

ShortWaveMagazine

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& Scanning Scene



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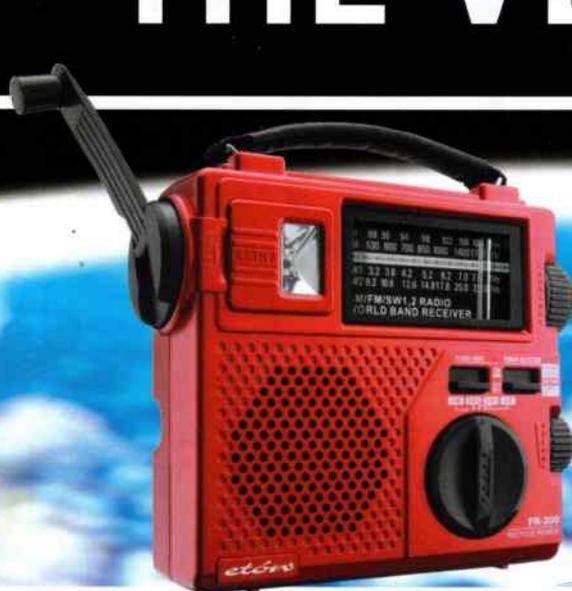
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World Radio History

# THE VERY BEST IN S



## Self-powered radio

### FR200 AM/FM Shortwave radio and flashlight

Without the need for batteries, this self-powered 2-in-1 radio and flashlight helps you stay informed and prepared for emergencies. The Hand-Crank Power Generator ensures that you have unlimited power for AM/FM radio use, access to 7 International SW bands, and the built-in flashlight - making the FR200 perfect for emergencies, camping, hiking etc.

- Shortwave coverage from 3,200 KHz - 22,000 kHz
- Incorporates fine-tuning control knob superimposed on the main tuning knob
- Quality sound from the 2.5" speaker.
- 6 colours:  
Metallic Red, Metallic Blue, Metallic Pearl, Metallic Bronze, Yellow, Sand



**Dimensions:** 17.3 x 14.7 x 5.3cm  
**Weight:** 595 g  
**Power Source:** Hand-Crank Power Generator with rechargeable battery pack, 3 AA batteries (not included) or AC adaptor (not included)  
**Price:** £24.95 plus £8 P&P

## Pocket sized - the perfect travelling companion!

### Mini 300PE World Band Receiver

AM/FM/Shortwave radio! The Mini 300 is must have radio for everyone to take everywhere. At a microscopic 4.7 ounces, the Mini 300 is pocket-sized but power-packed - capable of receiving AM, FM and seven Shortwave bands. Its crystal clear reception, easy operation, and large LCD screen with alarm function make the Mini 300 the indispensable companion.

- AM / FM Coverage
- Shortwave Bands
  - SW1 49 Meters 5.95 - 6.20 Mhz
  - SW2 41 Meters 7.10 - 7.30 Mhz
  - SW3 31 Meters 9.50 - 9.95 Mhz
  - SW4 25 Meters 11.60 - 12.10 Mhz
  - SW5 22 Meters 13.60 - 13.80 Mhz
  - SW6 19 Meters 15.10 - 15.80 Mhz
  - SW7 16 Meters 17.50 - 17.90 Mhz
- Clock, Alarm, and Sleep Timer Functions
- Analogue Tuner with Digital Frequency Readout
- Built-in Speaker and stereo Earphone Socket
- Stylish carrying pouch with belt loop
- Comprehensive operating manual
- Available in Metallic Pearl or Metallic Red

**Dimensions:** 23 W x 63 H x 11 D mm  
**Weight:** 133g (4.7oz)  
**Power Source:** 2 AA batteries (included)  
**Price:** £24.95 plus £8 P&P

## Full-size features in your palm or pocket

### E100 AM/FM Shortwave radio

Imagine a radio packed with all the bells and whistles: digital tuning, AM, FM, Shortwave reception, and small enough to fit into your coat pocket. The E100 is a dream come true.

- Shortwave range: 1711-29.995 KHz.
- FM: 87.0 - 108.0MHz;
- Medium Wave: 520 - 1710 KHz
- Manual and Auto-Scan Tuning
- Direct Keypad Frequency Entry
- Manual/Auto Scan to scan the preset stations
- Fine-Tuning Control Knob
- 200 Random Programmable Memories
- Memory Page Customizing
- 9/10KHz step size selector (for worldwide Medium Wave (AM) reception)
- FM-Stereo/Signal Strength/Power Level Indicators
- Digital Clock
- Selectable 12/24 hour clock display format.
- Simultaneous display of frequency and clock
- Favourite Station Wake-Up.
- Programmable Alarm
- Programmable Sleep Timer (10 - 90min) functions
- LCD display light.
- Built in antennas for AM, FM and SW reception

**Dimensions:** 12.4 x 7.6 x 3 cm  
**Weight:** 210g  
**Power Source:** 2 AA batteries (included) or AC adaptor (not included)  
**Price:** £59.95 plus £8 P&P

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World Radio History

# SHORTWAVE RADIOS



## Intelligent features Strong performance

### E10 AM/FM Shortwave radio

Imagine a radio that combines strong performance for fantastic reception and all of today's digital wizardry, bringing the world to your fingertips. The E10 is where intelligence meets performance.

- FM Frequency Range: 87 - 108 MHz
- Shortwave Range: 1711 - 29999KHz
- 9/10KHz step selector for Medium Wave (AM) reception
- 1/5KHz step for the display of Shortwave
- 550 Programmable Memories
- Memory Page Customization
- Direct Memory Access
- SW IF SET feature, shifts the i.f. to minimize interference
- Shortwave antenna trimmer
- ATS (AUTO TUNING SYSTEM) automatic memory storage of FM/MW stations
- Manual Tuning
- Auto Scan Tuning
- Direct Keypad Frequency Entry
- Digital Tuning Knob With Lock Feature
- Auto-Scan and manually scan stations stored into memory
- Fast/Slow tuning rate selection for manual tuning
- Sleep Function
- Two Turn-On Timers With Station Memory
- Snooze Function: 10 minutes, repeated three times.
- FM Stereo/Mono selection
- High/Low Tone Control
- LCD Backlight With User Control
- Key Lock
- 12/24 Hr Format selection
- System Set Codes
- Built-in Ni-MH battery charger
- Supplied with: 4 x 1100mAh Ni-MH rechargeable batteries, Pair personal Earphones, Carrying Case, extendable SW wire Antenna

**Dimensions:** 18.8 x 11.4 x 3.3 cm  
**Weight:** 595g  
**Power Source:** 4 x AA batteries (inc) or AC adaptor/charger (inc)  
**Price:** £69.95 plus £8 P&P

## High-performance AM/FM/Shortwave field radio

### S350 AM/FM Shortwave radio

Opens the whole world for your listening pleasure! Its powerful FM, AM and shortwave receiver brings in far-flung stations that other radios simply can't hear. Precise tuning is assured by the two-speed slow-motion tuning dial and illuminated digital frequency readout, which also functions as a digital alarm clock. The generously-sized loudspeaker gives crystal-clear reproduction. Separate bass and treble controls tailor the sound to your individual taste. The S350 blends the best of yesterday and today. With the look of a retro field radio sporting a rugged body and military-style controls - the S350 also features today's innovations for excellent AM, FM, and SW reception. The external antenna input is ideal for enthusiasts. And features such as line-level output, RF gain, wide and narrow bandwidth filter controls put you in the command seat for tuning in to local and international news, music, and sports - wherever in the world you happen to be.

- AM: 530-1710 kHz, FM: 88-108 MHz, SW: continuous coverage from 3 - 28 MHz inc 13 international broadcast bands 11/13/15/16/19/22/25/31/41/49/60/75/90 meters
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- Built in telescopic antenna for FM & SW & built in ferrite bar antenna for AM
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**Dimensions:** 26.7 x 16.5 x 8.9 cm  
**Weight:** 1.6kg  
**Power source:** 4 x D batteries (not included) or AC adapter (included)

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World Radio History

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Although Rob Mannion G3XFD is well and truly beached nowadays, he likes to watch over friends who are still at sea, via radio and the Internet, including Mark Coultas G0SLP. AIS allows the tracking in near real time of vessels around our coast.

**21** Computers & Radio - Part 2 - Precision and Accuracy

Jack Weber continues his series with his discussion regarding the usefulness of computers to the radio hobbyist. See just how useful an addition a computer is in your shack.

**28** In The Ed's Shack

This month Kevin Nice continues with his guide to monitoring u.h.f. milsats. He provides details of frequencies in the spectrum between 240 and 280MHz or thereabouts, plus u.h.f. equipped satellite locations.

**38** Info In Orbit Special - Weather Satellites - An Introduction For Beginners

Over many years the number of operational weather satellites has seen a steady increase. This has been because older ones are not always switched off after replacement. Then in 2003 things started to develop quickly. This year sees more launches bringing new, exciting possibilities. Lawrence Harris begins by explaining weather satellite basics for newcomers, or anyone reading about this topic for the first time.

**49** Win A Quiet Solution And Keep That Noise Down!

You can now be in with a chance to win the superb bhi NEDSP1062-KDB noise reducing unit (as reviewed in *SWM* April 2005), worth £99.95. Turn to page 49 now!

**63** SWM Club Listing

If you want to meet others with a passion for radio, then look no further. Use our comprehensive and most up-to-date guide to local clubs.



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cover subject: *Watching the ships go by. Thanks to radio and AIS.*

### Share your thoughts

For the latest radio news, see our website [www.pwpublishing.ltd.uk](http://www.pwpublishing.ltd.uk)

Join in with the on-line action on the SWM Readers' E-mail Forum - send an E-mail to [swm\\_readers\\_subscribe@yahoo.com](mailto:swm_readers_subscribe@yahoo.com) to subscribe - don't miss the on-line action!

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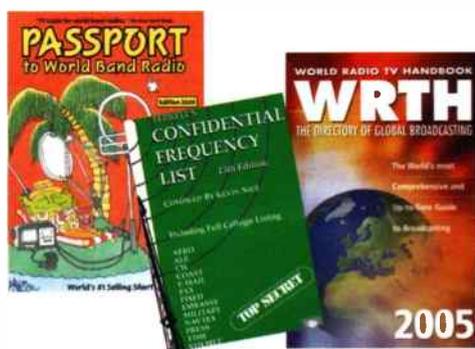
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## RADIO BOOK STORE

see page 32



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## Coming Next Month

in June 2005 SWM  
\*contents subject to change

- Bearcat UBC105XLT Starter Scanner - Reviewed
- SSB Special
- Free Radio? SW Radio Africa
- Just What Are Scanners?
- Keep on top of the world of monitoring with SWM
- and much more...

With bumper Scanning Scene section!

## SWM Services

### Subscriptions

Subscriptions are available at £36 per annum to UK addresses, £44 Europe, £54 Rest of the World. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £62 (UK) £76 (Europe) and £93 Rest of the World.

### Components For SWM Projects

In general all components used in constructing SWM projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article.

### Photocopies & Back Issues

We have a selection of back issues, covering the past three years of SWM. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues for SWM are £5.00 inc P&P each and photocopies are £3.00 per article inc P&P.

Binders are also available (each binder takes one volume) for £6.50 plus £1.50 P&P for one binder, £2.75 P&P for two or more, UK or overseas. Prices include VAT where appropriate.

A complete review listing for SWM/PW is also available from the Editorial Offices for £2 inc P&P.

### Placing An Order

Orders for back numbers, binders and items from our Book Store should be sent to: **PW Publishing Ltd., Post Sales Department, Arrowsmith Court, Station Approach, Broadstone Dorset BH18 8PW**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone **0870 224 7830**. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Broadstone **0870 224 7850**.

The E-mail address is [bookstore@pwpublishing.ltd.uk](mailto:bookstore@pwpublishing.ltd.uk)

### Technical Help

We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone. Any technical queries by E-mail are very unlikely to receive immediate attention either. So, if you require help with problems relating to topics covered by SWM, then please write to the Editorial Offices, we will do our best to help and reply by mail.

# ED's



## comments

### Goodbye!

There are several goodbyes to deliver this month. Firstly, the time has finally arrived when my long term colleague and invaluable Editorial cohort, **Zoë Shortland** is departing to pursue development to her career. I wish to extend my deepest thanks for all her hard work on SWM over the 12 years that she's been working on the magazine. It would not have been possible to have brought you the high quality magazine without Zoë's commitment and dedication, not to mention her lightening fast typing! Zoë has been a constant on the magazine over the years and her leaving will be a loss indeed. I'm sure the rest of the staff here will join me in wishing Zoë all the very best and much success in her new post.

I have enjoyed working with Zoë, who was originally editorial assistant on SWM. Then, until recently, News and Production Editor prior to becoming Deputy Group Production Editor. Her efforts have been key to the timely completion of each magazine. We're all going to miss her dedication and happy disposition - good luck Zoë!

### Bandscan

It's also time to bid the monthly rotating Bandscan feature a fond farewell. The publishers of SWM have told me that they believe this aspect of the magazine is no longer of interest to many of our readers. So, the decision has been made to drop the feature. I have asked the authors of each of the three variants, Europe, America and Australia to furnish us with broadcast related news from their territories so the names **Greg Baker** (Australia) and **Gerry Dexter** (America) shouldn't disappear from these pages. **Martin Peters** (Europe) continues to compile his excellent 'LM&S' logs compilation.

Many thanks to all three authors for their highly informative and often unique reports over the years.

### Scanning

More changes and scanning it seems, according to our survey results, is top of the list of interests of SWM readers. So, we've decided to regularly include more scanning pages every month. We kick off with the new format next month with an increase in the coverage of the subject.

### Airband

Running a close second in popularity, according to the respondents of the survey is Airband. Next month therefore, we'll also be boosting our coverage of this

interest. The following month with our July issue, we'll be bringing you a complimentary guide to the 2005 RIAT. A supplement, which proved to be highly popular last year.

### MilSats

Further to my 'Ed's Shack' look at Milsat monitoring in last month's SWM, I've had some E-mail correspondence from readers who've taken a look at this part of the spectrum. There have been a few 'new faces' on the #hearsat IRC channel too. This month I continue my look at this fascinating subject that provides much interesting traffic. If you haven't been tempted yet, don't forget that you don't need highly sophisticated or expensive equipment. One of the correspondents was using a mini hand-held scanner and a length of stiff wire as an antenna. He was most impressed with the results.

### Winners

The WRTH competition winner announcement was inadvertently left out of last month's SWM. The lucky recipients of the broadcast listeners bible are as follows. **DJ Dickson - Cumbria. TW Hadlington - Worcestershire, JT Jones - West Midlands, ME Porteous - Peterborough and Mark Sinclair - Swansea**. Well done all of you, I hope you enjoy your prizes.

### Deregulation

There's much to do about the proposed deregulation of amateur radio licensing. It seems some of those involved with the national society have become a little hot under the collar at the suggestion that Ofcom are considering the introduction of licences for life.

Many appear to have taken this as meaning the abandonment of a qualification process. Two entirely different issues if you ask me.

**Clive Hardy** has been researching the matter with the Canadian authorities, as they've been running a licence for life scheme for some while. Look out for next month's SWM for more details from Clive.

Also coming in next month's *Short Wave Magazine*, a familiar friend to all utility listeners is revealed with a visit to Kinloss Rescue by **Ben Hogan**.

Don't miss it!

014 73 Kevin

# QSL

THE BEST LETTER WILL RECEIVE A £20  
VOUCHER TO SPEND ON ANY SWM SERVICE.

**Is there something you want to get off your chest? Do you have a problem fellow readers can solve? If so then drop a line to the Editor at QSL, Short Wave Magazine, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

## Dear Sir

I have been short wave listening since 1969, but I became particularly interested in the UK short wave transmitting stations since your articles appeared on Woofferton and Rampisham in SWM in September 2003 and January 2004. In 'Ed's Comments' in the January 2004 issue you mentioned that you had visited three stations and I would be very grateful if you could let me know whether you published an article on this third station and if so, which issue of SWM it appeared in. Finally, I wonder if you know whether SWM covered the closure of Daventry in 1992? I look forward to hearing from you. Thanks for an excellent magazine.

PS: You pointed out the beauty of the masts and antennas in the Rampisham article, I wondered if you had seen the excellent photos on the following website of these structures: <http://tx.mb21.co.uk/gallery>  
**Brian Edwards  
Stirling**

*Brian, the third station I referred to was Orford Ness, the Suffolk based VT Merlin outpost, that*

*was once the home of the US security services and other interesting activities. I attended a launch ceremony for the new m.w. DRM transmitter back in 2003. It was mentioned in Ed's Comments SWM November 2003. I'm sad to SWM didn't give any in-depth coverage to the Daventry closure in 1992. Finally, I am aware of the excellent [tx.mb21.co.uk](http://tx.mb21.co.uk) site - It's worth a long browse for those with the time. All the best - Ed.*

## Dear Sir

Just thought I would drop you a line regarding the 'LM&S' section of your magazine. The new frequency table layout is a vast improvement, much neater, tidier and easy to read, well done! Many thanks for a great magazine, my subscription renewal is assured!

**George Ryan  
Warrington**

## Dear Kevin

As you have referred to elsewhere in this issue, my time as a Short Wave Magazine columnist

has come to an end. I wanted to thank you very much for the opportunity to write about radio matters from the Australian part of the world. My first column was in March 1991, my last in March 2005, making 56 columns in all. It has been a great pleasure working with you and with Zoë Shortland and with the people who wrote and E-mailed with their reception reports.

73

**Greg Baker  
Canberra, Australia**

*Greg, many thanks for your letter, it has been great working with you over the years. Your columns have been of great interest to the regular readers of SWM.*

*You have provided us, here in the Northern Hemisphere, an ongoing insight into the broadcast scene on the other side of the planet. Detailed reports that were unavailable from elsewhere. Your quarterly report will be missed. I do most sincerely hope that you will continue to contribute to the magazine with news from afar. Thanks from me and all the SWM readers. - Kevin.*

## topqsl

### Dear Sir

Firstly, I would like to congratulate you on a great magazine. I am an avid reader of your magazine, even though I do not own any specialist radio equipment myself. My background is one of computers, but was introduced to radio and this magazine by my father when I was a teenager. Even though I have a strong computing background, I still find radio to be a thoroughly interesting medium and I believe the two can easily co-exist and often compliment each other.

Having purchased the June 2004 issue of SWM I sat down, as usual, to read it. I could not believe my luck when, on page 29, I found the opportunity to enter a competition to win an Icom R20. It was too good to miss. I had the previous issue of SWM so I felt I could quite comfortably answer all the questions for the competition.

I ran around the room trying to locate the May issue of SWM. Bingo! It was under my bed! I leafed through SWM in search of the review. I found the answer to question 1 - 'How many memories does the IC-R20 have?'. On page 29 of the May issue it says 1050. I wrote this down. I jump to question 6 - 'How long will the R20 record for?'. I know this, page 27 says, and I quote, "265 minutes of audio can be recorded on the 'Long Time' setting". Again, I try and

locate the answer for question 3, the scan speed, on page 26 I find that the reviewer seems uncertain with 'around 23 channels per second'. Suddenly, it occurs to me that the May review isn't 100% accurate! No! I've just entered a competition to win my first radio and I've been given the wrong answers.

I quickly start reading everything on the competition page of the June issue and then scour the magazine for adverts for the radio. It cannot be true! Different adverts (the Nevada and ML&S adverts) have differing figures for the number of memories. It looks as though some of the adverts are possibly based on the May review of the R20.

I dart back to the competition page and then notice that you have included all of the answers for the competition at various places on the page. I quickly cross out the previous competition entries and try and make amends with new information. I have had quite a chuckle over this whole episode. I really wanted the chance to win my very first radio, but given that you have printed different answers in consecutive issues of SWM I feel I'm not going to win now.

As mentioned previously, I absolutely adore this magazine and love reading it, but I feel let down by the review of the R20 and the different figures given on adverts for different functions of the radio itself. In future, can we make sure this doesn't happen again or when reviewing

equipment, at least place a technical disclaimer on the specifications. The same should be done for the companies advertising in your magazine.

I enclosed what I thought are the right answers to the competition, but I'm not sure now. Keep up the good work.

**Gerald Davies, Cardiff**

*Gerald, when we reviewed the R20 there were not 'official' figures regarding scan speed available from Icom UK. Due to the nature of the operation of the any scanner the actual rate depends very much on the spread of frequencies stored in the memories included in the scan. Additionally, the numbers of channels and the inclusion or exclusion of banks can also have an effect. In summary, producing a definitive figure is not straightforward as with most measurements all the variable conditions need to be specified. Generally manufacturers tend to quote the best possible figures - yes really! The source for the figures quoted in the review was different to that used subsequently. As or speed quoted by the UK radio trade, I'm unsure as to where they obtain their data. Generally the answers to competition questions are available in the body of the referring review. On reflection I should not have asked this specific question! I'm glad to learn that you enjoy SWM, I hope that you'll forgive this instance of confusion. Keep trying with the competitions, you stand as good a chance as any of the entrants. - Ed.*

## 13th Successful Year!

This year, the **National Vintage Communications Fair (NVCF)** celebrates its 13th successful year! Since its inception in 1992, the NVCF has been recognised as the UK's leading vintage communications fair, aimed specifically at collectors of early radios, Bakelite and Candlestick Telephones, fifties television sets, old wind-up gramophones, classic valved audio equipment and the like, all saved from a bygone era and lovingly restored.

As well as supplying the needs of collectors, the NVCF caters for those interested in furnishing 20th century period homes and interiors and supplying the film and TV industry with authentic and genuine props. The fair is actually held twice a year at the NEC and is supported by over 300 stallholders from all over Britain and as far afield as Europe, America and the Far East, who may be anything from full time specialist dealers to people selling surplus items from their collections. Several collectors' clubs and magazines also exhibit at the fair and are available to give helpful advice on the practical side of the hobby.

The fair will be held on **Sunday 1 May 2005** in Hall 11 at the National Exhibition Centre, Birmingham. Doors open from 1030 'till 1600 and admission is £5 (under 14s free of charge). Contact the organisers **Terry Martin/Peter Yates** at **122b Cannon Street Road, Whitechapel, London E1 2LH, Tel: (017947) 460161, E-mail: info@nvcf.org.uk** or visit **www.nvcf.org.uk** for more information.



## Worthing Museum Goes Global

The **Worthing & District Amateur Radio Club (WADARC)** has

staged a full week of events for National Science Week. In Worthing, the club was invited in conjunction with Worthing Museum and Worthing Borough Council to set up an active amateur radio station within the fantastic Worthing Museum.

The week started on 11 March and ended on 19 March. During this time, many visitors to the museum chatted to the WADARC volunteers who gave a full explanation of the science behind radio communications, mobile telephone technologies with regular video presentations in the lecture theatre. Also explained, was the new licensing structure introduced by Ofcom and the Radio Society of Great Britain, which allows non electronically minded people and juniors to come into the hobby, with training and exams on a gradual rising curve of learning until the full A class licence is achieved.

Excited pupils from Whytemead and Hawthorns First schools enjoyed learning how to send their own names using Morse code and with further practice learnt to key the SOS

call used by the ill fated *Titanic* ocean liner. Each pupil was awarded a certificate of achievement on completion of their Morse training.

The visiting pupils were also able to speak directly to other 30 other amateur radio stations locally and across the world, with an



explanation of how their transmissions reached other parts of the world. The Museum radio station managed to contact over 30 countries world-wide during science week, these included Japan, Indonesia, Saudi Arabia and islands in the Pacific Ocean using the special callsign of **GX1WOR**.

The club would like to thank Worthing Borough Council, Worthing Museum and its superb staff for making the event the huge success it was. Also, thanks to Icom (UK) Ltd., who supported the event too, with some 'goodie' bags.

## Science Festival Report

The Wrexham Amateur Radio Society recently had a trip to the Science Festival. Here's a brief report from **Mark MW1MDH**, Wrexham ARS's Chairman. Take it away, Mark...

"I think, firstly a memo to *Scientriffic's* organisers - try not to hold an event such as this on the same day as major sporting events (Wales/Ireland rugby match) - this led to a major drop in visitors over previous years! That and the exceptional weather, and possibly the Starchaser rocket, outside in the main campus car park.

As Wrexham ARS was 'on tour' that weekend (heading up to Blackpool almost straight after they had finished at *Scientriffic*) they ran a somewhat smaller set-up than previously. As last year's antenna system took half a day to sort out, to get this one up in two hours this time was quite something!

An FT-102 was pressed into use and run into a simple dipole at about 9m, on v.h.f. an FT-100 (with Microset linear) helped out on 2m. Despite being in a built up area, the 2m station worked all over NW England, and even Coventry! Given that the collinear for v.h.f. was on top of the mast for h.f., and couldn't 'see' properly in that direction, Coventry was quite an achievement!

In the meantime, h.f. had good coverage all over Northern Europe. We also had the ever popular Morse displays, these were bolstered by the addition of the 'Children's University' - a scheme whereby children could gain a certificate and T-shirt if they completed a number of activities, throughout the event, in this case, sending their name in Morse.

Despite low turn outs this year (not just felt by us) the club decided to give this year's event 7 out of 10. We'd have liked more visitors and perhaps not quite such hot weather (it was almost tropical outside!) and maybe if they could have moved the rugby as well? - well, we could have asked!

Wrexham ARS's trip to *Scientriffic* was generously supported by Icom, Kenwood, and of course *SWM*. The literature and posters supplied by both Icom and Kenwood made walls a bit more colourful. Thanks also to all at NEWI and the *Scientriffic* organisers.



**Geoff GW6SBD** operating the v.h.f. station at *Scientriffic*.

## rallies

**May 2:** The Dartmoor Radio Rally is to be held at Tavistock College, Tavistock, Devon. This is the same new location as last year, with plenty of space for traders to display their wares and for visitors to see them and talk to old friends. There is access for disabled visitors, but due to extensive building works, there can be no dedicated disabled parking. However, there is adequate car parking around the college site. There will be trade stands, a Bring & Buy and refreshments, etc. Doors open 1030 (1015 for disabled visitors), Talk-in on S22. Come and visit beautiful Dartmoor, ideal for picnics, so why not bring the whole family along? **Ron G7LLG** on (01822) 852586.

**May 8:** The Magnum Rally is to be held at the Magnum Leisure Centre, Irvine, Ayrshire. Doors open 1030. There will be trade stands for radio and computer, Bring & Buy, raffle and free parking. Signposted on all major routes. Cost £3 entrance fee, under 14s free. **Helen Mason MM0HLN** on (07776) 385247 or visit [www.magnumrally.co.uk](http://www.magnumrally.co.uk)

**May 8:** The Dunstable Downs are holding their 22nd Annual Amateur Radio Car Boot Sale at Stockwood Park, Luton, now the largest event of its type in the UK. Access via M1, junction 10. Doors open 0900 and parking is just £2 per car. There will be full catering and toilet facilities. Details and seller's booking form on [www.ddrcbootsale.org](http://www.ddrcbootsale.org)

**May 29:** The Mid-Ulster Amateur Radio Club are holding their rally and computer fair in The Embankment, Derrymacash, near Lurgan, Co. Armagh. Doors open at 12 noon and there will be all the usual trade stands, Bring & Buy, pub lunches, etc. Talk-in on S22. **Ivan** on 02838 342501.

If you're travelling a long distance to a rally, it could be worth 'phoning the contact number to check all is well, before setting off.

## Dover's Foundation Course

The *SWM* newsdesk received this picture from Matt Curtis, Chairman of the **Dover Radio Club**, which shows some students taking the Foundation course at the club. Back row left to right: **Brian Joyner G8ZYZ (Assistant Instructor)**, **Richard Bax**, **Albert Wilson**, **Barry Pearson**, **Mark Gibbinson**, **Sam Whitlock**, **Paul Cook**, **David Harding G0DQI (Lead Instructor)**. Front row left to right: **Graham Cahill 2E1ITE (Assistant Invigilator)**, **Katrina Barton**, **Samantha Evans**, **Cecil Armstrong G0OJZ (Chief Invigilator)**.



## New Palstar ZM30 Analyser

**N**evada are pleased to announce the introduction of the new Palstar ZM30 h.f. antenna analyser. Unlike other brands on the market at this price, the ZM30 uses a precision low power Direct Digital Synthesis (DDS) signal generator to provide a stable signal source. This gives it greater accuracy and allows its use as a stable stand alone low power transmitter for remote antenna tests.

The s.w.r. analyser is powered by an 8-bit micro-controller with a self-calibrating reflectometer. The unit can also measure impedance, reactance, inductance, capacitance, stubs, Q factor and resonant frequency. Covering from 1 to 30MHz the analyser has a serial port for field upgradable software, and runs from its own internal batteries. The ZM30 will sell for £299.95 and customers can contact the Nevada sales line on (02392) 313090 or visit [www.nevada.co.uk](http://www.nevada.co.uk) for further details.



## Foundation Course

The **Andover Radio Amateur Club** intends to hold another Foundation course on **4/5th June**. The venue for the course will be the Community Centre at Larkhill. This course will be open to all and no previous experience is necessary. Applicants may be between 9 and 80 years old! A fee of £30 is charged, which includes the examination fee and a copy of the book *Foundation Licence Now!* Success in the examination on day two entitles the candidate to apply for a Foundation Licence permitting low power world-wide radio operation. For more information or to make a booking call **Keith G0HKC** on (01980) 594892.

## National Mills Weekend

The **Clacton Radio Club** is pleased to announce that members will be participating in **National Mills Weekend** on **7/8 May 2005** using the callsign **GB2TTM**. Activity will be from Thorrington Tidal Mill, located near to Brightlingsea and a special QSL card will be issued for the event. This is the first time this particular Mill has been put on the air and the Clacton Radio Club is pleased to be allowed with this venture. More information from Secretary **Geoff Axford G4AQZ** on (01225) 429117 or Tel/FAX: (01225) 435700.

## Summer Schedules

International short wave broadcasters started their summer frequency schedules on 27 March. The **World DX Club** has published a 12 page pamphlet listing the times and frequencies of their English broadcasts in country order. Over 100 broadcasters are listed and the pamphlet is constantly updated so that the information is as up-to-date as possible when you order. To order a copy send 50p or two IRCs to: **Arthur Ward, 17 Motspur Drive, Northampton NN2 6LY**.

## Archive CD

The **Medium Wave Circle** is pleased to announce the release of its latest archive CD. Included are more than 100 audio clips of DX catches heard in the UK, mostly on beverage antennas, plus audio from numerous other stations including the 1960s offshore pirates Radios City and London. There are also various video clips, 25+ useful maps, station lists such as the Pacific Asian list, the Euro African list etc.

Also included are 24 receiver manuals and 50+ receiver reviews from Radio Netherlands. There are various other features too numerous to list in detail. Included for the first time are the 4 MWC All Time DX Lists of m.w. stations heard in the UK since 1953. There are more than 2000 stations listed from all around the world. In addition to all the above, there are also 10 issues of magazine *Medium Wave News* in PDF format from April 2002 - March 2003, plus 10 issues from April 2004 - March 2005.

There are many hours of listening, reading and watching on the CD. The cost is £5 in the UK, 10 Euros to Europe and US\$11 anywhere else in the world. Prices include postage & packing. To order the CD, send your money to **MWC, 59 Moat Lane, Luton LU3 1UU, England**. Alternatively, we accept PayPal payments from outside the UK. The payment should be sent to: [contact@mwcircle.org](mailto:contact@mwcircle.org)

## Plug And Play With WRN

WRN, the London-based international transmission provider, has played host to the 88.3 Village FM Breakfast Show team from Agios Ioannis Rentis, Greece. Hosts **Vicky Hatzaki** and **Dimitris Milioglou** were in London with ten competition winners over the weekend and late on Friday afternoon (18 March) found they needed a studio from which to broadcast their live Monday morning breakfast show. WRN was able to offer the team its 'plug and play' studio with ISDN connectivity back to the Village FM studio. The team simply turned up at 0430 on Monday 21 March and started their live show at 0500 (0600 local Greek time).

Radio stations visiting London and



broadcasting live shows back home regularly use WRN's studio. Recently this has included Dublin's FM 104, which broadcast its post BRITS Award breakfast show from the WRN studio. Tim Ayris, WRN's Marketing Manager, said: "We are always delighted to welcome stations from around the world to use our studio facilities, which offer world-wide connectivity at a great price".

ARC Ltd. will close its doors on the 7 May after 21 years based in Earlestown, Newton-le-Willows in Merseyside. **Peter G4KKN**, **Frank G4MWM** and **Elaine** have been here since 1983 when it was the northern branch of Amateur Radio Exchange. Then in 1988, Peter bought the business and traded as Amateur Radio Communications Limited. However Peter has finally decided to retire this year and concentrate on his commitments at home including his smallholding activities.

Nevertheless Peter, Elaine and Frank will be sad to see the door close on that Saturday but would like to thank all their loyal customers for their support over the years and hope that some will keep in touch. Also if any wish to call in and see them before the end of business on 7 May they may even pick up a last minute bargain!

## Open Day

QSL Communications are holding their open day on **Sunday 8 May 2005** and invite you to come along and help them celebrate their 20th Anniversary. Representatives from Icom (UK) Ltd., Kenwood Electronics and Yaesu UK will be on site and demonstrating their products. Why not go along and meet up with old friends and meet new ones. For further information contact **Jayne** on (01934) 512757, E-mail: [jayne@qslcomms.f9.co.uk](mailto:jayne@qslcomms.f9.co.uk) or visit their website at: [www.qsl-comms.co.uk](http://www.qsl-comms.co.uk)

## Plymouth Radio Club

After loosing its wonderful venue at the Royal Fleet Club in Plymouth at the end of the last century, the **Plymouth Radio Club** was offered temporary premises in the University of Plymouth by the Dean of faculty and **Alan Santillo** (senior lecturer). The venue allowed the club to carry on, although at a reduced level, for several years, during which time **Bob Griffiths** and **Chris Wingate** were able to achieve wonders on the teaching front with many new callsigns being issued due to their diligent work.

During the end of 2003 it was made known that the electronics department of the University of Plymouth was about to be completely modernised and the club would again be homeless. A meeting was called by the steering committee, during which it was decided to have a massive push by members to try and resurrect the club to its former glory. The interested parties in the area formed a new committee and located premises for a trial period.

During the first year the club had three field days, a BBQ, took part in Lighthouses On The Air and helped out on the Plymouth Navy Days amongst a host of other events. The club has 'hopefully' settled at the Royal Air Force Association premises in Ermington Terrace, meeting on the second Tuesday of the month at 1900 for 1930 start.

There is a full programme of events scheduled for this year and a few events already planned for next year. One of the major events planned for this year is the Rally. The club has not been able to hold a rally for about eight years, so this year's rally is by way of a trial. The Rally is to be held at the Sparkwell Village Hall on **Sunday 5 June 2005**, with a start time of 1000. There are still a few tables left and further information on the rally is available from **Peter Connor** on (01752) 837319. A full listing of events, directions and other information about the club is available at [parc.org.uk](http://parc.org.uk) or contact **Frank G7LUL** via E-mail at: [frank@foxonezero.fsnet.co.uk](mailto:frank@foxonezero.fsnet.co.uk)



## New Product From ML&S

**M**L&S are always adding to their range of unique products and the EH Antennas from ARNO in Italy seemed to fit the bill nicely. Following on from the tremendous success of the Miracle Antenna and associated products, the 'Cobra' and 'Venus' antennas are yet another innovative design, this time

from a European manufacturer.

The EH Antennas are available for all bands as single band systems. Covering h.f. amateur bands 160-6m, they offer very small overall size (the 40m version is just under a metre tall!), they offer superb low v.s.w.r., require no tuning unit and can handle 2kW of power. They have many advantages over the usual trapped antenna designs and seem to offer lower noise, TVI and of course low profile neighbour friendly sizes. Prices are £105 for the Cobra 6-40m range and £179 for the Venus 80-160m versions.

For further details see [www.hamradio.co.uk](http://www.hamradio.co.uk) or the manufacturers website [www.eheuroantenna.com](http://www.eheuroantenna.com)

## MyDEL Power Supplies

**Y**et more MyDEL own brand products from **ML&S** featuring two small and compact switch-mode power supplies. The first is the MP-250A, which is a neat looking desk-top power supply ideal for powering any main rig requiring 13.8V d.c. @ 22-25A. Unlike many other switch-mode offerings, despite the very compact dimensions (only 146 x 114 x 152mm (w x h x d)). The front panel sports two huge back-lit meters showing volts and amps. The current RRP is £89.95.



The second unit is the MP-4128, a more usual 'slab' design without metering, retailing at £69.95. All MyDEL power supplies are offered with two years exchange or repair warranty and are available now. See [www.hamradio.co.uk](http://www.hamradio.co.uk) for further details.

