT1, OUT2, TRIG, and CURSOR are all very obvious. Clicking on the little cog wheel revealed the functions available for each channel / function. It was so easy and a delight to use.

Although by the standards of some scopes some of the capabilities were relatively basic, they were more than adequate for most measurements. Triggering, for example was fairly simple, offering source, edge, level and mode. A time offset was also available. This is fine for most applications; it is really only if you are to get into deep investigations where some advanced triggering may be required that this may not come up to what is needed. More expensive scopes will offer more advanced capabilities like triggering on a logic pattern, etc, but for most applications these are not needed.

Essentially, the scope function covered everything that would be needed for most measurements around the shack, unless you need to measure the host of logic levels... but then there is the logic analyser capability.

Another function, in fact one allied to the scope, is that of the signal generator. This provides a variety of waveforms including sine, square, triangular, etc. It also was able to operate at frequencies up to its top operating range, making it a very useful signal generator for the shack. It was very controllable - the frequency could be entered to the nearest Hz via a keyboard, and it could also be incremented in 1Hz steps. The amplitude was also finely variable as well up to 1V.

The other capability that was of great interest was the DFT spectrum analyser option. This covered the range 0-65MHz. Although it is possible to set the span, ie the start and stop frequencies, I was not able to look close in to signals, like the sidebands on signals, as it is only a DFT function on the board and not a full professional spectrum analyser. Consideration may be given to adding greater spectrum analyser functionality in the future. Nevertheless the spectrum analyser capability was very useful in locating spurious signals and the like within the 65MHz span.

Summary

The STEMLab development environment is a powerful tool for use around the shack. With so many instruments in one package, it can provide a very good option. With so many instruments often being required, it makes a very useful companion for a host of different applications.

The multi-function instrument comes in two forms. The Diagnostic Kit costs 489 Euros and includes STEMLab 125-14 board, SD card. Ethernet cable. Power supply, aluminium case, logic analyser PRO, 2 x oscilloscope probes, 2 x SMA to BNC adapters, 2 x 50 ohm termination and 2 x SMA T adapters.

The Ultimate kit includes the diagnostic kit as well as the LCR meter board and costs 799 Euros.

Whilst entry level scopes from companies like Keysight are now available even via Amazon and can cost well under £450 for a scope with two analogue channels and a 50MHz bandwidth, they do not have the flexibility of the STEMLab kit.

One of the aims of the Red Pitaya STEMLab board was to reduce the cost of ownership whilst proving considerable functionality. It seems to achieve this admirably, and though it looks a little different from the standard test instruments, it packs in a considerable level of functionality at a low cost.

Also of interest to amateurs is the SDR transceiver kit that includes the basic STEMLab board plus extras to turn it into a full SDR transceiver. This uses the full capability of software defined technology to provide a very flexible transceiver and test measurement system.

Websearch

Red Pitaya: www.redpitaya.com
Oscilloscopes: www.electronics-notes.com/articles/test-methods/oscilloscope/scope-basics.php
SMA connectors: www.electronics-notes.com/articles/electronic_components/rf-connectors/sma-connector.php

Ian Poole, G3YWX
g3ywx@electronics-notes.com

Design Notes

PSU modules

At a recent radio rally I purchased the 36V 4.4Ah lithium battery shown in **Photo 1**, intending that it could be used for various portable operations with switch mode converters dropping the output down to more useable voltages. The 4.4 amp-hour rating at 36V corresponds to the same energy storage as a battery of around 13Ah at 12V – about 160Wh. At this rating, the traditional lead-acid type is a very much heavier beast to have to carry around. But there was to be an unforeseen minor glitch in my theory that led to a bit more work than expected.

For applications needing up to 2-3A (at 12V) the intention was to use the 'Simple Switcher' family of chips, such as the LM2596 buck mode converter [1] [2]. This family of TO220 devices allows low component count switch mode converters to be constructed. (There are many such units available on eBay as ready-to-go units for ridiculously low cost). I have several of these and have mentioned them in this column. However, consulting the data sheet for the LM2596 showed that it is rated for operation with an input voltage up to 40V and an *absolute maximum* (beyond which damage can occur) of 45V. Lithium batteries at full charge deliver 4.2V per cell so at full charge my 10-cell lithium battery with virtually zero load could give 42V, which is above the specification. Even after several weeks of being left fully charged but otherwise unused, the battery still measured 40.5V. The highest likely to be seen, 42V, is below the absolute maximum rating so the setup would probably be safe but it is just *not done*; it is unethical and unprofessional to deliberately exceed specifications like this. So another solution was needed.

PHOTO 1: Ten-cell lithium battery pack purchased at a rally. At any reasonable state of charge its voltage would exceed the maximum input for most 'Simple Switcher' SMPSU devices.

Over the years I've gained a lot of experience using a range of switch mode power supply (SMPSU) chips in various power supply configurations, but much of that was learnt 20 years ago and things have moved on so a bit of research into the latest generation devices was needed. Looking through the catalogues threw up the NCP1034 synchronous pulse width mode buck controller chip as a contender. The chip is rated up to 100V input so, as well as working for this battery, it could also be used on the 50V supplies common to big MOSFET RF power amplifiers, delivering the lower voltages needed for driver stages.

Synchronous operation

The NCP1034 is a 16-pin SOIC packaged device used in conjunction with external MOSFET switches. Several resistors and capacitors have to be added for setting the oscillator, voltage feedback, stability and current limit. But of particular significance is that it uses what is termed synchronous operation. This can be seen in outline in **Figure 1**, which shows just the basic functional circuitry around the switching circuit. Note the two FETs that operate in a totem-pole arrangement. Normal SMPSUs use a diode in place of Q2 to pass the circulating current when Q1 is off; the arrangement shown in **Figure 2**. Forward voltage drop across this diode loses some power and reduces efficiency – especially at low voltage and high current. By replacing the diode with a FET, switched on when the upper one is turned off, the voltage drop can be reduced – especially so if a FET with low on-resistance, $R_{DS(ON)}$, is used in this position.

A rather novel twist has been adopted by the chip manufacturers to measure load current – something that is needed for overload protection. The load current flows though the channel resistance $R_{DS(ON)}$ of the MOSFET used in the Q2 position. $R_{DS(ON)}$ has a value that is reasonably well defined by the manufacturer and given in data sheets; perhaps not as accurate as a 'proper' resistor, but good enough for most practical purposes. The voltage dropped across Q2 due to the load current (when it is switched on) is fed back into the controller chip and compared against a threshold. If it exceeds this, overcurrent protection measures are enabled – mostly involving lowering the switching duty cycle. The threshold is set by an internal reference voltage and two external resistors (one being the series R shown), so is completely user defined provided $R_{DS(ON)}$ and any extra resistance, due perhaps to PCB tracks, is known.

Bootstrapping

When the upper FET Q1 is switched hard on its source rises to the supply potential on its drain. In order to keep the FET switched on, the gate has to be a few volts above the source, so gate voltage now has to ride above the input

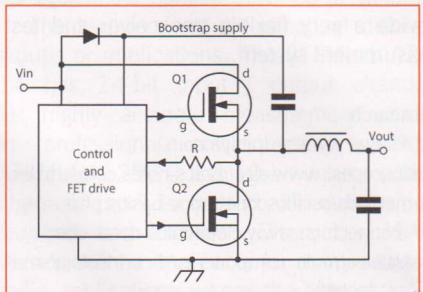


FIGURE 1: The synchronous switching part of the NCP1034 SMPSU circuitry. Resistor R is part of a very neat current monitor arrangement based on measuring the voltage dropped across $R_{DS(ON)}$ of Q2.

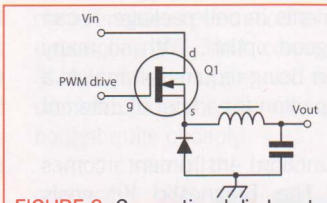


FIGURE 2: Conventional diode setup used in place of Q2 in Figure 1. Voltage drop across the diode contributes to a lower overall efficiency for this arrangement.

TABLE 1: Comparison of switch mode supplies.

eBay module using LM2596			
Input	29.8V	1.03A	30.7W
Output	13.64V	1.85A	25.2W
Efficiency			82%
Heat dissipated			5.5W
NCP1034 synchronous design with 2 xIRF540 FETs			
Input	29.8V	0.92A	27.4W
Output	13.65V	1.85A	25.3W
Efficiency			92%
Heat dissipated			2.1W

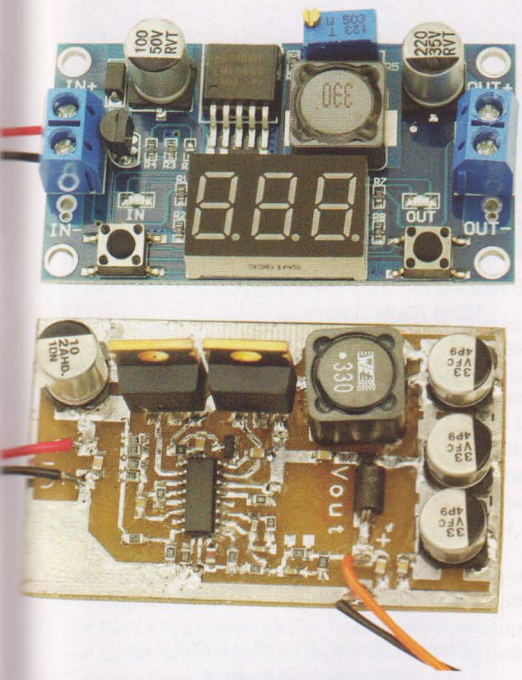


PHOTO 2: Two buck mode SMPSU modules. Top is the eBay Simple Switcher module; bottom is my NCP1034 synchronous switcher.

voltage. This awkward situation is catered for by an arrangement known as bootstrapping. The capacitor and diode, shown as 'Bootstrap Supply' in Figure 1, provide an auxiliary supply to the upper driver stage within the chip. The first time Q1 is turned on, just as soon as its source voltage starts to rise, the sudden increase is coupled back via the bootstrap capacitor and in conjunction with the diode adds to the input supply voltage. So now, provided continuous switching is maintained, the junction of the capacitor and diode will always be at a significantly higher potential than the input. The chip uses this increased supply – whose absolute voltage is toggling at switching frequency – to provide the gate drive to Q1. A voltage clamp inside the chip ensures gate drive is kept down to a level that won't destroy the FET.

A practical design

To use this chip in a real voltage converter, several more parts are needed. The final circuit is a bit too complicated to be worth showing here but a complete design is on the first page of the datasheet [1], which also gives all equations for calculating values of feedback resistor, voltage setting, undervoltage trip and current limit. Using almost exactly that circuit but with resistor values chosen for 13.6V output and a current limit of 4A, I built the module shown at the bottom of Photo 2. I even kept the same component references on the PCB as those in the datasheet. The PCB is double sided with a continuous ground plane underneath and plenty of through links made from copper tape to minimise loop resistance. The circuit is based around IRF540 MOSFETS, which have an $R_{DS(ON)}$ of 80mΩ. Additional 100nF capacitors were liberally sprinkled around and a ferrite bead added on the output for RF decoupling.

Lithium batteries can be damaged or even ruined by being discharged below a certain point, often taken to be 3.0V per cell [3] at moderate discharge or 2.7V for heavy current. Slightly lower values are sometimes adopted There is an undervoltage trip on the NCP1034, which I set to around 25V, but to maintain full safe discharging an auxiliary monitor circuit really ought to be added.