# Bandscan

America

● **Gerry Dexter** do SWM Editorial Offices, Arrowsmith Court, Broadstone, Dorset BH18 8PW  
● **E-mail:** gdexter@pwpublishing.ltd.uk

**B**y now surely everyone has heard of the passing of Dr. Gene Scott who died in Los Angeles of a stroke earlier this year. For years Dr. Scott broadcast audio tapes of his satellite TV 'sermons' (probably too heavy a word in his case). In recent years his ubiquitous University Network could be heard over WWCR, via Anguilla (Caribbean Beacon) and from transmitters in Samara, Russia and Cahuita, Costa Rica. Despite his passing he is still on the air via tapes of earlier broadcasts.

The Colombian station on 6.140 returned to the air a few months ago under its old name, Radio Melodia but within a matter of weeks began to relay its domestic affiliate Radio Lider, which has a.m. and f.m. outlets in Bogota. Signals from this one have been quite good during local evenings. The frequency tends to be a hair beneath the station's assigned channel.

A second transmitter is on the air for La Voz de su Conciencia. The frequency 5.910 has joined 6.010 in operation. Eventually, each channel will carry different programming.

## Return To Short Wave

Before the year is out we can start chasing Radio Television Djibouti, which is due to return to the short waves after an absence of many years. The USA government is rebuilding both the medium wave and short wave stations.

The frequency 4.780 has been used in the past - a bad spot for North American listeners due to the near round-the-clock use of that frequency by a Federal Emergency Management Agency (FEMA) transmitter, which belted out a terrible noise much of the time. Djibouti used to sign on at 0300. Perhaps by the fall this target will again be available.

The USA station, which began the rush to short wave more than 20 years ago and soon found itself unable to sell airtime, is making a comeback of sorts.

## Station News

WRNO - then 'the rock of New Orleans' - eventually sputtered out and has been off the air for several years. But, it should be active again by the time you read this. Check 7.355 and 15.420. Good News World Outreach, based in Fort Worth, Texas, now owns WRNO.

Meantime, the VOA relay at Mopeng Hill, Botswana has begun using the 60m band. It signs on just before 0300 on 4.930.

Radio Havana Cuba facilities have been carrying the domestic news and time station Radio Reloj during the wee small hours here (0700-0900) on a number of regular RHC frequencies, including 6.060 and 11.760. However, the broadcasts do not appear to be a sure thing day in and day out.

HRMI - Radio Misiones International has been reactivated on 3.340, running to 0500 or a little later with religious programming in English and Spanish. Unfortunately, reception is not as good or consistent as it was on their 5.010 spot.

Radio Vanuatu is back on the air (on 7.260) after having been off while the facility underwent an upgrade. Eventually, you can look for their old, old 3.945 frequency to light up again, as well.

In Brazil, Radio Gazeta has reopened operations on its old 15.325 frequency and now carries programming from Radio Cancao

Nova. Radio Gazeta is one of the oldest stations in Brazil.

Radio Ancash, Huaraz, Peru has resumed broadcasts on



**GOVERNO DO ESTADO DO AMAPÁ**  
Rádio Difusora de Macapá  
Gabinete da Gerência



4.990. This is one of Peru's old standby stations, which has been on the air for many years. Back when I was active in sending reception reports they were the very devil to pull out a QSL.

Radio Amazonas, Venezuela on 4.939 is still active, though for some reasons it appears to be so only in the early morning. Finding this one in the local evenings is a rare event.

Is Radio Nacional, Paraguay in trouble? They used to be a rock on 9.735, then sometime back their frequency slipped up to variable 9.737 and lately some of the punch has gone out of their signal. This is usually a sign that something is wrong with the electronics (and isn't being seen to by the engineers). Radio Nacional is virtually the only Paraguayan short wave station on the air, unless you count the flea-powered Radio Americas, which no one is able to hear.

## Propagation Conditions

Propagation conditions continue to be spotty. The higher bands start to 'lose it' by early evening, local time. The trade off has been some good openings to Africa, though not occurring on an every day basis. Stations that have made it into this listening post include:

3.200	Trans World Radio, Swaziland
3.230	SW Radio Africa
3.240	Trans World Radio, Swaziland
3.255	BBC Relay, South Africa
3.270	NBC, Namibia
3.290	NBC, Namibia
3.306	ZBC, Zimbabwe
3.320	Radio Sondergrense, South Africa
3.345	Channel Africa, South Africa
4.750	Radio Peace, Sudan
4.760	ELWA, Liberia
4.770	Radio Nigeria
4.775	Trans World Radio, Swaziland
4.777	RTV Gabonaise, Gabon
4.783	RTVM, Mali (variable)
4.800	Radio Lesotho
4.834	RTVM, Mali
4.845	Radio Mauritanie, Mauritania
4.890	Radio France Int. Relay, Gabon
4.910	ZBC, Zambia
4.915	GBC, Ghana
4.930	VOA Relay, Botswana
4.940	VOA Relay, Sao Tome
4.950	Radio Nacional, Angola
4.960	VOA Relay, Sao Tome
4.965	Christian Voice, Zambia
4.976	Radio Uganda
5.005	Radio Bata, Equatorial Guinea
5.010	RTV, Malagasy, Madagascar

All these tropical band Africans were being heard in the Midwestern US between about 0300 and 0600. DXers in the Eastern Time Zone were also able to get logs on most of

these stations during their local afternoon. In addition, a few lucky ones have been able to bag RTVC, Congo on 5.985, Radiodiffusion Rwandaise - 6.055 and RN Tchadienne, Chad on 6.165, the latter with a particularly good signal.

Coalition Maritime Forces Radio - Radio one is still active, airing programs aimed at sailors plying the waters of the middle east. The broadcasts are in several languages and consist of news, music and other entertainment and also include requests for information about any suspicious people or activities that might be noticed as ships and sailors go about their business. The station is on the air on 6.125 from 0300-0800 and 15.500 1400-1900 and is an operation of the United States Navy.

That wraps things up for this time.

# LM&S

Long, Medium & Short Wave Bands

● **Martin Peters** 11 Jilbert Drive, Reading RG31 5DZ  
 ● **E-mail:** lms@pwpublishing.ltd.uk

Dxers:-  
 A Rhoderick Illman, Oxted  
 B Peter Pollard, Rugby  
 C Bernard Curtis, Stalbridge  
 D Vic Prier, Seaton  
 E Simon Hockenull, Bristol  
 F Freddy McGavin, Dublin

**T**he change to UK local time took place Sunday 27 March. By the time you read this, the summer schedules will be operational and well and truly bedded in for the season. Here follows a selection of English transmissions beamed to Europe.

## Radio Japan

0500-0600	5.975
0500-0700	7.230
1000-1100	17.585
1700-1800	11.970
2100-2200	6.055, 6.180

## Radio Ukraine

2100-2200	7.420
0000-0100	7.440
0300-0400	7.440
1100-1200	15.675

## Radio Budapest

1900-1930	3.975
2100-2130	6.025

## Bible Voice Network

0715-0830 (Fri)	5.945
0700-0815 (Sat)	5.945
0630-0845 (Sun)	5.945

## Radio Prague

0700-0730	9.880, 11.600
1030-1100	9.880, 11.615
1300-1330	13.580
1600-1630	5.930
1700-1730	5.930
2000-2030	5.930

## Voice of Turkey

0300-0350	6.140, 7.270
1230-1320	15.225, 15.535
1830-1920	9.785
2030-2120	7.170
2200-2250	9.830

## Deutsche Welle

0600-1000	6.140
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Our friend and regular contributor, **Sheila Hughes** wound up in hospital following a nasty fall. Many thanks to her son, Paul, for letting me know. I'm sure you all join me in wishing you, Sheila, a full and speedy recovery. I look forward to adding your initials to the listings again just as soon as you're up to it. In the meantime, allow the family to pamper you. Get well soon and keep smiling.

The listings come with a health warning

## Tropical Band Table

MHz	UTC	Service	Country	Listener
3.210	0700	WWCR, Nashville	USA	C D
3.915	1645	BBC World Service	G/SNG	A D E F
3.950	2352	Xinjiang	CHN	F
3.955	1653	HCJB	EQA/D	A
3.955	2005	KBS World	KOR/G	A F
3.955	1950	Radio Taiwan	TWN/G	F
3.965	2106	Radio France Int'l	F	A E F
3.965	1820	Radio Taiwan	TWN/F	C E
3.975	1704	Radio Budapest	HNG	A E F
3.985	2015	VIRI	IRN	F
4.005	2108	Vatican Radio	CVA	A D F
4.635	2216	Radio Tajikistan		A F
4.760	0122	All India Radio, Port Blair	IND	F
4.770	2132	FRCN Kaduna	NIG	F
4.783	2138	RTM Bamako	MLI	F
4.800	1715	CPBS 2 Beijing	CHN	A
4.800	2245	CNR1 Shijiazhuang	CHN	D F
4.810	2053	Voice of Armenia	ARM	A F
4.820	2230	Xizang Lhasa	CHN	D F
4.830	0110	All India Radio, Jammu	IND	F
4.840	0025	All India Radio, Mumbai	IND	F
4.845	2058	ORTM Nouakchott	MTN	A D F
4.850	0035	All India Radio, Kohima	IND	F
4.860	1925	All India Radio, Delhi	IND	F
4.885	0520	Radio Clube Do Para	B	D
4.905	2240	Xizang Lhasa	CHN	D F
4.910	1755	All India Radio, Jaipur	IND	F
4.910	1742	ZNBC Radio 1	ZMB	F
4.915	2215	GBC 1 Accra	GHA	D F
4.920	2230	Xizang Lhasa	CHN	D F
4.930	2020	Turkmen Radio	TKM	F
4.940	2100	Voice of America	USA/STP	A B F
4.940		Voice of Russia	RUS	E
4.960	0520	Voice of America	USA/STP	D
4.976	2027	Radio Uganda, Kampala	UGA	F
4.985	0530	Radio Brasil Central, Goiania	B	D F
5.010	0100	All India Radio, Thirupuram	IND	F
5.015	1910	Turkmen Radio	TKM	F
5.025	0114	Radio Rebelde	CUB	F
5.030	2250	Radio Burkina	BFA	D
5.050	0135	WWRB, Manchester	USA	F
5.060	0129	Xinjiang Urumqi	CHN	F
5.070	0915	WWCR, Nashville	USA	C D F
3.365	2157	Radio Cultura, Araraquara	B	F
3.930	1925	Radio Boomerang (pirate)		F
4.775	0048	All India Radio, Imphal	IND	F
4.785	2356	Radio Brasil, Campinas	B	F
4.790	0053	RRI Fak Fak	INS	F
4.930	2020	Voice of America	USA/STP	F
4.930	1927	China Radio International	CHN	F
4.950	2131	Radio Canada International	F	F
4.990	0052	All India Radio, Itanagar	IND	F
5.025	1742	Radio Tashkent	UZB	E F

## Long Wave Table

kHz	Service	TX Location	Country	Power (kW)	Listener
153	Deutschlandfunk	Donebach	D	500/250	A B
162	France Inter	Allouis	F	2000/1000	A
171	Radio Rossi	Bolsakovo	RUS	600	B
177	Deutschlandradio Berlin	Zehlendorf	D	500	A B
183	Europe 1	Saarlouis	D	2000	A
189	Rikisutvarpid	Gufuskalar	ISL	150	B
198	BBC Radio 4	Droitwich	G	500	A
207	Deutschlandfunk	Aholmung	D	500	A B
207	Rikisutvarpid	Eidar	ISL	100	B*
216	Radio Monte Carlo	Roumoules	F	1400	A B
225	Polish Radio 1	Solec Kujawski	POL	1000	A B
234	RTL	Beidweiler	LUX	2000	A
243	Denmark Radio 1	Kalundborg	DNK	300	A B
252	RTE Radio 1	Clarkstown	IRL	500/150	A B
252	Algiers Radio 3	Tipaza	ALG	1500/750	B
261	Radio Rossi	Taldom	RUS	2500	B*
270	Czech Radio 1	Uherske Hradiste	CZE	650	B
279	Belarussian Radio 1	Sasnovy	BLR	500	B
279	Turkmen Radio 1	Asgabat	TKM	150	B*

\* = dark

Listeners:-

A Rhoderick Illman, Oxted B Simon Hockenull, Bristol

## Local Radio Table

kHz	Service	Svc area/TX site	kW	SWL
558	Spectrum	Crystal Palace	1	A B C
603	Capital Gold	Littlebourne	0.1	A B
630	BBC 3CR	Luton	0.2	B C
666	BBC Radio York	York	0.5	B
666	Classic Gold	Exeter	0.34	C
729	BBC Essex	Manningtree	0.2	A B
738	BBC Hereford & Worcester	Worcester	0.037	B C
756	BBC Radio Cumbria	Carlisle	1	B
756	Magic Maldivyn	Newtown	0.63	B C
765	BBC Essex	Chelmsford	0.5	A B C
774	Classic Gold	Gloucester	0.14	B
774	BBC Radio Kent	Littlebourne	0.7	A
774	BBC Radio Leeds	Leeds	0.5	B
792	Classic Gold	Bedford	0.275	A B C
801	BBC Radio Devon	Barnstaple	2	A C
828	Classic Gold	Bournemouth	0.27	C
828	BBC Asian Network	Wolverhampton	0.2	B C
828	Classic Gold	Luton	0.2	C
828	Magic 828	Leeds	0.12	B
837	BBC Radio Cumbria	Barrow in Furness	1	B
837	BBC Asian Network	Leicester	0.5	A B C
855	BBC Radio Norfolk	Norwich	1.5	A B
855	BBC Radio Devon	Plymouth	1	C*
855	BBC Radio Lancashire	Preston	1	B*
855	Sunshine 855	Ludlow	0.15	C
873	BBC Radio Norfolk	West Lynn	0.3	A B
936	Fresh AM	Skipton	1	B
945	Classic Gold	Derby	0.2	B
945	Capital Gold	Bexhill	0.7	A C
954	Classic Gold	Torbay	0.4	C
954	Classic Gold	Hereford	0.16	B C
963	Asian Club	Hackney	0.95	A B C
963	Asian Club	E. Lanes	0.2	B
972	Asian Club	Southall	1	A B C
990	BBC Radio Devon	Exeter	1	C

this month. They refer to loggings made during the month of February, before the plan change. Many broadcasts beamed to Europe will now be an hour earlier than indicated, possibly on different frequencies. Summer conditions favour the higher frequency bands.

## Medium Wave Table

kHz	Service	Location	Country	kW	Listener
531	Uthvar Foraya	Akraberg	FRO	200/100	D
531	RNE 5	Many	E	10-25	A*
531	Swiss Radio (German)	Beromunster	SUI	600	A* B D
540	Radio Twee	Wavre	BEL	150	A* B D
549	UCB Europe	Dundalk	IRL	70	A D
558	RNE 5	Many	E	5-50	A*
567	RTE 1	Tullamore	IRL	500	A B D
576	Sudwestrundfunk (SWR)	Muhlacker	D	100	A* D
585	RNE 1	Madrid	E	600	A* B D*
585	FIP	Paris	F	8	D
585	BBC Radio Scotland/ Solway	Dumfries	G	2	A
594	HR Skyline	Frankfurt	D	250	A* B
594	RTM A	Oujda	MRC	100	D*
603	France Info	Lyon	F	300	A* D
603	RNE 5	Seville	E	5	D*
603	BBC Radio 4	Newcastle u Tyne	G	2	A
612	RTM A	Sebaa-Aioun	MRC	300	A*
612	Radio Jordan	Amman	JOR	200	D*
612	RNE 1	Viitoria	E	10	A* D*
621	RTBF 1	Wavre	BEL	300	A* B D
621	RNE 1	Many	E	10	A* D*
630	Tunis Radio	Djedeida	TUN	600	D
630	NRK Europakanalen	Vigra	NDR	100	A*
639	RNE 1	Many	E	10-300	A* B D*
639	Czech Radio 2	Prague	TCH	1500	A* B D*
648	BBC World Service	Orfordness	G	500	B D
657	RNE 5	Madrid	E	50	A* D*
657	BBC Radio Wales	Wrexham	G	2	A D
666	Radio Vilnius	Sitkunai	LTU	500	A*
666	Sudwestrundfunk (SWR)	Rohrdorf	D	150	A* D*
675	Arrow Classic Rock	Lopik	HOL	120	A* B D
684	RNE 1	Seville	E	600	A* B D*
693	Voice of Russia	Moscow	RUS	20	C
693	RDP Antena 1	Azores	POR/AZR	10	D*
702	Truck Radio	Julich	D	5	A*
702	NDR 4	Flensburg	D	5	A* D*
711	France Info/Bleu	Bennes	F	300	A* B D
720	BBC Radio 4	Lisnagarvey	G	10	D*
720	BBC Radio 4	London	G	0.75	D
729	RNE 1	Many	E	10-100	A*
729	RTE Radio 1	Cork	IRL	10	A
738	RNE 1	Barcelona	E	500	D*
738	Radio France International	Paris	F	5	A
747	Radio 747	Flevoland	HOL	400	A B D
756	Deutschlandfunk (DLF)	Many	D	100-200	A* B D*
765	Option Musique	Sottens	SUI	600	A* D*
774	RNE 1	Many	F	20-100	A*
774	BBC Radio 4	Enniskillen	G	1	A
783	MDR Info	Leipzig	D	100	D*
792	France Info	Limoges	F	300	A* D*
792	BBC Radio Foyle	Londonderry	G	1	A
801	Bayern	Munich	O	100	B
810	BBC Radio Scotland	Westerglen	G	100	A B D*
819	Sud Radio	Toulouse	F	20	A*
819	RAI Uno	Trieste	I	20	D*
828	NDR	Hanover	D	200	A* D*
837	France Info	Nancy	F	205	A* D*
846	RAI Due	Rome	I	60	A*

kHz	Service	Svc area/TX site	kW	SWL
990	Magic AM	Doncaster	0.25	B
990	Classic Gold	Wolverhampton	0.09	C
999	Classic Gold GEM	Nottingham	0.25	B
999	BBC Radio Solent	Fareham	1	A C
999	Valleys Radio	Ebbw Vale	0.3	C
1017	Classic Gold	Shropshire	0.63	B C
1026	BBC Radio Jersey	Trinity	1	C
1026	BBC Radio Cambridgeshire	Cambridge	0.5	A B C
1035	Kismet Radio	Crystal Palace	1	A C
1035	BBC Radio Sheffield	Sheffield	1	B
1035	North Sound	Aberdeen	0.78	B
1116	BBC Radio Derby	Derby	1	B C
1116	BBC Radio Guernsey	Rohais	0.5	C
1152	LBC	London	23.5	A
1152	Capital Gold	Birmingham	3	C*
1152	Classic Gold Amber	Norwich	0.83	B C*
1161	Magic	Hull	0.35	B
1161	BBC Southern Counties Radio	Baxhill	1	A
1170	Swansea Sound	Swansea	0.58	C
1170	Magic 1170	Teeside	0.32	B
1170	Classic Gold Amber	Ipswich	0.28	C*
1170	Capital Gold	Portsmouth	0.12	A C
1242	Classic Gold	Maidstone	0.32	A
1251	Classic Gold Amber	Bury St Edmunds	0.76	B C*
1260	BBC Radio York	Scarborough	0.5	B
1260	Sabrag Sound	Leicester	0.29	B
1278	Classic Gold	W Yorkshire	0.43	B C*
1287	Radio Redhill RSL	East Surrey Hospital	0.001	A
1296	Radio XL	Birmingham	10	B C
1305	Premier	London	0.5	A
1305	Magic AM	Barnsley	0.15	B
1323	Capital Gold	Brighton	0.5	A
1332	Premier	Central London	1	A
1332	Classic Gold	Peterborough	0.6	B
1350	Mid Downs Radio RSL	Haywards Heath Hosp	0.001	A
1359	Classic Gold Breeze	Chelmsford	0.28	A
1368	BBC Radio Lincolnshire	Lincoln	2	B
1368	BBC Southern Counties Radio	Duxhurst	0.5	A
1377	Asian Sound	East Lancashire	0.08	B
1413	Premier	East/West London	0.5	A B*

So if your favourite station isn't where you expect it to be, try hunting around a band or two higher in frequency and you may get lucky.

Be aware that Robert Hughes' logs this time were made whilst sunning himself in

kHz	Service	Location	Country	kW	Listener
855	RNE 1	Murcia	E	300	A* D*
864	La City Radio	Paris	F	300	A* B D
873	American Forces Network	Frankfurt	D	150	A* D
882	BBC Radio Wales	Walsford	G	100	A*
891	RTA 1	Algiers	ALG	600/300	D*
891	Radio 538	Hulsberg	HOL	20	A* D*
900	RAI Uno	Milan	I	600	A* D*
909	BBC Radio 5 Live	Many	G	0.25-200	B
918	Radio Slivenia	Domzale	SVN	600/100	A* D*
927	Radio Len/927 Live	Wolvertem	BEL	300	A* B D*
936	Bremen 1	Bremen	D	50/10	A*
945	France Bleu/Franc Info	Toulouse	F	300	A* D*
954	Czech Radio 2	Brno	CZE	200	A* D*
954	Qnda Cera Radio	Madrid	E	20	A*
963	YLE Radio	Pori	FIN	600	A* D
972	Nord Deutscher Rundfunk (NDR)	Hamburg	D	100	A* D*
981	RTA 2	Algiers	ALG	600/300	D*
990	Deutschlandfunk (DLF)	Berlin	D	100	A* D*
990	Radio Bilbao	Bilbao	E	10	D*
999	COPE	Madrid	E	50	A* C*
1008	SER	Many	E	5-10	B
1008	Radio 10 Gold	Flevoland	HOL	400	A* D*
1017	Sudwestrundfunk (SWR)	Wolfsheim	D	100	A* D*
1017	RNE 5	Many	E	10	C*
1026	SER	Many	E	5-10	D*
1035	Radio Nacional	Porto Alto	POR	100	A* D*
1044	RTM C	Sebaa Aioun	MRC	300	D*
1044	MDR Info	Dresden	D	20	A* D*
1044	Radio San Sebastian	San Sebastian	E	10	A* D*
1053	COPE	Many	E	5-25	A*
1053	Talksport	Droitwich	G	500	A* B
1062	Denmark Radio P3	Kalunborg	DNK	250	A* D*
1071	Euskadi Irratia	Bilbao	E	50	D*
1071	Talksport	Clipstone	G	1	A*
1080	SER	Many	E	5-10	A* C*
1089	Talksport	Brookmans Park	G	400	A* B
1089	Radio Slovensko	Nitra	SVK	50	A*
1107	American Forces Network	Bavaria	USA/D	10	A* D
1107	Talksport	Many	G	2	A* B
1116	Radio Pontevedra	Pontevedra	E	5	A*
1125	Croatian Radio HR1	Deanovac	HRV	100	D*
1125	Radio 21	Houdeng	BEL	10	A* D*
1125	BBC Radio Wales	Llandindod Wells	G	1	A* D
1134	Croatian Radio HR1	Zadar	HRV	600	A* D*
1143	American Forces Network	Many	USA/D	0.3-10	A* D
1179	Swedish Radio	Solvesborg	S	600/300	A* D
1188	VOA/RFE	Marcali	USA/HNG	500	A*
1188	Radio Tysee	Kuurne	BEL	5	A* B D*
1197	VOA/RFE	Munich	USA/D	300/150	D
1197	Virgin Radio	Many	G	0.2-2	A* B
1206	France Info	Bordeaux	F	300	A* D
1215	Virgin Radio	Many	G	0.32-200	A B
1215	Voice of Russia	Bolshakovo	RUS	1200	A*
1224	Radio Popular	San Sebastian	E	10	A* D*
1233	Virgin Radio	Many	G	0.1-0.5	A* B
1233	Cr66	Prague	CZE	40	A*
1242	Virgin Radio	Many	G	0.5-2	A*
1242	France Info	Marseille	F	150	A* D*
1251	Radio 747	Hulsberg	HOL	10	A* D*
1260	SER	Many	E	5	A*
1260	Virgin Radio	Lydd	G	1	A* B

kHz	Service	Svc area/TX site	kW	SWL
1413	BBC Radio Gloucester	Bourton/Berkeley Heath	0.5	B*
1413	Fresh AM	Skipton	0.1	B
1431	Classic Gold Breeze	Southend	0.35	A C*
1431	Classic Gold	Reading	0.14	C
1449	BBC Asian Network	Peterborough	0.15	B
1458	Sunrise	London	125	A C
1458	BBC Asian Network	Birmingham	5	B C
1485	BBC Radio Humber	Hull	2	B
1485	BBC Southern Counties Radio	Brighton	1	A
1485	Classic Gold	Newbury	1	C
1503	Sound Radio	London	?	A
1503	BBC Radio Stoke	Staffordshire	1	B C
1521	Classic Gold	Reigate	0.64	A C*
1521	Forest of Dean Community Radio	Coleford	0.1	C
1530	Classic Gold	Huddersfield	0.74	B
1530	Classic Gold	Worcester	0.52	C
1530	BBC Radio Essex	Southend	0.15	A
1548	Capital Gold	London	97.5	A B
1548	Magic AM	Sheffield	0.74	B
1557	BBC Radio Lancashire	Lancaster	0.25	B
1566	County Sound	Guildford	0.8	A
1566	BBC Somerset Spund	Taunton	0.6	C
1584	BBC Radio Nottingham	Clipstone	1	B
1584	BBC Hereford & Worcester	Woodferton	0.3	C
1584	Turkish Radio	London	0.2	A
1602	BBC Radio Kent	Rustall	0.25	A C*
1602	Desi Radio	Southall	0.07	C*

\* = dark

Listeners:-

- A Rhoderick Illman, Oxted
- B Harry Richards, Lincolnshire
- C Simon Hockenhill, Bristol

Bali, Indonesia and Kuantan, Malaysia. Lucky chap.

I can only include a smattering of Summer schedules here so if you have access to the Internet, zip along to <http://tinyurl.com/44rpr>, where I've

kHz	Service	Location	Country	kW	Listener
1269	Deutschlandfunk (DLF)	Neumunster	D	300	A* D*
1278	France Bleu	Strasbourg	F	300	A* C* D*
1287	SER	Many	E	5-10	A* D*
1296	BBC World Service	Orfordness	G	500	D*
1305	RNE 5	Many	E	10-25	A*
1314	NRK Europakanalen	Kvitsoy	NOR	1200	A* D*
1323	Voice of Russia	Wachenbrunn	RUS/D	800/150	A* D*
1332	RAI Uno	Rome	I	300	A*
1341	BBC Radio Ulster	Lisnagarvey	G	100	A* D*
1350	Radio Orient	Nancy	LRN/F	300	A* D*
1359	RNE 3	Madrid	E	600	A* D*
1368	Manx Radio	Douglas, IOM	G	20	A* D*
1377	France Info	Lille	F	300	A* B D
1386	Radio Baltic Waves International	Sitkunai	LTU	750	A*
1386	China Radio Int'l	Sitkunai	CHN/LTU	750	A* D*
1386	Voice of Russia	Sitkunai	RUS/LTU	750	D
1395	Trans World Radio	Flake	MCO/ALB	500	A* D*
1404	Radio Cluj	Sighetul Marmatiei	ROU	50	A*
1404	France Info	Brest	F	20	A* D*
1413	RNE 5	Many	E	5-10	A*
1422	Deutschlandfunk (DLF)	Heusweiler	D	1200/600	A* D*
1431	Voice of Russia	Mykolajiv	RUS/UKR	1200	D*
1440</					

assembled a small selection of links for you, including one to a large collection of current schedules.

Some medium wave news now, and the 630kHz 200kW medium wave transmitter near Braunschweig, Germany, has been licensed to the Voice of Russia. The agreement runs for two years as Germany's long term plans for the frequency include home-grown DRM transmissions. According to the licensing authorities, VOR's programmes on 630kHz will go out in German, Russian and English.

A note on the Radio Netherlands Weblog site details the demise of their Belgium-based 1512kHz relay. Radio Vlaanderen International's decision to abandon most of its short wave transmissions, and the end of the exchange of airtime arrangements with Radio Netherlands means that an alternative outlet has been established.

The website continues, "We arranged a one-hour transmission on Radio Sweden's medium wave transmitter on 1179kHz. Unfortunately this is very late - 2300-0000UTC - but is the only solution we can find".

Whilst on the subject, the USA-funded International Broadcasting Bureau's (IBB) medium wave facility on 1197kHz closed at the end of March. Radio Free Europe, south Slavic strand will then have no medium wave, depending on short wave and f.m. rebroadcasters instead.

The good news is that those of you not living too close to a Virgin Radio outlet on this frequency may be treated to offerings from Iran or Morocco. Let me know.

## Low Power MW DRM

Radica Broadcast Systems have announced the start of low-power medium wave DRM transmissions on 1386kHz from Sussex. These engineering trials will be on a 24-hour

basis, but will be subject to possible interruption and periods of no audio content.

Following on from last month's snippet, Radio London has indeed shown up on Sky channel 940 with a mix of hits from yesteryear and using the jingle package aired by the offshore radio station of the same name. Meanwhile, Radio Tatra International is said to be poised to launch, but I'll not sauté my *WRTH* just yet, if you don't mind.

More bad news from Europe, this time it's swissinfo, the web-based replacement for Swiss Radio International, which is to suffer major cutbacks to its output. The Swiss Broadcasting Corporation (SBC) says that, in response to the government's decision to end funding for swissinfo, it will axe up to 80 jobs and eight language services, leaving only a reduced English department.

The cuts, which should result in annual savings of over 13 million dollars a year, have brought condemnation from the Council of the Swiss Abroad - the organisation representing the interests of more than 600,000 Swiss ex-pats.

London-based short wave Radio Africa has been suffering the effects of jamming to its short wave outlets by the Mugabe regime, ahead of Zimbabwe's general election. In an attempt to overstretch the jammers, several transmitters are being brought up in parallel and the following short wave schedule was the state of play as of the end of March:

UTC	MHz
0300-0500	3.230
1600-1700	15.145, 11.845, 6.145 and 3.300
1700-1800	15.145, 11.705, 6.145 and 3.300
1800-1900	11.995, 6.145 and 3.300

From 1600-1900, 3.230 and 4.880 may also be used spasmodically.

Those of you into tropical band DXing will be interested to hear that RTD Djibouti has returned to 4.780MHz after a period of absence. Scheduled broadcasts are 0300-2000 from the station's 50kW transmitter - a gift from the USA-based Broadcasting Board of Governors (BBG). Check it out.

## Encryption

WorldSpace, the direct-to-home satellite radio operator has taken to encrypting the vast majority of its hitherto free-to-air channels. Included is World Radio Network (WRN), a fine institution that repackages and rebroadcasts output from an array of stations world-wide. Ireland's RTE is one such station and they are said to be displeased by WorldSpace's latest move. It's just possible that RTE will revert to buying airtime on short wave to plug the gap, so to speak. Please let me know if you hear anything.

Creating the master list that goes to make up the column each month involves the entry of around 7000 fields of information into an Excel spreadsheet. Imagine, dear reader, my undiluted joy at completing the task at the last minute (I always do this, as Kevin's fingernails will testify to), only to have the PC crash and my file irrevocably lost. If you'll excuse me, I'm off for a stiff drink...

As always, thanks to those of you kind enough to get in touch with your logs. Please let me have your contributions by the 10th of the month.

## Short Wave Table

MHz	UTC	Service	Country	Lang	SINPO	SWL
<b>0000-0600</b>						
5.810	0650	WYFR	USA	Rus	3322	VP
5.825	0347	WEWN	USA	Eng	34343	DB
5.880	0030	Radio Thailand	THA	Eng	25212	EM
5.910	0115	Radio Ukraine Int.	UKR	Eng	45444	SH
5.975	0108	BBC World Service	G/ATG	Eng	33333	SH
6.000	0205	Radio Havana Cuba	CUB	Eng	35433	SH
6.020	0144	China Radio Int.	CHN	Eng	44444	PH
6.035	0312	Voice of America	USA	Eng	44444	PH
6.065	0005	Radio Exterior de Espana	E	Eng	44434	SH
6.145	0002	R. Japan	J/CAN	Eng	34433	SH
6.150	0335	Radio Singapore	SNG	Eng	55555	PH
6.200	0202	Radio Prague	CZE	Eng	33433	SH
7.115	0118	Int. R. of Serbia and Mont.	SCG/BIH	Eng	54444	SH
7.130	0206	Int. R. of Serbia and Mont.	SCG/BIH	Eng	32432	SH
7.160	0315	BBC World Service	G/ASC	Eng	33333	DB
7.185	0320	BBC World Service	G/CYP	Eng	22222	DB
7.180	0330	Voice of Russia	RUS	Eng	55444	DB
7.200	0210	Voice of America	USA/GRC	Eng	34433	SH
7.230	0110	Radio Slovakia Int.	SVK	Eng	34523	SH
7.325	0005	ORF Radio Austria Int.	AUT	Eng	55243	EM
7.345	0204	Radio Prague	CZE	Eng	45444	SH
7.400	0335	Radio Bulgaria	BUL	Eng	55455	DB
7.535	0339	World Harvest Radio	USA	Eng	34343	DB
7.580	0340	World Harvest Radio	USA	Eng	34322	DB
9.545	0450	Deutsche Welle	D/FRW	Eng	45554	JP
9.570	0045	China Radio Int.	CHN?	Eng	55545	SH
9.775	0212	Radio Budapest	HNG	Eng	24422	SH
9.880	0015	Voice of America	USA/PHL	Eng	55444	PH
11.660	0300	Radio Australia	AUS	Chi	44444	PH
11.780	0020	Voice of America	USA/PHL	Eng	54344	PH
11.830	0028	Radio Free Asia	USA/CLN	Vie		PH

MHz	UTC	Service	Country	Lang	SINPO	SWL
11.860	0030	Radio Republic of Indonesia	INS	Ind	22222	PH
11.860	0540	Radio Republic of Indonesia	INS	Ind		PH
11.955	0030	BBC World Service	G/THA	Eng	44333	PH
11.955	0540	BBC World Service	G/THA	Eng	44444	PH
13.610	0545	China National Radio 1	CHN	Chi	55444	PH
15.360	0605	BBC World Service	G/SNG	Eng	55555	PH
15.550	0540	China National Radio 1	CHN	Chi	44444	PH
17.740	0030	Voice of America	USA/PHL	Eng	55555	PH
17.750	0045	Radio Australia	AUS	Eng	33333	PH
17.750	0450	Radio Australia	AUS	Eng	55555	PH
17.790	0100	BBC World Service	G/SNG	Eng		PH
17.810	0105	Radio Japan	J	Eng	33444	PH
21.725	0440	Radio Australia	AUS	Eng	55444	PH
<b>0600-0900</b>						
5.825	0600	WEWN	USA	Eng	44232	VP
5.825	0621	WEWN	USA	Eng	44334	DB
5.865	0610	Voice of Greece	GRC	Gre	55534	VP
5.885	0615	Vatican Radio	CVA	Eng	55555	VP
5.935	0623	WWOZ	USA	Eng	34344	DB
5.945	0635	Bible Voice Network	USA/D	Eng	55555	EM
5.965	0600	Radio Vlaanderen Int.	BEL	Eng	55555	EM
6.005	0749	Deutschland Radio	D	Ger	55445	DB
6.065	0625	Radio Sweden Int.	S	Swé	44434	DB
6.075	0626	Deutsche Welle	D	Ger	34344	DB
6.120	0628	YLE Radio Finland	FIN	Fin	34333	DB
6.140	0630	Deutsche Welle	D	Eng	34344	DB
6.855	0631	WYFR	USA	Eng	24121	EM
7.135	0744	Radio France Int.	F	Fre	55455	DB
7.250	0633	Vatican Radio	CVA	Lat	34344	DB
7.255	0649	Voice of America	USA	Eng	55455	DB
7.315	0633	WHRI	USA	Eng	24122	EM
7.345	0746	Radio Prague	CZE	Ger	55555	DB
9.370	0655	WTJC	USA	Eng	44333	BC
9.410	0643	BBC World Service	G/CYP	Eng	34233	DB
9.420	0625	Voice of Greece	GRC	Gr	34333	DB

MHz	UTC	Service	Country	Lang	SINPO	SWL
9.430	0750	Radio Sweden Int.	S	Swé	55555	DB
9.545	0751	Deutsche Welle	D	Ger	55555	DB
9.565	0652	Radio Romania Int.	ROU	Eng	55444	DB
9.580	0844	Radio Vlaanderen Int.	BEL	Flé	24242	DB
9.710	0846	Radio Vinius	LTU	Eng	55545	DB
9.815	0830	RDP Internacional	POR	Por	55555	VP
9.870	0759	Trans World Radio	MCO	Eng	55555	EM
9.880	0802	Radio Prague	CZE	Eng	55555	EM
11.625	0655	Vatican Radio	CVA	Eng	45344	DB
11.840	0848	KTWR Guam	USA	Eng	44434	DB
11.855	0820	China Radio Int.	CHN	Eng	55445	DB
11.865	0849	Trans World Radio	USA	Eng	54344	DB
12.005	0615	Voice of Russia	RUS	Eng	55453	DB
12.060	0618	Voice of Russia	RUS	Eng	55455	DB
12.085	0650	BBC World Service	G/CYP	Eng	44344	DB
13.720	0824	Radio Exterior de Espana	E	Eng	55555	DB
15.145	0826	Deutsche Welle	D	?	35443	DB
15.170	0829	Radio Free Europe/Radio Liberty	USA	Mix	45444	DB
15.400	0652	BBC World Service	G	Eng	45444	DB
15.565	0653	BBC World Service	G	Eng	34443	DB
17.490	0654	China Radio Int.	CHN	Eng	55445	DB
11.765	0650	BBC World Service	G/ASC	Eng	24552	JP
11.840	0840	KTYR Guam	GUM	Eng	44232	EM
11.855	0828	China Radio Int.	CHN	Eng	55444	EM
11.865	0758	Trans World Radio	MCO	Eng	55555	EM
13.720	0845	Radio Exterior de Espana	E	Spe	55555	VP
15.160	0650	Voice of Turkey	TUR	Aze	43222	VP
15.400	0624	BBC World Service	G	Eng	55354	DB
15.630	0630	Voice of Greece	GRC	Gre	55555	VP
15.650	0630	Voice of Greece	GRC	Gre	44434	VP
15.770	0845	All India Radio	IND	Hin	23322	VP
17.490	0827	China Radio Int.	CHN	Eng	55555	EM
17.540	0826	China Radio Int.	CHN	Eng	44232	EM
17.830	0821	BBC World Service	G	Eng	45243	EM
17.860	0705	Radio Japan	J	Jap	44444	PH

MHz	UTC	Service	Country	Lang	SINPO	SWL	MHz	UTC	Service	Country	Lang	SINPO	SWL	MHz	UTC	Service	Country	Lang	SINPO	SWL																		
21.530	0865	Voice of Greece	GRC	Gre	55555	VP	15.485	1222	BBC World Service	G	Eng	45233	EM	5.765	1515	American Forces Network (usb)	USA/GUM	Eng	34553	JP																		
21.660	0830	BBC World Service	G/THA	Eng	34423	VP	15.530	1255	Radio New Zealand Int.	NZL	Eng	44333	TW	6.110	1552	The Overcomer Ministry	USA/D	Eng	45444	PW																		
21.790	0850	Voice of Russia	RUS	Eng	22222	VP	15.565	1223	BBC World Service	G	Eng	24122	EM	6.140	1510	Deutsche Welle	D	Eng	55445	BC																		
<b>0900-1200</b>																																						
5.815	0903	World Music Radio	DNK	Eng	44333	PP	15.675	1226	Radio Ukraine Int.	UKR	Eng	45243	EM	6.155	1509	ORF Radio Austria Int.	AUT	Ger	55444	DB																		
5.860	0910	WHRI	USA		44334	BC	15.700	1255	Radio Bulgaria	BUL	Eng	45454	PW	7.125	1546	Voice of America	USA/THA	Eng	34433	MC																		
5.955	0916	Radio Netherlands	HOL	Eng	55555	PP	17.490	1205	China Radio Int.	CHN	Eng	55444	PW	7.475	1548	Voice of Greece	GRC	Eng	54444	FM																		
6.040	0920	Deutsche Welle	D	Eng	44444	PP	17.670	1232	Radio Cairo	EGY	Eng	25222	EM	7.570	1509	Voice of Korea	KRE	Eng	34443	MC																		
7.535	1104	WHRI	USA	Eng	44233	EM	17.800	1200	Voz Cristiana	CHL	Eng	23323	GG	9.345	1545	Radio Netherlands	HOL/MDG	Eng	45444	PW																		
7.590	0927	Radio Scoop?	?	Eng	34333	PP	21.620	1209	Radio France Int.	F	Eng	25112	EM	9.475	1557	Radio Australia	AUS	Eng	44444	FM																		
9.580	1046	Radio Australia	AUS	Eng	34222	EM	<b>1300-1400</b>																															
9.710	0966	Radio Vilnius	LTU	Eng	35434	MC	6.110	1310	The Overcomer Ministry	USA	Eng	44233	PP	9.630	1514	YLE Radio Finland	FIN	Fin	55555	DB																		
9.720	0935	Radio Rossi	RUS	Eng	44344	PP	6.115	1313	ORF Radio Austria Int.	AUT	Eng	44444	PP	9.740	1515	BBC World Service	G/SNG	Eng	54444	DB																		
9.780	0938	Radio Netherlands	HOL	Eng	44344	PP	6.140	1353	Deutsche Welle	D	Eng	55555	DB	9.780	1516	Voice of America	USA/PHIL	Eng	45444	DB																		
9.790	1035	Radio Netherlands	HOL	Eng	44434	TW	6.155	1347	ORF Radio Austria Int.	AUT	Eng	35333	SH	11.660	1532	Radio Australia	AUS	Eng	34433	SH																		
9.815	1102	RDP International	POR	Por	45445	MC	7.200	1350	Int. R of Serbia and Mont	SCG/BIH	Eng	54344	BC	11.750	1517	Radio Australia	AUS	Eng	45445	DB																		
9.885	0910	Radio New Zealand Int.	NZL	Eng	44334	BC	7.440	1308	Radio Sweden	S	Eng	44333	TW	11.840	1518	Voice Int.	AUS	Eng	55545	DB																		
9.885	0910	Radio New Zealand Int.	NZL	Eng	32222	TW	7.580	1319	AFRTS (USB)	USA/ISL	Eng	44444	FM	12.015	1531	Voice of Korea	KRE	Eng	35344	MC																		
9.945	1145	Radio Vlaanderen Int.	BEL	Eng	24122	EM	9.525	1300	Radio Polonia	POL	Eng	44334	DB	13.635	1520	Voice Int.	AUS	Eng	44444	DB																		
11.640	1129	Radio Prague	CZE	Eng	34544	SH	9.545	1317	Deutsche Welle	D	Eng	55555	PP	15.485	1522	BBC World Service	G	Eng	33443	DB																		
11.880	1132	Radio Australia	AUS	Eng	23422	SH	9.700	1320	China Radio Int.	CHN	Eng	55455	PP	17.820	1523	Radio Canada Int.	CAN	Eng	55445	DB																		
13.730	1050	ORF Radio Austria Int.	AUT	Ger	34533	SH	9.715	1356	Radio Tashkent	UZB	Eng	25443	MC	11.520	1500	Radio Free Asia	USA/ARM	Tib	54444	BC																		
17.490	1105	China Radio Int.	CHN	Eng	45544	SH	9.875	1322	China Radio Int.	CHN	Eng	53354	PP	11.660	1530	Radio Australia	AUS	Eng	55454	EM																		
21.840	1120	Deutsche Welle	D	Ger	35533	SH	9.885	1328	Voice of Russia	RUS	Eng	55555	PP	11.755	1505	YLE Radio Finland	FIN	Eng	55454	PW																		
11.640	1133	Radio Prague	CZE	Eng	54554	EM	9.870	1301	Radio New Zealand Int.	NZL	Eng	32333	TW	13.730	1501	ORF Radio Austria Int.	AUT	Eng	44444	PP																		
11.750	1000	HCBJ	EOA/AUS	Eng	44444	RH	9.885	1303	Radio Netherlands	HOL	Dut	44444	TW	13.830	1520	Croatian Radio	HRV	Eng	54444	BC																		
11.755	1025	YLE Radio Finland	FIN	Fin	44434	TW	9.980	1331	AFRTS (USB)	USA/ISL	Eng	44444	FM	15.190	1525	Africa No. 2	GAB	Eng	32222	EM																		
11.760	0900	BBC World Service	G/OMA	Eng	34553	JP	11.530	1304	Radio Mesopotamia	IRQ/G	Kur?	44444	DB	<b>1600-1700</b>																								
11.880	1045	Radio Australia	AUS	Eng	42232	EM	11.760	1341	BBC World Service	G/OMA	Eng	24442	MC	5.800	1650	Radio Bulgaria	BUL	Eng	24333	RI																		
11.955	0935	Voice Int.	AUS	Eng	55444	RH	11.835	1334	Int. R of Serbia and Mont	SCG/BIH	Eng	25221	SH	5.875	1652	BBC World Service	G	Bul	44444	RI																		
12.065	1025	Voice of Mongolia	MING	Eng	22222	TW	11.850	1306	Radio Polonia	POL	Eng	55455	DB	5.885	1658	Vatican Radio	VAT	Tur	33333	RI																		
12.120	1117	?	CHN	?	31222	TW	11.980	1345	Adventist World Radio	USA/GUM	Eng	44444	FM	6.085	1601	Bayrischer Rundfunk	D	Ger	55445	DB																		
13.685	1020	Voice Int.	AUS	Eng	22222	TW	13.610	1308	China Radio Int.	CHN	Eng	55555	DB	6.130	1623	Voice of Russia	RUS	Eng	24232	RI																		
13.720	1023	Radio Exterior de Espana	E	Spa	44444	DB	13.730	1305	Radio Australia	AUS	Eng	54555	DB	7.255	1602	China Radio Int.	CHN	Eng	44444	MC																		
13.730	0900	ORF Radio Austria Int.	AUT	Ger	55545	VP	13.730	1345	ORF Radio Austria Int.	AUT	Eng	45544	SH	7.290	1615	Voice of Russia	RUS	Eng	44444	SH																		
13.730	1040	ORF Radio Austria Int.	AUT	Ger	44444	TW	13.790	1307	China Radio Int.	CHN	Eng	53545	DB	9.290	1600	European Music Radio	LVA	Eng	45343	EM																		
13.830	1050	Croatian Radio	HRV	?	34433	TW	13.830	1314	Croatian Radio	HRV	Cro	35232	SH	9.410	1625	BBC World Service	G/CYP	Eng	45444	PW																		
13.840	0953	IFRS	I	Eng	35444	PW	15.105	1308	Radio Romania Int.	ROU	Eng	54455	DB	9.435	1642	China Radio Int.	CHN	Eng	45434	SH																		
13.865	1045	Voice of America	USA	Eng	22222	TW	15.120	1312	Voice of Nigeria	NIG	Eng	53222	SH	9.525	1605	China Radio Int.	CHN	Eng	55335	DB																		
15.100	1102	Radio Pakistan	PAK	Eng	24122	EM	15.155	1336	Voice of Turkey	TUR	Eng	45333	SH	9.940	1606	V. of the Islamic Rev. of Iran	IRN	Eng	44344	FM																		
15.120	1053	Voice of Nigeria	NIG	Eng	25232	EM	15.195	1338	Voice of Turkey	TUR	Eng	25422	SH	11.660	1640	Radio Australia	AUS	Eng	55545	DB																		
15.190	1048	BBC World Service	G	Eng	22222	TW	15.230	1309	China Radio Int.	CHN	Eng	54434	DB	11.695	1624	Deutsche Welle	D	Eng	32422	SH																		
15.310	1015	BBC World Service	G/THA	Eng	33333	RH	15.235	1318	Vatican Radio	VAT	Ital	55555	DB	12.035	1601	Deutsche Welle	D/POR	Eng	55345	DB																		
15.400	1058	BBC World Service	G	Eng	33333	TW	17.560	1319	World Harvest Radio	USA	Eng	55555	DB	13.635	1615	Voice Int.	AUS	Eng	44334	FM																		
15.415	1108	Radio Australia	AUS	Eng	44333	TW	17.670	1305	Radio Cairo	EGY	Eng	25422	SH	15.160	1620	Radio France Int.	F	Eng	43444	FM																		
15.530	1120	Radio New Zealand Int.	NZL	Eng	44333	TW	17.745	1347	Radio Romania Int.	ROU	Eng	55445	DB	15.330	1630	The Voice	G/?	Eng	43444	FM																		
15.560	1110	Voice of Greece	GRC	?	44333	TW	12.015	1317	Voice of Korea Int.	CHN	Eng	43433	TW	15.605	1637	Radio France Int.	F	Eng	44444	FM																		
15.585	1130	Vatican Radio	VAT	Eng	44243	EM	13.635	1325	Voice Int.	AUS	Eng	44444	TW	15.685	1650	WEWYN	USA	Eng	35433	MC																		
15.615	1101	Voice of America	USA	Eng	33333	TW	13.790	1325	ORF Radio Austria Int.	AUT	Ger	43333	TW	15.710	1659	Radio Prague	CZE	Eng	25433	SH																		
15.640	0944	Kol Israel	ISR	Eng	44444	PP	15.105	1350	Radio Romania Int.	ROU	Eng	53444	BC	21.455	1650	Family Radio	USA	Eng	35333	SH																		
15.640	1105	Kol Israel	ISR	?	44333	PP	15.120	1320	Voice of Nigeria	NIG	Eng	33333	TW	21.490	1652	BBC World Service	G/AFS	Eng	45534	SH																		
17.490	0945	China Radio Int.	CHN	Eng	55455	PP	15.240	1320	Radio Sweden	S	Swe	33333	TW	21.570	1645	Radio Exterior de Espana	E	Spa	25522	SH																		
17.490	1030	China Radio Int.	CHN	Eng	44444	TW	17.760	1350	BBC World Service	G/SNG	Eng	34553	JP	11.690	1610	Radio Jordan	JOR	Eng	55544	PW																		
17.535	1030	Kol Israel	ISR	Heb	44434	VP	21.460	1350	Saudi Radio	ARS	Ara	55445	BC	11.795	1612	Deutsche Welle	D/RRW	Ger	34333	JP																		
17.535	1030	Kol Israel	ISR	Eng	33333	TW	<b>1400-1500</b>																															
17.555	0915	Voice of America	USA/MRC	Eng	43334	BC	6.080	1415	Radio Singapore	SNG	Eng	44444	RH	15.160	1605	Radio France Int.	F	Eng	35444	PW																		
17.585	1052	Radio Japan	J	Eng	45243	EM	6.195	1410	BBC World Service	G/SNG	Eng	55544	RH	15.240	1612	Voice of America	USA	Eng	44444	TW																		
17.600	0930	Radio Rossi	RUS	Rus	55545	VP	7.410	1415	All India Radio	IND	Eng	55444	BC	21.470	1630	BBC World Service	G	Eng	44444	TW																		
17.685	1142	Voice of Africa	LBY/F	Eng	43443	EM	9.345	1441	Radio Netherlands	HQL	Eng	45233	EM	<b>1700-1800</b>																								
17.835	1100	Radio Pakistan	PAK	Eng	45243	EM	9.475	1430	Radio Australia	AUS	Eng	54444	BC	5.815	1705	World Music Radio	DNK	Eng	34433	FM																		
17.895	1005	All India Radio	IND	Eng	55445	BC	9.645	1451	Voice of America	USA/PHIL	Eng	13442	MC	5.850	1747	Radio Canada Int.	CAN	Eng	44444	PP																		
19.010	1049	Voice of America	USA	?	33333	TW	9.700	1400	China Radio Int.	CHN	Eng	44444	GG	5.910	1750	Radio Vlaanderen Int.	BEL	Eng	55555	PP																		
19.010	1135	Voice of America	USA	Mix	25212	EM	9.795	1400	China Radio Int.	CHN	Eng	34434	GG	5.915	1730	Radio Slovakia Int.	SVK	Eng	44444	EM																		
21.455	1045	BBC World Service	G	Ara	44333	TW	11.550	1445	Radio Sweden	S	Eng	55555	FM	5.930	1700	Radio Prague	CZE	Eng	54334	SH																		
21.470	1145	BBC World Service	G/THA	Eng	44333	BC	11.860	1410	Radio Republic of Indonesia	INS	Mal?	44444	FM	6.055	1730	Radio Slovakia Int.	SVK	Eng	45554	EM																		
21.485	1143	Voice of Africa	LBY/F	Eng	14221	EM	13.635	1423	Voice Int.	AUS	Eng	15432	MC	7.250	1718	Vatican Radio	VAT	Eng	43543	MC																		
21.620	0900	Radio Soth	G	Mix	55545	VP	15.250	1426	China Radio Int.	CHN	Chi	55455	DB	9.470	1706	Voice of Russia	RUS	Eng	24322	SH																		
21.675	1142	Voice of Africa	LBY/F	Eng	22222	EM	15.595	1426	Radio Netherlands	HOL	Eng	34343	FM	9.645	1719	Vatican Radio	VAT	Eng	44444	MC																		
21.745	1050	Radio Prague	CZE	?	44444	TW	17.560	1429	WHRA	USA	Eng	55555	DB	9.830	1733	Voice of Russia	RUS	Eng	33542	MC																		
21.820	1045	Radio Japan	J/GAB	Swe	44444	TW	17.640	1436	BBC World Service	G/?	Eng	44444	FM	9.855	1704	Radio Cairo	EGY	Eng	24322	SH																		
21.840	1036	Deutsche Welle	D43333	TW			17.820	1440	Radio Canada Int.	CAN	Eng	43333	FM	9.950	1740	All India Radio	IND	Eng	35343	MC																		
<b>1200-1300</b>																				9.980	1745	AFRTS (USB)	USA/ISL	Eng	35433	MC												
5.955	1240	Radio Netherlands	HOL	Dut	55535	DB	21.470	1447	BBC World Service	G/SEY	Eng	34343	FM	11.615	1730	Radio France Int.	F	Eng	35443	MC																		
6.075	12																																					

## Scanner Base Verticals

**SUPERSCAN STICK I (WIDEBAND)**.....£29.95  
FREQ: 0-2000MHz LENGTH 100cm SOCKET SO239 £7.00 P&P  
RADIALS: 3 x 17cm

**SUPERSCAN STICK II (WIDEBAND)**.....£39.95  
FREQ: 0-2000MHz GAIN: 3.00dB OVER SSSI £7.00 P&P  
LENGTH: 150cm SOCKET: SO239 RADIALS: 3 x 50cm

These two superb fibreglass external antennas have capacitor loaded trapped coils to give maximum sensitivity to even the weakest of signals. No wonder they are best selling verticles!

**AR-30 (AIR BAND)**.....£39.95  
FREQ: CIVIL & MILITARY AIR GAIN: 3.0/6.0dB £7.00 P&P  
LENGTH: 100cm SOCKET: SO239 RADIALS: 3 x 17cm

**AR-50 (AIR BAND)**.....£49.95  
FREQ: CIVIL & MILITARY AIR GAIN: 4.5/7.0dB £7.00 P&P  
LENGTH: 150cm SOCKET: SO239 RADIALS: 3 x 50cm

These dedicated fibreglass external antennas are pre-tuned for both air band frequencies. Get the gain and don't miss take off!

**X1-HF VERTICAL (DEDICATED HF)**.....£49.95  
FREQ: 1-50MHz LENGTH: 200cm SOCKET: SO239 £7.00 P&P  
RADIALS: NONE

This HF vertical antenna incorporates helical traps and is an ideal alternative to long wire.

## Going Mobile

**G-SCAN II MOBILE (WIDEBAND)**.....£29.95  
TYPE: TWIN COIL FREQ: 25-2000MHz £7.00 P&P  
LENGTH: 65cm BASE MAGNETIC CABLE: 4m WITH BNC

**SKYSCAN MOBILE (WIDEBAND)**.....£19.95  
TYPE: 4 TUNED WHIPS FREQ: 25-2500MHz £7.00 P&P  
LENGTH: 65cm BASE MAGNETIC CABLE: 4m WITH BNC

Don't loose those signals while on the move. Get high performance reception wherever whenever.

## Portable Antennas

**SKYSCAN DESKTOP (INTERNAL/WIDEBAND)**.....£49.95  
TYPE: DISCONE STYLE FREQ: 25-2000MHz £7.00 P&P  
LENGTH: 90cm CABLE: 4m WITH BNC

**TRI-SCAN III DESKTOP (INTERNAL/WIDEBAND)**.....£39.95  
TYPE: TWIN COIL FREQ: 25-2000MHz £7.00 P&P  
LENGTH: 90cm CABLE: 4m WITH BNC

**SWP-2000 (GLASS MOUNT/WIDEBAND)**.....£29.95  
TYPE: SUCTION MOUNT FREQ: 25-2000MHz £7.00 P&P  
LENGTH: 55cm CABLE: 4m WITH BNC

**SWP-HF30 (GLASS MOUNT/DEDICATED HF)**.....£39.95  
TYPE: SUCTION MOUNT FREQ HF: 0.05-30MHz £7.00 P&P  
LENGTH: 80cm CABLE: 4m WITH BNC

**MAX-5 ACTIVE (INTERNAL/EXTERNAL/WIDEBAND)**.....£49.95  
TYPE: ACTIVE PRE-AMP FREQ: 25-1800MHz £7.00 P&P  
GAIN: 14dB LENGTH: 140cm CABLE: 4m WITH BNC

Get the most from your scanner by using one of our portable antennas and enjoy great performance without the need to erect an external one.

## Discone Base Antennas

**STANDARD DISCONE (WIDEBAND)**.....£29.95  
FREQ: 25-1300MHz LENGTH 100cm SOCKET: SO239 £7.00 P&P  
RADIALS: 16

**SUPER DISCONE (WIDEBAND)**.....£39.95  
FREQ: 25-2000MHz GAIN: 3.00dB OVER STANDARD £7.00 P&P  
LENGTH: 140cm SOCKET: SO239 RADIALS: 16

**HF DISCONE (WIDEBAND/HF SENSITIVE)**.....£49.95  
FREQ: 0.05-2000MHz LENGTH: 180cm SOCKET: SO239 £7.00 P&P  
RADIALS: 16

**ROYAL DISCONE 2000 (WIDEBAND - STAINLESS)**.....£49.95  
FREQ RX: 25-2000MHz FREQ TX: 50-52, 144-146, 430-440MHz £7.00 P&P  
900-986, 1240-1325MHz LENGTH: 155cm GAIN: 4.5dB OVER STANDARD SOCKET: N TYPE RADIALS: 16

The discone has been around for over 40 years and is generally recognized as the original and probably the best all round scanner antenna. Choose the best one for your station or call us for advice.

## Beam Antennas

**MLP-32 (LOG PERIODIC)**.....£99.95  
FREQ: 100-1300MHz TX & RX.....£7.00 P&P  
GAIN: 11-13dB LENGTH 140cm  
SOCKET: N TYPE

**MLP-62 (LOG PERIODIC)**.....£169.95  
FREQ: 50-1300MHz TX & RX.....£7.00 P&P  
GAIN: 10-12dB LENGTH: 300cm  
SOCKET: N TYPE

These two beam antennas are sold mainly to our military & commercial customers. With an SWR 2:1 or better over the whole frequency, for performance it just doesn't get better.

**AR300XL**.....£49.95  
Rotator for both antennas.....£7.00 P&P

## Shortwave Wire Antennas

**MWA-HF MkII (EXTERNAL DELUXE HF ANTENNA)**.....£49.95  
TYPE: WIRE BALUN MATCH FREQ: 0-40MHz £7.00 P&P  
LENGTH: 25m CABLE: 10m WITH PL259

**MD37-SKYWIRE (EXTERNAL STANDARD HF ANTENNA)**.....£39.95  
TYPE: WIRE BALUN MATCH FREQ: 0-40MHz £7.00 P&P  
LENGTH: 25cm CABLE: 10m WITH PL259

**LONG WIRE BALUN (ON ITS OWN)**.....£19.95  
Get the best from your HF receiver and get.....£2.00 P&P  
a long wire. Our own ferrite baluns give up to 2 "S" points greater signal than other similar baluns with a smooth match over 40MHz.

## Hand-held Antennas

**MRW-100 (SUPER GAINER BNC)**.....£19.95  
FREQ: 25-1800MHz LENGTH: 40m FITTING: BNC £2.00 P&P

**MRW-210 (SUPER GAINER SMA)**.....£22.95  
FREQ: 25-1800MHz LENGTH: 40m FITTING: SMA £2.00 P&P

Going out? Don't miss out! Get a Super Gainer!

## Something Extra

**TURNSTILE 137 (DEDICATED WEATHER SATELLITE)**.....£39.95  
FREQ: 137.5MHz LENGTH: 100cm SOCKET: SO239 £7.00 P&P  
RADIALS: 4

For use with receiving weather satellite pictures.  
**MRP-2000 (ACTIVE WIDEBAND PRE-AMP)**.....£49.95  
FREQ: 25-2000MHz GAIN: 14.0dB POWER: 9-15V £7.00 P&P  
CABLE: 1m BNC-BNC

**MRP-137 (ACTIVE WEATHER SAT PRE-AMP)**.....£44.95  
FREQ: 137.5MHz GAIN: 25.0dB POWER: 9-15V £7.00 P&P  
CABLE: 1m BNC-BNC

## Getting Rigged Up

We have a massive stock of all mounting hardware products, brackets, poles, cables & connectors, etc. Phone, e-mail or check the web-site for details! Remember we can make up any cable leads. Fitted with connectors of your choice at your request.



**ROYAL DOUBLE DISCONE 2000** NORMAL PRICE  
FREQ RX: 25-2000MHz £59.95  
FREQ TX: 130-175/410-475MHz  
GAIN: 5.5dB  
LENGTH: 150cm  
SOCKET: N TYPE  
**SALE PRICE £49.95**

This antenna has a superior wideband coverage for receive with a low SWR match right across the VHF and UHF spectrum

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



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UNIT 12, CRANFIELD ROAD UNITS, CRANFIELD ROAD  
WOBURN SANDS, BUCKS MK17 8UR

MHz	UTC	Service	Country	Lang	SINPO	SWL
5.965	1824	Radio Romania Int.	ROU	Eng	33422	SH
6.075	1833	Deutsche Welle	D	Ger	55545	DB
6.095	1834	Bayerischer Rundfunk	D	Ger	54555	DB
6.115	1845	Radio Tirane	ALB	Eng	44444	DB
6.120	1836	YLE Radio Finland	FIN	Fin	55434	DB
6.155	1838	ORF Radio Austria Int.	AUT	Ger	43444	DB
6.165	1840	Croatian Radio	HRV	Cro	54434	DB
6.195	1842	BBC World Service	G	Eng	45544	DB
6.275	1855	Radio Tohi (Prate)	HOL	Eng	34433	FM
7.130	1841	Radio Romania Int.	ROU	Eng	55444	DB
7.185	1857	Radio Bangladesh	BGD	Eng	33433	SH
7.205	1844	Voice of Turkey	TUR	Ger	55445	DB
7.240	1825	Family Radio	USA?/G	Eng	43323	BC
7.290	1826	Voice of Russia	RUS	Eng	44444	PP
7.330	1828	Voice of Russia	RUS	Eng	43444	PP
7.345	1829	Radio Slovakia Int.	SVK	Eng	44444	PP
7.380	1830	V. of the Islamic Rev. of Iran	IRN	Eng	44444	PP
7.430	1834	Voice of Greece	GRC	Eng	44444	PP
7.490	1851	Radio Vlaanderen Int.	BEL	Eng	45444	SH
7.500	1849	Radio Bulgaria	BUL	Eng	35444	SH
9.390	1840	Kol Israel	ISR	Eng	45444	SH
9.500	1832	Trans World Radio	MCO/SWZ	Eng	33333	FM
9.735	1845	Deutsche Welle	D/FRW	Ger	44554	JP
9.780	1803	Republic of Yemen Radio	YEM	Eng	24342	MC
11.585	1838	Kol Israel	ISR	Eng	43444	FM
15.140	1827	Radio Canada Int.	CAN	Eng	35433	SH
21.470	1859	BBC World Service	G/ASC	Eng	25321	SH
11.585	1815	Kol Israel	ISR	Spa	55555	VP
11.655	1830	Radio Netherlands	HOL/MDG	Eng	34323	VP
11.755	1830	YLE Radio Finland	FIN	Fin	44333	VP
11.770	1840	Voice of America	USA/MRC	Aze	43433	VP
11.840	1800	Radio Santez	D	Eng	42442	EM
15.570	1820	Yatican Radio	CYA	Poi	34323	VP
<b>1900-2000</b>						
5.895	1920	Radio Rossi	RUS	Rus	55545	VP
5.915	1950	Radio Slovakia Int.	SVK	Eng	44533	SH
6.035	1940	RAI	I	Eng	32422	SH
6.055	1950	Voice of Turkey	TUR	Eng	54544	SH
6.100	1955	Int. R. of Serbia and Mont.	SCG/BIH	Eng	54434	SH
6.110	1935	V. of the Islamic Rev. of Iran	IRN	Eng	43223	SH
6.140	1950	Deutsche Welle	D	Ger	54444	DB
6.235	1923	Voice of Russia	RUS	Eng	45444	DB
7.120	1920	Radio Netherlands	HOL	Eng	23222	EM
7.130	1915	China Radio Int.	CHN	Far	44434	VP
7.170	1930	China Radio Int.	CHN/RUS	Ger	55534	VP
7.185	1945	Radio Bangladesh	BGD	Ban	54434	VP
7.260	1910	Bible Voice Network	USA	Eng	22232	EM
7.290	1910	Voice of Russia	RUS	Eng	44444	EM
7.345	1900	Radio Slovakia Int.	SVK	Ger	54445	BC
7.430	1952	Voice of Greece	GRC	Eng	45434	SH
7.570	1908	Voice of Korea	KRE	Eng	25222	EM
9.325	1945	Voice of America	USA/CLN	Kur	55545	VP
9.335	1945	Radio Farda	USA/CLN	Far	55545	VP
9.460	1903	Bible Voice Network	USA/D	Eng	34222	EM
9.500	1905	Radio Australia	AUS	Eng	34233	EM
9.575	1924	Mgdi 1	MRC	Fre	45545	MC
9.730	1900	Voice of Vietnam	VTN	Eng	24222	EM
9.760	1947	RAI	I	Eng	43433	SH
9.760	1950	Voice of America	USA/PHL	Eng	25443	MC
9.785	1950	Voice of America	USA/GRC	Eng	44554	JP
9.840	1918	Radio Thailand	THA	Eng	44444	FM
9.885	1950	Radio Netherlands	HOL	Eng	45333	VP
9.965	1925	Voice of Armenia	ARM	Eng	45233	EM
9.990	1945	Radio Cairo	EGY	Ger	53544	VP
11.630	1930	RDP Internacional	POR	Por	55534	VP
11.655	1918	Radio Netherlands	HOL	Eng	34243	EM
11.865	1905	Deutsche Welle	D/POR	Eng	45554	JP
11.955	1910	Radio France Int.	F/GAB	Fre	55534	VP
12.050	1920	Radio Cairo	EGY	Ara	55545	VP
12.080	1930	Voice of America	USA/BOT	Fre	45333	VP
12.160	1915	WWCR	USA	Eng	44333	BC
13.650	1910	Radio Canada Int.	CAN	Fre	44334	BC
15.230	1915	Radio Vlaanderen Int.	BEL/CAN	Dut	45534	VP
15.400	1925	BBC World Service	G/ASC	Eng	44433	VP
15.565	1915	WYFR	USA	Eng	44334	BC
17.810	1917	Radio Netherlands	HOL	Eng	24222	EM
17.810	1930	BBC World Service	G/ASC	Eng	24552	JP
18.960	1910	WYFR	USA	Eng	34333	BC
21.455	1905	WYFR	USA	Eng	44333	BC
<b>2000-2100</b>						
5.775	2014	IRRS	I	Eng	35333	MC
5.960	2005	China Radio Int.	CHN	Eng	33533	SH
5.980	2015	Radio Prinosstroye	MDA	Eng	44444	FW
6.025	2015	Radio Budapest	HNG/SVK	Eng	44554	FW
6.035	2020	Voice of America	USA/STP	Eng	44444	FW
6.040	2027	RAI	I	Eng	44242	EM
6.055	2000	Voice of Turkey	TUR	Eng	55545	VP
6.110	2004	V. of the Islamic Rev. of Iran	IRN	Eng	45444	MC
6.235	2050	Voice of Russia	RUS	Eng	23333	TW
6.280	2015	Kol Israel	ISR	Eng	33333	TW
7.105	2030	Radio Belarus	BLR	Eng	53434	DB
7.190	2053	China Radio Int.	CHN	Eng	43433	MC
7.225	2015	Tunisian Radio	TUN	Ara	55555	VP
7.255	2025	Voice of Nigeria	NG	Eng	32332	EM
7.280	2032	Voice of Vietnam	VTN	Eng	22222	EM
7.285	2048	China Radio Int.	CHN	Eng	33333	TW
7.290	2025	Voice of Russia	RUS	Eng	55434	VP
7.300	2030	Voice of Russia	RUS	Fre	55555	VP

MHz	UTC	Service	Country	Lang	SINPO	SWL
7.330	2035	Voice of Russia	RUS	Eng	54434	VP
7.345	2045	Radio Slovakia Int.	SVK	Fre	55534	VP
7.365	2046	Vatican Radio	VVA	Eng	41332	EM
7.440	2035	Radio Belarus	BLR	Eng	24132	EM
7.490	2040	Radio Vlaanderen Int.	BEL/RUS	Eng	55555	FW
7.520	2045	Kol Israel	ISR	Spa	44434	VP
7.550	2055	Radio Farda	USA/CLN	Far	55545	VP
7.935	2045	China National Radio 1	CHN	Chi	32222	VP
9.375	2035	Voice of Greece	GRC	Gre	55545	VP
9.390	2000	Kol Israel	ISR	Eng	55434	VP
9.440	2030	China Radio Int.	CHN	Eng	44434	VP
9.500	2000	Radio Australia	AUS	Eng	35444	FW
9.525	2024	Voice of Indonesia	INS	Eng	24112	EM
9.535	2036	Radio Thailand	THA	Eng	44444	TW
9.550	2040	Voice of Vietnam	VTN	Eng	54444	DB
9.595	2005	Radio Exterior de Espana	E	Eng	43242	EM
9.630	2030	BBC World Service	G/SEY	Eng	34553	JP
9.680	2004	Radio Exterior de Espana	E	Eng	45243	EM
9.710	2029	Radio Canada Int.	CAN	Eng	55455	DB
9.755	2010	Vatican Radio	VVA	Eng	33232	EM
9.815	2000	Voice of America	USA/BOT	Fre	44423	VP
9.998	2045	All India Radio	IND	Eng	25444	FW
11.655	2037	Radio Netherlands	HOL/MDG	Eng	25444	FW
11.760	2044	Radio Havana Cuba	CUB	Eng	25342	MC
11.855	2045	BBC World Service	G/ASC	Hau	45433	VP
11.890	2005	Deutsche Welle	D/CLN	Ara	45554	JP
11.900	2005	China Radio Int.	CHN	Eng	45554	JP
11.905	2036	Radio Tashkent	UZB	Eng	44444	DB
11.930	2015	Radio Algeri	USA	Spa	45423	VP
11.985	2030	Trans World Radio	MCO/AFS	Fre	55444	VP
15.180	2010	Radio Canada Int.	CAN	Eng	25444	FW
15.400	2022	BBC World Service	G/ASC	Eng	35433	SH
17.810	2009	Radio Netherlands	HOL/?	Eng	25422	SH
17.830	2007	BBC World Service	G/ASC	Eng	25433	SH
<b>2100-2200</b>						
11.855	2123	R Japan	J/ASC	Eng	25422	SH
12.085	2125	Radio Damascus	SYR	Eng	35422	SH
5.850	2100	Radio Canada Int.	CAN/S	Eng	44444	GG
5.930	2100	Radio Prague	CZE	Eng	55555	GG
6.180	2121	R Japan	J/G	Eng	33522	SH
6.195	2150	BBC World Service	G/CYP	Eng	45444	FW
6.235	2105	Voice of Russia	RUS	Eng	34333	TW
7.190	2123	China Radio Int.	CHN	Eng	55544	FW
7.285	2112	China Radio Int.	CHN	Eng	45545	MC
7.300	2132	Voice of Russia	RUS	Eng	35434	MC
7.330	2103	Voice of Russia	RUS	Eng	34434	TW
7.360	2145	Family Radio	USA/MDA	Eng	55555	VP
7.410	2145	All India Radio	IND	Eng	44444	VP
7.450	2125	ERT 3	GRC	Gre	55545	VP
7.580	2140	Family Radio	USA	Eng	33322	TW
9.410	2145	BBC World Service	G/CYP	Eng	44444	VP
9.420	2130	Voice of Greece	GRC	Gre	55555	VP
9.445	2120	All India Radio	IND	Eng	55545	VP
9.490	2145	China Radio Int.	CHN	Eng	55555	FW
9.500	2110	Radio Australia	AUS	Eng	45333	VP
9.600	2136	China Radio Int.	CHN	Eng	45544	FW
9.615	2100	Deutsche Welle	D	Eng	55534	VP
9.770	2107	Radio Canada Int.	CAN	Eng	45243	EM
9.840	2110	WHRI	USA	Eng	35444	FW
9.855	2135	Radio Kuwait	KWT	Eng	45555	FW
9.910	2125	All India Radio	IND	Eng	25544	FW
9.950	2100	All India Radio	IND	Eng	44333	VP
9.985	2115	WWCR	USA	Eng	24444	FW
9.990	2145	Radio Cairo	EGY	Eng	22222	TW
<b>2200-2300</b>						
5.775	2259	IRRS	I	Ita	44434	RI
5.800	2207	Radio Bulgaria	BUL	Eng	44444	FH
5.840	2232	Radio Ukraine Int.	UKR	Eng	45544	FW
5.930	2242	Radio Prague	CZE	Eng	44444	FH
6.025	2202	Radio Budapest	HNG	Eng	44534	SH
6.100	2226	Int. R. of Serbia and Mont.	SCG/BIH	Eng	44444	FH
7.105	2204	Radio Belarus	BLR	Eng	35232	EM
7.120	2253	Radio Tirane	ALB	Eng	33333	FH
7.170	2250	China Radio Int.	CHN/RUS	Eng	45544	FW
7.340	2205	Radio Belarus	BLR	Eng	35232	EM
7.500	2215	Radio Bulgaria	BUL	Eng	55555	FW
7.535	2235	Northern Lights Radio	USA	Eng	55555	DB
7.535	2243	World Harvest Radio	USA	Eng	54444	DB
9.355	2220	Radio Taiwan Int.	TWN/USA	Eng	25444	FW
9.370	2250	WTJC	USA	Eng	25444	FW
9.375	2225	Voice of Greece	GRC	Eng	35544	FW
9.445	2218	All India Radio	IND	Eng	45444	DB
9.525	2210	Voice of Turkey	TUR	Eng	43444	DB
9.525	2225	Voice of America	USA	Fre	44444	DB
9.595	2240	Radio Exterior de Espana	E	Eng	44344	DB
9.910	2220	All India Radio	IND	Eng	44444	DB
9.950	2218	All India Radio	IND	Eng	43444	DB
9.990	2215	Radio Cairo	EGY	Eng	55545	DB
11.715	2200	All India Radio	IND	Eng	45444	MC
11.730	2204	Radio Vlaanderen Int.	BEL/ATN	Eng	45444	MC
12.010	2210	Radio Budapest	HNG	Eng	15321	SH
12.050	2215	Radio Cairo	EGY	Ara	55545	MC
<b>2300-0000</b>						
5.840	2301	Radio Ukraine Int.	UKR	Eng	44333	RI
5.865	2303	Voice of Greece	GRC	Ukr	44434	RI
5.875	2306	BBC World Service	G	Ara	34444	RI
5.930	2344	Radio Prague	CZE	Eng	33333	FH
5.960	2300	Voice of Turkey	TUR	Eng	55555	EM

MHz	UTC	Service	Country	Lang	SINPO	SWL
6.135	2312	Radio Romania Int.	ROU	Eng	44444	FH
6.180	2310	Radio Romania Int.	ROU	Eng	44544	FW
6.195	2314	BBC World Service	G/CYP	Eng	45332	MC
6.280	2316	Kol Israel	ISR	Heb	55545	MC
6.405	2333	FEBC	PHL	Chi	34433	RI
6.950	231					

# AISLive - A Service for All Involved with The Sea

**Although Rob Mannion G3XFD is well and truly beached nowadays, he likes to watch over friends who are still at sea, including Mark Coultas GOSLP. Mark is a Chief Engineer working on Liquefied Petroleum Gas tanker ships - definitely a job for a non smoker!**



Even though I've been ashore for very many years, I still have an abiding interest in ships and shipping. It's a family thing, my late father was Maintenance Superintendent for the Union Castle ships on the South African run from Southampton and up until recently, one of my brothers was in charge of the King George V dry dock in Southampton. This dock was built in the 1930s especially for the much loved RMS *Queen Mary* and the RMS *Queen Elizabeth*, which was tragically lost in Hong Kong following conversion to a 'floating University'. When she caught fire - mysterious fires broke out throughout the ship. It was a sad end for a beautiful liner born in adversity - she made her maiden voyage in secrecy from Clydebank in Scotland to America to bring back whole divisions of American troops, and continued doing this, among other jobs, throughout the Second World War.