Efficiencies compared

Photo 2 also shows, at the top, a module purchased on eBay. It uses the LM2596 and includes an on-board voltmeter for input and output supplies. Both these two modules perform much the same function so I thought it would be interesting to compare their performance. Using a 30V input (the maximum my bench PSU will go to, and safely within the limit for the LM2596), the outputs of both modules were adjusted to within 10mV of each other at 13.6V. The load was a 21W vehicle bulb so that the converters would be comfortably within their design current limits. The measured results [4] were as shown in Table 1.

Charging the battery

This is the bit I haven't yet fully decided upon. After buying the battery I initially charged it using my bench PSU in series with another PSU, carefully adjusted for 42.0V output with the current limit set to a safe 500mA. A digital voltmeter sat across the battery and I constantly monitored things, including battery temperature. When the current-limited charging reached 42V and current fell to a low level I considered it to be charged. This took several hours (it could be 15 – 20 hours if it had originally been fully discharged) but is a pretty safe way to use these potentially quite dangerous beasts. As lithium battery technology is not hurt by being not fully charged [3], unlike lead-acid, NiCd and NiMH cells, I'm quite happy to use this method as an interim solution.

Although slow charging with manual monitoring is pretty safe, it is time consuming and needs to be done at home. Ideally I want a charger that will operate anywhere, even from the car 12V supply. Single-chip charge controllers for one and two cell lithium batteries abound – just look in the catalogues – but there don't seem to be any that allow the user to set the charging voltage with a potential divider. Perhaps quite sensibly so, as the magic 4.2V per cell needs to be defined to a higher accuracy than average mass produced resistors will allow.

There are many voltage references around these days that offer high stability and precision. One example I use is the MAX600x family with 1% initial calibration and 100ppm per °C temperature stability (0.2% over 20°C change). There are plenty of better ones. So one of those as the reference for the 10 bit (0.1% resolution) A/D converter in a PIC micro, used together with the PIC's own pulse width modulator output could allow a custom charger with sufficient voltage accuracy and stability, after initial calibration, to ensure safe charging at a higher current. Let's say 1 to 1.5A as a nice safe compromise for this 4.4Ah battery. Using a fly-back, or boost, converter topology to charge the higher voltage battery has two advantages: it will work from a nominal 12V such as the car or shack PSU; also, boost converters are themselves virtual current sources. So there is no simple failure mechanism that can cause massive over-current or over-voltage, unlike the case of a linear regulator failing short circuit. Using a PIC as the controller allows other monitoring tasks like charge current and temperature and a charge timer to be automated. But all that is a project for the future.

References

[1] Search for NCP1034 at, for example, UK.Farnell.com and download the datasheet there.

[2] The term 'buck mode' is used for the SMPSU topology where output voltage is lower than the input. The origin of the term is not certain, but could be related to a 'bucking bronco' perhaps, in the way the device switches and voltages swing. Or the Americanism of bucking to mean reducing. A discussion on the RSGBTechnical group came to no definitive conclusion. The converse, 'boost mode', is more obviously meaningful.

[3] See https://batteryuniversity.com – it's a wonderful resource, telling you more than you'll ever need to know about the care and feeding of all battery types.

[4] Perpetual Motion? My first measurements to gauge efficiency used the analogue meter on the bench PSU to measure input current and a clamp-on ammeter for the load. Calculating power in and out suggested the eBay LM2596 module had an efficiency around 92%, which was somewhat unlikely as it ran quite warm. My own module showed a quite impossible 100.7% efficiency – in spite of the two FETs being warm to the touch. More accurate digital ammeters were later used. This result does illustrate just how difficult some measurements can be when a small difference between two not terribly precise measurements are needed to generate a final answer.

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Please send news reports to radcom@rsgb.org.uk. To get future events listed here and put on GB2RS, email details of your meetings as early as possible to radcom@RSGB.org.uk Include your club name, RSGB Region number, contact name, callsign & phone number, date and details of meeting. **Example:** Fraser Road Radio Club, Region 9, Steve, M1ACB, 01234 832 700, 29 Oct, talk on Meerkat Farming, Phil, G9ABC. We normally acknowledge all submissions within 3 working days: if you don't hear from us, please phone. We don't normally include 'closed', 'TBA' or 'every Tuesday'-type entries. **The deadline for the November issue is 26 September and for December it's 24 October.** For GB2RS, the deadline is 10am Thursday before broadcast.

CLUB EVENTS CALENDAR

INTERNATIONAL

Pafos Radio Club, Cyprus
Richard, 5B4AJG, 00 357 97 857 891, 5b4ajg@gmail.com www.cyhams.org
Meets 3rd Thursdays at the Hole in the Wall Restaurant, Coral Bay, 6 for 6.30. Visitors welcome.

International Federation of Railway Radio Amateurs (FIRAC) www.firac.org.uk
Nets Sun 14.320MHz at 0830UTC, Wed 21.3MHz at 1430UTC g4gnq@hotmail.co.uk

NATIONAL

Amateur Radio Caravan & Camping Club, membership@arcc.org.uk
Rallies September: Wolvey, Leicestershire

AMSAT-UK – http://amsat-uk.org/
Open net every Sunday, 10am, 3.780MHz (±)

British Railways ARS
Ian, G4EAN, www.brars.info
23 (Tuesday) AGM at the Brunswick Inn in Derby, 11am for chats, 1.15pm formal start

Civil Service Amateur Radio Society
Weekly net every Tuesday, 8pm, 3.763MHz

CDXC – The UK DX Foundation – cdxc.org.uk
For all interested in HF DX and contesting

Radio Amateur Old Timers' Association
MemSec@RAOTA.org, www.RAOTA.org
Diamond Jubilee year. Nets: see website

REGION 1: SCOTLAND SOUTH & WESTERN ISLES

RM: Anthony Miles, MM0TMZ, RM1@rsgb.org.uk

Cockenzie & Port Seton ARC
Bob, GM4UYZ, 01875 811 723
5 Club night

Edinburgh & District ARC
Norman, GM1CNH, 0774 094 6192
6-7 433MHz field day portable operating
21 Trip to Galashiels radio rally
27 Social evening

Kilmarnock & Loudoun ARC
Len, GM0ONX, Klarcinfo@gmail.com
2, 16, 30 Training and construction night
9, 23 Club meeting

Lothians RS
Mike, MM0MLB, secretary@lothiansradiosociety.com
10 Surplus equipment sale
24 Club night

West of Scotland (Glasgow) ARS
Jack, GM4COX, www.wosars.org.uk
3, 10, 17, 24 Solder Group
5, 19, 26 Discussing winter programme

REGION 2: SCOTLAND NORTH & NORTHERN ISLES

RM: Andrew Burns, MM0CXA, RM2@rsgb.org.uk

Dundee ARC
Martin, 2M0KAU, 0776 370 8933
2 2m VHF contest
9, 23 Club night and training
21 Galashiels rally visit
30 Talk

Inverness & District ARS
John, GM0OTI, 01463 791 444
3 Club net, 145.575MHz, 8pm
10, 24 Club night, 7.30pm

REGION 3: NORTH WEST

RM: Kath Wilson, M1CNY, RM3@rsgb.org.uk

Bolton Wireless Club
boltonwireless@gmail.com
8, 22 Meeting with talk

Chester & District RS
Bruce, M0CVP, 01244 343 825
2, 9 UKAC / Committee meeting
16 Back to Basics – Brains Trust
23 Intro to split frequency working, GW4MVA
30 What is FT8? Glynn, GW4MVA

Macclesfield & District RS
Greg, M0TXX, info@gx4mws.com
1, 8 Shack OTA / film night, radio related
15, 22, 29 Talk / construction / social night

Oldham Radio Club
Mike, M1CVL, 0740 276 3203
3, 10, 17, 24, 31 2m FM net, 8pm
4, 11, 18 Club night & Intermediate course
7 C4FM Net, FCS004-55, 9.30am
14, 28 D-Star Net – REF 14B 9.30am
19 Setup for JOTA, 7.30pm
20-21 GB2GMN for JOTA, Scout HQ, Middleton, 9am
25 Construction group & Intermediate course

South Manchester R&CC
Ron, G3SVW, 01619 693 999
4 Constructors' clinic, Ged, G8RSI
11 Kit building updates, Phil, M1CYV
18 Soldering evening, Bob, M6TMA
25 Intermediate syllabus, Ron, G3SVW

Stockport Radio Society
Heather, M6HNS, 0750 690 4422
2 Society meeting
8, 22 Advanced tutorial
9 Net, 51.550MHz FM, 7.30pm
11, 32 Net, 145.375MHz FM, 7.30pm
16, 23 Radio night/ Skills night

Thornton Cleveleys ARS
John, G4FRK, 01253 862 810
1 Natter night / practical / on air
8 EchoLink, John, M0JFE
15, 22 AGM / New Chairman's address
27-28 CQ Worldwide SSB contest
29 The Raspberry Pi, Ray, MORGV

Wirral ARS
Bill, G4YWD, 0780 488 4245
2 Natter night & registration for Intermediate course
3 AGM, then construction competition judging
4, 11, 18, 25 G3NWR ATV net, talkback 144.75MHz
9, 16, 23, 30 Natter night, Intermediate course
10 Movie night
17, 24, 31 G3NWR on the air from 7pm

REGION 4: NORTH EAST

RM: Ian Douglas, G7MFN, RM4@rsgb.org.uk

Angel of the North ARC
Nancy, G7UUR, 0799 076 0920,
1 On the air
5 Setting up for eDay at Central Library, 6pm
6 10am-3pm eDay, Central Library
8 Shetland SOTA DXpedition, David, G0EVV
15, 22, 29 JOTA prep, 7pm / JOTA roundup & OTA
20 JOTA, 8am-4pm, House on the Hill

Bishop Auckland RAC
Gail, M3GBB, 0191 372 0473
4, 11, 18, 25 Club night and training

Blyth Radio Club
John, 2E0DCV, 0191 237 1729
3, 31 Club night & Foundation training / club night
10, 17, 24 Club night, Foundation & Morse training

Durham and District ARS
Michael, G7TWX, 0782 692 4192
3, 10, 17, 24, 31 Club night

Hambleton ARS
John, M6BHP, 0798 000 3293
3, 17, 31 Club night

Hornsea ARC
Gordon, G3WOV, 01377 240 573
3, 17 Video night / 80m Data
10, 14 Prep for rally / HARC Rally
24 Port Health Inspector, M0INM
31 My shack, John, G3XYF

Ripon & District ARS
David, G3UNA, 01423 860 778
4, 11, 18, 25 Club night

Scarborough ARS
Jeremy, M0JLP, 0788 905 1696
12-14 GB2YMR at North Yorks Moors station

Sheffield & District Wireless Society
Krystyna, 2E0KSH, 0788 406 5375
10, 24 Social night & training
17, 31 Construction competition / meal out

Sheffield ARC
David, G6DCT, littlewood20@btinternet.com
1 PSK31 operation, Steve, M1ERS
8, 22 Club night
15, 29 Shack night operating GX3RCM

Spen Valley ARS
Russell, G0FOI, 01274 875 038
4 QRP SSB kit appraisal
18 Shack meeting and on the air

Tynemouth ARC
mail@g0nwm.com, www.g0nwm.com
5, 19 No meeting but please note new venue
12 Single board computers and amateur radio
26 Radio contesting

York Radio Club
www.yorkradioclub.uk
3, 10, 17, 24, 31 Net, 8pm, 145.450MHz
4, 11, 18, 25 Club night, 8pm
7 Breakfast meeting, 10am