Fire is something my friend Mark Coultas GOSLP, based in County Durham in the north of England, wants to avoid aboard his ships. This is because they are in fact huge floating liquefied petroleum gas (l.p.g.) tanks, carrying many thousands tonnes of this highly explosive gas. Mark's work on these tankers makes the dangerous work on the giant bulk crude oil vessels look deceptively safer!

Mark has been at sea for many years and he's a specialist within an extremely specialised branch of marine engineering. Despite months away from home he's managed to keep active in amateur radio and to help train others to take up our absorbing hobby. Unfortunately though, taking amateur radio equipment on board ships

nowadays can be difficult and Mark can only do this under favourable conditions (a friendly Ship's Master helps!).

When ashore or afloat Mark keeps me up-to-date with his activities, and provides feedback on whether he's got his copy of *Practical Wireless* on time, whether he's in Panama, North America, Suez or the South of France. However, in 2004 Mark, unable to take his Amateur equipment on board the Motor Vessel (MV) *Yarrow*, because she's a bulk LPG carrier, Mark introduced me to the AISLive website and I now keep track of his ships, my friends on the Irish Ferries ship *Isle of Inishmore* and many others friends afloat.

I'm sure *Short Wave Magazine* readers are already aware of the marine Automatic Information System (AIS). However, perhaps, like me - until Mark GOSLP told me of it, there are some who may not be familiar with the website. So, let's take a look at the system, which enables me to keep track of my friends serving at sea - literally all round the world.

## Anglo-Dutch

The AISLive website is a joint owned venture between the British Based Lloyds Register - Fairplay Ltd. and HITT NV (Holland). The British end is located in Redhill, Surrey, with the real-time computer tracking being done in Holland, and the historical referencing in Redhill.

In a nutshell, the ship borne AIS system is actually public domain and each vessel (commercial shipping mostly) carries dedicated AIS transmitting and receiving equipment working on the 156.250 to 162.025MHz section of the marine band. The transmitters typically have powers of 25W (high) and 2W (low) inputs. The transmitters send details of the ship, its heading and other accurate details derived from GPS navigation, which can be received by other ships. It's very useful to know that the dim shadow on





● The LPG carrier  
MV Yarrow.

advantage of marine ducting to achieve great ranges either listening to v.h.f. and u.h.f. transmissions over sea pathways. The effect can be quite dramatic, an example being that viewers in County Cork and the east coast of Ireland can often get very reliable u.h.f. TV coverage from Wales and south West England over the Irish Sea. The same propagation effect has proved useful to AISlive too!

Recently, the Island of Malta GC (The George Cross was awarded to the Island following the heroic action of the Islanders during the second World War) has recently been activated on AISlive.

Very soon, the superb propagation often available for v.h.f. and u.h.f.

transmissions over the Mediterranean sea showed themselves when ship AIS transmissions were being received on Malta using simple antennas at distances approaching 240km. I'm now waiting to see just how far ship AIS transmissions will travel in the Pacific when ports in that giant ocean come on air. My experiences in the Royal Navy over 45 years ago, demonstrated that standard ship-to-ship v.h.f. services could often exceed 400 nautical miles under good conditions!

The received information, including that from Malta GC,



● Sister ship  
MV Traquair.

is then relayed to the AISlive centre in Holland, to be entered on to the appropriate bitmap. As familiar as I am with electronics and modern shipping communication techniques, I still sit in the comfort of my own home in Bournemouth - admiring the superb technology which enables me to track ships of interest, and those in which friends, like Mark Coultas GOSLP, serve on.

Incidentally, my Church, All Saints, in Southborne, Bournemouth, has an interest in shipping. This isn't only because we are so close to the sea! It's also due to the fact that a number of the congregation are either active or retired Merchant Navy Officers.

My own interest extends to the Mission For Seafarers and

at the moment I'm working on the idea for the Church to 'adopt' a small Motor Tanker! The tanker, the MV *Alacrity*, is one of those hard working but often unrecognised workhorses (Seahorses?) which ply back and forth from Southampton (the Esso Fawley Oil Refinery) and the huge refinery at Milford Haven in West Wales.

I can often see the MV *Alacrity* as she passes on her regular trips to and from Wales. She's one of a large fleet of small tankers owned and operated by the London Company Everards. All their vessels have names beginning with 'A'. I also often see her on my way to Ireland on the Irish Ferry's ship *Isle of Inishmore*, sailing from Pembroke Dock.

In fact, the tracking process has been made even easier recently as an AISlive 'black hole' around Falmouth in Cornwall has been filled. This is because the south western tip of England is now effectively covered by AISlive. It's just another of the gaps recently filled by the system, leading to an even more effective tracking and improved safety.

Some readers may regard this form of ship tracking to be morally debatable. However, we must also remember that half the battle in getting to a ship that is in distress is knowing where it is!

The next step with the application of AIS must surely be the equipping of pleasure craft. Once equipped with suitable AIS transmitters and receivers, the reports of incredibly long (and sometimes fruitless) searches for missing pleasure craft unable to pin-point their locations will be history.

Instead of confusing details - often provided by barely working mobile 'phone - the AIS system could become yet another life saver. Indeed, the rescue process for both the rescuer - who often go into to extreme dangers themselves - will no doubt become much safer. It can't come quickly enough for me, even though I'm mostly safely ashore nowadays, going to sea via my Macintosh computer.

SWM

## Using The AISLive Website

Access to the website will remain free for enthusiasts, but the information displayed will be delayed. Register at [www.aislive.com](http://www.aislive.com) and you will soon be able to track ships all over the world- from Aberdeen to Panama, and from Amsterdam to Japan. Once you've used the site, if you're as keen as I am - I can guarantee you'll be hooked! Even though I know how busy the Dover Straights are - when viewed via the AISLive site - it looks like the M25 motorway on a Friday afternoon. The only difference being that instead of HGVs, and ordinary cars - this motorway carries super tankers and container ships, all threading their way up or down channel, while keeping a careful look-out the cross-channel ferries which scuttle to and fro directly across the main traffic flow. Try the site - it's a real eye opener!

## How Does Marine AIS Work?

For a full explanation of the technical aspects of the marine AIS system, one website offers particular good and informed reading. It's offered by the American Coastguard (unlike the British Coastguard the US version is part of their armed services, protecting their huge coastline). So, for more details on this fascinating safety and information system, I thoroughly recommend you look at

[www.navcen.uscg.gov/enav/ais/how\\_AIS\\_works.htm](http://www.navcen.uscg.gov/enav/ais/how_AIS_works.htm)



# COMPUTERS & RADIO

## PART 2

**Jack Weber continues his series with his discussion regarding the usefulness of computers to the radio hobbyist.**

## Precision and Accuracy

Last time, I looked at spectrum analysers in general and at two in particular - *Spectrum Laboratory* and *Spectran* - that are available free of charge on the web. These programs, and others like them, use the mathematics of the Fast Fourier Transform (FFT) to plot signal strength with a level of precision that goes down to less than 1Hz.

Now, precision is all very well, but it would be a lot better if we also had accuracy. The two words are often used interchangeably, but the difference between them is enormous. Precision will allow us to separate out two signals that are only a few Hertz apart, but accuracy will ensure that we know what those two frequencies actually are.

If you've had a chance to use one of these FFT programs,

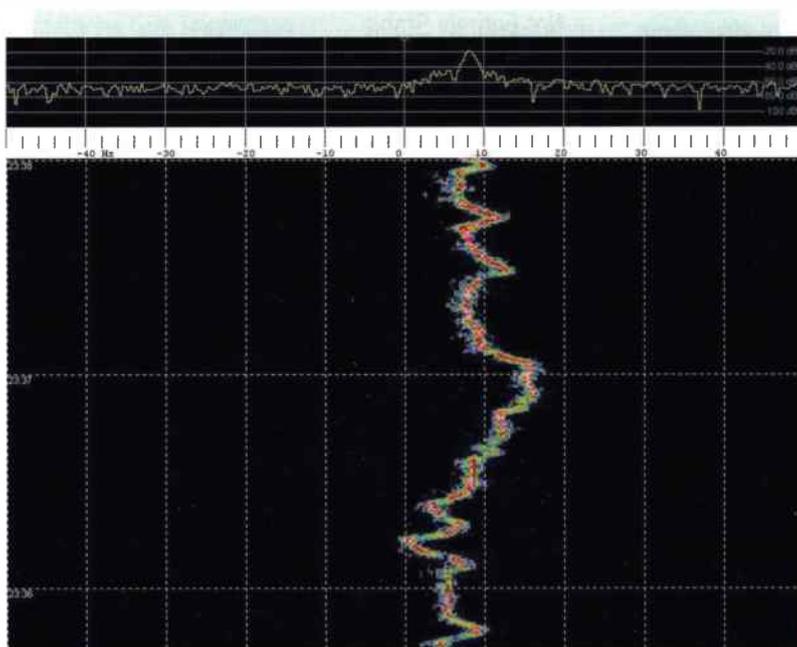


Fig. 1: Station WBCQ in Maine, USA drifting slightly around its nominal frequency of 5.105MHz. There is negligible drift in the receiver, which was checked against standard frequency stations before and after this plot.

you'll have seen already that many transmitters appear to be slightly off their nominal frequency and quite a few drift about quite badly. The problem is how do you tell whether any apparent error or drift is in the transmitter, the receiver or both? You may not even be aware that there is any error if a positive offset in the transmitter is cancelled out by a negative one in the receiver to make it seem as if both are spot on.

### The Problem

The two plots in Fig. 1 and Fig. 2 illustrate the problem. The signal in Fig. 1 is a wobbly transmitter being picked up on a stable receiver. In Fig. 2 we have a stable transmitter on a rather erratic receiver. You certainly can't tell the source of the problem just by looking at the waterfall graphs. So, basically we'll be stumbling about in the dark until we can pin down the receiver's accuracy. And we can't do that until we know something about its stability. So, that's the place to begin.

An obvious way to approach this is to use some of the standard frequency stations such as MSF on 60kHz and WWV on various h.f. frequencies. They're guaranteed to always be accurate so any drift or error must be coming from the receiver. As we'll see later though, these transmissions aren't always easy to use when you're working at such high precision, so we'll leave them alone for now and in the meantime I'll suggest another simpler option.

For this we'll need a frequency, which has at least three or four receivable transmitters operating on it. An ideal choice is one of the European m.w. channels (they're spaced every 9kHz between 540 and 1602kHz), but be sure to pick one that isn't dominated by a local transmitter near to you. After dark, there may be half-a-dozen or more carriers visible on some m.w. channels and the chances are they won't all be on exactly the same frequency, which is just what we want.

*Speclab* is the best choice for this test. Set its Offset to -1000 and its Min and Max values to -50 and 50 respectively. This provides us with a 100Hz wide window. A scroll rate of about one line every 5 to 10 seconds should be right. Next, tune your receiver to 1kHz below the channel you want to monitor and switch to u.s.b. mode. Check that you can see several distinct carriers on the display. If there's only one, try another frequency.

### Best Served Cold

Try to do this with the receiver just switched on and still cold. The waterfall that develops will probably look something like Fig. 3. Here we can clearly see several closely-spaced carriers. All of them are drifting in frequency,



# COMPUTERS & RADIO

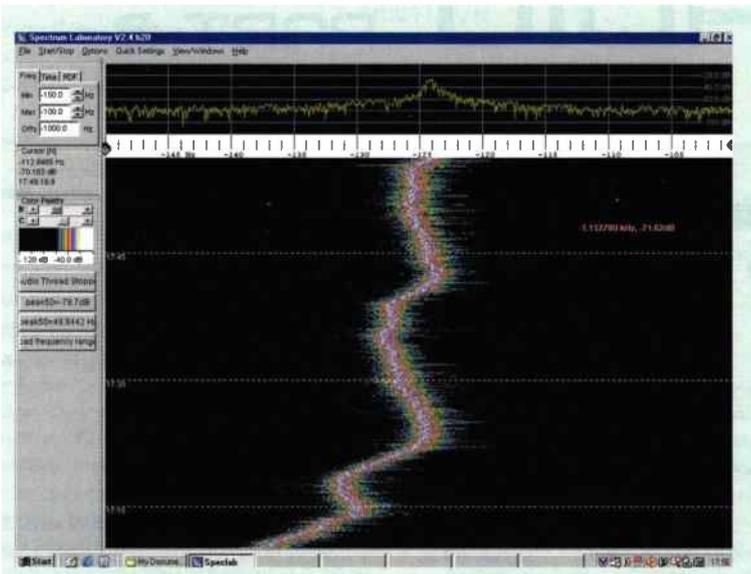


Fig. 2: Here, the receiver is a mid-range portable and doesn't have very good frequency control, but the transmitter (BBC World Service on 15.400MHz) was stable to less than 0.5Hz when observed on a good receiver.

but the traces are strictly parallel. Now, the chances that this jumble of transmitters from all over Europe would be drifting at exactly the same rate in the same direction is essentially zero. Now we can be certain that what we're seeing is local drift. That's why we had to pick a frequency shared by several stations because, with just a single transmitter, you'd never know where the drift was coming from. Make sure, however, that the carriers are quite closely spaced. If they're exactly 50Hz apart, then you're seeing local mains interference mixing with the signal. On a typical m.w. channel most of the stations will generally be within about 40Hz of the correct frequency.

This kind of drift is unavoidable when equipment is warming up. It should eventually stabilise, but you'll need to know how long your particular set-up takes to settle - one to two hours is typical. If it's a modern frequency-synthesised communications receiver, it will almost certainly stabilise quite well, but portable radios or older valve receivers may never do so. There's not much you can do about this except to learn the pattern and extent of your system's drift and make some allowance for it.

If all is well, you should eventually see the carriers settle down into straight vertical tramlines. As they do, you may want to zoom in on the waterfall to see minor changes more easily. Simply narrowing the range between Min and Max will produce a blocky display that isn't very helpful. What we need to do is to increase the resolution at the same time as we tighten the displayed bandwidth.

## Divides The Bandwidth

First, open FFT Settings in the Options menu and increase the FFT Input Size value from its default of 16384. This divides the bandwidth into finer steps and so improves the

resolution, but you may find that the display starts to stutter and slow down. If it's a problem, reduce the scroll speed in Spectrum Display Settings.

Alternatively, or additionally, you could increase the Decimation value (also in FFT Settings) above its default setting of 1. Decimation is a mathematical procedure that improves resolution at the expense of bandwidth. Try increasing it step-by-step to 2, 3, 4 and so on. You'll reach a point at which the Min and Max fields suddenly change from the values you've set because the analyser has run out of bandwidth. At that point back off to the previous decimation value and reset the Min and Max values. Bear in mind that if your window is set to  $\pm 10$ Hz with an offset of -1000Hz, the overall bandwidth the analyser has to deal with is 1.01kHz, not 20Hz - that's just the portion that we're displaying.

If the display still needs sharpening, you could re-tune your receiver 500Hz higher, reduce the Offset to -500 and try again. The total bandwidth is now 510Hz, which may allow another decimation step. You can keep adjusting all of these settings as long as your PC will cope, but eventually it will run out of steam. However, given enough computing power, these adjustments can provide very precise readings at fractions of a Hertz.

With luck, you should now have a stable receiver and a clear high-resolution display on the screen. We still don't know anything about the accuracy of the system, but we can now begin to look critically at transmitter stability. The frequency control in most modern professional transmitters is rock-solid, but there are also lots of small stations using low-budget, or even home-made, equipment, as well as stations in poorer countries relying on ancient equipment that has been repeatedly patched up and mended with whatever components came to hand. Then, of course, there are some transmitters that are just plain faulty.

## Not Entirely Stable

The wobbly carrier in Fig. 1 shows a healthy, but not entirely stable, transmitter on 5.105MHz. This belongs to WBCQ in Maine, USA and you can see how erratically it drifts. It's almost certainly quite an old piece of equipment and may never have been capable of the sort of stability that is common today.

In some cases, you can even identify the type of hardware that is in use. Fig. 4 shows Scandinavian Weekend Radio, a licensed short wave broadcaster in Virrat, Finland that is operated on a voluntary basis by radio enthusiasts. This type of trace, with its regular swing between fairly constant limits and a relatively sharp reversal at those limits, is characteristic of a temperature-controlled crystal oscillator (TCXO). Just like a central heating thermostat, it has to overshoot slightly before the error is detected and corrected. SWR's website confirms that this is, in fact, a home-made transmitter with TCXO frequency control.

The variations shown by WBCQ and SWR are so small that they're of no concern to their listeners and wouldn't be a problem for other nearby broadcasters, but they're interesting in their own right and can be of help in identifying a weak carrier or in judging propagation conditions because most transmitters that drift do so in quite

distinct and consistent ways. On the amateur bands you'll see a much wider variation ranging from near-perfect stability to transmitters that shift frequency significantly within a matter of seconds. Remember though that s.s.b. signals don't show up well with this type of FFT analyser because there is no carrier to pick out.

The next step is to assess the receiver's accuracy. It would be very convenient if receivers simply had a fixed error at all frequencies. Sadly, that never happens. The best you can hope for is a linear error, which means that at 2MHz it will be twice as great as it is at 1MHz, and so on for all other frequencies. The worst case will be an error that's positive in places and negative in others, following a roughly S-shaped curve if you're lucky, or wobbling about rather drunkenly if you're not.

### Parts Per Million

Modern communications receivers generally derive their tuning from a master oscillator by digital frequency division (and frequency doubling for higher frequencies). If this master oscillator is out by, say, 0.000001% then that will be the percentage error at every frequency. This gives a simple linear relationship, which manufacturers often quote in terms of parts per million (p.p.m.). If, for example, it's 10p.p.m. then that means the error should be no more than 10Hz at 1MHz, 100Hz at 10MHz and so on.

Older receivers that use tuned circuits are never linear but, anyway, it's impossible to judge the frequency very accurately on an analogue dial, so this kind of measurement doesn't really apply to them. You can certainly judge the receiver's stability though, just by tuning in to a known stable carrier and noting how it drifts.

With a digital frequency display, the best way of checking its accuracy is to draw a calibration curve. This is where we need to resort to the frequency standard transmissions. Unfortunately, these are not as common as they once were and they're also mostly clustered around the low frequency end of the spectrum where we least need them because receivers tend to be most accurate there.

Anyway, a good place to start is with two UK-based stations - MSF in Rugby on 60kHz and the Radio 4 transmitter at Droitwich on 198kHz. MSF is run by the National Physical Laboratory and is Britain's official transmitted frequency standard. For our purposes Droitwich is just as good because it's controlled by a rubidium laser giving a typical accuracy of 10 parts per trillion, which is way better than anything our receivers will achieve. Check, though, that you are in the Droitwich coverage area as there are a few other Radio 4 transmitters on 198kHz (notably Burghead and Westerglen), which are not stabilised in this way.

### Precisely Controlled

As before, tune to exactly 1kHz below the nominal frequency and set *Speclab* to an offset of -1000Hz. Instead of a nice thin single-frequency carrier as you might expect, you'll see something like the pattern in Fig. 5. This is Radio 4 Droitwich and it looks like there are dozens of adjacent

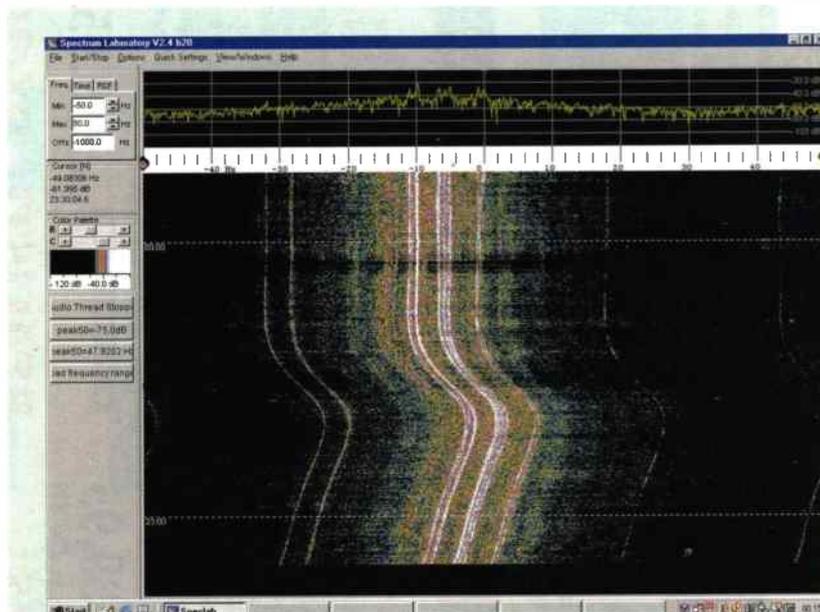
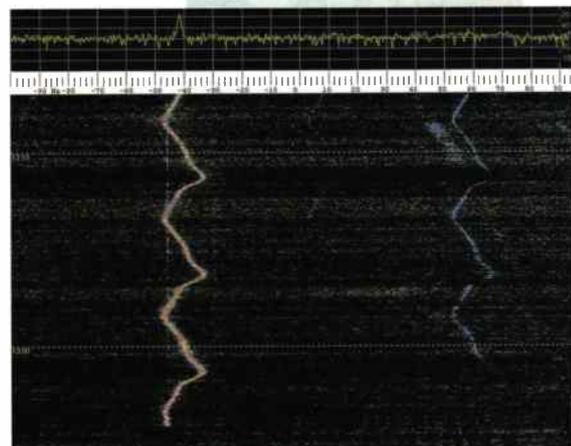


Fig. 3: This is a plot of 1602kHz in the evening with the receiver switched on from cold. Because several stations are all apparently drifting together, the drift must be coming from the receiving set-up and not from the transmitters. After about 90 minutes the receiver appears quite stable.

carriers. The reason is that this transmitter carries a complex pattern of subsonic phase modulation, which is used to transmit digital time signals as well as signals for switching certain types of off-peak electricity meter. So, even though the average carrier frequency is extremely precisely controlled, the modulation produces lots of closely spaced sidebands that make it appear to be all over the place. Similarly, you'll often see a complex pattern around MSF's nominal frequency because its one-second pulses and Morse identifications also introduce various close-in sidebands.

Moving up to the h.f. bands, the best known frequency standard station is WWV in Fort Collins, Colorado, which transmits on 5, 10, 15 and 20MHz. Unfortunately, propagation restricts the 5MHz frequency to late at night in the UK and usually limits the higher frequencies to no more than a few hours during the day. A better bet is to use the Russian frequency standards, which are 4kHz below WWV on 4.996, 9.996 and 14.996MHz. Not only is the signal stronger, but they're audible for much more of the day. Fig. 6 shows the Russian station on 14.996MHz. The modulation is arranged in blocks of one-second ticks, rapid pulses and unmodulated carrier with a short break before the cycle repeats. So, again, it's not always easy to see the precise carrier frequency.

Fig. 4: Scandinavian Weekend Radio in Finland on 11.690MHz. This kind of pattern is characteristic of a transmitter controlled by a Temperature-Controlled Crystal Oscillator.



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Fig. 5: This is the Radio 4 long wave transmitter at Droitwich on 198kHz. The carrier is the central white line, all the others result from the timing signals that this station carries.

Paradoxically then, many frequency standard transmissions are actually quite difficult to use for checking tuning frequency.

## Some Tricks

Fortunately, *Speclab* has some tricks up its sleeve to make this easier. In addition to the spectrum analyser itself, *Speclab* provides an oscilloscope, phase meter, signal generator and the rather obscurely named Watch List and Plotter. This last one allows you to watch - i.e. measure over

time - various values from the spectrum analyser, with the results being plotted on a graph.

We'll use this to select a narrow window that includes the frequency standard transmission we're trying to measure. We'll then tell *Speclab* to find and plot the frequency that has the highest signal strength within this window. Rather than seeing a fuzzy, speckly display that shows all the noise as well as the signal, we'll get a clear screen with just

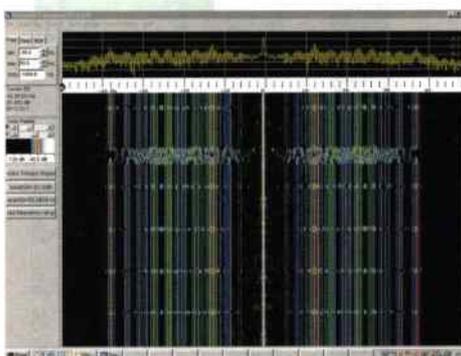
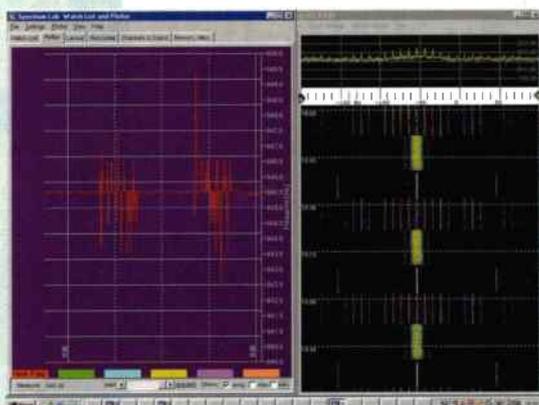


Fig. 6: The Russian frequency standard station on 14.996MHz appears here in a conventional waterfall display on the right. The window on the left displays the same signal in the 'Watch List Plotter', which discards everything except the strongest signal at each

moment. If you're only interested in one signal, this gives a much clearer display because the plot is always a uniform thin line. Each step on the vertical scale represents 0.5Hz and it's easy to see that the carrier appears fairly stable at about 945.45Hz. This shows that the receiver is stable too and has a tuning error of -54.55Hz at this frequency, or about 3.6 p.p.m.



the exact carrier frequency picked out. Assuming, of course, that the signal is reasonably well above the noise.

Use the waterfall first to check where the carrier is. The Watch List Plotter doesn't use offsets so you'll need to find the actual frequency where the analyser sees the carrier. Suppose you have set an offset of -1000Hz and the carrier is at -37, then the actual frequency is

$$963\text{Hz} = (-37 - (-1000)).$$

If it's reasonably stable we could plot a narrow range of, say,  $\pm 5\text{Hz}$  from 958 to 968Hz.

If you look in *Speclab*'s View/Window menu, you'll find 'Watch List & plot window' as an item in the bottom section. Selecting this opens the Plotter. Just above the display area is a row of tabs - click the one labelled Watch List. You'll see a table in which you can define several channels of measurement. We'll use Channel 1, in the first row. In the Expression column enter 'peak\_f(f1,f2)' where f1 and f2 are the actual frequency limits you want to use. This tells *Speclab* to find the strongest frequency between those two values. Then enter these same values in the Scale Min and Scale Max columns respectively. Next, click the Plotter tab and, if necessary, use the Plotter menu just above it to start the Plotter running. Click the Horizontal tab if you want to change the scroll rate for the plot.

## Endless Uses

The Watch List and Plotter has endless uses from observing changes in mains frequency (use a short wire aerial to pick up local hum) to plotting long-term propagation changes. For example, to see how a station's signal strength varies with time just replace the expression with peak\_a(f1,f2) and you'll get a graph of signal strength for the strongest signal between f1 and f2. Or combine peak\_f and peak\_a by plotting them simultaneously on different channels (rows) in the Watch List. It's an incredibly powerful tool.

Whatever frequencies you're observing, beware of anything that looks too good to be true, it's almost always a spurious signal generated inside the receiver. For example, Fig. 7 shows a waterfall graph with 0 on the frequency scale corresponding to 15MHz. The thin straight line at exactly 15MHz is not WWV but a spurious signal caused by the receiver's master oscillator. WWV is the fuzzy line surrounded by modulation sidebands at about -58Hz. If your receiver has a linear error you should be able to predict from other readings what to expect at any frequency. Anything that doesn't fit and looks perfect is bound to be internally generated because any signal that's been through the ionosphere will always look rather irregular, even if it's a steady carrier with no modulation.

Once you have a few error readings for standard transmissions at different frequencies, it's best to plot them onto a graph. Graph paper and pencil will do fine, but if you have a spreadsheet program such as Microsoft Excel, this will do it much more easily - see Fig. 8. It can also calculate the best-fit straight line through the data points and print out a nice graph that you can keep by the receiver to find the correction needed at any frequency. The error curve for most modern receivers should be linear, but there are exceptions. Bear in mind also that the receiver's minimum tuning step will limit the accuracy. Some receivers tune in odd steps such as 2.88Hz, so the straight line may wobble by this amount.

## Kinky

Wideband receivers that cover l.f. to v.h.f. or beyond, may use more than one oscillator, so there'll probably be a kink in the calibration curve where the oscillators switch over. Unfortunately, there aren't any actual frequency standard transmissions above 20MHz, but you should get reasonable

results from some of the amateur beacons.

For example, the Buxton beacons on 50 and 70MHz have published frequencies of 50.00000 and 70.00000MHz - i.e. a precision of 10Hz, which implies that they should be accurate to  $\pm 5$ Hz. I haven't seen published figures for other beacons, but they are likely to be pretty accurate too.

For even higher frequencies, you could use TV vision carriers as they're amplitude modulated. Their frequencies are quite well controlled, however they employ a complex system of offsets in order to minimise interference and so they generally won't be on exactly their nominal frequency. Unless you have a list of offsets and know which transmitter you're observing, this could be very misleading.

How accurate can we get? Well, not quite as accurate as it may appear. Once you start measuring things down to fractions of a Hertz it's easy to convince yourself that precision equals accuracy. It doesn't. Doppler effects in the ionosphere could easily shift a signal by 1 or 2Hz, so even a frequency standard may not be accurate by the time it gets to you. There may also be inaccuracies in your computer that will limit what you can measure and, of course, no receiver is ever totally stable. Temperature changes, mains voltage fluctuations and physical jolts can all induce drift.

### Stability Matters

On the other hand, we're not trying to eliminate error, simply to know what the error is so that we can make allowances for it. A professional monitoring receiver may offer an accuracy of 1p.p.m., which equates to  $\pm 30$ Hz at the top of short wave. That sounds a lot, but if we can measure this error to within, say,  $\pm 2$ Hz then that's how accurately we can correct for it. Stability is what really matters because it allows us to make an error graph and deduce what the correct frequency is. With an unstable receiver you never know where you are.

Once the graph has been drawn and you have a good straight line to show the error, it should be possible to achieve an accuracy of no worse than  $\pm 5$ Hz on h.f. without much trouble and, with extra care and patience, you could probably calibrate your receiver to within  $\pm 2$ Hz. But you'll never really know unless you have access to a calibrated frequency source that can be traced back to a national standard. Buying one of those requires a mortgage, but there are some alternatives that are nearly as good. One is an off-air standard. In the UK many of these use MSF or Droitwich. Professional models aren't cheap, but you can build a decent off-air standard quite easily. I have one that I built from a design published in *Everyday Practical Electronics* (June 2002). It cost only a few pounds and took just a couple of hours to build. It provides very accurate squarewaves, though only up to 198kHz.\*

### GPS Derived

An even better option is to use a GPS-derived frequency standard such as the Hewlett-Packard Z3801A. These typically offer an accuracy that's better than 1 in  $10^9$ , i.e. an error of less than 1Hz per GHz. They were very expensive

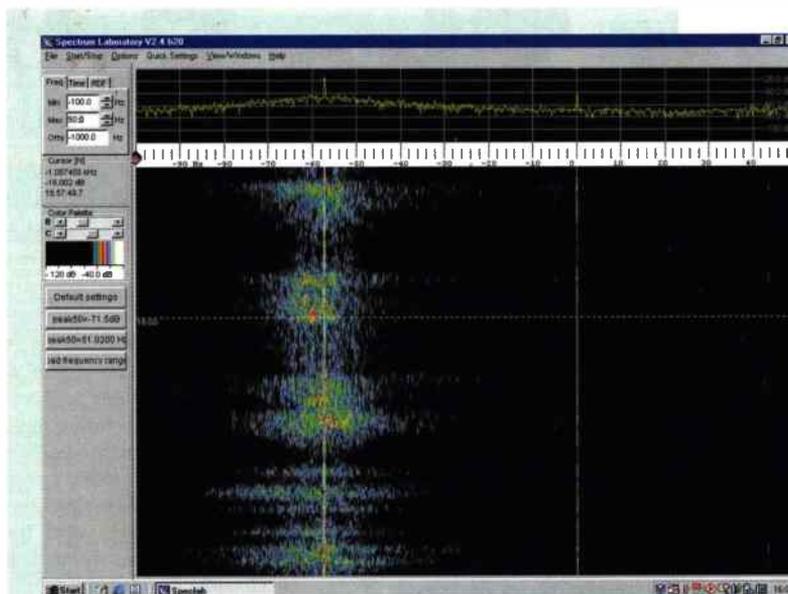


Fig. 7: In this plot, zero corresponds to 15MHz on the receiver's display. The straight line at that point is a spurious signal from the receiver's own master oscillator, the line on the left is WWV at the actual 15MHz frequency.

when new, but a large number of second-hand units came onto the market in America a few years ago and these can still be found for around £200-250. You'll also need a GPS antenna and a computer to control the instrument. However, they're ideal for radio monitoring and several software programs have been written by radio amateurs specifically for using and operating the HP Z3801A.

Incidentally, while just about every GPS provides a timing signal in its digital data output, most units are designed for positional accuracy and the timing data isn't given priority. They're fine as basic clocks, but useless as frequency standards. Using one that's been specially designed as a time and frequency reference is the only option.

Even without that sort of equipment though, a software spectrum analyser can bring an unparalleled level of accuracy to most receivers. If you still have any doubts about putting computers and radio together, I suggest you try it and I'm sure you'll be convinced. After all, the software is free so there's nothing to lose.

Next time, we'll turn our attention from r.f. to a.f. and look at how computers can revolutionise recording and audio processing.

SWM

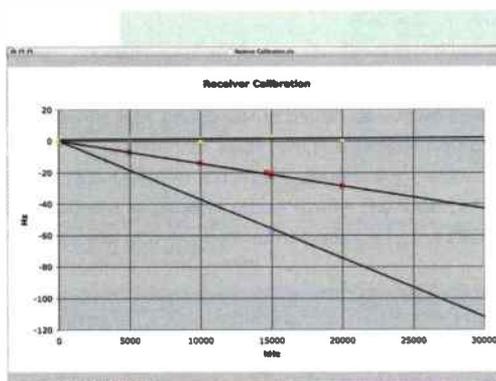


Fig. 8: These are error graphs for three communications receivers as plotted on Microsoft Excel. One receiver is almost perfectly accurate, but limited slightly by having a minimum tuning step of nearly 3Hz. The other two receivers tune in 1Hz steps and show linear errors of about 1.4 and 3.6p.p.m.

\* Our sister magazine, *Practical Wireless*, provides two more possibilities.

Locking The Robin To Droitwich, *PW* Dec '95 and The Droitwich Chronicles, *PW* Oct '98 - Ed.

# In The Ed's Shack

**Last month I looked at what's needed to be able to receive radio relaying spacecraft that have transponders using frequencies in the spectrum between 240 and 280MHz or thereabouts.**

Since I wrote last month's offering covering the activity of monitoring 'u.h.f.' downlink frequencies used by Military satellites, there has been some more extraordinary activity with lots of in-the-clear voice activity on 252.050MHz. I am assured by those who have been involved in the monitoring of these frequencies for many years that capturing the occurrence of such traffic is very rare indeed. The operational procedures used by the two parties involved, WOLFEN and WEREWOLF were military in nature, but it was far from polished. This would seem to indicate that the link was being used by cadets or other trainees. Unfortunately, after a good period of clear traffic the channel finally went encrypted. There were however, many hours of in-the-clear communications that took place prior to the mode change.

Again, as with last month, I have much recorded material from over the time. This can be heard or downloaded from the Internet URL given below.

## A Picture Paints...

Over the past decades there have been thousands of artificial satellites placed into orbit

around our small blue planet. Many of these carry communications payloads - transponders. These are essentially radio repeaters in space and can be either narrow or wideband devices. The ones generally found operating in the spectrum under discussion here, tend to be either 150 or 500kHz wide. They are able to carry numerous narrow band signals or some rather wider digital modes.

Last month I mentioned the use of the RF Space SDR-14 software defined receiver and its suitability for investigation of satellite transponder characteristics. I lent my SDR-14 to local satellite guru who just happens to be co-owner of the UHF-Satcom website. He spent a busy few days looking at the transponders that he'd discovered previously and unearthing a few more into the bargain operating on satellites around 12°W.

I've included a listing here that resulted from that work in **Table 1**. You can also see some of the spectrum plots too. The transponder spectrum plots have been produced to show the actual bandwidth of the transponder as received. The plots were captured using an RF-Space SDR-14 software defined radio, which was being fed with the 10.7MHz i.f. from an AOR AR5000 communications receiver.

Further information is given in **Table 2**, which provides a list of satellites with u.h.f. downlinks.

## More to Come

Sadly I've not had time to do the construction work on the low noise amplifier and the helical antenna I mentioned last month - I will cover these and some more information in a future issue. If you've any questions relating to this and other topics, please drop me an E-mail or letter. I'm happy to help.

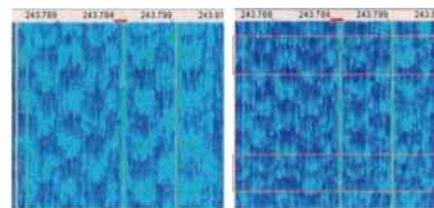


Fig. 1.

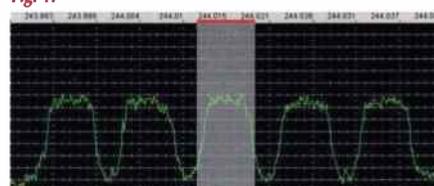


Fig. 2.

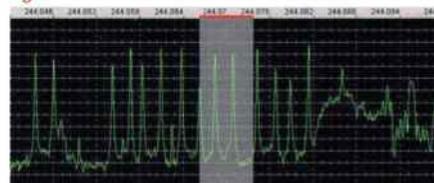


Fig. 3.

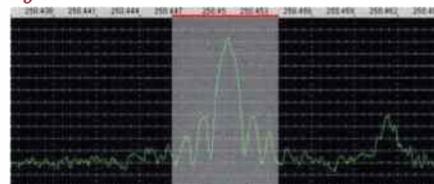


Fig. 4.



Fig. 5.



Fig. 6.



SWM Fig. 7.

## Some useful URLs

[www.uhf-satcom.com](http://www.uhf-satcom.com) - Lots of Info.

[www.time-step.com/inmarsatsystem2.htm](http://www.time-step.com/inmarsatsystem2.htm) - Assembled pre-amp and Yagi all ready to go.

[www.uhf-satcom.com/uhfsatcom/uhfpreamp.htm](http://www.uhf-satcom.com/uhfsatcom/uhfpreamp.htm) - Low Noise Amplifier.

[www.geckos-haunt.org/wolfden/](http://www.geckos-haunt.org/wolfden/) - 252.050MHz in-the-clear comms from WEREWOLF and WOLFEN. Audio samples as mentioned this month.

[www.geckos-haunt.org/hearsat/](http://www.geckos-haunt.org/hearsat/) - 252.300MHz MilAir Audio samples as mentioned in last month's 'Ed's Shack'.

<http://groups.yahoo.com/group/SDR14/> is the Yahoo group dedicated to this excellent Software Defined Radio - please join if you are interested.

#hearsat channel formed on the ZIRC network - server details from [www.zirc.org](http://www.zirc.org) Once you connect to the ZIRC network, please register your nickname by issuing a /msg nickserv REGISTER. You will then receive an E-mail with an authentication step. When you connect to ZIRC in future, you should issue a /msg nickserv identify and you will be identified to the ZIRC network. This is an important step in case #hearsat needs to be closed to registered users only.

**Table 1: Satellites around 12°W of South**

Downlink MHz	Uplink MHz	Notes	Transponder spectrum plot
243.800	-	Waterdrops	Fig. 1
243.995	317.095		Fig. 2
244.005	317.105		Fig. 3
244.015	317.115		
244.025	317.125		
244.035	317.135		
244.045	317.145		
244.055	317.155		
244.065	317.165		FSK data.
244.075	317.175		FSK data.
244.085	317.185	Unid. radio station.	Fig. 4
244.095	317.195		Fig. 5
244.105	317.205		Fig. 6
244.115	317.215		Fig. 7
244.125	317.225		
244.135	317.235		
244.145	317.245		
248.975	302.575		
248.985	302.585		
248.995	302.595		
249.005	302.605		
249.015	302.615		
249.025	302.625		
249.035	302.635		
249.045	302.645		
249.055	302.655		
249.065	302.665		
249.075	302.675		
249.085	302.685		
249.095	302.695		
249.105	302.705		
249.115	302.715		
249.125	302.725		
249.135	302.735		
249.145	302.745		
249.155	302.755		
249.165	302.765		
249.175	302.775		
249.185	302.785		
249.195	302.795		
249.205	302.805		
249.215	302.815		
249.225	302.825		
250.450	s.h.f.	Fleet Broadcast (Data).	Fig. 4
250.550	s.h.f.	Fleet Broadcast (Data).	Fig. 5
250.600	s.h.f.	Wideband Data.	Fig. 6
251.325	-	Spread spectrum or PSK data.	Fig. 6
251.700	-	Spread spectrum or PSK data.	Fig. 6
251.950	292.950	WOLF DEN & WEREWOLF units in the clear	Fig. 7
252.050	293.050		Fig. 7
253.650	294.650		Fig. 7
253.750	294.750		Fig. 7

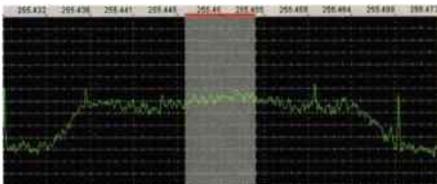


Fig. 8.



Fig. 9.

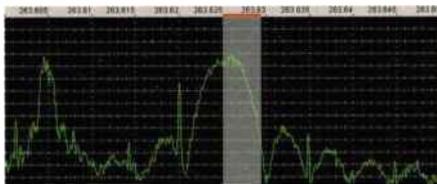


Fig. 10.

Downlink MHz	Uplink MHz	Notes	Transponder spectrum plot
253.950	307.550	Italian Navy and unid. Spanish radio station. Super Radio from Colombia.	Fig. 8
254.100	307.700		Fig. 8
255.350	296.350		Fig. 8
255.450	296.450		Fig. 8
256.950	297.950		Fig. 8
257.050	298.050		Fig. 8
257.450	311.050		Fig. 8
257.600	311.200		Fig. 8
258.450	299.450		Fig. 8
258.775	-		Fig. 8
260.425	294.025	Unid. radio station.	Fig. 9
260.525	294.125		Fig. 9
260.575	294.175		Fig. 9
260.675	294.275		Fig. 9
261.400	295.000		Fig. 9
261.425	295.025		Fig. 9
261.450	295.050		Fig. 9
261.475	295.075		Fig. 9
261.500	295.100		Fig. 9
261.525	295.125		Fig. 9
261.550	295.150	Frequent piccolo type data (u.s.b.).	Fig. 11
261.575	295.175		Fig. 11
261.600	295.200		Fig. 11
261.625	295.225		Fig. 11
261.650	295.250		Fig. 11
261.675	295.275		Fig. 11
261.700	295.300		Fig. 11
261.725	295.325		Fig. 11
261.750	295.350		Fig. 11
261.775	295.375		Fig. 11
261.800	295.400	King 4 & 5 - Used during Space Shuttle launches.	Fig. 10
261.825	295.425		Fig. 10
261.850	295.450		Fig. 10
261.875	295.475		Fig. 10
261.900	295.500		Fig. 10
261.925	295.525		Fig. 10
261.950	295.550		Fig. 10
262.175	-		Fig. 10
262.275	-		Fig. 10
262.375	-		Fig. 10
263.625	297.225	Spread spectrum or PSK data.	Fig. 12
263.725	297.325		Fig. 12
263.775	297.375		Fig. 12
263.875	297.475		Fig. 12
265.350	306.350		Fig. 12
265.450	306.450		Fig. 12
266.850	307.850		Fig. 12
266.950	307.950		Fig. 12
268.250	309.250		Fig. 12
268.350	309.350		Fig. 12
268.675	-	Fig. 12	
269.750	310.750	relay of Russian 'phone system.	Fig. 11
269.850	310.850		Fig. 12



Fig. 11.



Fig. 10.

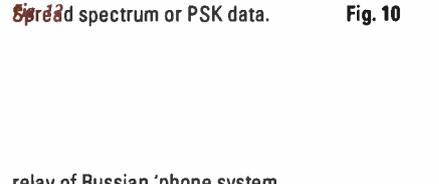


Fig. 12.

**Table 2: Satellites with u.h.f. down-links - positions from West to East.**

Heading Rel to South	Satellite	Down-link bands
-177.85	UHF 4	u.h.f., e.h.f. (Mil)
-135.45	GOES 10	u.h.f., L, S (Weather)
-107.99	GOES 7	u.h.f., L, S (Weather)
-105.64	UHF 6	u.h.f., e.h.f.
-100.59	UHF 7	u.h.f., e.h.f.
-100.1	FLEETSATCOM 7	u.h.f., e.h.f.
-98.36	GOES 9	u.h.f., L, S (Weather)
-74.29	GOES 8	u.h.f., L, S
-33.9	SKYNET 4A	u.h.f., X
-24.69	UHF 9	u.h.f., Ka (Mil)
-22.63	FLEETSATCOM 8	u.h.f., e.h.f. (Mil)
-20.32	NATO 4B	u.h.f., X (Mil)
-17.82	NATO 4A	u.h.f., X (Mil)
-15.82	UHF 3	u.h.f. (Mil)
-1.01	SKYNET 4C	u.h.f., X (Mil)
52.38	SKYNET 4D	u.h.f., X (Mil)
71.44	UHF 2	u.h.f. (Mil)
72.03	UHF 5	u.h.f., e.h.f. (Mil)

Heading Rel to South	Satellite	Down-link bands
77.47	LUCH 1	u.h.f.?, Ku
99.19	EKRAN 20	u.h.f.,
120.23	GMS 4	u.h.f., L, S (Weather)
139.83	GMS 5	u.h.f., L, S (Weather)
155.73	LEASAT 5	u.h.f., X (Mil)
169.81	UHF 8	u.h.f., Ka

Bands Designation	Freq Range
u.h.f.	240-280MHz*
e.h.f.	30-300GHz
L	1-2GHz
S	2-4GHz
X	8 - 12GHz
Ku	12 - 18GHz
Ka	27 - 40GHz

\* Although the ITU definition for u.h.f. is 300 - 3000MHz use of the term in this context includes the frequencies discussed here.

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**DJ-X2000E** £334 B

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#### AR-8600 MKII

\*530kHz-2040MHz  
\*FM, AM, SSB, CW  
\*1000 memories  
\*Tuning steps programmable  
\*8.33kHz airband spacing \*RS232 PC interface fitted \*Power 10.8-16V DC \*Telescopic antenna \*Optional slot card sockets



£599 C

**AR-8200 MKIII** £369 B

All mode handheld scanner, 530kHz-3000MHz

### GRE Scanners

#### GRE PSR-282

\*66-88/118-137/137-174/  
380-512MHz \*Modes AM, FM  
\*Memories 200 (10x20)  
\*Search speed 50 steps/sec  
\*Scan speed 25Ch/sec  
\*4xOne-touch search banks  
\*8.33kHz steps in airband  
\*Audio 180mW into 8 Ohms int. spkr \*4xAA (not included) ext. power 9V DC



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#### PSR-255

£69.95 B

26-54/68-88/137-174/380-512MHz, 50 memories

#### PSR-295

£139.95 B

25-88/118-174/216-512/806-1300MHz

### Icom Scanners

#### ICOM IC-R5

\*150kHz-1310MHz  
\*AM, FM, WFM  
\*1250 Memories  
\*Name Tagging  
\*AM Ferrite antenna  
\*Civil & Military  
\*Emergency Services  
\*2xAA cells (extra)



£159 B

#### IC-R20

£349 B

150kHz-3304.999MHz, 1,250 memories

#### IC-R3

£339 B

0.495-2450.095MHz, 450 mems, TFT colour display

### Yupiteru Scanners

#### YUPITERU MVT-9000 MKII

\*530kHz - 2039MHz  
\*NFB, WFM, NAM, WAM, USB, LSB, CW  
\*1000 memories  
\*500 Pass channels  
\*25 tuning steps  
\*Voice-reversed scrambled decoder  
\*4xAA Ni-Cds  
\*12V DC/230V AC mains  
\*Telescopic Antenna



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#### MVT-7300

£239 B

531kHz - 1320MHz all modes, 1000 memories

#### MVT-7100

£199 B

Covers 530kHz to 1650MHz all modes, 1000 memories

#### MVT-3300

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\*100kHz-1300MHz  
\*NFM, WFM, AM, USB, LSB, CW  
\*1000 Memories  
\*100 Skip channels  
\*Smart search feature  
\*8 char. alphanumeric display  
\*Band scope  
\*PC programmable



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#### VR-5000

£489 B

100kHz-2599.99MHz all modes base scanner

#### VR-120D

£139 B

100kHz-1300MHz, 64 memories

### Uniden-Bearcat Scanners

#### UBC-3300XLT

\*25 - 1300MHz with gaps  
\*NFM, WFM, AM  
\*1000 Ch/10 Banks Memory system  
\*10 Priority channels  
\*Turbo Search 300chs per sec  
\*6V 600mAh Ni-Cd pack + AC charger \*LCD with back light  
\*BNC antenna socket  
\*Ni-MH Rechargeable battery (5hrs)



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#### UBC-780XLT

£279 C

25-956MHz & 1240-1300MHz, 500 mems, base scanner

#### UBC-280XLT

£159 B

25-88/108-512/806-956MHz, 200 memories

#### UBC-180XLT

£99 B

25-960MHz with gaps, 100 memories

#### UBC-120XLT

£99 B

66-512MHz with gaps, 100 memories

#### UBC-105XLT

£99 B

25-87/108-174/406-512/806-960MHz 8.33MHz steps

#### UBC-72XLT

£99 B

25-512MHz + Airband, 100 memories

#### UBC-80XLT

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## AOR Receivers

### AOR AR-5000A/AR-5000A+

The new AR-5000A now offers a frequency coverage of the entire radio spectrum that is practical to cover. The +3 version offers even more with synchronous AM (USB/LSB/DSB) AFC & Noise Blanker.



AR-5000A £1599 C AR-5000A+ £1799 C

AR-ONE £3195 C

10kHz-3300MHz, 1000 memories

AR-5600 MKII £599 C

100kHz-3000MHz, 1000 memories

AR-7030 £699 C

0-32MHz, 100 memories

## Icom Receivers

### ICOM IC-R75E

The IC-R75 communications receiver covers a frequency range that's wider than most other HF receivers - from 300kHz to 60MHz. Using the latest wide band technology it provides a highly stable platform over the entire receive frequency range.



£599 C

IC-PCR-1000IS £299 B

Computer controlled receiver, 100kHz-1300MHz

## JRC Receivers

### JRC NRD-545G

\*100kHz - 29.99MHz  
\*LSB USB  
\*CW RTTY  
\*AM FM  
\*1000 Memories \*Bandwidths 10Hz - 9.9kHz  
\*Multi-function display \*Tuning steps 1Hz to 100kHz \*32 programmable features  
\*Built-in PSU or 12V Ext.



£1395 C

NVA-319 £199.95 C

Ext. Speaker 8 Ohms

ST-3 £79.95 B

Communication Headphones

CGD-197 £89.95 B

TCXO High Stability Crystal

CHE-199W £299.95 B

VHF/UHF Converter adds FM

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### YAESU VR-5000

\*100kHz - 2599MHz  
\*FM, AM, SSB, CW  
\*Large digital display  
\*Real-time band scope  
\*DSP Noise & notch filters (Opt)  
\*Super HF performance  
\*Automatic Tape recorder option



£489 C

## Sony Receivers

### SONY ICF-SW-7600

\*150kHz-30MHz (LW/MW/SW)  
\*76-108MHz (FM)  
\*AM, SSB, CW (FM)  
\*100 memory presets  
\*Audio output 380mW  
\*Supply: 4 x AA  
\*Size 190 x 118.8 x 35.3mm  
\*Weight 608g



£119 B

## Mizuho

### Active Loop Antenna

### UZ-77 Ultra Loop

\*530kHz - 1600kHz  
\*DX & Local switch  
\*Front-panel tune control  
\*Size 115 x 35 x 110mm  
\*Weight 400g with batts  
\*Loop 200 x 210mm  
\*Loop weight 200g



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Workes great on scanners that cover the medium wave band. We received European stations during daylight. Rotate for best reception or to null out signals.

## Vectronics Active Antenna

### VECTRONICS AT-100

Active Antenna/Tuner  
\*300kHz - 30MHz  
\*Band position switch \*Tune adjust  
\*50 Ohm to Rx \*Whip provided \*Up to 10dB gain \*Connectors SO-239 \*Supply: 9V DC batt. ext \*Size 84 x 55 x 60mm \*Weight 255g approx



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## Power Stations

### FD-7021

Self-contained power station output 12V at up to 12 Amps plus 1A outputs for 3 / 6 / 9V. Built in lamp. Includes AC & DC charger.



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Power station with built-in 150W inverter.  
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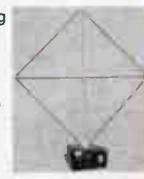


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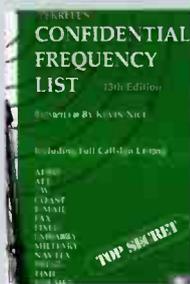


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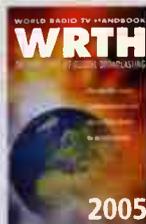
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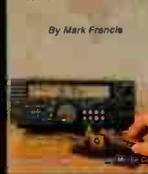
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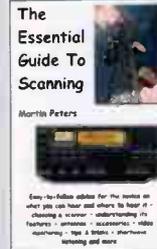
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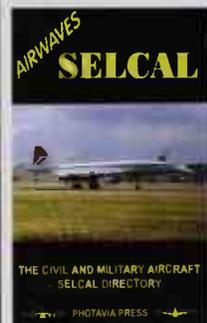
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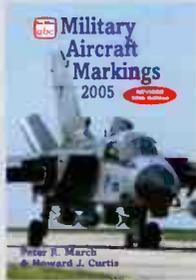
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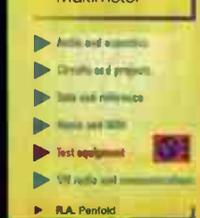
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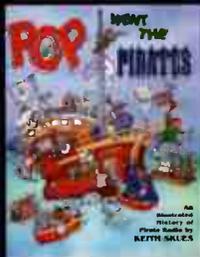
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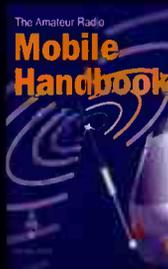
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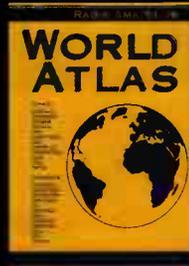
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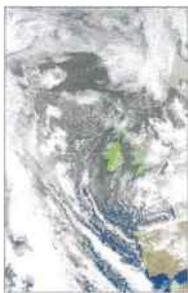
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# Weather Satellites - An In

● **Lawrence Harris** 55 Richville Road, Shirley, Southampton SO16 4GH  
● **E-mail** info.orbit@pwpublishing.ltd.uk **Website** www.astronomer.plus.com

**Over many years the number of operational weather satellites has seen a steady increase. This has been because older ones are not always switched off after replacement. Then in 2003 things started to develop quickly. This year sees more launches bringing new, exciting possibilities. Lawrence Harris begins by explaining weather satellite basics for newcomers. Indeed, anyone reading SWM or about this topic for the first time.**



**Fig. 1: NOAA-17 a.p.t. format 1142 6 March from Kevin Hughes.**

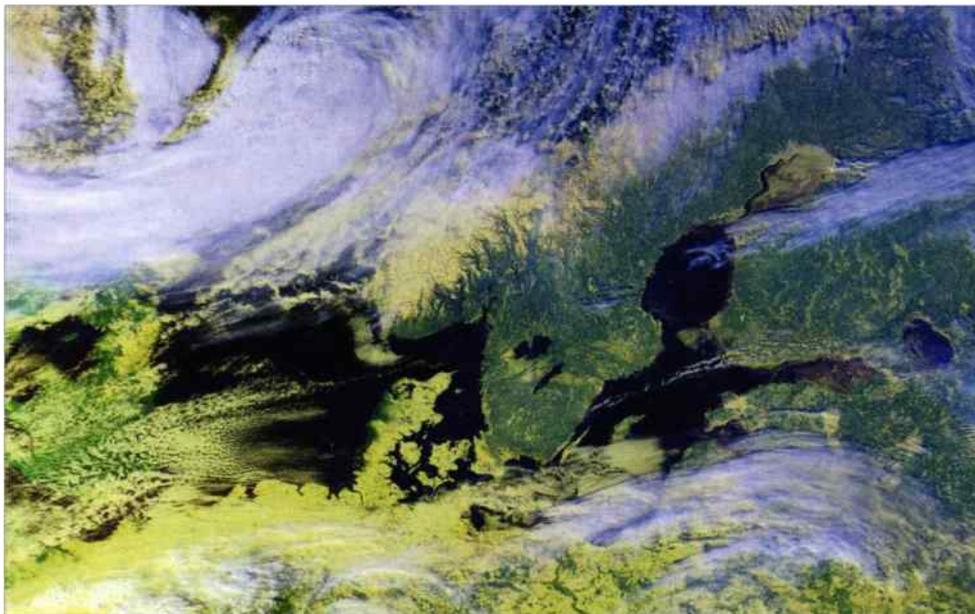
Probably everyone knows what satellites are: objects circling a larger body, for example our moon (a natural satellite) circling the earth. We have launched thousands of artificial satellites into earth orbit so we usually classify them into types: these include communications satellites, direct broadcast, amateur radio, scientific, weather, navigation... the list is long.

Some satellites are multi-purpose and some are dedicated to a main task. Weather satellites (abbreviated to WXSATs) carry equipment designed to take continuous images (scan lines) of the earth below, at high resolution, and transmit the image data back to earth.

Anyone having suitable equipment can receive this data - we call the process remote imaging. When the scan lines are combined to form an image, they show the clouds, land and sea below the satellite. The image data are transmitted on one or more of several allocated frequencies - see the lists later in this article.

What defines them as a WXSAT is that they transmit the data in a recognised WXSAT format - such as automatic picture transmission (a.p.t.) or high resolution picture transmission (h.r.p.t.), or one of the other formats. **Fig. 1** and **Fig. 2** show examples of these types of image.

The exact format and frequency depends on their category. WXSATs are divided into



**Fig. 2: NOAA-16 h.r.p.t. format 1228 3 March.**

two categories: geostationary and polar orbiting. **Fig. 1** and **Fig. 2** are from different polar orbiting WXSATs (with added artificial colour!). As well as the conventional direct-readout WXSATs (those transmitting data directly to users), some data are also available in other forms, such as relayed data between satellites and the ground stations.

There are also some satellites that can provide WXSAT-type data in a specific part of the spectrum - such as radar images. If you are a complete beginner, please read this feature to the end before considering your own potential interest in this field.

If you do decide to get started, be assured that there are thousands of other hobbyists around Britain and the rest of the world and many are happy to share their knowledge and experience with you. Details about the main British clubs are included later in this feature.

## Polar WXSATs - An Introduction

The original (first) type of WXSAT was the low, polar earth orbit WXSAT. Like their later counterparts in geostationary orbit, the polar satellites transmit data continuously. Ever since the early 1960s it has been possible to receive signals from these polar orbiting WXSATs.

Automatic Picture Transmission (a.p.t.) - see **Fig. 1** - is still used on most polar orbiting WXSATs in 2005, but after a 40-year life, it is finally changing this year - at least for the new satellites. It was first tested in 1963 on *TIROS-8*. In 1964 *NIMBUS-1* was launched, followed by *ESSA-2* in 1966 (ESSA was the Environmental Science Service Administration). The original vidicon cameras of the earlier satellites were replaced by new radiometers on *NOAA-2*, launched in 1972.

The next generation - ITOS - (Improved TIROS) satellites were in almost circular, sun-synchronous orbits, some 1450km high. Following *TIROS-10*, the first of the next series of TIROS satellites was called *TIROS-N*, launched in 1978 to an 850km high orbit. Data was collected along a swath width (the distance across the width of the view below the satellite) of about 2700km, so global coverage was then achieved twice each day.

*TIROS-E* was the first of the advanced TIROS satellites (*AT-M*) and, after launch in 1983, was renamed *NOAA-8*. *TIROS-F* became *NOAA-9*, following a successful launch in December 1984. *NOAA-9* was considered an experimental satellite and was the very first WXSAT to be received by me in 1985 when I connected my first antenna to my first WXSAT receiver. By coincidence it passed overhead as I connected up the new system!

These later weather satellites carried new equipment - the Advanced Very High Resolution Radiometer (AVHRR) instead of

# Introduction for Beginners

the VHRR used on previous NOAA craft. The equipment features on-board data processing. After scanning the earth below in five channels (instead of just three used in the VHRR), data are digitally processed with on-board and external calibration targets to provide reference temperatures. The NOAA satellites carry NiCad batteries (nickel and cadmium) to supplement the solar panels, providing power during spacecraft night.

Light from the scanner - whether received from earth, cold space, or a reference temperature within the satellite - is split into five (six in later satellites) beams. These beams fall on separate sensors, each of which is sensitive to a specific band - for example infra-red. Part of the mirror's spin provides a reference level when the telescope is looking into deep, cold space. The channels include visible light, reflected infra-red, and three thermal channels.

This multi-channel data stream is digitised by the on-board systems processor and the resulting processed data is transmitted on one of a number of frequencies in the 1700MHz band, depending on the satellite - see later table. The channels analysed by the AVHRR scanner have been carefully chosen to look at the earth through windows - gaps in the spectrum through which radiation penetrates the earth's atmosphere with minimal absorption.

The casual use of a scanner, fed by the simplest of antennas, should enable you to hear a large number of satellite signals amongst other sounds. Even a rubber duck antenna could bring in 20 to 30 satellites, and if you include a sweep of the 137MHz band, you should hear several WXSATS. If you are scanning spot frequencies, check that the frequencies 137.50 and 137.62MHz (see the table) are included in the programming.

What you can hear is the passage of satellites in near-polar orbits, going over your location - we call them polar orbiting WXSATS. The hardware required to receive the basic, low resolution images is relatively inexpensive but is more sophisticated than that required for routine - listen-only - reception. These passes last for approximately 12 - 15 minutes, depending on which satellite pass you hear.

You are receiving transmissions directly from the satellite - this is called direct read-out - so the professionals cannot get the pictures before you do! These WXSATS are in typically circular orbits, averaging some 850km above the earth. The orbits are not randomly selected; they are carefully planned so that each orbital plane maintains a fairly constant angle to the sun - they are sun-synchronous (see next paragraph).

Let us look more closely at a typical polar WXSAT - for example NOAA-17. (NOAA - National Oceanographic and Atmospheric

Administration). This WXSAT has a high orbital inclination (about 99°) and therefore passes close to the north and south poles on every orbit. Because the earth turns below the satellite during the 101 minutes of orbit, the next pass covers a slightly different swath across the earth.

Each successive swath overlaps the previous one, so down below, on the ground, anyone with suitable equipment would hear both of these satellite passes, lasting individually about 12 minutes each, displaced westwards - see Fig. 2 and Fig. 3. From a favourable location - for example somewhere high up with no surrounding physical obstructions - you should hear at least three successive passes on most days.

After the last (low elevation) pass to the west, there will then follow a period when the satellite does not pass within monitoring range - unless of course you are at one of the poles, or at a similar high latitude. But that is



Fig. 3: NOAA-16 h.r.p.t. 3 March 1407.

## Geostationary WXSATS - An Introduction

The closer to earth that a satellite orbits, the higher must be its orbital velocity, and therefore the shorter its orbital period. A satellite moving at high speed in the earth's

# Info <sup>in</sup> Orbit Special

not all. During a given 24-hour period, NOAA-17 - like the other NOAA WXSATS - makes one set of passes travelling southbound (called descending), followed twelve hours later by a further set of passes travelling northbound (called ascending).

The earth has rotated under the satellite during this time, although from the perspective of the observer it appears that it is the satellite that does the moving! An observer out in space would see the satellite simply continuing to orbit earth while keeping approximately the same aspect to the sun - a sun-synchronous orbit.

Picture, Fig. 2, shows the high resolution image received at 1228 from NOAA-16. This was a north-bound pass, followed one orbit later by the 1407 pass, several degrees further west. The equipment required to receive this high quality image will be discussed later. Before looking at the equipment required to receive and decode NOAA WXSATS, let us develop this introduction by stepping out to the Clarke belt.



Fig. 4: METEOT-8 channel 2 (visible-light) 8 March 1200 with artificial colouring. Image © EUMETSAT 2005.

upper atmosphere may encounter considerable friction (remember what happened to *MIR!*), so there is a natural lower altitude limit at which a satellite's orbit becomes unstable.

Satellites in low, but stable earth orbits (LEOs) have periods of about 90 minutes; the Moon, our main natural satellite at 404,000km, takes 27 days. In between there is an infinite number of orbits of varying periods. As pointed out by Arthur C. Clarke in his legendary paper on geostationary orbits, at a distance of 35,787km above earth, a satellite orbits once every 23 hours 56 minutes.

This is the same period as the earth's period of rotation, so satellites in this orbit appear - as seen by someone on earth - to remain stationary in the sky. This belt of

**Fig. 5: GOES-12 7**  
**March 1800. ©**  
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**Fig. 6: METEOSAT-5**  
**(vis) 8 March 1030.**  
**© EUMETSAT 2005.**

orbits is known as the Clarke belt. There are a number of satellites in the Clarke belt that are carrying imaging equipment, and some of these are WXSATs. In this belt, from any position around

the earth, our planet always presents the same face to the satellite, so every image will cover the same consistent area - see Fig. 4, Fig. 5 and Fig. 6 for examples.

Geostationary WXSATs have their own image formats and transmission frequencies. There are constellations of such satellites around the globe, operated by different countries. By international agreement, real-time imagery is exchanged between several, but not all, of the various satellite operators. Details about receiving WXSAT images from geostationary satellites follow later.

These three examples (see above) show the view from three of the various WXSATs located at their respective spots in the Clarke belt. Details of their exact locations, together with those of the other geostationary WXSATs, are given near the end of this feature.

The scanner that you might use to tune into the polar WXSATs is unlikely to casually pick up transmissions from the geostationary satellites. These require a different antenna for the different band, and some signal amplification. The hardware is not expensive - but please read the whole of this feature before considering involvement.

### Polar WXSATs

Most, but not all polar orbiters provide low resolution images. There is a significant point here. The low resolution (a.p.t. - automatic picture transmission) images that have been transmitted in the 137MHz v.h.f. band since

the 1960s still have exactly the same format. Equipment built to receive and display a.p.t. images in 1963 could, in theory, still be used now, yet the hardware/software that is available for anyone to buy now, is more than a generation ahead. It is not difficult to understand, therefore, why the professionals have been wanting to upgrade the systems to make better use of several decades of advancement in electronics.

NOAA orbits - see Fig. 7 - are nominally sun-synchronous. Each satellite passes over the same location, at about the same time each day. In practice, passes are between 10 and 20 minutes earlier than the previous day, but the maximum elevation varies, and the sequence essentially remains the same. NOAA-17 passes south-bound during late morning, and north-bound about 12 hours later. NOAA-16 passes north-bound around 1300 and south-bound about 12 hours later. Other polar WXSATs (see Table 1) follow similar pass trends.

NOAA WXSATs transmit continuous a.p.t. image data in the form of a single line every half-second. This line contains several components: the edge carries a short white-line minute marker, preceded and followed by black within the column. This section is followed by the low resolution version of the image from the visible-light channel, occupying about half the (half-second) total line length.

The middle of the image line contains a calibration scale for enabling measurements of temperature and channel identification, followed by a further minute marker section, and then the content of an infra-red channel, and the final calibration section. Consequently, each half-second line of NOAA data carries a large amount of useful information with two spectral image components - see the screen on Fig. 9.

When you hear the audio sound of NOAA a.p.t. from your scanner, you cannot fail to recognise it - a characteristic tick-tock. This cycle represents one line of the continuous picture being transmitted. The repetitive sound lasts half-a-second, so we hear two cycles per second. This sound is the signal that is carried by the 137MHz carrier signal. The receiver tunes into the r.f. carrier (on, for example, 137.50MHz) and extracts (we say de-modulates) the main a.p.t. signal - and this is what we hear as the tick-tock.

If you have suitable hardware and software to decode this (demodulated) sound, you would find that one cycle represents one complete

picture line. The two sound components become two image components (after successful signal processing on your computer) - they are two different spectral channels. Because of this, a standard scanner cannot normally decode the signal to produce a full-quality image; we should use a WXSAT specific scanner fed by a suitable antenna.

NOAA operations staff can select any two channels for subsequent transmission as the low resolution channels, known as video A and video B. This low resolution data is actually smoothed high resolution data (h.r.p.t.) with just one in three of the output data lines used.