REGION 5: WEST MIDLANDS

RM: Martyn Vincent, G3UKV, RM5@rsgb.org.uk

Bromsgrove & District ARC
John, G4OJS, 0788 967 8303
5, 12, 19, 26 Club night

Burton ARC
Rob, G6EIH, 0781 214 6333,
3 Club night, remote SDR Flex 6000 for use
4, 11, 18, 25 Open net, 145.575MHz, 8pm
7, 14, 21, 28 Open net, 145.575MHz, 10am
10, 17, 24, 31 Club night

Coventry ARS
John, G8SEQ, 0795 877 7363
5 Reflections on Iceland
12, 19 AGM / Video night
26 Radio workshop & on the air

Gloucester AR&ES
Anne, 2E1GKY, 01242 699 595, daytime
1 Amateur radio on a budget, Sean, 2E0SFQ
3, 10, 17, 24 Club net, 7.30pm, 145.475MHz FM
4, 11, 18, 25 Net, 7.30pm, 145.475, then 80m SSB
5, 12, 19, 26 Club net, 7.30pm, 432.220MHz SSB
8, 29 Informal activities
15 2m Slim Jim using 300Ω ribbon cable, Brian, G4CIB
22 Venue closed – no meeting

Malvern Hills RAC
Dave, G4IDF, 01905 351 568
9 Getting going on LF/MF
23 Informal

Midland ARS
Norman, G8BHE, 0780 807 8003
3 Open meeting, ragchew, training classes
10 Committee meeting, training classes
17 31 AGM / new committee & planning next year
24 General meeting, shack on air, training

Mid-Warwickshire ARS
midwarwicks@gmail.com
9 Homebrew and construction
23 Programme planning for 2019

Rugby ATS
Steve, G8LYB, 01788 578 940
2, 9, 16 UKAC, CW practice, training, projects
6 Antenna discussion, OTA, training, projects
7 Hut maintenance; management meeting
13 Using 'scopes, Steve, G8LYB; OTA, projects
20, 27 On the air, training, projects
23, 30 On the air, CW practice, training, projects
27 Preamps & Noise Figure, Steve, G8LYB

Salop ARS
Eamon, M0MEB, salopamateurradio@gmail.com
2, 9, 16, 23, 30 CW net, 4.30pm, 144.070MHz
3, 10, 17, 24, 31 Club net, 8.30pm, GB3LH
4, 7 Natter night / committee meeting
11, 18 Natter night
25 AGM, Telepost Club SY2 6BT

Solihull ARS
Roger, G4BBT, 0121 743 7277
4, 11, 25 Net, 8pm, 145.450MHz
18 AGM

South Birmingham RS
Gemma, M6GKG, gemmagordon.m6gkg@gmail.com
1, 8 Checking equipment in the shack
2, 9, 16, 23, 30 Coffee morning, 11am, visitors welcome
4, 11, 18, 25 Training classes with Dave, G8OWL
5, 19 Open meeting and ragchew

Sutton Coldfield ARS
Robert, rob2e0zap@gmail.com
1, 15, 29 Open net, ±145.250MHz, 7.30pm
8, 22 Club meeting
9 Open net, 70.475MHz, 7.30pm
23 DMR open net, slot/local 2 gb7fw, 7.30pm

Telford & District ARS
John, M0JZH, 0782 473 7716
3 Committee meeting, GX3ZME on the air
10, 17 Winter project ideas / surplus sale
24 Talk, Callum McCormick, M0MCX
31 Soup and roll Halloween social

Wythall Radio Club
Chris, G0EYO, 0771 041 2819
2 Free & easy social evening
7, 14, 21, 28 Net, 145.225MHz or GB3WL, 8pm
9, 16 Committee meeting / AGM
23 3 short talks of 15 mins each
30 6cm demo, Matt, G8XYJ

REGION 6: NORTH WALES
RM: John Pritchard, MW0JWP
RM6@rsgb.org.uk

Porthmadog & District ARS
Peter, GW0DFK, 0773 177 1319
18 Construction evening

Wireless in Wales ARC
Hugh, GW0WWQ, mc0wiw@gmail.com
1 HF at the Wireless in Wales Museum
8 GB0WIW marking Wireless in Wales Museum's 10th anniversary

REGION 7: SOUTH WALES
RM: Glyn Jones, GW0ANA, RM7@rsgb.org.uk

Aberystwyth & District ARS
Ray, GW7AGG, 01970 611 853
11 AGM

Blackwood & District ARS
Rob, MW0CVT, 0797 471 7152
5 Start of new Foundation class

Carmarthen ARS
Andy, GW0JLX, 0776 828 2880
2 On air & social
16 Digimodes part 2, Peter, GW4VRO

Llanelli ARS
Steve, MW6CCG, 0787 849 4337
1, 15 Social evening / DVD night
8, 22 On the air & club raffle / on the air
29 Junk sale and club raffle

REGION 9: LONDON & THAMES VALLEY
RM: Tom O'Reilly, G0NSY, RM9@rsgb.org.uk

Aylesbury Vale RS
avrs@rakewell.com
10 Discussion evening

Bracknell ARC
David, M0XDF, M0XDF@alphadene.co.uk
3, 17, 24, 31 Open net, 8pm, 145.375MHz
10 Satellites, Craig, G1WTW

Hammersmith ARS
m0xhs@outlook.com
4, 11, 18, 25 Club net, GB3LW, 8pm
12, 26 Club night and on the air

Milton Keynes ARS
Phil, G4FVZ, 0780 263 6998
1 Community radio broadcasting, Mick Bannister, Secklow Sounds Ltd
22 AGM

Newbury & District ARS
Rob, G4LMW, 0797 088 5614
24 Ferrites & baluns, Mike, G8HKS

Radio Society of Harrow
Linda, G7RJL, lcasey100@outlook.com
5 EGM, Lincolnsfields Centre, 8pm
7, 14, 21, 28 Club net, 1938kHz LSB, 12 noon
8, 15, 22, 29 Net, 145.5/145.35MHz FM, 8.15pm
19 Wireless equipment on the *Titanic*, G1IGA
28 Outdoor event, Old Redding car park 2-5pm

Reading & District ARC
Laurence, G2DD, 0758 470 6625
11 Marconi: maritime wireless telegraphy, Dr Elizabeth Bruton
25 Junk sale

Shefford & District ARS
David, G8UOD, 01234 742 757
4 70th anniversary celebration night
11 Closed due to Shefford Fun Fair
18 Junk sale
25 Feeding antennas part 1, Richard, G3NII

Silverthorn Radio Club
Robbie, M0HVC, 0742 913 1105
5, 12, 19, 26 Club night, 7.30pm

Southgate ARC
Keith, G8RPA, g8rpa@arrl.net
11 Planning meeting for 2019
20-21 Jamboree on the Air

Whitton Amateur Radio Group
Ian, G0OFN, 0795 620 3495
5, 12, 19, 26 Club night & on the air, 8pm

REGION 10: SOUTH & SOUTH EAST
RM: Keith Bird, G4JED, RM10@rsgb.org.uk

Brede Steam ARS
Martin, M0MJU, m0nuc.bsars@gmail.com
2, 6, 9, 16, 23, 30 Operating at the shack 9am-2pm

Bromley & District ARS
Andy, G4WGZ, 01689 878 089
3, 10, 17, 24, 31 Net, 145.500MHz and QSY, 9pm
7, 21 Foundation course day 1/day 2 and exam
16, 30 SDR construction evening / club meal

Chippenham & District ARC
secretary@g3vre.org.uk
2, 9, 16, 23, 30 Club night
4, 11, 18, 25 Foundation course, 7pm

Crawley ARC
Richard, G3ZIY, 01342 843 545
24 FPGAs, Alister, G3ZBU

Cray Valley RS
Dave, G8ZZK, 0773 954 9822
4 Surplus equipment sale
18 QRP, Tony, G4WIF

Crystal Palace R&EC
Bob, G3OOU, 01737 552 170
3, 10, 17, 24, 31 Net, 8pm, 145.525MHz ± QRM
5 Building a compact VHF aerial
5 Intro to PSUs, Bob, G3OOU

Darenth Valley Radio Society
Mike, G8AXA, 0788 415 7776
10 Baluns, Mike, G8AXA
24 Programme for 2019 & natter night

Dorking & District RS
David, M6DJB, djb.abraxas@btinternet.com
23 Logger 32, Mike, G4PFF

Fareham & District ARC
Chris, G7MFR, 0781 749 8772
3, 17 Club night + bar
10 DF Hunt in the dark
24, 31 Film night/ Junk sale

Farnborough & District RS
Mel, M0JMR, sec@farnboroughradio.org.uk
10, 24 Natter night
19-21 GB0GUN at Bisley for JOTA

Fort Purbrook ARC
Chris, G3WIE, g3wie@fparc.org.uk
1, 8, 15, 22, 29 Open net, 8pm, 145.275MHz
5 AGM in the marquee atop the Fort
6-7 RSGB DX contest, 23cm Trophy contest
26 Club meeting in room FP-1

The November deadline is 26 September and the December deadline is 24 October

Hastings E&RC
Gordon, M3YXH, 01424 431 909
7, 14, 21, 28 Net, 144.575MHz, 11am
24 I was a cold war spy, Brian Spiby
11, 25 Club night / talk
19-21 GB1SJM for JOTA, Margate

Hog's Back ARC
Ray, G4LUA, 0118 981 4174
8 Natter night
22 54 years of EME, Peter Blair, G3LTF

Horndean & District ARC
Stuart, G0FYX, 02392 472 846
5 Natter night
19 AGM

Mid Sussex ARS
Peter, G4AKG, 01444 239 371
5, 19 Radio night / radio night & table top sale
12 AGM
19 26 On the air

Southdown ARS
Tom, M6ONX, secretary@sars.club
1 GEE nav alternative, Bob Downhill
3 Hailsham shack meeting, 10.30am
3, 10, 17, 24, 31 Cafe meeting 12.30; FM net, 145.275MHz, 8.30am, CW net, 144.060MHz, 7pm

Surrey Radio Contact Club
John, G3MCX, 020 8688 3322
1 Surplus equipment sale
4, 11, 18, 25 Net, 70.300MHz, 8pm
5, 12, 19, 26 Net, 145.350MHz, 8pm
7, 14, 21, 28 Net, 1905kHz, 9.30am
15 Chat, fix-it & skills, John, G8MNY

West Kent ARS
Keith, G4JED, 01732 446 331
8 Amateur radio in films, Paul, G4DCV

REGION 11: SOUTH WEST & CHANNEL ISLES

RM: Martin Sables, G7NTY, RM11@rsgb.org.uk

Appledore & District ARC
Alan, M6CCH, 01237 422 833
15 Talk, Mike, G4KXQ

Bristol RSGB Group
John, G4DVV, johnthomas@blueyonder.co.uk
29 Goonhilly Satellite Station

Cornish RAC
Steve, G7VOH, 01209 844 939
3, 31 Committee meeting
4, 18 Main meeting / social evening

Exmouth ARC
Mike, G1GZG, 01395 274 172
3 Morse practice
17 G0XRC OTA; websites & HTML explained

Gordano ARG
Malcolm, G4KPM, mal@g4kpm.co.uk
24 Club night

Holsworthy ARC
Ken, G7VJA, 01237 441 074
14 Rally at Holsworthy Community College

North Bristol ARC
Mat, G7FBD, g7fbd@gb3bs.com
5 Relax & chat, operating, committee meeting
12, 19 Quiz night / relax & chat, operating
26 Historical radio control, Dave, G7BYN

Saltash & District ARC
Mark, M0WMB, 0781 054 8445
4, 18 Open meeting

South Bristol ARC
Andrew, G7KNA, 0783 869 5471
4 Calendar 2019 planning
11 Canals, Waterways and Narrowboats
18, 25 Committee, AGM / Open house & OTA

Torbay ARS
John, G4VUD@tars.org.uk
5, 19, 26 Club night / Club night with speaker
12 Club night with business meeting

Weston Super Mare RS
Martin, G7UWI, 01934 613 094
1, 8, 22, 29 Construction, Morse, operating
15 Radio astronomy, Gordon Dennis

Yeovil ARC
Bob, G8UED, 01963 440 167
4 The first lady radio hams, G3MYM
5, 19 Construction and operating at Sparkford
11 VHF/UHF propagation modes, G3ZXX
18 Morse Practice
25 Vintage & antique radio equipment, G3MYM

REGION 12: EAST & EAST ANGLIA

RM: Peter Onion, G0DZB, RM12@rsgb.org.uk

Braintree & District ARS
Edwin, G0LPO, 01376 324 031
2, 16, 30 Club net, 8pm, 145.375MHz
9, 23 JOTA planning / natter night & TX Factor 19

Cambridge & District ARC
Richard, G4AWP, 0770 229 5300
26 Surplus sale

Essex CW Club
Andy, G0IBN 0745 342 6087
27 Essex CW Club Boot Camp

Essex Ham
Pete, M0PSX, news@essexham.co.uk
1, 8, 15, 22, 29 Net, GB3DA, 8pm, www.essexham.net
2 Online Foundation course (www.hamtrain.co.uk)
7, 20-21 Essex YL Net, GB3DA, 8pm / JOTA

Felixstowe & District ARS
Paul, G4YQC, pjw@btinternet.com
8 Supper
22 Worked All FDARS contest

Great Yarmouth Radio Club
Simon, M0TRJ, g3yrc.radioclub@gmail.com
12, 26 Club night & radio operation, 7.30pm

Harlow & District ARS
Jackie, 2E0SIJ, secretary@g6ut.com
4 Intermediate course enrolment
20-21 JOTA for Scouts and Guides

Harwich Amateur Radio Interest Group
Kevan, 2E0WMG, 0749 352 1049
10 Talk by Karl Lumbers of Trinity House

Loughton & Epping Forest ARS
Dave, M0MBD, 0798 016 5172
4, 11, 18, 25 Net, 144.725MHz, 8pm

Lowestoft District & Pye ARC
secretary@ldparc.co.uk
4, 18, 25 Club evening
8, 22 Informal / operating evening
11 Talk or film

Norfolk ARC
Chris, G0DWV, 01603 898 308
3, 10 Skype talk by Bob Heil / table top sale
17, 31 Informal + Morse / informal + Bright Sparks
24 Life and death of stars, Paul Money

Peterborough & District ARC
Alan, G8XLH, secretary@padarc.co.uk
1, 8, 15, 22, 29 Club net, 1.980MHz, 8pm
2, 16 Club net, 145.400MHz, 8pm
10, 19-21 EGM and JOTA planning / JOTA
24 LF reception, David, G4ETG

South Essex ARS
Terry, G1FBW, 0798 607 0040
9 Ex-military radios, Andy Tyler, G1GKN

Thames ARG
Patrick, G8JLM, 01621 855 461
5 Isolated DXing, John, G4LTH
19 Target night, 8pm

Thurrock Acorns ARC
Gordon, M0WJL, acorns@taarc.co.uk
2 SSTV net, 7.30pm, 144.500MHz
4, 10, 11, 18, 25 FM net, 7.30pm, 145.5MHz
16 Introduction to DMR, Gary, M6GPM

REGION 13: EAST MIDLANDS

Regional Manager: Jim Stevenson, G0EJQ
RM13@rsgb.org.uk

Derby & District ARS
radio@dadars.org.uk
2, 9 Junk sale / committee meeting
16 Integrating old & new British Gas PMR, G8VYO

Kettering & District ARS
EdM0TZX, M0TZX@yahoo.com
4, 11, 18, 25 Net, 7pm, 145.300MHz FM

Lincoln Short-Wave Club
Pam, G4STO, 01427 788 356
3 Nibble & natter night
4, 18 Club net, GB3LM/GB3LS 8pm
6, 13 Surgery / new licensee mentoring, 9.30am
10 10-minute talks by members
11, 25 Club net, 145.375MHz, 8pm
20, 27 New member induction / open shack, 9.30am
15, 17 Committee meeting/formal meeting
24 Mobile phone photography, Alistair, M0TEF
31 Used equipment sale, 7pm, Aisthorpe Village Hall

Loughborough & District ARC
Chris, G1ETZ, 01509 504 319
2, 9 AGM 8pm / internet video on aerials
16, 30 Natter night / practical evening
23 The other man's shack, Phil, G4DCI

Melton Mowbray ARS
Phil, G4LWB, 01664 567 972
19 Club meeting, 7.30pm

Northampton Radio Club
Odette, M6KZW, odettedawkins@gmail.com
7 Trip to Royal Signals Museum (guests welcome)

Nunsfield House ARG
Paul, G1SGZ, pr@nharg.org.uk
1, 8, 15, 22, 29 Shack night
4, 11, 18, 25 Club net, 8pm 145.325MHz
5, 12 Projects night / club night
19, 26 Surplus sale / TX Factor

RAF Waddington ARC
Bob, G3VCA, 0797 116 6250
1, 8, 15, 22, 29 Club net, 145.325MHz, 8pm
5, 12, 19, 26 Club night

South Kesteven Amateur Radio Society
Stewart, M0SDM, 0794 408 5113
3, 10, 17, 24, 31 Club net, GB3GR, 8pm
5, 19 Show and tell night / social night
20-21 Jamboree on the Air

Welland Valley ARS
Peter, G4XEX, QTHR, 01858 432 105
1-28 GB6FWW, Mail Street, Great Bowden
1 Open net, 145.275MHz
15 Construction night: RF power/SWR meter

INTERNATIONAL

On 25 & 26 August, Pafos Radio Club was pleased to welcome an IOTA Group (Islands on the Air) who activated Manijin Island, AS-120, just off the coast of Pafos, Cyprus. They were accompanied by Norman, 5B4AIE. They enjoyed a final meal before leaving Cyprus. Those attending the meal were Mary daughter of 5B4AIE, Colin, MM0NDX, Emil, DL8JJ, Norman, 5B4AIE, Paul, G4PVM and Helen, XYL of 5B4AIE.

REGION 2: SCOTLAND NORTH & NORTHERN ISLES

Members of Dundee ARC visited the rally at Criarnlarich. Many bits and pieces were bought by those who attended. Two members ventured out to activate four of the local lighthouses for ILLW, along the banks of the River Tay.

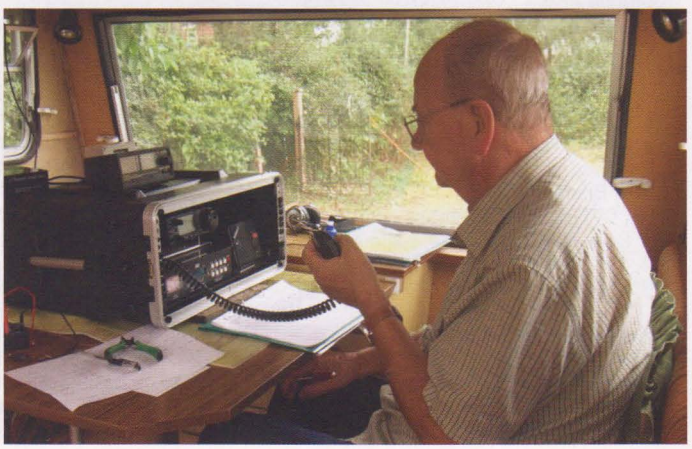
REGION 3: NORTH WEST

South Manchester Club celebrated the 70th anniversary of its first meeting on 20 August 1948. They had a party with guests of honour RSGB President Dave Wilson and Region 3 Manager Cath Wilson. The party was also attended by two of their international members – from Sweden and France. Chairman of the Club, Ron, G3SVW, longest serving member at 57 years, gave a short talk on the history, recalling stories of the very early members and the venues that were used. There was a display of 1948 members' QSL cards and photographs showing RAE training classes taking place in 1950. The RSGB President made a short speech and Cath Wilson helped the Club Chairman cut the large chocolate birthday cake.

Furness ARS held their second (and last of 2018) 80m ARDF event at the beginning of August near Ulverston. A friend of a club member was persuaded to set the beacons out and the course was set. Club members set out with their 80m receivers and the 5 beacons were found within 35 to 55 minutes – some were hidden 'well off the beaten track' and took some finding. The last August meeting was a portable meet on Birkrigg common (IO84KD) where club members set up a range of antennas and radio kit including portable trapped dipoles, VHF Yagis, 6m whips and HF whips (see photo above). Members worked stations in Europe on 6m SSB, Europe, Oman and the USA on 20m SSB, and local 2m FM. There was even some 23cm digital and FM ATV reception tests carried out.

REGION 4: NORTH EAST

It's quite a busy time for members of **Pontefract & District ARS**. Over the weekend of 21/22 July they operated GB1AVR (Ackworth Vintage Rally) at Water Tower Field between Pontefract & Ackworth. Saturday saw a great many visitors to the caravan, most amateurs, but also a few interested passers-by. Unfortunately the bands weren't too good. Sunday was totally different, fewer visitors, but a massive pileup on 40m lasting a couple of hours. The following weekend it was exams. Jeff took his Foundation, immediately followed by the Intermediate. Vic, M3VBT took the Intermediate exam. Both are now eagerly awaiting their 2E0 calls. On Yorkshire Day and the club operated GB0YD at Royd Moor. Good contacts were made, including one with Kevin, M0XLT, deep in the valleys of the Yorkshire Dales. Peter, GM3VMB, near Lockerbie was another excellent contact, both on 2m FM. On HF, 40 & 80m were the main bands used.



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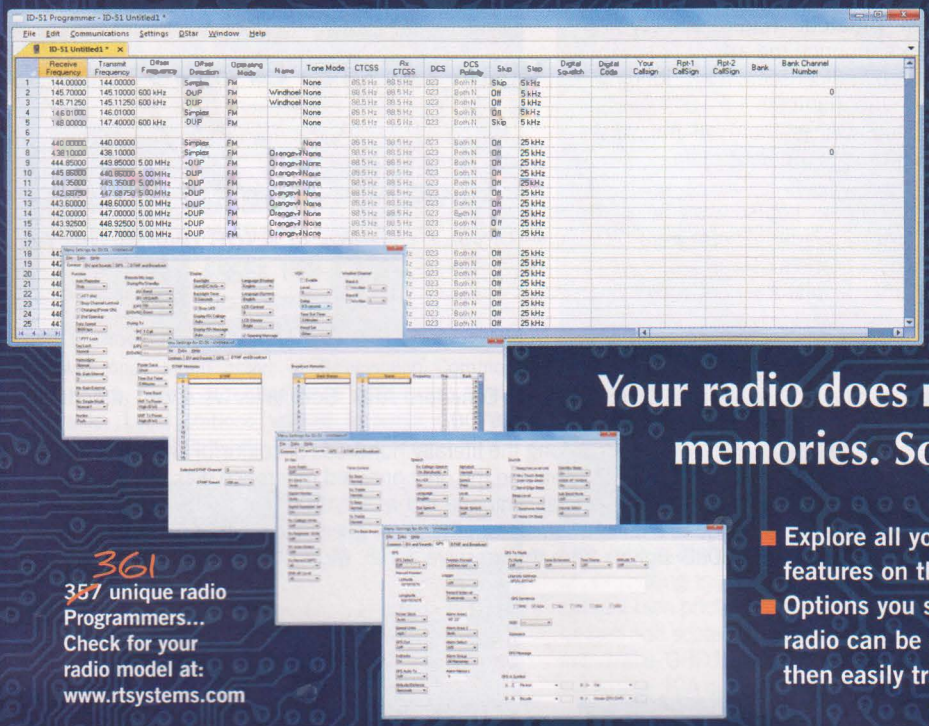