### Receiving equipment for a.p.t.

Unlike any other form of utility modulation, an a.p.t. signal requires a minimum of about 30kHz of bandwidth to accommodate the spectrum spread. Add to that about 15kHz of Doppler shift due to the relative movement of the satellite towards and then away from the observer, and we need up to 45 or 50kHz bandwidth capability. The signal encoding method is also unique for WXSATs: an amplitude modulated signal that frequency modulates the main carrier. This is why purpose built receivers are essential if good quality images are to be reconstructed from the original data received from the satellite.

**Antenna** For a.p.t. reception, a crossed-dipole, phased for right-circular polarisation, is required for NOAA WXSATs - see Fig. 8. A simple dipole can be used for testing, but this may produce shorter periods of good telemetry. The quadrifilar helix antenna has gained popularity. The antenna can be mounted on a roof-top, though you should first test near ground level to ensure that it is

**Table 1: Polar WXSATs - v.h.f. band frequencies.**

Satellite	Format	MHz
NOAA-12	a.p.t.	137.500
NOAA-15	a.p.t.	137.500
NOAA-17	a.p.t.	137.620
*NOAA-M (18)	a.p.t.	137.9125
**SICH-1M (Oceanographic resources satellite).	a.p.t.	137.40

\* Due to be launched  
 \*\* Occasional

**Table 2: Polar WXSATs - s.h.f. band frequencies.**

Satellite	Format	MHz
NOAA-12	h.r.p.t.	1698.0
NOAA-15	h.r.p.t.	1702.5
NOAA-16	h.r.p.t.	1698.0
NOAA-17	h.r.p.t.	1707.0
*NOAA-M (18)	h.r.p.t.	
FengYun-1C	(no data)	1700.4
FengYun-1D	c.h.r.p.t.	1700.4

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working properly. Cabling should normally be low-loss 50Ω, terminated in a matching socket - usually F-type - for the receiver.

**Receiver** Utility radio scanners are not designed for extracting the picture modulation from WXSAT signals, despite the seemingly clear tick-tock sound that you might hear in short bursts. As described, WXSATs require an intermediate frequency bandwidth up to 50kHz, (including Doppler changes). Utility scanners usually have a bandwidth of about 15kHz. Decoding pictures therefore requires a properly designed polar WXSAT receiver. Facilities on receivers for the polar satellites may vary with supplier; they may include sequential scanning for an a.p.t. signal, and a computer interface to allow easy programming for data collection in your absence. For the best results, I would recommend purchasing a receiver from a known group or supplier.

**Decoding** The output of the receiver contains the demodulated signal, and is ready for conversion to an image. This can be done in either of two ways, direct software decoding or soundcard analysis. A complete decoding system will usually include software and hardware to facilitate connection from the receiver to a computer. The software converts the incoming (audio) signal into a picture in real-time. By this means one can hear exactly how the audio signal translates to an image.

An alternative and very popular method of decoding is to record the audio signal as a 'wav' file using software such as *wxsat*, *WXtalmg* [www.wxtoimg.com](http://www.wxtoimg.com) or other commercial software. This can be decoded either in real-time using the same program, or later using *SatSignal* [www.satsignal.net](http://www.satsignal.net). Whatever method is chosen, the final result depends significantly on the quality of the hardware used to obtain the signal.

A properly set-up ground station - see **Fig. 9** - should receive several a.p.t. images from each of the operational polar orbiters, every day. Images from *NOAA-12*, *NOAA-15* and *NOAA-17* should be received on both ascending (south-to-north) and descending passes. They provide side-by-side images; during sunlight passes, visible-light and thermal infra-red images are transmitted. The visible channel that would otherwise be blank is exchanged during the night for an adjacent infra-red band responsive to near water vapour.

## Other APT - Non-American Satellites

The Russians had in orbit a very large number of satellites in the *COSMOS* series, and those that monitored these satellites identified occasional a.p.t., apparently on an experimental basis. I became interested in these satellites during the 1980s. They frequently used 137.30, 137.40 and 137.85MHz for transmitting a.p.t. images.

Consequently I ensured that my scanner included these frequencies.

One morning, shortly before noon I picked up a transmission that sounded like a variation on a.p.t. I fed it through my framestore - there was no such facility to decode signals on my home computer in 1985 - and to my amazement it produced a picture of Italy at an unusually higher resolution than the normal NOAA WXSATs.

A call to a friend who was more familiar with Russian satellite telemetry revealed that this was almost certainly *METEOR 1-30*. The signal switched off before the next pass. I later learned that this was one of the early Russian satellites that made limited, but regular transmissions, but had lost its synchronisation bars, and its frequency had drifted. Those were fascinating times for monitoring Russian satellites!

I frequently monitored *METEOR 1-30* and recorded some extremely impressive images on audio tape, I'm pleased to say I still have them! The *METEOR 2* series followed, and ran to *METEOR 2-21*. The last operational *METEOR* was *3-5* (*3-6* had failed earlier). The image content of *METEOR* a.p.t. was different from the NOAAs, but fully compatible - see **Fig. 10**. Each a.p.t. line also lasted for a half-second for compatibility.

Only one spectral image was present, so *METEOR* ground resolution was higher than that of the NOAAs. The satellite's scanner band covered 0.5 to 0.8µm (microns) - a little different from the main visible-light band from the NOAA scanner. Some remarkable satellite sleuthing was done by the Kettering Group, a team of British experts on Russian satellites formed during earlier decades. They discovered many important facts about Russian satellites, including the location of an otherwise secret Russian launch site!

## SICH & OKEAN

A few other satellites operated by Russia have previously provided short-duration transmissions. *SICH-1*, *OKEAN-4* and *OKEAN-0* transmitted short bursts of a.p.t. on 137.40MHz. These were oceanographic resource satellites and typical transmissions contained a visible-light image of a region recorded earlier in orbit, or transmitted live; a radar and/or microwave scanner was sometimes included, formatted within the transmitted image.

None of these are now believed to be active, but the first of the new, modified series - *SICH-1M* - was

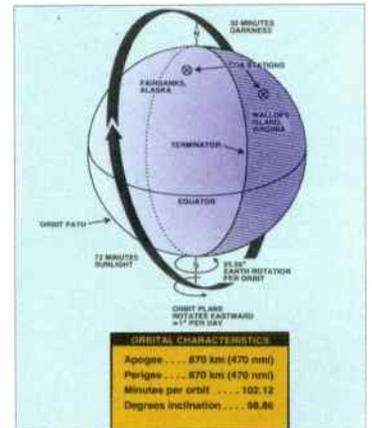
launched in December. Regrettably this entered the wrong orbit, apparently caused by the early shut down of one of the rocket stages. From its highly elliptical orbit, *SICH-1M* has so far made a few, brief transmissions on 137.40MHz.

## NOAA High Resolution Images

Systems to receive h.r.p.t. from the NOAA WXSATs were once just the province of the professionals. Some American hobbyists developed their own h.r.p.t. systems by constructing the necessary hardware to decode the complex telemetry. Timestep Weather Satellite Systems became involved with bringing some of this research to the British amateur WXSAT market with a new range of receivers and decoders. For the first time it became possible to operate a tracking dish and decoder under the control of a personal computer, and receive and decode h.r.p.t. of the highest quality within a total costing of approximately £2,500 or so - an order of magnitude cheaper than previously possible.

A typical h.r.p.t. receiving system includes a small dish fixed to a fully steerable mount - see **Fig. 11**. This is controlled by a domestic computer running suitable software and updated with current Kepler elements. The dish controller is connected to an alt-azimuth motor that drives the mount.

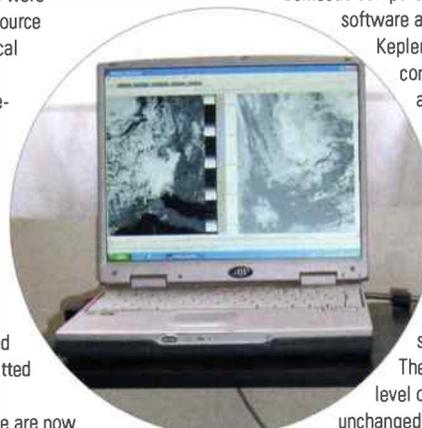
An h.r.p.t. receiver processes the data stream from NOAA and/or FENGYUN (the Chinese WXSAT). Software processes the digital data and can synthesise colour images. The result is a professional level of imagery virtually unchanged from the 1960s and



**Fig. 7: Typical NOAA WXSAT orbit.**



**Fig. 8: 137MHz crossed-dipole antenna (turnstile).**



**Fig. 9: Portable computer used to receive and decode a.p.t.**



**Fig. 10: METEOR 3-5 picture showing single spectral image.**

capable of scientific analysis and the highest quality imagery available from these satellites. The cost of this data is a limiting factor, but note that there are more satellites available for monitoring. *NOAA-16* and the *FENGYUNs* do not transmit a.p.t.

### Geostationary WXSAT Reception

Earlier I referred to **Fig. 4** showing an image received from *METEOSAT-8* - previously known as *METEOSAT Second Generation-1 (MSG-1)*. At the beginning of this feature I mentioned that everything changed in 2003; this referred to the change to *MSG-1* user transmission's planning when an amplifier unexpectedly failed. *METEOSAT-8* is the first WXSAT in the *METEOSAT* constellation to carry the new generation of hardware. *EUMETSAT* also uses a different transmission system for users of this data.

For decades the *METEOSAT* constellation has provided professionals and



**Fig. 11: Mike Long's h.r.p.t. tracking dish.**

amateurs with a steady stream of *WEFAX* and *Primary Data*. As with the polar orbiters, *METEOSAT* has delivered high resolution imagery (*Primary Data*) - and low resolution (*WEFAX*). This finally ends around December 2005. For the last two years *METEOSAT-8* has provided the new format imagery - *HRIT* (*High Rate Information Transmission*) and *LRIT* (*Low Rate*), but with a major difference!

### EUMETCast - Reception For METEOSAT Data

Following the amplifier failure and the decision to not activate *MSG-1*'s planned user downlink, *EUMETSAT* had to look at an alternative means of relaying live image data to the user population. Quite logically, they chose to expand their *EUMETCast* service, a transmission system that was already providing a limited stream of data to a group of registered users. This decision was highly significant and instantly meant that every amateur (and also professional) would be able to receive a high quality data stream (including the high resolution images) at a fraction of the originally anticipated cost, and without the requirement to seek planning permission for a giant dish - assuming that any domestic user would even wish to contemplate this and its associated dangers! It had always been assumed by amateurs that *LRIT* would be the only practical option.

Access to the expanded *EUMETCast* system requires users to successfully complete a number of preliminary stages. Firstly, potential users need to confirm the approximate total cost of a complete system, including both their chosen hardware and

software - the latter including *EUMETSAT* licence fees and decoding software. The next stage is completing an application form for permission to receive *EUMETCast* data. If you have access to the Internet this becomes relatively easy; the forms can be downloaded, completed and E-mailed.

Subsequently, a modest fee is payable to *EUMETSAT* for the licence and associated decryption software. A suitable system can then be ordered. Management software is required to compile the data segments; this can be obtained from one of the commercial sources, or you could try one of the few freeware programs - [www.eumetsat.int](http://www.eumetsat.int) Select *MSG* and then select *MSG trial*. There is a detailed summary of the procedures summarised here.

Reception requires a fixed dish of about 1m or less diameter - see **Fig. 12**, a low noise block (*LNB*) and fittings to receive *HotBird-6*, the direct broadcast satellite that relays the *METEOSAT-8* data stream. You also require a suitable *PCI* card to receive the *DVB* data for your computer. Reception thus far does not require any *METEOSAT* software. You can receive any unencrypted, conventional television channels from *HotBird-6* in the usual way. Once set up, you have to wait for the *EUMETSAT* software and passwords to be delivered.

With *EUMETSAT*'s information, together with their document *td15.pdf* (available from their website), it is a matter of carefully setting up the required parameters to receive the *METEOSAT* data stream. There is a considerable amount of help available from *EUMETSAT*, users' websites and the user group forums so you are absolutely assured of help in getting going.

The reward? The most amazingly high quality image stream available anywhere. In addition to the European images, such as those shown earlier, there is a routine flow of foreign satellite imagery from both *GOES*

**Table 3: Geostationary WXSATs.**

Position	Satellite	Format	MHz
140°E	<i>GOES-9</i> (replacing <i>GMS-5</i> ) - over Japan/Australia	<i>WEFAX</i> (relayed from <i>GMS-5</i> )	1691.0
105°E	<i>FENGYUN-2B/2C</i> (China)	<i>SVISSR</i> and <i>LRIT</i>	
74°E7	<i>INSAT-3A</i> (over India)	<i>VHRR</i> (non-standard multi-purpose WXSAT)	2599
63°E	<i>METEOSAT-5</i> (over India)	<i>HRI</i> , some <i>WEFAX</i>	1691.0
10°E	<i>METEOSAT-6</i> (over Europe)	<i>HRI</i> (used for rapid scans)	1691
0°W	<i>METEOSAT-7</i> ( <i>EUMETSAT</i> )	<i>WEFAX</i>	1691.0, 1694.5
	<i>HRI</i>	1694.5	
3°W	<i>METEOSAT-8</i> (via <i>HotBird</i> )	<i>HRIT</i> and <i>LRIT</i>	
75°W	<i>GOES-12</i> (East position) - E America	<i>LRIT</i>	1691.0
135°W	<i>GOES-10</i> (West position) - W America	<i>WEFAX</i>	1691.0
TBA	<i>MTSAT-1R</i>	<i>HiRID</i> and <i>WEFAX/LRIT</i> shared	
		Being manoeuvred and commissioned by Japan.	

*GOES* (*Geostationary Operational Environmental Satellites*). The scanner on the Japanese *GMS-5* (*Geostationary Meteorological Satellite*) failed so imaging is replaced by *GOES-9*; data is still relayed from *GMS-5*. *GOMS* (*Geostationary Operational Meteorological Satellite*) was operated by *CIS* (formerly *Russia*); the satellite failed and will eventually be replaced. *FENG-YUN 2C* (translates as 'wind and cloud') is China's geostationary WXSAT. India operates *INSAT*, a communications satellite carrying an imaging scanner. It is not a WXSAT, but does transmit WXSAT-type images in three bands though not using conventional frequencies.



**Fig. 12: Typical METEOSAT-8 (HotBird-6) receiving system.**

will be launched probably later this year - see Fig. 14.

Some of its data is expected to be included in the EUMETCast data stream, but some amateurs will surely try to receive live data at first, even if not immediately decode it? As far as the next generation of polar WXSATs is concerned, we are now at the stage where amateur hobbyists were in the early 1960s. Surely that is what it is all about?

### Hobbyist Groups & Equipment Suppliers

There are several potential sources of WXSAT equipment and software. A glance through the pages of *SWM* may suggest several, although not all suppliers advertise every month. I would suggest joining a club and taking early advantage of any special deals. The main national/international groups are the Group for Earth Observation (GEO) and the Remote Imaging Group (RIG), both based in Britain. In addition, Timestep has been producing WXSAT hardware for about 20 years.

WXSATs, and also *METEOSAT-5* and *GOES-9* (replacing *GMS-5*). This is the data stream illustrated in Fig. 5 and Fig. 6. Other data, such as ice coverage around the poles is included if you wish to investigate.

Help forums for EUMETCast: visit [www.yahoo.com](http://www.yahoo.com) and subscribe (free of charge) to the *MSG-1* forum. The *SatSignal* forum helps with David Taylor's *METEOSAT-8* software suite.

### Future Of WXSATs

I personally look forward to the future with some excitement. The next generation of geostationary WXSATs is here and more are scheduled for launch. New systems will be needed to receive their data in the very long term, but I believe that EUMETCast is likely to be retained for many years. Its imagery is perfect for my hobbyist needs and its popularity can only increase.

The NOAA WXSATs are expected to continue to provide a.p.t. for some years yet, and *NOAA-N* is expected to be launched after 11 May, transmitting on the new a.p.t. frequencies (see Fig. 13 showing a NOAA launch). The European METOP polar WXSAT



**Fig. 13: Launch of NOAA-15.**

### Group For Earth Observation (GEO)

GEO [www.geo-web.org.uk](http://www.geo-web.org.uk) - was formed "because of their perceived need to enable amateur reception of the new generation of weather and earth imaging satellites which are already in orbit or planned for launch in the near future. The people leading GEO have experience in amateur radio, electronics, meteorology, oceanography, satellites, computing and publishing. They are quoted as saying they just wish to share their skills freely with other amateurs". Nigel Evans is the contact for membership enquiries: [members@geo-web.org.uk](mailto:members@geo-web.org.uk)

### Remote Imaging Group (RIG)

"An international group of enthusiasts with membership open to all. The group caters for everyone interested in imaging from satellites and has members in 45 countries. The group is keen to assist new members and provide an ongoing service to existing members, which includes both professional and amateur interests". Membership secretary is **John Din**, E-mail: [membership@rig.org.uk](mailto:membership@rig.org.uk)  
**Timestep UK, PO Box 2001, Dartmouth, Devon TQ6 9QN, Tel: (01803) 833366.** Currently the main commercial supplier in Britain offering a wide range of hardware and software for the WXSAT hobbyist, E-mail: [information@time-step.com](mailto:information@time-step.com)

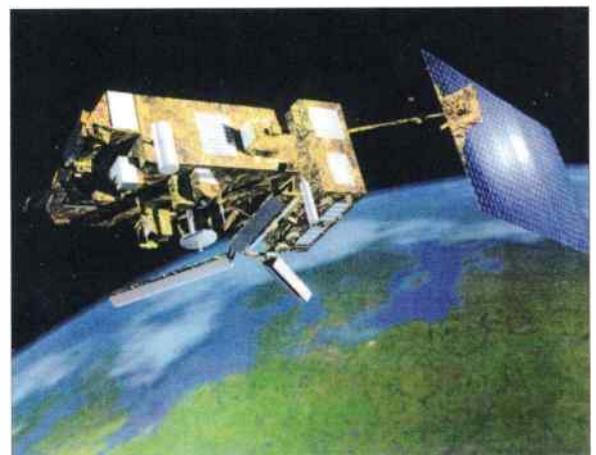
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## System Cost Guidelines

The cost of a system obviously depends on your choice of hardware. A complete **METEOSAT WEFAX** receiving system, excluding computer, once cost a few hundred pounds, but these are now virtually redundant. New **METEOSAT-8/HotBird-6** systems are currently being sold for approximately £200, plus about £100 for software and Euros100 to EUMETSAT. Watch my monthly column 'Info In Orbit' for details on new WXSAT systems.

Basic receiving equipment for the polar orbiters can cost about £300, including about £35 for a suitable dipole and perhaps £200 - £250 for a WXSAT receiver. Discounts can sometimes be found, particularly by obtaining group membership. These prices are guidelines, special offers and kit options may reduce the cost.

I would advise caution when considering kit construction. Proven systems can be bought in kit form from reputable organisations, such as the UK groups. I am shortly reviewing a new receiver in a future edition of *SWM*. Do be aware that some electronics experience and test equipment is essential for success with kit construction. Other kit suppliers may not be so accessible, or have such a genuine interest in your success - do make careful enquiries before purchase.



**Fig. 14: First European polar WXSAT - METOP.**

### Credits

My thanks to NOAA, NASA and EUMETSAT for the use of their images.

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# Info<sup>in</sup> Orbit

## The Column

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**T**his edition includes the first Special to be published in spring instead of the original autumn slot. One of the reasons for this was my wish to encourage beginners to see the late spring and summertime satellite images while also having the opportunity to set up systems in the warmer weather. It has been some time since I provided an overview of the weather satellite (WXSAT) scene so this edition attends to that need. Also included - when **Sir Patrick Moore** asked me about weather satellites!

### Future WXSATs

We have been watching the progress of plans for the launch of the next (polar orbiting) NOAA WXSAT - NOAA-N. Launch was postponed in February and the current launch date is no earlier than 11 May. For the first time, low resolution images (automatic picture telemetry) are to be transmitted on 137.9125MHz, the other reserved frequency being 137.10MHz.

The new frequencies form part of the Initial Joint Polar-Orbiting Operational Satellite System, (IJPS), a joint venture between NOAA (USA) and EUMETSAT (Europe) to establish a cooperative effort in weather monitoring by polar WXSATs. I have included a short update on NOAA-N and its part in the IJPS.

### Unexpected Interference

During February, reports were posted about unusual interference received during reception of NOAA-15's a.p.t. In the past, we have been able to trace the culprits by matching up NOAA-15's pass times with known, older satellites such as NOAA-9 and TIROS-N. This time was different because neither of these WXSATs was in the right place.

Some sleuthing by monitors using the Kepler elements of even older NOAA satellites showed that NOAA-6 was a possible cause. I checked a pass using my Icom R8500 scanner and Yagi and confirmed that a strong though varying signal was being transmitted near 137.50MHz, coinciding with some NOAA-15 passes.

I monitored NOAA-6 during a high elevation pass in the absence of NOAA-15, and could identify the Doppler changes associated with NOAA-6. Douglas Deans noted "The carrier bursts were about two seconds, sometimes in groups separated by a few seconds, sometimes just one, and sometimes good gaps with nothing". This could suggest that NOAA-6 is tumbling.

### SICH-1M Activity

The Ukraine resources satellite SICH-1M was launched in December, but failed to enter the correct orbit, instead entering a highly elliptical orbit having a very low perigee. This results in the satellite having a finite lifetime of only a few months before it decays in the upper atmosphere. There was some implication in the Russian media that the satellite had the means to have its orbit raised - presumably using thrusters that are not known to have been included on the platform. However, there is no evidence from measurements of its orbit since launch that any such change has occurred.

During late February and early March all seemed quiet until Nigel Heasman reported recording a transmission. From his location, Nigel can see the distant hills of Turkey about 80km. At an altitude of only 285km, SICH-1M was monitored by Nigel on both 5 and 6 March. He very kindly sent me a copy of the audio file, and Douglas Deans processed it and

forwarded Fig. 1. The transmission was definitely SICH-1M and remarkably clear, probably resulting from Nigel's closer location.

On 7 March, Douglas Deans and David Taylor both recorded overnight transmissions from SICH-1M, possibly the first to be identified, apart from the ground station.

### NOAA-N - First Of The IJPS

The launch of NOAA-N inaugurates a new era of international cooperation. Back in November 1998, the Administrator of NOAA and the Director-General of the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) signed an agreement creating the Initial Joint Polar-Orbiting Operational Satellite (IJPS) System. The primary mission of the IJPS is to collect and exchange polar satellite environmental data between NOAA and EUMETSAT and to disseminate this data to users world-wide, to support continued and improved operational meteorological and environmental forecasting and global monitoring.

Figure 2 shows a table collating the characteristics of NOAA-N and METOP-1 - the first two satellites of the IJPS constellation. Each WXSAT fulfils two requirements: they are designed to provide their respective organisations with specified data, and each simultaneously provides global coverage at specific times of the day. The METOP satellites will provide morning passes with a descending node of 0930 (or an equivalent local morning time around the world).

The nominal NOAA orbit is planned to be Sun-synchronous and precess (rotate) eastward about the Earth's polar axis by about 0.986° per day - the same rate and direction as the Earth's average daily rotation about the Sun. This precession keeps the satellite in a constant position with reference to the Sun for constant illumination throughout the year. NOAA-N will be launched at 1022 (with a 10 minute window) so that it will cross the Equator at about 1400 northbound and 0200 southbound local solar time.

NOAA-N is totally compatible with previous NOAA WXSATs and, apart from transmitting a.p.t. on the new frequency, will provide identically formatted data for users so that no other equipment modifications will be required for reception.

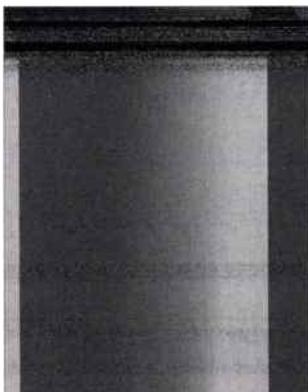


Fig. 1: SICH-1M from Douglas Deans.

Cooperation 2004 in monitoring global environmental weather

IJPS Spacecraft Characteristics

Spacecraft	NOAA-N.1.1	METOP-1.2
Dimensions (deployed configuration without solar array)	Height 185 m (4 1/2 ft) Diameter 74 m (2 1/2 ft) Solar array area 180 0 m <sup>2</sup> (16 0 m <sup>2</sup> )	Height 7.6 m (25 0 ft) Length 9.8 m (32 2 ft) Width 3.7 m (12 1 ft) Solar array length 11.3 m (37 ft)
Mass (at launch)	3620 kg (7977 lb)	3622.6 kg (8000 lb)
Star array Output Power (End Of Life)	875 W	3800 W
Design Lifetime	5-7 years	5 years
Orbit	Nominal Altitude 670 km Inclination 92.825 degrees Local Solar Time 13:40 (ascending node)	Nominal Altitude 840 km Local Solar Time 09:30 (ascending node) 15 days repeat cycle
Instrument Mass	802.6 kg (1760 lb)	840 kg (1852.2 lb)
Instrument Power	480 W	980 W
Ascending Local Solar Time at Equatorial Crossing	14:00	09:30
Apogee Altitude	870 km	804.6 km

Fig. 2: Initial Joint Polar Orbiting Satellite System (IJPS) characteristics.



Fig. 3: NOAA-N spacecraft under test (courtesy NOAA).



**Fig. 4: NOAA-N launch vehicle (courtesy NOAA).**

### NOAA-N Frequencies

a.p.t. primary: 137.9125MHz, secondary 137.10MHz.  
h.r.p.t.: 1698 or 1707MHz.  
beacon: 137.35 or 137.77MHz.

### EUMETSAT Prepares For METOP

During David Taylor's February visit to EUMETSAT's headquarters, he managed to take a distant picture of their new METOP tracking dish - see Fig. 5 - designed to receive the 1.7GHz AHRPT (advanced high resolution picture telemetry) data stream. Behind the vertically parked dish, David noted the turnstile antenna (visible behind the larger white dish on the left) designed for 137MHz LRPT (low resolution picture telemetry) reception.

### News From America

The latest Geostationary Operational Environmental Satellite (GOES) *GOES-N* developed by NASA for the National Oceanic and Atmospheric Administration (NOAA), arrived in mid-March at Kennedy Space Centre's Shuttle Landing Facility. The new satellite is scheduled to launch on 4 May by a Boeing expendable launch vehicle Delta IV. Once in orbit *GOES-N* will be designated *GOES-13* and will complete checkout and be placed in on-orbit storage as a replacement for an older GOES satellite.

Final testing of the imaging, instrumentation, communications and power systems will take approximately two months to complete. The spacecraft will be fuelled with propellant for the attitude control system, secured in the nose fairing and prepared for transport to the launch pad. *GOES-N* is the first spacecraft to be launched in the new *GOES-N/O/P* series of geostationary environmental weather satellites. GOES satellites provide continuous observations of 60% of the Earth over the United States,



**Fig. 5: EUMETSAT's METOP dish and turnstile antennas - courtesy David Taylor.**



**Fig. 6: NOAA-17 1209 24 February from Alan Crookes.**

aiding weather monitoring and forecasting, as well as a continuous stream of environmental information and severe weather warnings.

On board *GOES-N* will be an advanced attitude control system using star trackers to provide enhanced instrument-pointing ability. These enhancements improve image navigation to identify severe storms and other events. NASA and NOAA have set a higher standard of accuracy for the *GOES-N* series, including data pixel location to approximately 2km from geosynchronous orbit 35,000km above the Earth's surface. Eventually these images may be included in the EUMETCast Foreign Satellite Transmissions from EUMETCast (see later).

### Contributors' Images

**Alan Crookes G8UCN** lives at the foot of the Pennines, not far from Sheffield, and uses a RIG RX2 satellite receiver for monitoring the NOAAs. His home-brew crossed Yagi comprises a standard f.m. broadcast Yagi cut for

137MHz, correctly phased for the NOAAs, and pointing 'at the heavens'. He tells me that he has been receiving polar images for some years.

Alan kindly forwarded a couple of NOAA-17 images taken during a heavy snowfall in February. One picture - see Fig. 6 - shows a rather longer overall pass than those that I receive in Southampton, despite my antenna being mounted on the roof from where it has an apparently clear view to the north. I find that Iceland forms the northern limit of my reception, yet Alan's image, from only a nominal distance further north, shows much of Greenland.

### Trails Monitored By WXSAT

**Dave Ball** was one of a number of WXSAT monitors that noticed the various trails off the western coast of Spain around 12 February, see Fig. 7. Because of their width they are believed to be trails from ships - in contrast with the rather narrower condensation trails sometimes caused by high-flying aircraft.

Dave kindly sent me a picture of his well-equipped receiving station - see Fig. 8. Dave uses the RIG RX2 receiver, seen second from the left on the shelf. Dave's station is neatly laid out and shows how well electronic equipment can be blended into the domestic environment. Perhaps I should try some rearranging of my own station - also known as our former dining room!

The cold early March winds produced snow for Kevin Hughes - see Fig. 9 - at his Tamworth home.

**Magnus McInnes** of Cockenzie, East Lothian reads *SWM* fairly comprehensively, with his main interests being the air and marine broadcast bands; however, he is also interested in astronomy and so is aware of the enormous help provided by the WXSATs. Magnus told me of his problems with one local resident who objected to his having a very simple roof antenna installed.

From Magnus' description, I would suggest that he contact either (or both) a neighbourhood warden or the local Council. The wardens are invariably very helpful and can intervene in such minor matters and I am sure would be able to easily resolve this query. It is true that a few residents who do not understand basic reception can make many



**Fig. 7: Ships' trails off coastal Spain - from Dave Ball.**



**Fig. 8: Dave Ball's receiving station.**



**Fig. 9: NOAA-17 6 March 1142 from Kevin Hughes.**

false assumptions about what is going on. I have mostly been blessed with reasonable neighbours to whom I have asked to let me know if they have any queries about what any of my various antennas and dishes are doing.

### A Weekend With Sir Patrick

Back in 1963, I wrote to television astronomer **Patrick Moore** asking for advice about becoming a professional astronomer. He replied with some valuable advice - and I duly became a professional astronomer! I kept in touch with him during the decades that followed, and met him on several occasions. I was invited to the *Sky at Night* Star Party in early March, and set off with my camera and overnight bag! Much of the talk was about the weather - would it cooperate?

Patrick asked me about my current writing so I explained about SWM and WXSAT monitoring. Amongst the other guests was **Dr. Alan Chapman** - see Fig. 10 - a frequent television speaker on astronomical history. There was great interest in downloading weather pictures from the Internet and I described how many people were now able to monitor high resolution images from *METEOSAT-8*.

Throughout the night, those with Internet access reported on the infra-red WEFAX images from *METEOST-7*, whilst I wondered whether I should have anticipated a need to feed my *METEOSAT-8* images through to a site for the use of the Star Party! My picture of Dr Alan and Sir Patrick was taken in his study at about 0100 during one of the many periods of cloud cover!

### News From The WXSAT Groups

GEO is again holding its annual symposium at the National Space Centre in Leicester. The meeting starts at 1000 on Saturday 30 April. The cost of attending is £12, including access to the Centre. Listed presentations include Gordon Bridge of EUMETSAT discussing 'Multi-spectral Imaging from *METEOSAT-8*', David Taylor (*SatSignal* software) discussing 'Extended EUMETSAT ATOVS Retransmission Service

## Group For Earth Observation (GEO) - The Shop

Here is a selection of products available to GEO members:

### *METEOSAT-8* Reception:

TechniSat SkyStar 2 PCI card - £50. This is a DVB (direct video broadcast) satellite TV and data receiver card as recommended by EUMETSAT. If you prefer to avoid installing cards, you can opt for a USB connected receiver costing about £110.

Telesat 0.80m dish and Universal 0.6dB LNB. This aluminium dish and LNB (down-converter) comes with an azimuth/elevation mount to fit on a vertical pole. Guideline price £50.

TechniSat SatFinder alignment meter. These are very useful to help with setting up and aligning the dish for maximum signal. Cost about £22. Remote Imaging Group (RIG) - the Shop

Here is a selection of the products offered to members of RIG.

### Rig Products

RIGSAT RX2 kit: This is a high performance, microcontroller driven 5 channel receiver kit. It includes all PCB mounted parts, display, many associated components, coil adjustment tool; power connector; full instructions. £55.00 If you are familiar with kit construction, this is not a daunting project and will save you a considerable sum of money.

Computer control kit for the RX2: For an additional few pounds (£12) you can add automatic frequency selection from a PC for unattended operation. It includes all PCB mounted parts; connector; metal mounting screws; wire; new microcontroller for the RX2; PC serial port connection cable; full instructions and software.

HRPT receiver kit: A low-cost, high performance, HRPT receiver originally designed by Sam Elsdon and published in RIG, edition 65. Although a seven channel receiver, it is possible to expand this. The receiver outputs a TTL level signal as well as analogue outputs direct from the demodulator. Cost about £160.

(EARS)' and Les Hamilton discussing 'High Resolution Remote Images from the Internet'.

Les produced the fifth edition of the GEO quarterly magazine in March, a 52-page colour edition carrying articles on every aspect of WXSAT imaging, including construction projects.

In the Special feature for Beginners, I described the general hardware required for setting up a WXSAT station, both for polar satellite and for geostationary satellite reception. Here are more details about offers for members of GEO and RIG. Prices are guidelines only; they can change from time to time so please contact the organisations to check members' prices.



Fig. 10: Dr. Alan Chapman and Sir Patrick Moore.

### Frequencies

#### a.p.t.

NOAA-12 and NOAA-15 transmit a.p.t. on 137.50MHz.

NOAA-17 transmits a.p.t. on 137.62MHz. during overlap periods, NOAA-12 or NOAA-15's a.p.t. may be switched off.

NOAA-N (18 after launch) is expected to transmit a.p.t. on 137.9125MHz.

#### h.r.p.t.

NOAA-12 and NOAA-16 transmit h.r.p.t. on 1698.0MHz.

NOAA-15 transmits on 1702.5MHz.

NOAA-17 transmits on 1707MHz.

FENGYUN-1D transmits on 1700.5MHz.

WEFAX: *METEOSAT-7* (geostationary) transmits WEFAX on 1691 and 1694.5MHz and Primary Data on 1691.0MHz until the end of 2005. *METEOSAT-8* HRIT, LRIT and other formats transmitted via *HotBird-6* at 13°E on transponder 117- 10.853.44GHz as EUMETCast data.

# Win A Quiet Solution And Keep That Noise Down!

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**NEDSP1062-KDB**  
 as reviewed in  
*SWM April 2005*

**You can win this superb noise reducing prize worth £99.95!**

The NEDSP1062-KDB is another way to beat noise from bhi. This amplified d.s.p. unit is an add-on that you fit into the speaker of your choice. A cost effective, quietening solution for your favourite external speaker. Performance is exceptional, matching that of the other well established quietening solutions from bhi.

As reviewed in last month's *SWM*, Editor Kevin Nice was very impressed with what he found. You can find out just how good the NEDSP1062-KDB is for yourself - go on - have a go at winning this noise reducing marvel and discover its capabilities first hand.

Now you have a chance to win one of these superb add-on modules for yourself.

The specification for the NEDSP1062-KDB is as follows:

#### Noise Reduction Levels

4 Level	8 Level	Tone Reduction (dB)	Noise Reduction (dB)
	1	4	9
1	2	5	11
	3	6	13
2	4	8	14
	5	16	17
3	6	21	20
	7	25	24
4	8	65	35

## Entry Form

To enter this prize draw, please fill in your details on the entry form, photocopies are accepted with the original corner flash attached and answer the three questions. Post your entry to: *SWM*/bhi DSP1062 Competition, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Competition Closes 25 May 2005.

Name: .....

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.....Postcode: .....

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Q1: What is the output power of the NEDSP1062-KDB?

A: .....

Q2: How many buttons are there on the control keypad?

A: .....

Q3: How many colours can the NEDSP1062-KDB i.e.d. show?

A: .....

Q4: What is the total no. of noise reducing levels provided by the NEDSP1062-KDB?

A: .....

The closing date for this competition is 25 May 2005, the winner will be drawn on 29 June 2005 - the first correct answer drawn will win.

The winner will be announced in the August 2005 *SWM*. The Editor's decision is final. If you do not wish to be contacted by PW Publishing Ltd. or associated companies please tick here.

Special thanks to bhi Ltd. for donating the NEDSP1062-KDB module as a prize. The new NEDSP1062-KDB is available direct from bhi and most good radio stores, with a suggested retail price of £99.95.