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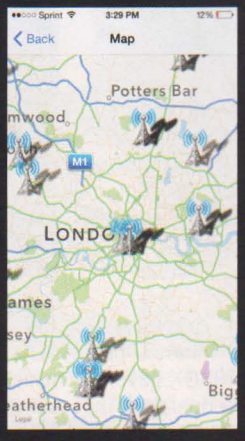

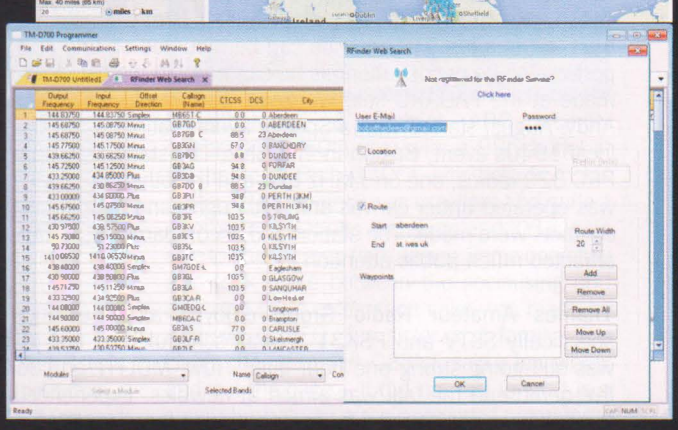

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REGION 6: NORTH WALES

Wrexham ARS send congratulations to Stephen who passed his Foundation exam and is now MW6OXV. Andy & Peter passed the Advanced level and are now M0JFA and MW0PTY. Well done all.

REGION 7: SOUTH WALES

Carmarthen Amateur Radio Society is delighted to announce the arrival of seven new Foundation licensees from training provided by club members – a 100% pass rate. The club wishes them all the very best for their time in amateur radio.

A Train the Trainers course was held at **Barry ARS** on 21 July. There were 20 delegates plus 3 trainers. It was a very well received course despite the heat wave!

REGION 10: SOUTH & SOUTH EAST

John, G4IRN recently gave his VU4G (Andaman Islands) talk to **Wey Valley ARG** and **Echelford ARS**. Both talks were well attended.

There was something different at this year's Portsmouth Kite Festival. Hidden among the literally hundreds of colourful kites and windsocks was a rainbow coloured 81 square foot sled kite for GB0PKF. Instead of the usual flying line the only outward difference was the thick white electric fence wire tethering it the ground spikes. This formed a 200 foot, almost vertical, antenna fed against a ground. The team from **Fareham & District ARC**, led by Ant, M0STD and Michael, G0TZE, attracted quite a bit of interest from the show goers and visiting radio amateurs. Contacts were made as far afield as Panama. Local contacts reported +60dB signals from the massive aerial. Most of the contacts were made on 20m with a few on 40m into Europe and North Africa.

REGION 12: EAST & EAST ANGLIA

Peterborough & District ARC had a talk and assembly demonstration of Moxon antennas by Andy, M0PXY. A keen antenna designer and constructor, he uses available software to work out the dimensions of the elements and spacing. He was keen to point out that HF Moxon antennas are light, easy to build and cheap, plus the gain is good. Andy built a 12m example at the meeting in less than 20 minutes. The antenna can be mounted on any pole. He only operates portable so he needs antennas he can carry in his car. A lot of the DX contacts made at the PADARC field weekend were made on a 20m Moxon made by Andy. August started with a Special Event Station in the Cold War section of a local 1940s event, Baston in The Blitz. The station set up was two Clansman PRC 320 radios, one on 7MHz LSB and the other on 14MHz USB. The station was operated under canvas and, although band conditions were poor, several contacts were made. The station and accompanying display of Clansman radio attracted much public attention.

Thames Amateur Radio Group enjoyed a presentation on datamodes, specifically SSTV and PSK31. It was scheduled to last just 20 minutes but was still going strong one hour later. Huw, M0LHT and Jon, M0KGX gave a live demo and the talk was aimed at newbies. Experienced data operators in the audience got involved by contributing to the discussion, but the aim was to motivate newcomers to the mode so everyone was involved.

Liz Turrell was in for a surprise when she visited Essex Wildlife Trust in Mucking, Essex on 11 August. There was a special event station, GB1EWT, set up by **Thurrock Acorns ARC** who were operating FM, SSB, FT8 and, importantly for Liz, CW. This brought back memories of her mother who had been a Morse operator during the war at RAF Calshot. Her mother returned to her old WRAAF station a few days before she died and sent her final Morse message in 1993 which read: "Hello this is NORAH". Liz was delighted to be asked to re-send her mother's message using a straight key. This nostalgic moment was the highlight of the visit that also included QSOs from the USA and Japan.

Essex Ham was once again active at Galleywood Common. Despite short notice, over a dozen members and visitors turned up to play radio. Local stations worked included GB0TBW (ILLW) and GB2RN (HMS Belfast)

South Essex ARS held a radio night with the club's latest radio purchase available for members to try. Pictured here are Dorothy, M0LMR and Andrew, 2E0ONH, operating on 20m.

Members of **Braintree & District ARS** brought the projects that they had been working on or putting to good use over the past twelve months for the club's construction contest (see photo above). After describing their entries, they were scrutinised, peer judged and scored. In third place was Geoff, G1GNQ with his 144MHz preamplifier, with Mike, G8DJO second with his battery of four lithium phosphate cells capable of producing 20A output, with integrated safety management and monitoring devices for operating /P. Winner of the club's Rob Taylor Construction Shield was John, G6LJF for his self-designed control box to switch output from two transceivers through a system of shielded relays into one HF antenna, including switching for voice and data modes and an amplifier to increase gain from one of the radios. An illustrated talk by Paul Bingley from the Ridgewell Airfield Commemorative Museum told of how this strategic airfield arose from agricultural fields in the throes of WWII. First used by RAF 90 Squadron, then by USAAF 381st Bomb Group, and finally back to RAF 94 & 95 Maintenance Units, they learned of the successes and of the sadness of the significant losses sustained by sorties flying from the location. Derek, G3MMA who was posted at the airfield between 1951 and 1955 then gave an account of his personal experiences and anecdotes.

REGION 13: EAST MIDLANDS

Two members at **Nunsfield House ARG** have recently gained their Full licence. Congratulations to Andrew, M0TDY and Steve, M0OSI. Special thanks to the course tutor Adrian, M0OJR, exam invigilators Tony, G6MWS and Ken, G0JKC and to Ken, G3OCA for organising the course.

RAF Waddington ARC operated a special event station from Newark Air Museum during their 1940s weekend. In keeping with the weekend theme the club displayed a T1154 and a R1154, both from a Lancaster. These vintage items attracted much interest. Bob, G3VCA dressed in simulated 40s flying gear. It was a good and interesting weekend with 70 QSOs made and much interest from the museum visitors.

Loughborough & District ARC recently celebrated its 60th year with a BBQ buffet at the home of Phil, G4DCI with help from his partner. The weather was excellent and quite a number of the clubs members and XYLs were able to attend, even from Jersey. Some operating also took place between the socialising and eating. A great celebration cake was made by Andrew, G7SEG, his sister and family. The club's chairman, Ian, G8SNF, said a few words and cut the cake – it did not last long. It is a small club with an active and varied programme and new members are most welcome.

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CTCSS ENCODER AND DECODER KITS, DTMF Kits and Modules, PIC Microcontroller Development Kits. www.cstech.co.uk

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Optimized for low noise. Linear regulators, better decoupling, improved heat dissipation, +/-0.5ppm TCXO, 5V input etc. For more information on this, our other SDRs and accessories go to technofix.uk or www.technofix.co.uk

QRP CW X-TALS 6OFF - 3.55, 3.56, 7.02, 7.03, 21.06, 28.06MHz £2.55. 5.262MHz £1/unit Freepost UK. voyjako@gmail.com

HYCAS 9.0MHZ IF AMPLIFIER KIT
Proven design from W7ZOI and WA7LMH updated by G4JXX. Full details from Mike, 07980 194227 mhadley157@gmail.com

Wanted

VINTAGE RADIO & VALVES WANTED national cash settlement for silent key, shack clearouts 07552 678725, vintageradio@btinternet.com

Equipment

REPAIRS TO RECEIVERS, TRANSMITTERS
New/Old, valve/transistor. Call 07903 023437 for details: www.kent-rigs.co.uk

RADIO REPAIRS BY MONKL
Icom, Yaesu, Kenwood etc, plus linear amplifiers, please contact Nick on 07770 397668 or email np262@yahoo.com

Aerials

M0CVO ANTENNAS
For quality HF Wire antennas, BALUNs, UNUNs, VHF/UHF base or mobile antennas, all made in England, for QRP to QRO. Also available accessories and kits for home builders. At a price to suit your pocket. www.m0cvoantennas.com

WESTERN HF 10
67ft wire dipole 160-6m, full details lookup m0bzi at: www.qrz.com buy direct: m0bzi@outlook.com or 07748331458 reviews at: http://g0kya.blogspot.com/2010_08_01_archive.html **or** http://www.eham.net/reviews/detail/9424

G4TPH MAGLOOPS BACK IN PRODUCTION.
Remote tune and manual tune models for 40m through 10m. Details at www.g4tph.com

QUAD BAND COLINEARS.
10/6/2/70 Quad band 2.5/2.5/3.5/5.5 dbi gain only 1.2m length £59.95 ea 6/4/2/70 Quad band yes Includes 4m, 2.5/2.5/3.5/5.5 dbi gain 1.2m length £59.95 ea 2/70 Dual band 3.5/5.5 dbi gain 1.1m length only £37.95 ea. UK post £7.95. Website: mirfield-electronics.co.uk Email: martin.stokes@hotmail.com or Tel: 07825549430

NEW ANYTONE ATD868UV 2/70 DMR + ANALOGUE handheld radio, 4000 channels,built in GPS, Multiple DMR ID's , inc charger, program lead, handbook etc£139.95, QYT KT8900D 2/70 25/20w mobile only £79.95 ea, Mirfield Electronics 07825549430 www.mirfield-electronics.co.uk

HAMTENNA UK
Manufacturers of Antennas, Baluns, Ununs and suppliers of antenna wire and accessories. Checkout www.Hamtenna.co.uk

COMMERCIAL BALUNS
Professionally made commercial baluns and matching transformers, multicore Mil spec, resin potted, IP68, custom made by Geoff Brown G4ICD. www.rfcomms.co.uk

PRO ANTENNAS
High performance stealth antennas: See the I-Pro Home. I-Pro Traveller and Dual Beam Pro at: www.proantennas.co.uk

Miscellaneous

ALL UK STATIONS – CALL IN ON OUR 'M1CRA' CHRISTIAN NETS!
WACRAL welcomes all amateurs & listeners to our Sunday morning 'GOOD NEWS' nets, now at 0730-0830 on 3.747 MHz +/- QRM and, again, at 14.00-15.00 on 7.147 MHz. Or, do join us on Wednesdays 07.30 3.747 MHz +/- QRM, 10.00 on 7.147 MHz (if no contact established after 5 mins QSY to 3.747 MHz and 21.30 on 3.751 MHz, for nationwide Christian fellowship and relaxed chat. All UK Local times. See www.wacral.org for more net info and WACRAL details or just call Ian G4OPP on 01622 746650 or g4opp@wacral.org

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Fast efficient logging and rig-control for Windows, Linux and Raspberry Pi.

Classified advertisements 58p per word (VAT inc.) with a minimum of 14 words £8.12. All classified advertisements must be prepaid. Please write clearly. No responsibility accepted for errors. Latest date for acceptance is 1st of the month prior to publication
Payment to: RSGB, 3 Abbey Court, Priory Business Park, Bedford, MK44 3WH

Advertising. All display and classified advertising enquiries (except Members' Ads, which go to memads@rsgb.org.uk) should be sent to: Chris Danby, GODWV, Danby Advertising, Fir Trees, Hall Rd, Hainford, Norwich, Norfolk NR10 3LX
Tel/Fax 01603 898 678
e-mail adsales@rsgb.org.uk

Business Cards

Advertisers Index

FREE MEMBERS' ADS OF UP TO 40 WORDS

Email your Members' Ad to memads@rsgb.org.uk. You must include your name, callsign, phone number, email address and location (not counted in the 40 word limit). Optionally, attach your own photo of the item (min res 800 x 600, must be in focus and well lit). Max 1 ad per Member per month; other terms & conditions also apply (see tinyurl.com/MemAdsInfo). Please note we can no longer accept ads by post or phone.

FOR SALE

CLANSMAN A320. Ex-Army, 2-30MHz AM, CW, USB, 3-30W output. GWO. Inc headset/mic, key lead, 24V power cable. Integral ATU and long wire capability. Suit base or portable. £175 ono. Gerry, G4LEX, 01778 571 906, chrisandgerry1@gmail.com (Bourne, Lincs).

CORVETTE TYPE 380 – working, £20. B40 with operating instructions, working, £40, FT One (no memory) working, with operating instructions, £60. Heath Kit 100 & 101, both working, including PSU & books, £70. Domestic radio, C1920, £20. John, M0AEK, 01323 721484, m0aek@btinternet.com (Eastbourne).

DRAKE AC4R PSU UPGRADE KIT. Complete upgrade kit for a Drake AC4 power supply. PCB, capacitors, rectifiers, resistors, hardware, instructions. Bought in 2016 from The Heathkit Shop in USA, never used. High quality, see www.theheathkitshop.com/page2/index.html and www.eham.net/reviews/detail/6438. £35, post paid. Dick, G3VKT, dick.smith@combpyne.com (West London).]

FLEXRADIO 3000 SDR plus inbuilt ATU (unboxed) running KE9NS software on desktop (free with radio). Complete package ready to run. Slight marking rear top. Would suit radio club or as introduction to SDR. £899 plus delivery at cost. Bryan, GW6TYO, 0798 932 7070, bpydesigns@gmail.com (Swansea).

KENWOOD TS-570S TRANSCEIVER. Predecessor to TS-590S. This is USA version (includes 6m). Owned from new and in good condition, complete with original packing, handbook, cables and fist mic. Also includes MicroHam DB9-K USB interface. £450. Reasonable offers considered. Andy, G3SVD, 0755 730 4817, andyphewitt@btopenworld.com (Newbury, Berks).

MAGNETIC LOOP ANTENNA BY CIRO MAZZONI. Covers 40 to 10m. Input the frequency on the Mk 2 keypad and the loop tunes automatically. All in very good condition. Buyer to collect after full demonstration. £625 ovno. Bryn, G7PKG, 01723 516536, bryninfrance@gmail.com (Filey, Yorks).

MOBILE ANTENNAS – Diamond HM6 40 – 10m, Watson W627, 6m, 2m & 70cm. Helical 28-29MHz. All in 1st class condition. Sensible offers only. Buyer collects. Mike, G4JXX, 0798 019 4227, mhadley157@gmail.com (Birmingham).

SGC AT-200pro Mk2 tuner with IC-7300 interface lead, £175. New driven element for Tonna 21-ele 70cm beam, £10. Above can be collected or postage at cost. Manson EP-925 25A 13.8V PSU, £50, collection only. John Higson, G4NTY, 0161 790 7673, jhigson42@gmail.com (Manchester).

SUPER ANTENNA MP1R-DLX portable tripod antenna, generally as shown on back cover advert of September's *RadCom*. Mint condition. Bought for site testing purposes this year. Cost £250. £100 + postage, or collect. Hugh, G3HRL, 01604 765 912, g3hrl@btinternet.com (Northampton).

TWO VACUUM CAPACITORS: Jennings 7-1000 3kV and Dolinco & Wilkens VVC 500-42-15; two large variable caps, one 150pF, one about 200pF. Please make sensible offers, will split. Mike, G3TOI, 01202 419394, mikenicholas888@btinternet.com (Bournemouth).

TYPE 3 MK2 (B2) SPY RADIO in suitcase + parachute drop boxes. Excellent condition and fully working. Refurbished by Marconi engineer. Some original documentation, history and spares. £3,500 ono. More pics and info on www.facebook.com/SpyRadioOnAir/ Geoff, G0DDX, g0ddx@btinternet.com (Cambridge).

UNUSED 7m LONG FIBREGLASS SOTA POLE, £8. Weller WHS40 temp-controlled soldering station (40W, 230V) £30. Elecraft DL1 wideband 20W dummy load £10. Great Circle DX Map (420 x 595mm) £2. P&P extra at cost, or collect. Chris, M0PSK, 01568 610 186, chrism0psk@gmail.com (Leominster).

VERSATUNER J969 300W 4 way ant sw, SWR/PWR meter, CN-101I 1.5kW SWR/PWR meter, RS101 3kW, keyer ETM 3, Kenwood desk mic MC-60, 18m Spiderpole, new 6-ele Tenadyn ant, etc etc. All offers considered. Keith Ginder, GW3NAS, 0786 011 9210, gw3nas.keith@gmail.com (New Quay, Wales).

WIMO 23 ELEMENT 70cm beam, £85. Wimo 67 element 23cm beam, £110. Both in 'as new' condition, only outside one day per month for UKACs. Collection only. Avair 3-way coaxial switch, unused N connectors, £28 plus postage. John Higson, G4NTY, 0161 790 7673, jhigson42@gmail.com (Manchester).

YAESU CLASSIC FL2000B HF LINEAR AMP, working. Offers. Mike Giddings, G3XLB, 0151 216 2210, mikegiddings1@yahoo.com (Liverpool).

YAESU FL-7000 HF solid state, automatic tuning QSK linear amplifier. Built-in PSU, 70W drive for full output. £850. Yaesu FT-990 HF transceiver, built-in PSU. Receive 100kHz to 30MHz, £550. Both with operating manuals, SK sale. Collection only. Chris, G1ETZ, 01509 504 319, g1etz@aol.com (Loughborough).

YAESU FT-102 TRANSCEIVER. Very little used and in very good condition. No mods. Comes in original box c/w Yaesu hand microphone and original instruction plus parts manuals. £375 ono. Prefer buyer to inspect and collect. Alan Buckley, G4STW, 0783 473 2822, Alan.buckleyuk@icloud.com (Scunthorpe, N Lincs).

EXCHANGE

FT450D – good condition, cost £625 two years ago, only used for 6 months. Reason for exchange – just moved to new house, no room for antenna. Wanted: D Star handheld, must be set up in good condition. Phone for more details. Roy Moss, GW7UVO, 0776 341 6875 (North Wales).

WANTED

28MHz MOXON ANTENNA, Vine / Innovation antennas or other quality make. Anything considered. Dual band 10/6? Let me know what you have. Also original colour sales brochure for the TR-751E transceiver, and main VFO knob for TR-751E. John, GM1ZVJ, hilton523@btinternet.com (Fife, Scotland).

BIRD 43 SLUG 1000H, 2-30MHz, 1000W. Ian, G3YUZ, 01202 767 001, i.c.wilson@open.ac.uk (Bournemouth, Dorset).

FDK MULTI U11 – working and in good condition. Also any documentation on this unit, will cover any costs. Kevin, G8LYV, 01245 381 961, g8lyv@freeuk.com (nr Chelmsford).

FM DEVIATION METER such as Heathkit IM4180 or Marconi TF2304. Mike Ayres, G4OQG, 01249 443 037, g4oqg@hotmail.co.uk (Wiltshire).

HAVE YOU AN UNUSED J Beam 6 element 2m cubical quad stored in your garage from the heyday of 2m SSB? A nostalgia trip is planned to see if these were as good as I remembered them to be. Details please to John, G4FTN, 01384 877 908, kinverjohn@me.com (Kinver, South Staffs).

ICOM PS126, ICOM PS23 AND ICOM SM20 – must be in perfect condition. Stan Hunt, G1VUK, 01580 881 968, Dreamer1605@icloud.com (Robertsbridge, East Sussex).

ORIGINAL MAURICE HATELEY multiband Dipole of Delight in good condition. Eddie Munro, MM0MUN, 01224 573 870, eddiemunro@aol.com (Aberdeen).

POLISH SPY RADIO SET BP-3. Seeking transmitter half, any bits, metal box, knobs, etc, and any stories or memories. WHY? I have the Rx side, I am seeking to restore it. Andy, G0SFJ, andythomasmail@yahoo.co.uk (Leicestershire).

SILENT KEY CLEAROUT or just not wanted – please don't throw them away. I collect QSL cards for historic interest and research. Any date but prior to 1970 preferred. Tony, G4UZN, AQuest1263@btinternet.com (Leeds).

SPECIAL EVENT STATIONS

These callsigns are valid for use from the date given, but the period of operation may vary from 1-28 days before or after the event date. Details published here were kindly supplied by Ofcom on 24 August 2018.

RSGB will do its best to publicise your special event and its callsign, but you must help us to help you. On the back of Ofcom's SES NoV application form there is a Data Protection section with two tick boxes. Please tick both 'yes', Ofcom can't give us the details so they won't appear here, on GB2RS, or on the RSGB website.

Start Date	Callsign	Event details	Location
01/10	GB0WIW	Wireless in Wales	Denbigh
01/10	GB100MCV	100 Years – MCV – Old Leinster Call	Holyhead
08/10	GB2YMR	Yorkshire Moors Railway.	Pickering
13/10	GB8LES	Long Eaton Scouts	Long Eaton
17/10	GB6TSG	Iota 2018	Tonypandy
18/10	GB1LHJ	Locksheath JOTA	Locksheath
19/10	GB2BG	Bear Grills	Rushton Spencer
19/10	GB1CUB	Cub Scouts	Bromsgrove
19/10	GB1TBS	Torbay Borough Scouts	Torquay
19/10	GB0FBS	ASE JOTA	Bradninch, Cullumpton
19/10	GB2WS	Wiltshire Scouts	Potterne
19/10	GB5SSG	Saxlingham Scouts and Guides	Saxlingham Nethergate
19/10	GB2BSG	Branston Scout Group	Burton-upon-Trent
19/10	GB2TWH	Taunton West Hatch	West Hatch Taunton
19/10	GB2RE	GB2 Royal Eltham	London
19/10	GB0GDS	Greenock District Scouts	Greenock
19/10	GB1CSG	CSG	Callington
19/10	GB2HW	Hesley Wood Scout Activity Centre	Sheffield
19/10	GB1SCS	Stoke Climsland Scouts	Venterdon, Stoke Climsland
19/10	GB2RSC	Radio Scouting Chesterfield	Derbyshire
19/10	GB1SJM	Saint Johns Margate	Margate
19/10	GB1TE	Trent Explorers	Derby
19/10	GB0SHS	St Helens Scouts	St Helens
19/10	GB1GLO	Gloucester	Gloucester
19/10	GB1FMS	Foxtrot Mike Sierra	Bowburn, Durham
19/10	GB0MKS	Milton Keynes Scouts	Cosgrove
19/10	GB0LSG	Ludlow Scout Group	Clee St Margaret
20/10	GB1MDS	Market Deeping Scouts	Market Deeping
20/10	GB2PS	GB2Patchway Scouts	Bristol
20/10	GB8CS	JOTA	Kenn, Nr Clevedon
29/10	GB100RSM	Royal Signals Museum	Bournemouth

SIM ORIGINAL CARD. Original size SIM card for cell phones. Same size as (and looks rather like) a chip & PIN' credit card. Non-working static exhibit. Godfrey, G4GLM, 020 8958 5113, cgmm2@btinternet.com (Edgware, Middlesex).