For more information contact **bhi Ltd.**,

Tel: 0870 240 7258 or web:  
[www.bhi-ltd.co.uk](http://www.bhi-ltd.co.uk)



**bhi NEDSP1062-KDB Comp**  
 May 05

### ARA-60 Active Antenna. £239.95

**Frequency range** 40kHz-60MHz (full performance) 60-120MHz 2:3dB less gain

**Output impedance** 50-75 ohm coaxial

**Connector to Rx** PL type delivered as standard. Other standards can be fitted on request

**Gain** 10dB +/-0.2dBs

**Intercept Point** -50dBm IP 3rd order (10MHz/12V)

**DC power supply** 11.5-13 volt DC at 80mA typ. (230V/12V DC stabilised mains adaptor is supplied with the antenna)

**Max diameter** 30-50mm can be fitted

**Dimensions** 115cm total length. Antenna tube 50mm x 160mm ideal for base stations

### ARA-2100 Active Antenna. £239.95

**Frequency range** 50-2100MHz

**Output impedance** 50-75 ohms coaxial

**Gain** 18dB-1000MHz  
9dB-1500MHz  
6dB-2100MHz

**Noise figure** 1.5-2.5dB-1000MHz  
1.8-2.5dB-1500MHz  
2.5-4dB-2000MHz

**3rd order IP** -38dBm typical

**Output impedance** 50-75 ohms coaxial

**Connector standards** N type connector at the antenna. BNC male connector to the receiver

**Power supply** 12V DC at 160mA DC. Power supply for 230V AC is delivered comes with the antenna

**Dimensions** Length 450mm. Diameter 90mm

**Weight** 2kg

**Accessories** Mains wall plug adaptor (230V A/12V DC). Interface unit (remote supply unit) 12m coaxial cable and mast mounting clamps

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# Scanning

Scene

● **Dave Roberts** *do SWM Editorial Offices, Broadstone*  
● **E-mail** *scanning@pwpublishing.ltd.uk*

The online auction site eBay, never ceases to interest me. The 11 February saw the end date of an auction for a v.h.f. surveillance receiver.

It was a little black box about 150 x 200 x 50mm, it bore an official sticker with the words 'Ministry of Defence Police Property Ser.No. 09275'. The front of the unit had v.h.f. Receiver printed on it but intriguingly an old type yellow 'Dymo' label on the top indicated 173.800, which we can happily assume was the receive frequency. It eventually sold for £21, which was probably about the right price providing that the thing worked.

The PROMA database shows 173.800 to be a Radio Microphone frequency (Ch 00) intended for use in theatres, etc. The only location specified on that database, for this frequency, is Woodbridge in Suffolk. There were twin bases at that location, RAF Bentwaters and RAF Woodbridge. Both were USAF facilities and I believe that both have now closed with Bentwaters being considered for civil aviation use and Woodbridge now being used by the British Army. There would have been (and probably still is) an MOD Police presence at those locations. Is it possible that the MOD were using this kit at that location? Any monitors in Suffolk?

## Monitoring GSM Telephones

Yes, there are systems on the market that allow you to monitor GSM mobile telephones. And yes you can buy one. The problem is that you'll probably have to go to another country to purchase it (Israel is probably the nearest supply point). The cost of the travel will not be a problem because if you can afford the system you'll find even first class air fare affordable.

The cheapest system that I have seen on sale is \$200,000. That's two hundred thousand US dollars! One set-up costs twice that. It's not the sort of thing that your average hobby scanner enthusiast would have on the shelf in the spare room.

Recently folks have been misled by a fairly well known company that offers a 'monitoring system' for a mere fraction of the above price. Don't be tempted. Their advert can easily be misconstrued. What they are flogging is a Digital Audio Tape recording system to record conversations that you are having on your cellphone. Just use the old Tandy stick-on microphone and a £20 tape recorder and save a fortune.

## Security Products

Many companies that sell 'security products'

are taking the mickey out of their clients. Waters & Stanton sell their excellent Watson Brand WR5001 nearfield wideband receiver for a little over £68. But wait - when the very same piece of gear is being sold by a 'security supplier' the price has gone up to 449 Euros.

Honestly, the Watson WR5001 is truly a first rate piece of equipment and at £68 it represents a real bargain, I was fortunate to have a WR5001 and its sister the WR5002 for review purposes in the December 2001 SWM and the package I sent them back in was tear stained, but 449 Euros for one is head slappingly expensive.

## Scanner Accessories

No one is in any doubt that the Uniden UBC-780XLT is one fine scanning receiver. Even though its sophisticated Motorola tracking circuitry is only of limited geographical use here in Great Britain it has still proved itself to be a popular purchase amongst UK monitors.

Well, it's now got better. A very well known company in Massachusetts, USA called Scanner Master have made a number of accessories for the 780 that any owner will drool over.

Firstly, Scanner Master make a unit called 'Smart Link' that connects an Optoelectronics frequency counter to a UBC-245 or UBC-780 to enable remote tuning and instant monitoring of any transmission. Just to make the UBC-780 even more versatile they also make a board that fits in the UBC-780 and holds two rechargeable batteries. The batteries charge while the UBC-780 is in use from external power, then if the power fails the internal cells switch in and power the unit for up to six hours. Scanner Master also supply carry cases for the UBC-780.

Also in order to extend the battery life they sell a plug-in unit that turns the panel lights on only when a transmission is received. Another one of their plug-in units will mute the UBC-780 when a radio transmits in the *immediate* area of the receiver. This facility was developed for police and other emergency service users in the USA but is equally valuable to amateur operators and the like. The unit can also be directly wired to most commercial transceivers for direct switching. The UBC-780 displays MUTE on the screen when this function is active.

Yet another plug-in turns the UBC-780 into an a.m. receive station giving additional coverage from 0-25MHz a.m. While this function is operable the scanner can still check priority channels at v.h.f./u.h.f. as usual - and there's more. Scanner Master are also making remote head kits for the UBC-780 and UBC-785 enabling the radio to be mounted under a

seat or in the back, or wherever with a control head Velcro fitted to the dash.

Best of all, and guaranteed to drive your wife or girlfriend absolutely off her head is the TV remote control accessory for the UBC-780, UBC-785, UBC-895 or PRO-2025. This handy gadget plugs into the back of the receiver with an infra-red receive unit. Aim your TV remote at it and control the radio's functions.

None of the accessories are particularly cheap, but then they are sophisticated. Scanner Master also supply a raft of other scanning accessories, it's almost worth taking a plane there. There are also a number of companies selling laser speed detector jammers suitable (so they say) for use in the UK. I never knew that!

## US Military News

Back in 2000 the US Military purchased over 13,000 Icom IC-4008M radios, mainly for the marines. These sets are basically the same as the IC-4008A Family Service Radio (FRS) that is sold for domestic use in America. The military, however, wanted them programmed for different channels for usage that they call Intra Squad. This means that they talk to each other on them. The radios run half a watt n.b.f.m. and are channelised.

Now the US forces are notorious for just pitching up at a location and carrying on their activities as if they are back home. It's interesting that I have been unable to find any user in the UK on these exact frequencies so I guess that there has been a fair amount of coordination between the US and British authorities to ensure that the American forces don't end up sharing frequencies with the local shoe shop.

Listeners near any installation where US forces are likely to be based or deployed should have these channels in their scanners:

Channel	MHz	Channel	MHz
1	396.875	8	397.950
2	397.125	9	398.050
3	397.175	10	399.425
4	397.375	11	399.475
5	397.425	12	399.725
6	397.475	13	399.925
7	397.550	14	399.975

So you can tell that to the marines!

## Finally

Increasing numbers of the v.h.f. f.m. German Army hand-held radios designated SEM52A are coming into the civilian market. These sets are 6-channel capable and run from half-a-dozen pen cells. They have a small speaker and a bone conduction microphone. A tape type antenna is usually included.

Invariably there are only two channels crystallised up. They are known as K5 on 47.8MHz and K6 at 55.5MHz. These frequencies could well be in use in several UK locations.

# DX

## Television

● **Keith Hamer & Garry Smith**

17 Collingham Gardens, Derby DE22 4FS

● **E-mail** [dxtv@pwpublishing.ltd.uk](mailto:dxtv@pwpublishing.ltd.uk)

**F**ebruary's long-distance reception can aptly be described as "scraping the barrel". With cold weather and a lack of signals, conditions can only improve!

### Reception Reports

"A few stations penetrated the winter gloom", writes **Peter Barber** (Coventry). At 2007 on 13 February RAI UNO on Channel A emerged with sound lasting throughout a 40-minute period. At 0904 on the 21st a Scandinavian weather chart was shown on E2, thought to be the Norwegian NRK-1 service; reception fizzled out at 0917. **Stephen Michie** (Bristol) took advantage of slight lift conditions, identifying several distant UK f.m. transmitters including Mendlesham (Suffolk) on the 16 and 18th.

### Analogue Switch-Off Project

There is more information regarding the analogue switch-off trial in South Wales. The Ferryside digital channels are 26 (MUX 1), 30 (MUX 2), 34 (MUX A) and 23 (MUX B); multiplexes C and D are not broadcast. Their effective radiated power (e.r.p.) levels are reputedly 1W for MUX 1 and MUX B and 5W for MUX 2 and MUX A. Presumably the lower e.r.p. of MUX 1 and MUX B is to protect the low-power (6W) Pencader relay (about 25km to the north) which transmits ITV1 on 23 and BBC2 on 26 from pollution. Ferryside analogue transmits on channels 21 (BBC1), 27 (BBC2), 24 (ITV1) and 31 (CH4) with 23W e.r.p. Interestingly, it was increased from 7W a few years ago to mask the effects of co-channel digital interference from the Caradon Hill and Kilvey Hill transmitters.

A recent edition of the *Culture Show* on BBC2 confirmed that unlimited equipment has been supplied to the Ferryside community free of charge with one happy holiday home-owner collecting nearly 100 set-top boxes. Antennas have been changed where necessary and unlimited technical support has been provided. The residents seemed delighted, cock-a-hoop in fact, mainly because of the free equipment. Let's hope that the rest of us do not have to shell-out for conversion when the time comes. (*Unlikely in my view. Ed.*)

It may be better to wait and see what happens because committing to digital before the axe falls could mean an antenna upgrade will be necessary. In any case, after switch-off, the e.r.p. levels of the digital multiplexes will be increased to improve coverage and signal reliability. So, changing the antenna might be an unnecessary expense.

The proposed analogue switch-off at Ferryside comes 20 years after another important milestone in TV history: the final axing of the 405-line transmitter network. Its switch-off was a staggered process over a period of 16 years with the last remaining transmitter finally switching off in January 1985. In its heyday there were 157 main transmitters and relays, 99 of them in Band I. Few viewers were aware of the network's demise and at one stage it was estimated

that there were only about half-a-dozen viewers in Wales using one particular transmitter before their service terminated. Towards the end, many transmitters limped gracefully towards retirement on reduced power.

### Spanish Band I Transmitters

Doubts exist as to whether the Madrid Band I outlet on Channel E2 has finally closed even though its low-level intrusions into the Algarve have suddenly stopped. The outlet may have switched to low-power as there were claims of its reception in Europe earlier this year. The Spanish Band I transmitters have been allowed to linger on-air for much longer than planned but they will be sadly missed. Spanish pictures were usually the first delights experienced by DXers and high transmitter powers meant DX was assured even with simple antennas. Receiving Spanish signals often whetted the DXers' appetite for greater challenges.

### Service Information

**Belgium:** The Belgian TV-1 Network has been renamed *één* (One) and a white logo with the letters *één* are displayed in the top-left of the screen.

Many RTBF transmitters have had their e.r.p. levels reduced for many years, but this is of little consequence as most viewers receive the RTBF programmes via the cable networks.

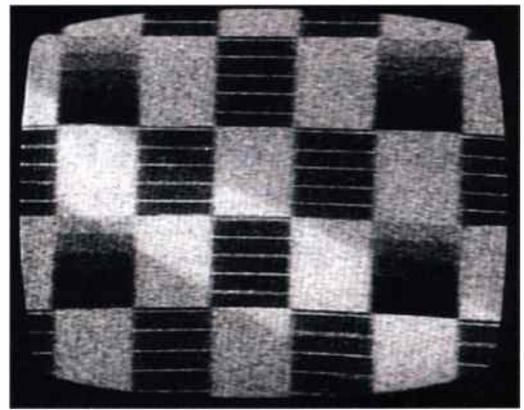
**Sweden:** Preparations for the DVB-T transmitter network are well under way with a rapid expansion planned between January 2006 and February 2008. In February 2008 SVT analogue transmitters will finally close. Some will have been in operation for about 54 years. All analogue TV4 transmitters will remain on-air until February 2008.

To pave the way for digital, the Helsingborg Channel E41 10kW transmissions are moving to E59. These changes should have taken place in early April 2005.

Band I has suffered another casualty: the low-power Joeström (SVT-I) relay on Ch. E4 has been taken out of service. The programme is now aired on E47 with 2kW e.r.p.

**Finland:** DAB transmissions are being axed completely - it was obviously not a huge success.

**United Kingdom:** Several local newspaper reports have recently been submitted relating to HTV West's cut in regional programming, following Ofcom's recommendation for the ITV regions. In the case of HTV West, local programming is to be slashed from three hours to 90 minutes. Ofcom claim regional ITV programmes are barely watched and therefore unattractive to advertisers. On an amusing note, a local HTV programme aired via the Mendip transmitter called *The Way We Were* (depicting past decades of local reminiscences) carried the sound of a



● Fig. 1: The TVE-2 Chessboard test card from the Santiago E2 outlet which closed in the 1990s.



● Fig. 2: The TVE-2 identification caption from the late Eighties received on E2 with slight multi-path distortion.



● Fig. 3: The BBC Tuning Signal which was first transmitted in 1949.

Welsh programme thanks to crossed lines at the studio. The episode is being screened again for the benefit of those who noticed the blunder...

This month's Service Information was kindly supplied by **Gösta van der Linden** (Rotterdam, Netherlands) and **Stephen Michie**.

### Keep On Writing!

Please send your DXTV, slow-scan TV and f.m. reception reports, news, off-screen photographs and information to arrive by the first of the month to: **Garry Smith, 17 Collingham Gardens, Derby DE22 4FS**. We can also use off-air pictures stored as JPG files on PC discs, good-quality VHS video and 'low-speed' (1x - 4x) recorded DVD recordings.

Our DXTV and Archive TV website can be found on the Internet, at [www.test-cards.fsnet.co.uk](http://www.test-cards.fsnet.co.uk)

- Ben Hogan, *clo SWM Editorial Offices*
- E-mail [ssb.utilis@pwpublishing.ltd.uk](mailto:ssb.utilis@pwpublishing.ltd.uk)

Summer is well and truly on the way, here in the Northern Hemisphere and in the higher latitudes people are beginning to travel out and about in remote areas.

When the Editor, Kevin, first asked me to write this column in April 2004 I mentioned h.f. usage in northern Canada. This may be an appropriate time to do so again as it's the time of year that 'fair weather' prospectors and travellers start to load up their packs and chuck them in their trucks or canoes to commence another season's adventures.

Living in the UK it's a struggle to imagine vast tracts of land devoid of mobile 'phone coverage and any amenities. Road systems don't exist either and the only way that vehicles can travel the land is to utilise the logging trails which, as you can imagine, are extremely rough often boasting severe gradients and terrifyingly flimsy bridges spanning wild rivers. Often these structures only exist in the memories of travellers, having been washed out years before.

As you might imagine, h.f. radio is truly a lifesaver under these circumstances. Here then are some frequencies that are currently in use in the north west of Canada.

You'll find 5.027, 5.100 and 5.031MHz are in use by several communities in the Pacific North West in order to disseminate weather and travel information. Transmissions may be in the native tongue of the Inuit (Eskimo) people of the region. The frequencies are also used by travellers, to keep in touch with each other, when 'out in the field'.

The rescue frequency 2.182MHz, is installed in most radios for obvious reasons, while another chatting channel is 4.4415MHz. It's likely that 'phone patches may also be established on 4.8652MHz. Try monitoring these frequencies after about midnight UTC. Most radios also have 9.625MHz loaded up as well, as this is the Canadian Broadcasting Corporation (CBC) frequency for CBC North.

For Alaskan comms, apart from those frequencies that I have previously listed, there are some within the amateur allocation that are in daily use for utility type contacts. The Alaska Pacific Preparedness Net is on 14.292MHz I.s.b. at 1730. The Bush Net is at 0500 on 7.093MHz while the Motley Group can be found at 0600 on 3.933MHz.

The Sniper's Net is on an Alaska Emergency frequency of 3.920MHz at 0300. In this case the term 'Sniper' does not denote a fellow who's handy with a long range rifle. Sniper is a prospecting term for the operation of a pick underneath a large boulder in order to extract

mineral deposits left there during a river's run. Many prospectors have been killed, crushed by large boulders when 'sniping'.

Of course 5.1675MHz u.s.b. is the main Alaska emergency frequency.

Some voices on u.s.b. at 3.008MHz have been overheard in Europe. The language appears to be German and from the conversation that has been monitored it appears that they may be German lorry drivers.

These days, of course, British roads are full of goods vehicles from Europe. The authorities are almost powerless to deal with them for breaches of our road traffic laws and so one can place a fairly safe bet that if there is an illegal net of German lorry drivers on 3.008MHz in Europe, then some of the members will be operating here when in their vehicles on our side of the channel. It is definitely a frequency worth checking.

## A Touch of Insomnia

A note from Richard Patterson in the south of England makes interesting reading. Richard has been suffering from a touch of insomnia recently and wrote to me on the 10 February. He listens on a Realistic DX-394 wired to a Wellbrook loop antenna in the garden. This combination serves him well. Listening in the small hours will usually more than compensate for loss of sleep, as it has in Richard's case. He's been hearing m.f. transmissions from shore stations throughout northern Europe at about 0400.

Richard identifies some of the frequencies as 2.642, 2.789 and 2.628MHz. Richard believes that the language used may have been Danish as well as English and that traffic consisted of position details. Richard, at these frequencies you are sat in a densely populated part of the lowest marine band.

The language may well have been Nordic as 2.642MHz u.s.b. is a frequency used by the Norwegian Maritime Service at Vardo. Likewise 2.789MHz is Kariskrona Radio's frequencies from Sweden and 2.628MHz is used by Vestmannaeyjay radio in Iceland. There are other marine coast stations that utilise these and adjacent frequencies but these, I think, may have been using a language that, to British ears, could possibly sound Nordic.

As that part of the band is so packed with stations it can be hard to be specific, particularly as one or two of the Realistic DX-394 sets that I have used have been very slightly off frequency. You were listening to safety transmissions at that time, Richard.

## Dog Race

As I write this, mid-March, the Iditarod Dog Race has been running for 24 hours. The race, run annually in February, starts officially in Anchorage and about a week later the participants end up in Nome, on the Seward peninsula in Western Alaska. The origins of the race are part of the folklore of the northland.

The western port of Nome is icebound throughout the winter so when the town's doctor, Dr Curtis Welch, realised in January 1925 that he had a diphtheria epidemic on his hands and not nearly enough serum to treat his patients, he knew that he was in big trouble. Serum was available in the lower 48 states and could be freighted by rail to the town of Nenana south west of Fairbanks.

After that the only practical transport was by dog sled to Nome. Dog teams were sent out to relay the serum in truly terrible conditions to Nome. At 0530UTC on 2 February 1925 the serum arrived in Nome and the epidemic was halted.



The Iditarod race marshals use all modern means of communications but there are three checkpoints on the way that are out of reach of landline, satphone and v.h.f., these are, Ophir, Eagle Island and Cripple. This is where they use h.f. radio on the amateur bands.

The frequencies in use on I.s.b. are 3.929 and 7.240MHz. Although this is an amateur band operation, the voice procedures in use are certainly non-amateur and no one will answer any non race calls. The frequencies are used sporadically to keep the equipment race ready so although the race is over for this year, someone monitoring in the night hours may well hear those KL7 callsigns testing the equipment, which is specifically retained for Iditarod use only.

## Scrambled Monitoring

I regularly receive queries from people who have an interest in monitoring scrambled h.f. s.s.b. communications. These are often in the marine sections of the bands and are usually fishing vessels tipping off others in their company fleets regarding the locations of fish shoals, etc.,

Generally the scrambling consists of simple analogue speech inversion and although it sounds totally incomprehensible it can easily be decoded by several programs available as freeware on the web. If you have Internet access then hit your search engine with something like 'Voice Inversion Software'. Good luck with your endeavours.

First this month is some h.f. frequency news. The RAF HF Flight Watch System formally known as STCICS (Strike Command Integrated Communications System), has been renamed to TASCComm (Terrestrial Air Sea Communications). The frequencies in use, operating hours and callsigns are as follows: The frequencies marked with a star (\*) are available 24 hours a day. Mount Pleasant (Falkland Islands), used to access all the frequencies on a receive only basis, but is now listed with the two listed below in

Table 1.

Table 1.

Location	Callsign	MHz
Ascension Island	HAVEN	4.742 (2000-0800)
		9.031 (0800-2000)
		11.247, *13.257 Standby
Cyprus	CYPRUS	4.742*, 9.031 (1600-0500) 11.247*
Mount Pleasant	VIPER	4.742, 11.247
United Kingdom	ARCHITECT	4.742*, 5.702*, 9.031* 11.247, 13.257*, 18.018*

## USA Coast Guard HF Frequencies

At the beginning of 2005 the USA Coast Guard introduced some new primary contact frequencies, which are highlighted in bold below. Thanks to Photavia Press, Gary in the USA and the World Utility News club website, I have included a listing of the other Air/Ground and Discrete frequencies noted in use by the USCG in recent years, shown in

Table 2.

## 8.33kHz Operational (At Last)

The saga of the first UK 8.33kHz spaced frequency was resolved on the 5 March when 132.84 became fully operational on the London Upper Sector West. At the time of writing, the old frequency 135.425 is apparently still available as a standby frequency on the same sector.

## RAF St. Mawgan

With the announcement last year of the transfer of the last flying unit from St. Mawgan to Valley, it perhaps then became obvious that the writing was on the wall for the airfield.

Sadly, what is possibly the final nail in the coffin came on 10 March when the MOD announced that from April 2007 the airfield was to be placed under a 'care and maintenance' status for five years.

This obviously places the future of Newquay civil airport into some doubt and has also caused a multi-million pound redevelopment of the airport to be put on hold. As the military currently provides the ATC, if the pullout takes place then the local council will have to find around 2-3 million pounds extra to fund the necessary Air Traffic Services, equipment and Fire-fighting

facilities. The announcement regarding the 2007 closure to flying did not refer to the other based units like the Joint Maritime Facility and the School of Combat Surveillance.

On a personal note, St. Mawgan is one of the three airfields that really started my interest in aviation in the sixties. Having been born near to Biggin Hill and with regular trips to

Gatwick with my Dad in the mid-sixties my interest in aviation soon blossomed. But it was summer holiday trips to stay with my uncle who lived just outside of St. Column Major that started me on the road to a lifelong interest in military aviation (I could see the approach to Runway 31 at St. Mawgan from the lounge and my bedroom window). I was in my teens so I had no car, but it was only a couple of kilometres cycle ride to the approach lights. Whenever I visited there always seemed to be 53 Squadron Belfasts in the circuit and regular visits from Buccaneers, Canberras, Hunters plus lots of other types - they were good summer holidays.

Is it a sign of age when the sun always seemed to shine in your school holidays and it never rained? Sadly, I could not afford a camera in those days, when I look at all the electronic gadgets the kids of the same age have now, I can only say one thing, 'You've never had it so good!' As usual I digress...

There is nevertheless a silver cloud on the horizon, albeit a small one for St. Mawgan. The airfield is still on the list of the five

Table 2.

MHz	Use
3.053	Air/Ground
3.056	Air/Ground
3.119	Air/Ground
3.122	Air/Ground
4.125	Primary
4.7165	Discrete 3A04
4.730	Air/Ground
4.733	Air/Ground
5.272	Discrete 3E06
5.320	Air/Ground
5.3995	Discrete 3C16
5.4225	Discrete 3A03
5.699	Air/Ground
6.215	Primary
6.2345	Discrete 3E11
6.501	Chesapeake
7.421	Discrete 3A09
7.626	Discrete 3E10
7.7735	Discrete 3A08
7.884	Discrete 3E13
7.909	Discrete 3E14
8.291	Primary
8.3375	Discrete 3E12
8.980	Air/Ground
10.608	Discrete 3A02
10.675	Discrete 3E19
10.759	Discrete 3E20
10.788	Discrete 3E21
10.993	Key West
10.9935	Discrete 3A17
11.1575	Discrete 3E24
11.196	Air/Ground
11.199	Air/Ground
12.290	Primary
13.218	Air/Ground
13.221	Air/Ground
13.413	Discrete 3E25
15.082	Air/Ground
15.085	Air/Ground
15.088	Air/Ground
16.420	Primary
17.988	Air/Ground
17.991	Air/Ground

airfields, which may host the Joint Combat Aircraft in the future. The Joint Combat Aircraft is being designed for Ground Attack missions and will replace the Sea Harriers of the Fleet Air Arm and the Harrier GR.9 and T.10 aircraft of the Royal Air Force.

The Ministry of Defence announced on the 10 March, (what a co-incidence - see above),



Our photo this month is an ATR-42 of the Italian Coast Guard landing at a gloomy RIAT at Fairford.

that there were five bases short-listed to host the new Joint Combat Aircraft, two of which are currently expected to be finally selected. The five candidates are Cottesmore, Leeming, Lossiemouth, Marham and St. Mawgan, a decision on which bases have been selected is expected by the end of 2005. If the JCA takes as long to develop and fly as the Typhoon it makes you wonder how long it will be before we see one in the air! With thanks to **Martin L, Jim** and the MOD and RAF websites.

### Frequency News

With thanks to E-mails from **Jamie A** and **Brian L**, I can tell you that the Scottish Control Southwest Sector has had a small change. Jamie writes that in addition to the primary frequency 125.675, a backup frequency of 130.975 has been allocated to the Sector. Whereas Brian's comment is that he thinks that the Sector has been split into East and West with both frequencies in use. Well, a quick check around the Internet soon produced the following NOTAM, (Notice to Airmen).

This NOTAM shows that as the new frequency is 'When Directed', this indicates that it is a secondary frequency to be used when air traffic dictates. Consequently, it is a secondary or backup frequency but both frequencies can be in use when it is busy - so you are both right! You can see from the text that the change took place on the 17 March and is a permanent change, the bottom line refers to the UK Air Pilot page/date that is amended.

B) 05/03/17 00:01 UTC C)PERM  
COM (B0434/05)  
E) UPPER ATS ROUTE UN517 - AMEND  
REMARKS WITHIN SCOTTISH UIR  
SCOTTISH ACC (ALL LEVELS)  
FREQ: 125.675 (WHEN DIRECTED BY  
ATC 130.975) UK AIP ENR 3-2-1-61  
(23DEC04) REFERS

Another piece of frequency news now. **Andrew** writes to me and says, 'I don't think that you have mentioned in your column that

the Heathrow Special VFR frequency (Visual Flight Rules), which has been 119.9 for many years has been changed. The new frequency is 125.625 and has been in use for some time. Thanks Andrew, you're right I have not mentioned it in the column. A quick check back shows that the frequency change must have taken place around August last year. You are right about the old frequency being in use for many years, 119.9 was in use when I started work at Heathrow in 1972!

It is worth pointing out here that sometimes even obvious changes escape my attention and it shows how important it is to get feedback from the readers of this column. The moral is, if you know of some new information please send it in to 'Sky High', don't assume that I am bound to know about it, the item above is a classic example. I would rather have the same information twice than not at all!

### Starlifters

**Rick P** has E-mailed me recently having just returned from a trip to the USA. He says, "I saw your comments regarding the C-141 Starlifter in the 'Sky High' column a few months ago. You may be interested to know that I have just returned from the USA and during the trip I visited the US Air Force museum at Wright Patterson Air Force Base. Whilst there I spoke to a crew member of the based 445th Airlift Wing and he told me that they will shortly be the only unit left flying the Starlifter and that just 16 are now left in operational service, (in early March)". Thanks Rick. I see from a recent report that a C-141C from the 445 AW passed through Mildenhall on 26 February so they are still visiting the UK, but I guess it can't be too long before another famous type disappears from our skies.

### New Books

I have had an E-mail from regular contributors to this column Photavia Press, regarding their new Airband publications. *Callsign 2005*, the *Civil and Military Aviation Callsign Directory* was published at the end of March and is priced at £10.95. The new

look *Airwaves 2005*, the *Complete HF/VHF/UHF Aviation Frequency Directory* is to be published in the last week of April and is also priced at £10.95. Both books are available from the SWM Book Store or direct from Photavia Press, see their advert in this magazine or visit their website at [www.photav.demon.co.uk](http://www.photav.demon.co.uk)

### Mildenhall 'Open House'

I have had a communication from a correspondent regarding the proposed 'Open House' at Mildenhall on the 4 June 2005, (actually called Community Appreciation Day). As expected, it is to be a very modest affair compared with the old style 'Air Fetes'. In a statement from a base spokesman they are expecting to have flypasts by the following types F-16, F-15, A-10 and a small display by the based KC-135, MC-130 and MH-53. They are hoping for some limited participation by the RAF, but at the time of writing nothing was confirmed - don't expect too much.

Entrance to the event is free, but is for local residents only, within a radius of about 40km. If you go to Mildenhall Town hall and can prove you live locally they will issue you with tickets.

With thanks to an E-mail from **Mervyn**, I am pleased to tell you that the late John Morley's field off of Pollards Lane and adjacent to the threshold of Runway 11, will be open for that weekend. Both camping and day parking will be available at a sensible price, showers and toilets will be available. If you want to move the radio shack and the camera to a good spot for the weekend then this site is to be recommended with excellent views across the base and of both arriving and departing aircraft - I can't guarantee they will be landing on Runway 11 though and please don't expect too much from this event.

### Oops!

The Editor asked me to provide some frequency information for last month's Airband Data Card and it has been pointed out that a glitch crept into the system. Nottingham East Midlands Approach frequency should read 134.175 and not 119.65 - sorry about that! Also with reference to the Heathrow item above, 119.9 should be deleted from the listing.

# QSL

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### MISCELLANEOUS

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# Satellite

TV News

- **Roger Bunney** 35 Grayling Mead, Fishlake, Romsey, Hants SO51 7RU
- **E-mail** rogerbunney@pwpublishing.ltd.uk

**G**ood news from Kourou, French Guinea, mid-February with the successful launch of their flight V164 using the all-powerful Ariane 5 rocket. The first attempted launch of the new series 5 rocket just over two years ago ended somewhat spectacularly as it was destroyed when problems were encountered just after lift-off. Those difficulties were identified and at 1930 approximately V164 lifted and inserted its payload into orbit to the cheers and handshakes in their launch control. As with NASA-TV, the European Space Agency (ESA) launches are now broadcast live, for satellite enthusiasts the 10.972GHz-V (SR 4167 + FEC 5/6) slot over *Eutelsat W1*, 10°E carried the broadcast and with taped reruns of the launch sequence.

Remarkable live pictures from accompanying aircraft were viewed as the Virgin Atlantic *Global Flier* round the world flight came into successfully land at Kansas Airport at about 1900, 3 March. Full airband communications between the *Global Flier* and Kansas Airport control were carried without other commentary. European distribution was carried live over 10°E again on 10.972GHz-V.

USA President Bush arrived on another of his European tours. 'Air Force One' appeared in live pictures at Brussels airport, 20 February at 2000. After the statutory handshakes, the 40 vehicle motorcade slid away. Still European hopping, he next appeared landing at Mainz airport, Germany.

I noted the main communications van near to the rear of the procession carried four 'very thick whip' antennas. For the curious, the final vehicles in the procession are two ambulances and a medical team. The typical Presidential motorcade includes between 30 and 40 vehicles - security, secret service, medical team, communications team, local police and the local security services. The 10.972GHz-V slot over *W1* is an excellent window on breaking news, both European and world-wide. Most of the time is non-encrypted.

At the time of writing, his Holiness Pope John Paul II had been unwell, he was rushed to the Rome Agostino hospital with breathing problems and underwent an operation. Though successful, the now late Pope John Paul II remained in hospital as his condition improved. He went on to appear occasionally at his window. Media coverage was considerable and the EBU created their own TV reporting area at the hospital. The Pope sadly passed away 2 April. It was from the EBU site that the BBC were feeding live inserts and recorded packages back into the BBC network 27 February - interesting to note a UK flyaway terminal in use - 'UKI.425' though this was operated by 'IMAGE UNLIMITED ITALY'. The BBC were using *Atlantic Bird-1* @ 12.5°W, 11.088GHz-V (4226+7/8). During the rehearsals BBC London MCR obviously picked up a lack of audio and picture sync. The reporter then slowly clapped her hands whilst the engineer adjusted the delay to regain lip sync.

This past month I have spent more time than usual monitoring the activities on the *Eutelsat W1*, 10°E. There's a lot going on both during the day and night. Pop singer Michael Jackson has been appearing at a Californian court house as his trial continues, daily reports were carried, usually over 10.972GHz though occasionally 10.967GHz-V.

Then the Olympic viewing committee toured London amongst other competing countries regarding hosting the 2012 Olympics. Coverage was live over UP4 (10.972GHz). The 10.967GHz slot provided Hollywood 'Academy Awards' on 27 and 28 February from 2000 onwards, carrying reports in several European languages. 'The Spanish network 'Antena 3 Television' was feeding back into Madrid on the 28th with 'Pactv 310.287.3800' - colour-bars identification - and then various reports of the awards night. One of the most unusual sights over *W1*'s 10.972GHz was the night-time coverage of a large grave, surrounded with candles, people waving flags and Arabic script banners paying solemn homage.

A few nights later on 28 February an agitated crowd was

again visible over the same satellite slot - the flag with the cedar tree confirmed the country as Lebanon. This was the Martyr's Square grave of the former Lebanese Prime Minister Rafik Hariri who was assassinated the previous week.

A 'phone call from **Roy Carman** (Dorking) recommended me to check out the *HELLAS-SAT* 39°E slot and specifically 12.606GHz-H (27500+3/4) where I would find a widescreen 'HD TEST' - and indeed there were the high definition tests, alpine scenes, symphony concert and a film.

The next channel in the bouquet featured a promotion video showing the services available from satellite telecommunications company 'STN' (Satellite Telecommunications Network), based in Slovakia.

A few days later I was cruising the empty bandwidth of *Eutelsat W6* @ 21.5°E and found more HD tests - 'TF1-20MB' advised the service identification, but I had found the French 'HD Forum' with another clutch of widescreen HD test films, beautiful scenery, colourful flowers with bees buzzing by and several numbers by Robbie Williams at Knebworth.

One largely ignored satellite is the PanAmSat *PAS-1R* well over in our Western skies at 45°W. A mid-February scan by Roy Carmen found poor quality pictures of a football match which eventually was identified as Senegal v the Ivory Coast and transmitted by the ORTM. Poor picture quality is very apparent on many of the African TV channels, the audience enduring smudgy pictures resembling a multi-copy VHS tape! The ORTM appeared at 11.522GHz-V (5632+3/4). From 45°W to 42°E and the *Turksat/Eurasiasat-1* slot. 'TECHNOLOGY CH' was a feature showing a 'robotic band', very clever but entirely computer generated. This transmission appeared at 12.664GHz-B with the unusual parameters of SR2344 + FEC 5/6.

## MPEG 4:2:2

*Atlantic Bird-1* can often be found carrying UK TV circuits and on the evening of 18 February 'UKI-116 SD16' was found downlinking over both 11.062 and 11.071GHz-V (SR 6140+7/8) with Welsh Rugby from the Newport Ground - actually the Welsh Dragons v. Ulster - being fed into 'BBC SPORTS - WALES'. Another downlink - 'UKI-1091 P1' - 11.098GHz-V (4226+7/8) simply refused to lock up any video. More luck with 'UKI-498 SD16 1386' - 11.054GHz-V (6140+7/8), which provided more BBC TV for Wales - the opera 'La Traviata' - sung in Italian with interviews in Welsh. The following evening more rugby for the Welsh Channel 4 'S4C'. All the above plus the HD tests were in MPEG 4:2:2.

Up to now, the increasing use of MPEG 4:2:2 has denied enthusiasts access to this digital standard as all digital transmissions have generally been at MPEG-2 or MPEG 4:2:0. MPEG 4:2:2 could be received on a professional receiver which generally cost around the £2000 level and available to order. High-end computers can also display 4:2:2 but need a special card such as the SkyCard-2. Very recently there has appeared in the UK a limited number of 'Quali-TV' model QS 10801RCI receivers which are intended for HDTV reception. New software though will enable the specialised receiver to display good quality audio and video from news feeds, outside broadcast (OBS) and other MPEG 4:2:2 transmissions. It doesn't offer blind search but in conjunction with a search receiver to locate suspect frequencies, the 'Quali-TV' will accept input single frequencies (home search) or transponder search and any HD/4:2:2 signals will be displayed, the receiver resolving all other parameters. The receiver cost me £400 inclusive of delivery, high for a hobbyist receiver but much lower than the c£2000 for an equivalent professional version. Initial tuning difficulties were sorted when I erased most of the pre-programmed channels and started again using the 'home search' option. The 'Quali-TV' receiver was supplied by: **Smallworld, 3 Wood End Rd., Erdington, Birmingham B24 8AA** or check for details on their website [www.smallworld.uk.com](http://www.smallworld.uk.com) or Tel: 0121-373 8016.