SPARE TRAPS FOR COMET H422 dipole antenna. Scrap spare antenna also considered. Bob Hammond, G4DBW, 0783 137 8810 (Herne Bay, Kent).

T-4-RADIOWORKS LINE ISOLATOR. Barry, G1NPN, 0790 0123 495, ukbaz1@yahoo.co.uk (Liverpool).

WANDEL & GOLTERMANN NOISE GENERATOR RS-50, also any LP or HP filters, service manual and noise notch modules for same model. Pat, G3YFK, 01743 884 858, patlmca@aol.com (Shrewsbury).

YAESU ANTENNA KIT: whip YA-70 and tripod RSM-70, ideally with antenna bag, for FT-70G HF 'manpack' portable. Glenn, GM0KMA, 0771 033 0366, RSGB@rainey.org.uk (Renfrewshire).

HELPLINES

INFORMATION ABOUT FC-902 ATU. It has two meters. SWR meter has two scales, top marked 1...1.5...2...3...4...∞. Scale from 3 to ∞ is underlined in red. Bottom scale is marked 1...2...3...4...∞ plus (25W). Scale from 3 to ∞ is underlined in red. Why two scales? What are the two scales for when you only need one scale when reading SWR? Ross Bradshaw, G4DTD, 01726 891 320, ross.bradshaw@mypostoffice.co.uk (Cornwall).

RALLIES & EVENTS

Members of the RSGB Regional Team will be present at the rallies this month marked with an RSGB diamond.

If *your* rally or event is not listed here,
PLEASE SEND US FULL INFORMATION
by email to radcom@rsgb.org.uk

7 OCTOBER
45th WELSH RADIO RALLY
Rougemont School, Malpas Road, Newport, South Wales NP20 6QB.
Doors open 10am and admittance is £2.50. Bring & Buy sale, catering, lectures/seminars, talk-in, RSGB bookstall, trade stands, special interest groups, prize draw/raffle. Michael, GW4JKV, 01495 226 149, rackhamone@aol.com.

7 OCTOBER
HACK GREEN BUNKER RALLY
Hack Green Secret Nuclear Bunker, French Lane, Hack Green, Nantwich, Cheshire, CW5 8AL.
Sale of electronic equipment, amateur gear, components, military radio items and vehicle spares. Doors open 10am, refreshments available onsite. 01270 623 353, coldwar@hackgreen.co.uk [www.hackgreen.co.uk].

11-14 OCTOBER
MICROWAVE UPDATE 2018
Holiday Inn Dayton, Fairborn, Ohio, USA.
International conference on microwave equipment design, construction and operation, hosted by The Midwest VHF/UHF Society. [www.microwaveupdate.org].

SILENT KEYS

We regret to record the passing of the following Members.

Name, callsign	Date
Mr P T Wade, G4TCE	11/03/2018
Mr G H Cass, G4HEV	27/07/2018
Mr G Buxton, G4VXG	30/07/2018
Mr K D Faichney, G4ZJE	4/07/2018
Mr D Buckley, G7ORT	11/08/2018
Mr G P Parry, G7OSR	August 2018
Mr J Wakenell, G8UGL	19/08/2018
Mr M W Hall, GOAWA	23/07/2018
Mr B A Lewis, M0IGT	14/05/2018
Mr A Williams, M6ASW	July 2018
Mr R P Pinborough, RS179641	14/08/2018

We apologise to Jim Houston, MI5AMO, whose details were incorrectly included on last month's list.

To notify us that a Member has passed away, email details to sales@rsgb.org.uk or phone 01234 832 700, option 1. This will ensure that their Membership will be ended properly and that they appear in the Silent Keys list. We need to know the name, callsign and date of death.

Please note that Ofcom must be informed separately, on 0207 981 3131 – we are not permitted to pass on details on your behalf.

12-14 OCTOBER
RSGB CONVENTION
Kent's Hill Park Training and Conference Centre, Swallow House, Timbold Drive, Kent's Hill Park, Milton Keynes, Buckinghamshire MK7 6BZ.
The Provisional Convention programme of lectures for all interests is now available on the conventiomn website. Principal sponsor Martin Lynch & Sons. [www.rsgbevents.org].

14 OCTOBER
HORNSEA AMATEUR RADIO RALLY
The Floral Hall, Hornsea HU18 1NQ.
Doors open 10am, admission £2, under 14 free. Trade stands, Bring & Buy and RSGB book stall. Hot and cold food available. Les, 2E0LBJ, 01377 252 393, lbjpinkney@hotmail.co.uk [www.hornseaarc.co.uk].

14 OCTOBER
HOLSWORTHY RADIO RALLY
Holsworthy Community College, Victoria Hill Holsworthy, Devon EX22 6JD.
Traders, Bring & Buy and catering. The venue also has disabled access. Doors open at 10am. Howard, M0MYB, holsworthyarc@gmail.com [www.qsl.net/m0omc/holsrally.html].

21 OCTOBER
GALASHIELS RADIO RALLY
(no further details provided by organisers)

3 Nov – VERON Ham Radio Convention (Dag voor de RadioAmateur 2018)
4 Nov – CANCELLED – W London Show (Kempton)
17 Nov – RADARS Traditional Radio Rally
18 Nov – 41st CATS Radio & Electronics Bazaar
18 Nov – Plymouth Radio Rally
25 Nov – Bishop Auckland RAC Rally
1 Dec – South Lancashire ARC Winter Rally
29-30 Dec – Hamfest India
24 Mar 2019 – Hamzilla Radiofest (Dover ARC)
24 Mar 2019 – Callington Radio Rally
16 Jun 2019 – 16th West of England Radio Rally

HF F-Layer Propagation Predictions for October 2018

Compiled by Gwyn Williams, G4FKH

	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** Europe								
Moscow	664....15666	435322345566	1.6444455311	..3555552...	..145552....	...23321....	...1111.....	....11.....
*** Asia								
Yakutsk	21......3333	.....1....11	...21.......	.....	.....	.....	.....	.....
Tokyo	.......2221.	....1134331.	...1223321..	....211.....	.....	.....	.....	.....
Singapore	.......2222.	344321	.....14431..	.....2321...	.....11.....	.....	.....	.....
Hyderabad	2......13333	2.....133333	......23.1..	.....13.....	...1122.....	.....	.....	.....
Tel Aviv	552.....3555	554....35555	.15322245211	..5443442...	..144442....	...2212.....	.....	.....
*** Oceania								
Wellington	.......12...	...333334...	...344313...	...1332.1...	....1.......	.....	.....	.....
Well (ZL) (LP)	.....	..2.....	..2.....	.....1..	.....	.....	.....	.....
Perth	........111.	......13332.	......2331..	.....121....	.....1.....	.....	.....	.....
Sydney	.......111..	.....13432..	.....23321..	....1221....	....1.......	.....	.....	.....
Melbourne (LP)	.....	...3.....	...3.....	...2.....	.....	.....	.....	.....
Honolulu	..12.....	..1321.....	...111.1....	.....	.....	.....	.....	.....
Honolulu (LP)	.....	.....	.....	.....1...	.....1...	.....	.....	.....
W. Samoa	...1.....	...32222....	...2332.....	....132.....	.....1.....	.....	.....	.....
*** Africa								
Mauritius	2.......1222	3......34333	.......342..	......132...	......12....	.....	.....	.....
Johanesburg	22.......232	33......3433	.1.....24311	......1331..	....11132...	....1112....	.....1....	.....
Ibadan	555.....2455	55531..14555	315421124521	..14323352..	...433345...	...344442...	....2111....	.....
Nairobi	33......2333	442.....4444	1.3....2441.	..12..134...	...22223....	...1.111....	.....	.....
Canary Isles	6663....1566	666521.24666	634543345642	11134444661.	...1255552..	....155551..	.....3232...	.....2121...
*** S. America								
Buenos Aires	222........2	3222......22	1..2.....11.	...1.....1..	....1.......	.....	.....	.....
Rio de Janeiro	333.......12	333......233	2112.....31.	...11...22..	....11.12...	....11.11...	.....	.....
Lima	2222.......1	2213......12	.....	.....	.....	.....	.....	.....
Caracas	3333......23	33131....133	...12....2..	....12..1...	.....2112...	.....1......	.....	.....
*** N. America								
Guatemala	2222.......1	32.31.....12	...2........	.....1......	.....	.....	.....	.....
New Orleans	3332.......2	3..3......13	.....1......	......1.....	.....	.....	.....	.....
Washington	44432.....24	421.31..1234	.....21122..	.....32231..	.....1331...	......1.....	.....	.....
Quebec	3443......23	31..2...1233	.....11122..	.....2223...	......11....	.....	.....	.....
Anchorage	.131........	..........1.	........2...	.....	.....	.....	.....	.....
Vancouver	1232........	1..........1	.....	........1...	.....	.....	.....	.....
San Francisco	2222........	2..21......1	.....	.....	.....	.....	.....	.....
San Fran (LP)	.....	.....	.....	.......2....	.......2....	.......2....	.......1....	.....

Key: The figures represent approximate S-meter readings, whilst the colours represent expected circuit reliability. **Black** equals low to very low probability, **Blue** equals good probability and **Red** equals a strong probability. No signal is expected when a '.' is shown. The RSGB Propagation Studies Committee provides propagation predictions on the internet at www.rsgb.org.uk/propagation/index.php. An input power of 100W and a dipole aerial has been used in the preparation of these predictions; therefore a better equipped station should expect better results. The predicted smoothed sunspot numbers for September, October and November respectively (SIDC classical method – Waldmeier's standard) 2, 1 & 0 and (combined method) 6, 5 & 4. The provisional mean sunspot number for August 2018 was 8.8. The daily maximum / minimum number were 33 on 25 August / 0 on 3-13 and 29-31 August.

A RADICAL IDEA

Stephen Blake, RS316144

As a relative newcomer to the RSGB, but not radio, it has become very apparent that there is real concern about the rapidly dwindling number of licence holders. When you look at any recent issue of *RadCom*, you can see why. Most members seem to be in their 60s or older – and I'm not being ageist as I am also in that age group.

So what is to be done? I have an idea, and I doubt it will be popular but please read to the end before dismissing it out of hand.

At the moment, to acquire a Foundation licence you have to pass a very easy practical test and then take an equally easy multiple choice exam. Some people study for this at home, others seek help from a local club – if they have one.

But the real obstacle to passing the Foundation exam is finding a club that provides an exam location. While many will relieve you of a few quid for training you can't sit your exam there. So, you have to find an exam centre and then hope the dates and timing fit in with your diary.

My suggestion is to move the Foundation exam online. Yes, I know it's online now but only available at specific locations. I mean make it available 24/7 from any computer. This would mean an element of trust and, yes, I know some people will cheat – but most won't. The practical element could be dealt with pictorially in the same way.

Let's be honest, the Foundation is hardly a major intellectual challenge. Making access easier will encourage all sorts of people to do it and gain their licence. They must still have a licence so of course all the regulatory elements will be met. The authorities will know who they are and where they are.

And before the Green Ink Brigade make more profit for the Royal Mail than Father Christmas, may I just remind everybody that I can, quite legally, go out and buy an EU approved CB radio with FM, AM and SSB. Nobody will know who I am or where I am so there is virtually no regulatory control and, as I won't have studied for my Foundation, I won't even know the basics and may quite innocently cause all sorts of problems. The bands may be more limited with CB but that's the only real difference.

Ultimately, making the Foundation licence exam more accessible can only encourage many more people to take it which in turn will lead to a huge upsurge in interest in what is a fascinating hobby.

EXAMS

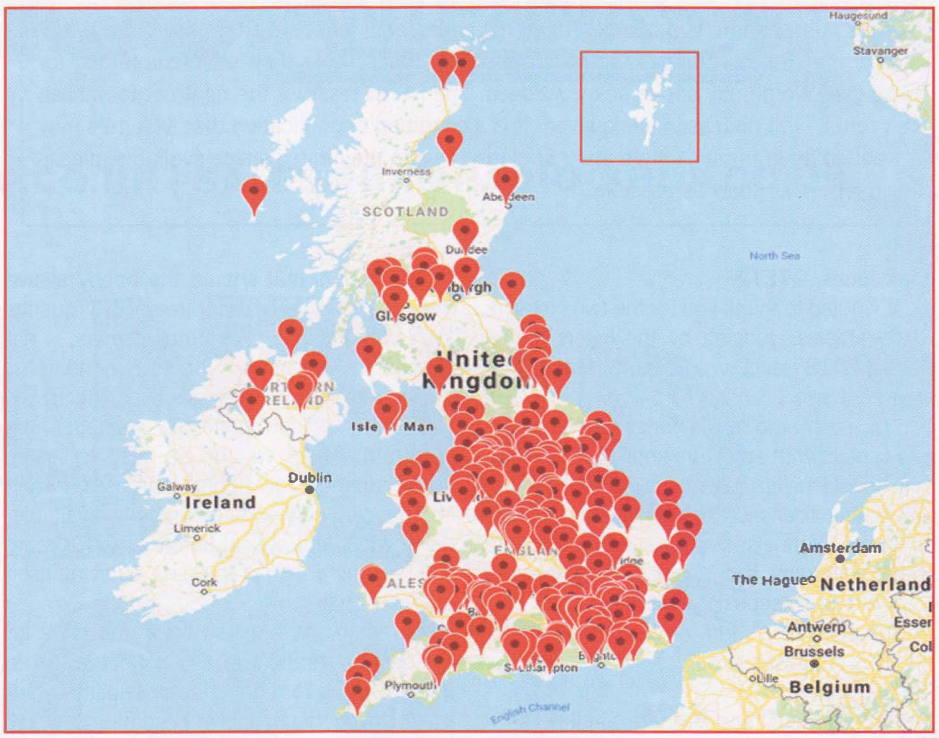
Tom Bell, M0IQQ

Finding an exam centre to take the Advanced exam can be very difficult. I couldn't find anywhere local to me in Gloucestershire.

I was at a loss until Rhys, GW0DIV from Rhondda ARS contacted me and offered me the chance to take the exam at their club. After a 90 minute drive, I was greeted eagerly by the club members and I was able to take the exam. Everyone was so friendly and I was so grateful that they put on the exam just for me!

I'm glad to say I passed and owe it to Rhondda ARS. Thank you so much to Rhys and all the guys there. You are all a credit to the hobby.

https://rsgb.org/find-courses helps you find your nearest training / exam centre – Ed.



Location of UK exam centres as seen on the RSGB Club & Exam Finder – https://rsgb.org/find-courses/

Map data courtesy of Google.

NETWORK RADIO

Richard Horton, G3XWH

What an excellent selection of letters in August. I began by reading Dave, G4BUO's opinion that Network Radio (NR) has nothing to do with the true heart of amateur radio, using the electromagnetic spectrum to experiment and communicate. Exactly my view I thought – but realised what a huge mistake I was making when I saw what Andy, G4JNT and Neil, G4DBN said about using NR for microwave talkback. NR may not be 'amateur radio' in its true sense but is certainly a supporting, enabling technology. Furthermore, I do not believe that it poses any more threat to the hobby than so many other technologies raised as harbingers of doom in the past – CB, code-free licences sounding the death knell for CW, microcomputers or smartphones attracting youth away from becoming licensed, and so on.

I should have mused upon my own experience from 1973 to 2012 as a teacher introducing amateur radio to school pupils. The numbers of pupils who took up the hobby through our license classes increased year on year. By 2001 ninety YLs had obtained their callsigns; by the time I retired in 2012 over 200 had done so.

Alan, G4DJX of Sandringham School is looking for a member of staff to support his school amateur radio club, a plea I know he has made previously. I was fortunate to have David, G4CWB on the staff to help, but today's workload for teachers leaves little or no time for hobby activities. In the 1990s over 200 UK schools had amateur radio clubs. How many are there now? I do think there is a role for local clubs, as with Verulam and Sandringham, but it is no replacement for licensed staff members permanently on site and able to get senior school management on board.

Colin, G8FRA mentions balloon flights, which have been used to great effect in German schools, where amateur transmissions from balloons are permitted. But as Giles, G1MFG (*RadCom* Technical Editor) correctly points out, this is not allowed in the UK – but *why* not? All the drones we have flying around transmit data and pictures back to the controller; how much better it would be if we could transmit back tracking data, telemetry etc to school stations *and under an amateur licence*?

Unless we push for such privileges they will never be granted. There must be someone out there to take up the challenge.

Letters published in 'The Last Word' do not necessarily reflect RSGB policy. 'Last Word' letters may be emailed to radcom@rsgb.org.uk Please note that letters submitted for 'The Last Word' may not be acknowledged. The RSGB reserves the right not to publish any letter, with no reason being given. It is a condition of publication that all letters may be edited for grammar, length and / or clarity. Due to the limited space available, please keep letters as short as possible.

Tony Jones, G7ETW

I just wanted to thank you for the two Network Radio articles. Judging by the letters in the August 2018 issue, was I the only reader who enjoyed them?

Why such vitriol? Zello brings non-amateurs into contact with amateurs and some of them, who would never have considered it before, are getting licensed. The operating on Zello 'amateur' channels is of a very high standard with no jamming, bad language or other abuse – tell me an RF repeater where that is so.

The point is, it's fun. And isn't that what a hobby is supposed to be?

Martin, GW3XJQ and Barbara Shelley, MW0RLD

It was very interesting to read the letter in September from Mike, GW1SXT and courageous to raise his head above the parapet on a subject that is of great concern to us (and, we suspect, for other radio amateurs). This is due to the proliferation and active promotion of what we would describe as 'amateur communications, wholly or partially assisted by the commercial and for profit network, called the internet'.

It was encouraging to read that the RSGB VHF Manager was happy to endorse this letter and by publishing same, our hats off also to the *RadCom* Technical Editor; our lifelong confidence in our society is reaffirmed; thank you, albeit it could provoke a strong defence of the alternative methods to wireless communication arriving at HQ. The proponents of the use of the internet, wholly or partially, are still my amateur radio friends and indeed, I also avail myself of modern digital communications technology and the internet, as and when it's appropriate. I do not consider myself to be a dinosaur.

But, internet assisted communication is not my hobby. It is an interest, one on which I have limited technical knowledge or ability to experiment with. There is a significant difference between an interest and a lifelong hobby of self-learning, experimentation and radio communication. My Ofcom licence still describes my hobby as being "for the purpose of self-training ... not for commercial purposes". I think this description is still appropriate, with radio being generally accepted and defined as "the wireless transmission and reception of electric impulses or signals by means of electromagnetic waves".

Our fear is that should the hobby evolve into one of interference free, BBC quality, 24/7 worldwide communications, not subject to atmospheric or solar conditions, any representative body such as the RSGB will find it difficult to defend amateur radio spectrum. There will be no case to justify its occupancy for hobby purposes, when commercial networks are readily available, using wires and optical fibres. Amateur radio will become a relic of the past, evolving itself into extinction.

So, should we just sit back and hope for the best or should we, as we believe, try to do something to reduce the possibility of our much loved radio hobby becoming history? Whatever our preference, wires or wireless, we ALL need to think about this very carefully, join up and support our national society – the RSGB – and give them a strong mandate to speak up for the retention of and indeed expansion of the free to air use of the electromagnetic spectrum.

It is obvious that Network Radio has split opinion and seems to concern some radio amateurs whilst others embrace it enthusiastically. All correspondence for this subject is now closed as we've shown both sides of the argument as fully as possible. Thank you to all those who have shared their views – Ed.

THE FUTURE OF TRAINING

Pete Sipple, M0PSX

The five-year project to revise the exam syllabus is now complete (*RadCom* September 2018, page 7), and RSGB volunteer trainers will now be working out just how to deliver this new material to the next generation of radio amateurs.

The changes at all three levels aren't trivial. The entry-level exam goes from 130 examinable items to close to 250, and the effort required on the practical side has significantly increased too. In my corner of Region 12, the majority of clubs run their training courses at a weekend and are likely assessing whether two-day courses will still be feasible from 2019.

For those not familiar with the changes, one example is that from August 2019, all prospective radio amateurs will need to complete a practical entirely unrelated to radio, involving altering the brightness of an LED using resistors in parallel.

The syllabus changes will have cost, time and resource implications for clubs, volunteers and online training providers.

Last year saw a significant drop in newcomers entering the hobby (a twelve-year low). Let's hope that the RSGB's new, more complex, syllabus helps to meet the its stated objective of growing the hobby by 2022.

The apparent increase in examinable points is due to breaking down the old syllabus points into smaller chunks; some on safety plus some new points based on digital radio concepts. The additional practical item at Foundation is aimed at giving students a grasp of ideas related to current in a circuit. In simple terms the new syllabus is aimed at better preparing candidates for life after the course and the exam. The driving test, like the amateur radio exams, has to move with the times; this has resulted in adding new things like sat nav driving. Understanding your subject often comes later once you practice what you have learnt. Similarly, it is hoped that with the tutor support tools that will be introduced in due course, they will help to deliver a more consistent package.

It's a perception, not a proven fact, that a change in the perceived difficulty of the examination will have any direct effect on numbers gaining a licence. In developing the syllabus, the primary considerations are always equipping candidates with the knowledge they require to get on the air safely and without causing interference to other users of the spectrum.

Tony Kent, G8PBH
Chair, Examination Standards Committee

BEWARE OF USING FORUMS

David Barlow, G3PLE

Most major rig manufacturers and many logging and cluster programs, amateur radio clubs and organisations now have dedicated forums. In my time I have joined some but have now withdrawn from all of them and will not be joining any new ones.

Such forums are often worldwide and can be very damaging. One enthusiastic forum member may have a fault in his equipment or program and found his own solution and suggests that other forum members follow his thoughts. What he does not realise that he may be advising others to do something that will have an adverse effect and could even damage their rig or computer. I have found this out the hard way (fortunately I had a backup and eventually recovered it).

In addition, some forums can fill your inbox with inane chatter and arguments. The forum can have its good side (I have yet to find it) but can lead to misinformation and disquiet on the other side; much better to steer clear and take advice from people you trust.

This is very much a personal view and not intended to criticise any particular forum manager.