Test card from rarely used Intelsat 907 at 27.5°W.



The launch of Ariane 5 Flight 164. All appears to have gone well via *W1*.



Football in a blizzard! (11°W).



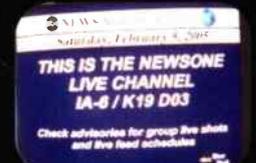
The homecoming of Helen McArthur after her record setting voyages. Via 'BT TES 27' (W2 16°E).



The Olympic Viewing Committee for the 2012 offering their comments (10°E).



The latest medical condition of Michael Jackson (10°E).



News distribution for ABC, NY (W2, 16°E).



Vox Pops in a Baghdad street, election day (10°E).

# Propagation

Forecasts

- Jacques D'Avignon VE3V9A
- E-mail: [Jacques@pwpublishing.ltd.uk](mailto:Jacques@pwpublishing.ltd.uk)

## How to use the Propagation Charts

The charts contain three plots. The lower dashed line represents the lowest usable frequency (LUF), or ALF (Absorption Limiting Frequency). The chances of success below this frequency are very slim.

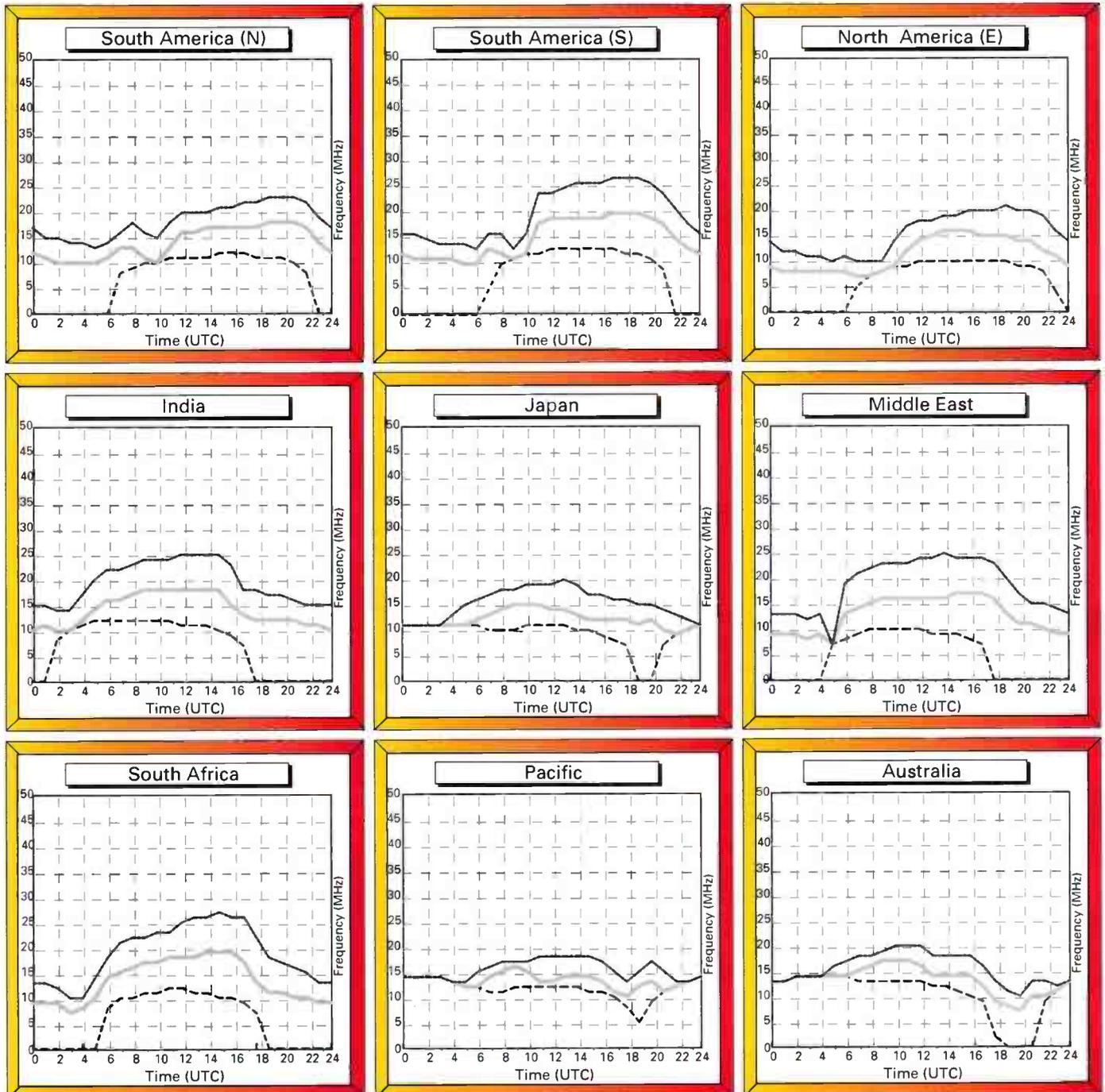
The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

Lastly, the upper dashed line represents the maximum usable frequency (MUF), a 50% probability of success for the path and time.

To make use of the charts you must select the chart most closely located to the region containing the station that you wish to hear. By selecting the time chosen for listening on the horizontal axis, the best frequencies for listening can be determined by the values of the intersections of the plots against frequency.

Good luck and happy listening.

May 2005  
Circuits to London

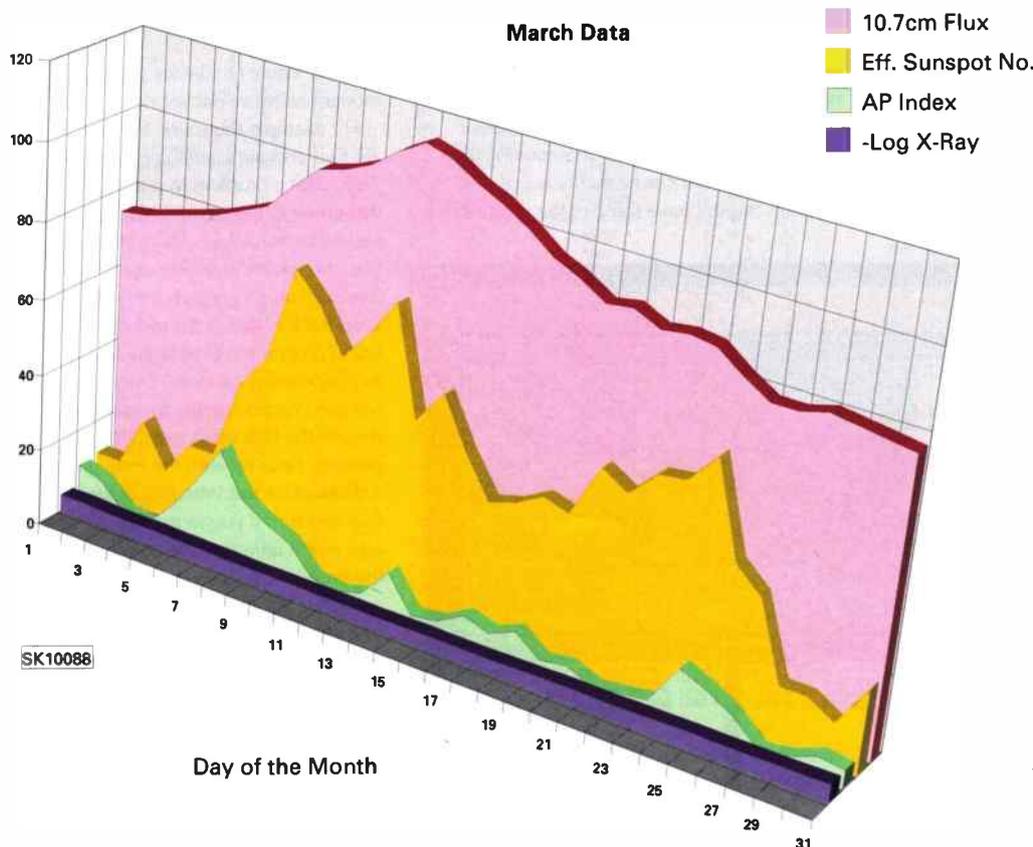
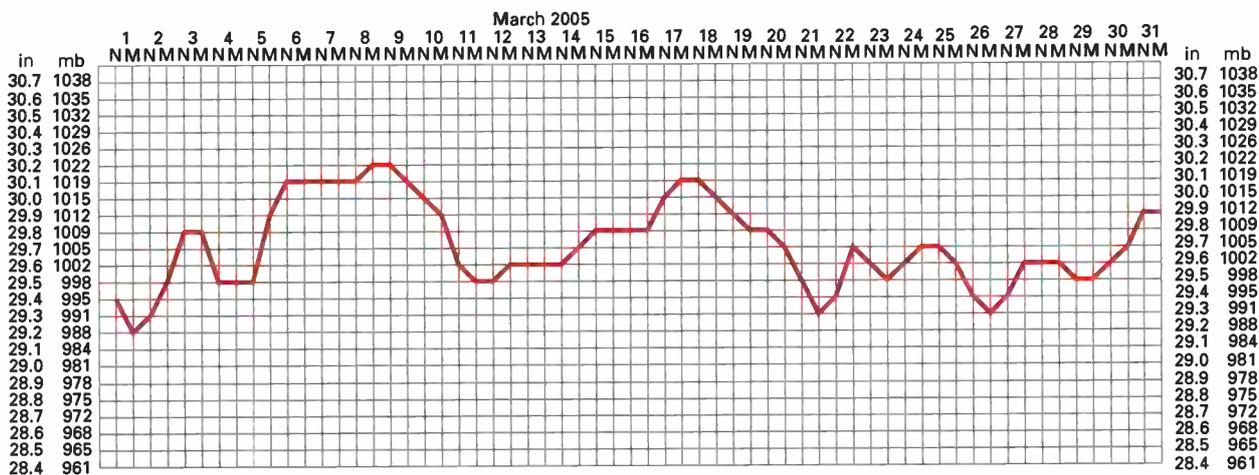


SK10087

# Propagation *Extra*

● **Kevin Nice** G3UNR, BR595787,  
SWM Editorial Offices, Broadstone  
● **E-mail:** kevin.nice@pwpublishing.ltd.uk

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, March 2005.



## guide to the chart

The 10.7cm solar radio flux is used as an indicator of the general level of solar activity.

The K and AP indices are measures of geomagnetic activity.

The K index ranges from zero (very quiet) to nine (severely disturbed).

K values of five or greater correspond to geomagnetic storm conditions that can relate to poor propagation conditions.

The AP index ranges from 0 to 400. An AP of 30 is the threshold for geomagnetic storm conditions.

# Decode

- **Mike Richards G4WNC**, 49 Cloughs Road, Ringwood, Hants BH24 1UU
- **E-mail** [decode@pwpublishing.ltd.uk](mailto:decode@pwpublishing.ltd.uk) **Website** <http://www.mikespage.btinternet.co.uk>

## Skysweeper Update

The *Skysweeper* suite is now established in the decoding world with their three main products Standard, Standard Plus and Pro versions. All three have just been upgraded to x.08 versions, e.g. Standard 3.08, Standard Plus 4.08 and Pro 5.08. This latest improvement has been issued as a free upgrade for registered users. One tip though - make sure you read the installation instructions carefully. If you follow the instructions, your current registration details will be picked-up and the transfer to the new version will be seamless.

If you don't read the instructions you will probably do what I did and lose the registration details! It's not a serious problem as you can generate another registration card - you will just have to be patient while the nice people at Skysweeper or Pervisell regenerate the activation code for you! As well as dealing with some minor bugs, the upgrade delivers useful improvements to the main RTTY, ACARS, HFDL and FAX decoders. In the case of the FAX option the picture size has been doubled, which is good news. The Standard-Plus and Pro upgrades also include improvements to STANAG4285 and the Coquelet decoder modules. New modes added to the Pro and Standard-Plus versions are MIL-STD-188-110/FED-STD-1052-1052/STANAG4539 (RX & TX) and a STANAG 4285 transmitter. As you can see, the upgrade is well worth getting. To download you should

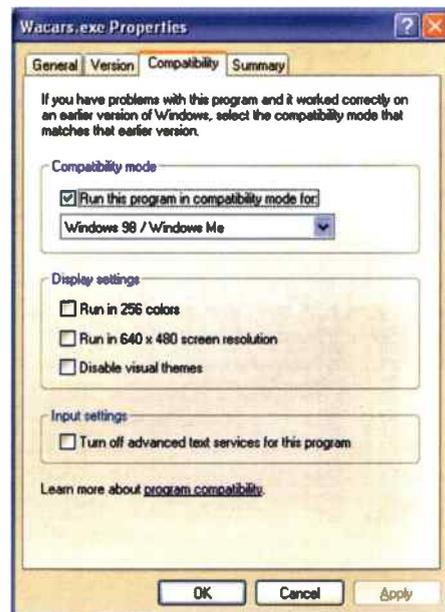
visit the Pervisell site at:

[www.pervisell.com/ham/skysweeper/main\\_download\\_frame.htm](http://www.pervisell.com/ham/skysweeper/main_download_frame.htm)

## ACARS

Although I've covered ACARS before in this column, looking back I don't think I've covered the WACARS decoding system. This seems to be an oversight because this is a very capable ACARS system that's available via the Internet free of charge! If you want to jump ahead and get a copy, here's the website: [www.geocities.com/CapeCanaveral/Cockpit/9870/wacars/intro.html](http://www.geocities.com/CapeCanaveral/Cockpit/9870/wacars/intro.html) or if you don't want have an Internet connection, you can find the program on the November 2004 SWM Software CDROM.

In addition to being free, the other significant advantage of this program is its ability to run on very basic PC systems. The minimum spec is a 486DX4-100 processor PC, running *Windows 3.1*. Yep! That really is a 100MHz processor! On the memory front the requirements are equally lightweight needing just 1MB of free memory and a bog-standard *Windows* soundcard and driver. There's even a processor loading monitor on the main display so you can check to see that you're operating within the capabilities of your PC. Even the download file size is very modest at just 360KB. The only snag with maintaining this level of backward compatibility is that the program doesn't have some of the niceties that



## Setting Windows XP compatibility for Wacars.

we have come to take for granted in many modern software packages.

For example there's no Installer to unpack the zip files and put everything onto your hard drive. This is not a problem in practice because the files that come in the zip archive, just need to be moved to one folder. This can be anywhere you like, though it's probably as well to create a directory under Program Files area just to help keep track of things. So to install you just use an unzip program to extract the files and move them to your chosen location. Once unpacked you just run the *Wacars.exe* file to start the program. So despite the lack of an installer, it's a very simple process. Final tip with the installation is to create a shortcut for the *Wacars.exe* file so it's easy to find and run. If you're running *Windows XP* it's also worth adjusting the compatibility mode for the program.

I had a few problems the first time I ran *Wacars*, but changing the compatibility to *Windows 98SE* seemed to put things right. To change the compatibility settings in *XP*, first use *Windows Explorer* to find the program file. With the cursor over the file, right-click and choose 'Properties' then select the 'Compatibility' tab. Tick the Compatibility Mode box and then choose *Windows 98* from the text box.

With the installation complete you just need to run the usual screened lead from your receiver to



Wacars in action.

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## Visual Basic 2005 Express Edition Beta

Visual Basic Express provides a lightweight experience for first-time programmers and hobbyists who are interested in building Windows Forms applications, console applications, and class libraries. Starter Kits and other introductory features make it fun for first-time programmers to take advantage of many of the productivity advances in Visual Basic 2005.

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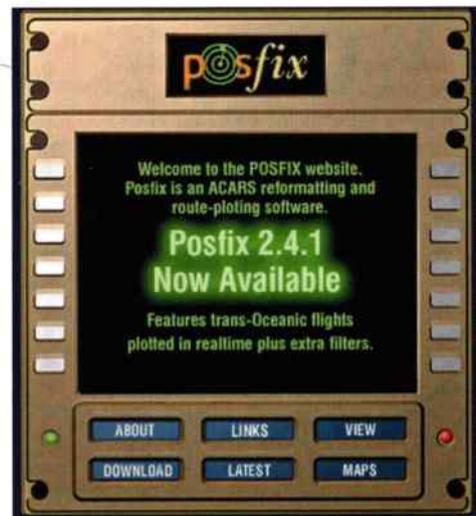
[Important information when downloading Visual Basic Express](#)

[Having trouble downloading? Click here for manual installation instructions.](#)

- Visual Basic Web developers can download [Visual Web Developer 2005 Express Edition](#).
- Please note: 1.3 GB of available space is required for installing a full Express product.

Microsoft's free *Visual Basic.NET 2005*.

Posfix an ACARS tidy-up program's website.



the 'Line-in' port on your PC's soundcard. To receive ACARS signals you will need a v.h.f. airband receiver that can receive a.m. signals between 130 and 136MHz. Always use the 'Line-out' (if your radio has one) rather than the speaker or headphone jack as that usually provides the best match for your soundcard.

Before you start pulling-in lots of signals it's worth paying another visit to the *Wacars*' site to download and install few maps. In addition to being a very capable ACARS decoder, *Wacars* includes plotting software that can display aircraft positions and routes. To get the maps you will need to go to the following site: [www.geocities.com/CapeCanaveral/Cockpit/9870/wacars/maps.html](http://www.geocities.com/CapeCanaveral/Cockpit/9870/wacars/maps.html)

Just choose the maps you want and download them to your PC. The maps are normally supplied as zip files so, you just have to extract the map and save it in the same location as the *Wacars* program files. When you first run *Wacars* you need to check a few settings before you can start receiving. First stop is to set the sound driver from the file menu - the recommendation is to choose the 38.4Kb/sec driver as this makes use of the latest decoding algorithms. The next task is to load the map that you want to use. This is done via the Options then Map Options. Use the Browse option to locate the desired map and it will load into the program. The next task is to set the record level for best results with *Wacars*. This seems to be particularly important with *Wacars* as the decoding quality (number of errors) seems to be critically dependant on having just the right audio level. This is much more critical than with the *AirNav* ACARS decoder for example. The instructions show you what needs to be done, but essentially, you have to set the levels so that a good ACARS signal moves the signal strength meter to its mid-point. Anything other than this level and the errors seem to increase significantly.

To check the set-up you need *Wacars* running then use the Window menu to select the Raw Data Log. The Raw Log is handy because, as the name implies, it shows you the raw data complete with errors. You also need to make sure the main display has the following windows open: Mess Log, Flights Contacted and Aircraft Contacted. To check/setup your decoding, tune into one of the main ACARS frequencies (131.725MHz is a good start point) and adjust the record level so that a good signal pushes the signal level to around half way. You should see data appear

in the Raw Data log after each received burst. If this is full of strange characters it's almost certainly errors so you should try adjusting the record level again.

As soon as you get a clean decode, you should find that the properly decoded text appears in one of the other message boxes. When you start receiving messages regularly, you will know you've got the settings right. You shouldn't expect to be able to receive all the messages you hear as some will inevitably be out-of-range. Assuming you've managed to complete the set-up satisfactorily you should have a regular stream of messages and contact details appearing in the *Wacars* windows. Getting aircraft to plot on the map is totally dependant on the information you happen to receive.

Possible reasons for non-plotting on the maps may be due to only a relatively small proportion of ACARS messages that contain positional data. And it's that data that *Wacars* uses to create a map plot. The best way is to set the decoder-up, leave it running and just check from time-to-time to see if you have any plots. If you have any problems getting *Wacars* to run make sure you check the FAQ and other useful tips that can be found on the *Wacars*' website.

### WACARS & Posfix

One of the limitations of *Wacars* is that it expects to see ACARS messages in a particular format or it will not display. This is why you can sometimes get what appears to be a good message in the Raw log but nothing transfers to the other windows. There is a solution and that is to download and install *Posfix* from the following site: [www.posfix.fsnet.co.uk](http://www.posfix.fsnet.co.uk) This neat and free program has been designed specifically to work with the *Wacars* plotting system. The main purpose of *Posfix* is to take the output of your ACARS decoder and tidy-up the data so that it's in a format that *Wacars* can plot with its mapping system.

The only snag for *Wacars* users is that you have to use another decoder as well as *Wacars* as you can't use the soundcard decoder in *Wacars* at the same time as transferring data to and from *posfix*. This is not a problem as you can easily download one of the alternative free ACARS decoders such as *Acarsd*. This is a freeware program that can be downloaded from the following site: [www.acarsd.org](http://www.acarsd.org) Once you've got a working decoder *posfix* and *Wacars* installed you just have to follow the

instructions on the *posfix* website to configure the programs so that they all talk to each other. The help files are pretty comprehensive so, it should be straightforward. On completion you will have a very sophisticated ACARS monitoring system that should be able to make some sense of the vast majority of the error free messages you manage to receive.

### Microsoft Freebie!

It doesn't happen too often I know, but Microsoft currently have a number of development versions of programming software available for free download from their Developer website. Whilst some of the programs are pretty complex and only of real interest to seasoned programmers, the one that caught my eye was *Visual Basic.NET 2005 Express Edition*. This is a new version of *Visual Basic.NET* that has been designed specifically for those that are either completely new to programming or only need to programme occasionally. Because this version uses Microsoft's .NET framework you can readily get to all the main Windows components and quickly build real applications that are certainly not toys.

As well as providing some comprehensive programming tools, *Visual Basic.NET Express* also includes a database application so you can use it to build customised databases - ideal for frequency list processing. Although there's lots of *Visual Basic.NET* help on the web you may need a book to help you on your way. I went down this route and found *Visual Basic.NET In Easy Steps* to be a very good introduction to *Visual Basic* programming. The ISBN for the book is 1-84078-131-9 and it's relatively cheap (for computer book!) at £9.99. It covers all the basics in very easy to read form. If you want to try-out *Visual Basic 2005 Express Edition* Beta visit this site: <http://lab.msdn.microsoft.com/express/vbasic>

# Amateur

Bands

- **Clive Hardy** SWM, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
- **E-mail** [clive@pwpublishing.ltd.uk](mailto:clive@pwpublishing.ltd.uk)

Several readers have mentioned how useful they find DX information, so here's a selection of what's on in May. Closest to home, look out for **TM3OBI** from Breatat Island, just off the northern coast of Brittany. Laurent, **F5AEG** and another operator will be active on all h.f. bands using s.s.b., RTTY and PSK31 from the 4-8 May.

Named by the British at a time when Anglo French relations were a little less cordial than they are now, Egypt's Nelson Island near Alexandria on the Nile Delta is the location for some Islands On The Air (IOTA) activity from the 23 April to 1 May. More commonly known as Jazirat Disuqi, this will be the first IOTA activity from the island, and from Egypt as a whole. A few pile-ups are pretty likely! Four of the country's amateurs will be activating the island using the call **SU8IOTA**.



Sticking with a French connection, the Glorioso Islands north west of Madagascar in the Indian Ocean should see some amateur radio activity around the middle of May. Twelve operators are hoping to visit the small islands, which have no indigenous inhabitants and boast a military garrison and a few meteorologists as the only regular occupants.

Frequencies from 1.8 to 52MHz will be used, with voice and the usual digital modes. Pop along to [http://glorieuses2005.free.fr/index\\_frame.html](http://glorieuses2005.free.fr/index_frame.html) for the latest news of the DXpedition, which will use the callsign **F5OGL**.

Italian **Nicola I0SNY**, will be in Ulaanbaatar Mongolia between 20 April and 8 May using the call **JT1Y**, with some help from locals **Khosbayar JT1CD** and **Nekiit JT2AN**.

Back to Europe and it's the fourth European Castles Day on the 22 May, with activity from 0600 to 1600 hours. Several stations are expected to operate from fortresses and castles in France, Belgium, Italy, Spain and Portugal. Take a look at <http://f6fna.club.fr/dcfca2.html> for more information about the castles award program.

## Round The Loop Again

Last month I said I'd give some specific details of the construction of the small loop antenna for 7MHz featured in the column. If you're interested in giving it a shot, and you missed last month's column, I've included the list at the end. The tools required are:

- Drill
- Screw driver
- Tape measure
- Pipe cutter
- Soldering iron

Blow torch/joint soldering iron (or a gas hob, provided you've got permission from the boss to use it!)

Cut four 400mm lengths of 15mm copper pipe. The length isn't critical, but life's a lot easier if all four are the same length. Using the 90° elbow joints solder the four lengths together to form a square.

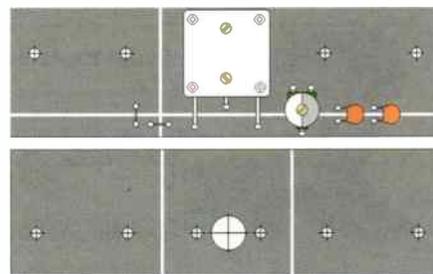
A fair amount of heat is required to melt the solder in the joints, which is where a blow torch or the gas hob mentioned earlier comes into play. I ran some extra solder into the joints just to make sure of good connections. The important thing is to make sure the square is 'flat', mostly so that the antenna looks ok, but also, if it's too 'wonky', it won't be as effective as it could be.

Next cut out a 30mm section from the centre of one of the sides. This is where the p.c.b. with the variable capacitor is fitted. Unless you want to get into etching, use a hack or hobby saw to cut two lines through the copper cladding as in **Fig. 1**. This is the side that fits against the piping. If it's double sided board then cut two lines across the copper on that other side, each about 15mm from the centre.

Drill four holes in the p.c.b. and piping for self tapping screws to fix the board to the piping. Also drill the hole for the shaft of the polycon variable capacitor. If you can find suitable small screws to attach the polycon to the board then drill two holes for them in the board. Alternatively use double sided self adhesive foam strip (outdoor Sticky Fixers are good) to attach the polycon.

Before fitting the capacitors attach the board to the pipe with the self tappers, then solder the board to the pipe. If, like me, you only have a low wattage soldering iron, you'll need to apply extra heat to the joints. I applied a flame to the pipe close to the board, but not so close as to burn it!

Fit the capacitors as per the diagram. The prototype version in the photograph, **Fig.2**, has the connections laid out slightly differently, but the circuit is the same. To get coverage of the 7MHz band, and several



● Fig.1



● Fig.2



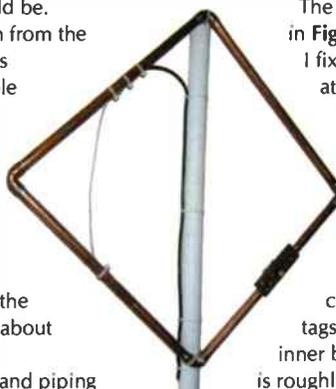
● Fig.3

hundred kilohertz either side, I used a total of 390pF in fixed capacitance, plus a 60pF trimmer, as well as the polycon.

Trial and error is the name of the game, but with the values stated and the same size loop the same coverage that I achieved should be obtained. The connection point for the outer of the coaxial cable is directly opposite the capacitor, with the inner connected to a point mid-way along one of the other sides.

The general layout can be seen in **Fig. 3**.

I fitted solder tags to the piping at the feed-points with self tapping screws, then soldered those joints using the heat source previously applied to the elbow joints. It was then only necessary to use a small soldering iron to attach the coaxial cable to the solder tags. The length of coaxial cable inner between the two connections is roughly 290mm - remember Pythagoras?



## Loop Shopping List

- 1.6m 15dia mm copper pipe
- Four 90° solderable joints
- p.c.b. (single or double sided) approx 100 x 30mm
- Small self tapping screws
- Cable ties
- Approx 1m of 50mm dia white plastic drain pipe
- 200pF Polycon variable capacitor (Maplin FK78E or equivalent)
- Ceramic capacitor(s) - 390pF for coverage of 7MHz band
- 60pF trimmer type variable capacitor
- 2m RG58 coaxial cable
- Plug to connect coaxial to receiver
- Knob

# SWM UK Radio Club Listing

If you want to meet with others with a radio passion, then please use this guide to assist...

## NORTH WEST

### CHESHIRE

**CHESTER & DRS, G3GIZ.** Meets at the Burley Memorial Hall, Waverton. Details from DERRICK SUMNER M1SUM. Tel: 0151-356 1572.

**HALTON RADIO CLUB, MOBXZ.** Meets at the Play Centre, Norton Hill, Windmill Hill, Runcorn. Details from Alan Parker 2E1DSF. Tel: (01928) 790228.

**MACCLESFIELD WIRELESS SOCIETY, G4MMS.** Meets at the Pack Horse Bowling Club, Abbey Road, Macclesfield. Details from Mrs Hazel Parrott.

**MID CHESHIRE ARS, G3ZTT.** Meets at the Cotebrook Village Hall, Cotebrook Nr. Tarporley, Cheshire. Details from Niall Reilly G0VOK.

**NORTH CHESHIRE RC, G0BAA.** Meets at the Morley Green Club, Moberley Road, Wilmerslow, Cheshire. Details from Jill Gourley G0OZJ. Tel: 0161-485 5036.

**RADIO OFFICERS ARS, MORDA.** Details from Mr J. Bell G0CMM.

**UKFM GROUP WESTERN, G83MP.** Meets at the Morley Green Club, Moberley Road, Wilmerslow, Cheshire. Details from Gordon Adams G3LEQ. Tel: (01565) 652652, FAX: (01565) 634560.

**WARRINGTON & DARS, G0WRs.** Meets at the Grappenhall Community Centre, Bethhouse Lane, Grappenhall, Warrington, Cheshire. Details from John Riley G0RPF. Tel: (01925) 762722.

**WIDNES & RUNCORN ARC, G0PWR.** Meets at the Scout Hut, Castle Road, Halton Castle, Runcorn, Cheshire. Details from Martin Tust G4LUQ. Tel: (01928) 714843.

### CUMBRIA

**EDEN VALLEY RS, G0ANT.** Meets at the BBC Club, Penrith. Details from John Rowe G0VMP. Tel: (01931) 716421.

**FURNESS ARS, G4AAR.** Meets at the Farmers Arms Hotel, Newton-in-Furness. Details from Mr K. Moore M1BWA. Tel: (01292) 465691.

**WHITEHAVEN ARC, MOBEE.** Details from Mr N. Williams M0CFM.

### GREATER MANCHESTER

**BURY RS, G3BRs.** Meets at the Mosses Centre, Cecil Street, Bury, Lancs BL9 0SB. Details from Steve Gilbert G30AG. Tel: 0161-881 1850.

**DOUGLAS VALLEY ARS, G3BPK.** Meets at the Wigan Sea Cadet HQ, Training Ship Sceptre, Brookhouse Terrace, off Warrington Lane, Wigan. Details from Mr D. Snape G4GWG. Tel: (01942) 211397.

**ECOLLS & DARS, G3GXJ.** Meets at the Eccles Liberal Club, Wellington Road, Eccles, Manchester. Details from Chris Harrison G8KRG. Tel: 0161-773 7899.

**THE MANCHESTER WIRELESS SOCIETY, G5MS.** Meets at the Simpson Memorial Community Hall, Moston Lane, Moston, Manchester. Details from Ian M0IPR. Tel: 0161-288 730 or visit [www.g5ms.com](http://www.g5ms.com)

**OLDHAM ARC, G4ORC, G1ORC.** Meets at the Royston Air Training Corps, Park Lane, Royston, Oldham. Details from Michael Crossley M1CVL. Tel: (01706) 367454.

**ROCHDALE & DARS (RADARS), G0RCC.** Meets at the Barnfield & Fieldhouse, Cricket Club, Barnfield Village. Details from John Cannel G7OAL. Tel: (01706) 376204.

**SHAWCLOUGH ARC, G0JQA.** Meets at the Rochdale City Learning Centre, Felings Road, Rochdale. Details from Alan G4TMV. Tel: (01706) 344186, E-mail: [info@sharc.org.uk](mailto:info@sharc.org.uk) website: [www.sharc.org.uk](http://www.sharc.org.uk)

**SOUTH MANCHESTER RAD & COMP CL, G3PVA.** Meets at the Sale Cricket Club, Dove Road, Sale, Cheshire. Details from Chris Ward G4HON. Tel: 0161-483 5174.

**STOCKPORT RS, G8UQ, G8SRs.** Meets at the T.S. Hawkins, Stockport Sea Cadets HQ, Pearmill Ind. Est., Stockport Road, West Wood, Lower Reddish, Stockport. Details from David Simcock M1JANF. Tel: 0161-456 7832.

**TRAFFORD ARC, G0TRC, G1TRC.** Meets at the Watch House, Cruising Club, Canal Bank, Strefford, Manchester M32 8WE. Details from Roger May G4YLQ. Tel: (01457) 868675.

**TRAFFORD RADIO GROUP, G0TRG.** Meets at 17th Strefford Scouts HQ, Barton Road, Strefford, Manchester. Details from Jon Mossman G7JKK. Tel: 0161-865 5609.

**WEST MANCHESTER RC, G4MNC.** Meets at the Astley & Tydesley Miners Welfare Club, Nearley Road, Astley, Tydesley, Manchester. Details from Jeffrey Moran M0BGU. Tel: (01204) 497694.

**WIGAN & DARC, G0HRW.** Details from Mr D.H. Barkley G0DFI. Tel: (01942) 237162.

### ISLE OF MAN

**ISLE OF MAN ARS, G3FHL.** Meets in the Sea Cadets Hall, Tromode Road, Tromode, Douglas. Details from Dave Walton M0B0IX. Tel: (01824) 816308.

### LANCASHIRE

**BURLEY & DARS, RS87674.** Meets at Barden High School, Barden Lane, Bury, Lancashire. Details from Bill Scrivener G0BQC.

**CENTRAL LANCs ARC, G0FDK.** Meets at the Priory Club, Broadfield Drive, Leyland, Lancs. Details from J.A. Lawson G0GVA.

**DARWEN ARC, G4JS.** Meets at the Darwen Catholic Club, Wellington Fold, Darwen, Lancashire. Details from Len Jackson G0NPF.

**FISTS CW CLUB, G0MFX.** Details from Mr E. Longden G3ZQS. Tel: (01254) 703948.

**FYLDE ARS, RS53939.** Meets at the A.N.T. Flying Clubhouse, Blackpool Airport. Details from Ken Randall G3RFH. Tel: (01253) 407952.

**MORECAMBE BAY ARS, G4YBS.** Meets at the Trimpeil Sports & Social Club, Outmoos Lane, Morecambe, Lancs. Details from Paul 2E1DDXO. Tel: (01524) 427793, E-mail: [2e1ddxo@mbars.co.uk](mailto:2e1ddxo@mbars.co.uk)

**PRESTON ARS, G3KJH.** Meets at the Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston. Details from Eric Eastwood G1W0Q. Tel: (01772) 686708.

**ROLLS-ROYCE ARC, G3RRL.** Meets at the Club Room, Rolls

Royce Sports Ground, Barnoldswick. Details from Mr J.A. York G3KYJ.

**ROSSENDALE ARS, G1RRS.** Meets at the Old Fire Station, Burnley Road, Rawtenstall, Rossendale, Lancs BB4 8EW. Details from Ken Slaughter. Tel: (01706) 830306.

**THORNTON CLEVELEYS ARS, G4ATH.** Meets at the Frank Townsend Centre, Beach Road, Thornton Clevelleys, Lancs. Details from Mr J.E. Duddington G4BHF. Tel: (01253) 853554.

### MERSEYSIDE

**LIVERPOOL & DARS, G3AHD.** Meets at the Churchill Conservative Club, Church Road, Wavertree, Liverpool L15. Details from David G. Parr G8DEY.

**SOUTH WIRRAL CONTEST GROUP, G3CSA.** Details from Mr T.B. Saggerson G4WSE. Tel: 0151-339 0842.

**SOUTHPORT & DARC, G20A.** Meets at St. Marks Church Hall, Scarisbrick, Lancs. Details from Don Atkins M1BUL.

**WIRRAL & DARC, G4MGR.** Meets at the Irbay Cricket Club, Mill Hill Road, Wirral. Details from Tom G4BFF. E-mail: [secretary@wadarc.com](mailto:secretary@wadarc.com). Tel: (0750) 291850.

**WIRRAL ARS, G3NWR, M0JARC.** Meets at the Club Room, Ivy Farm, Arrow Park Road, Wirral L49 5LW. Details from Alan Upton G3UZU. Tel: 0151-677 3266.

### NORTH EAST CLEVELAND

**EAST CLEVELAND ARC, G4CRS.** Meets at the New Marske Institute Club, Gurney Street, New Marske (near Redcar). Details from Alistair Mackey G4OLK. Tel: (01642) 475671.

**STOCKTON & DARG, G400G.** Meets at the Billingham Community Centre, Billingham, Cleveland. Details from David J. London G0VGB. Tel: (01642) 896395.

### CO DURHAM

**BISHOP AUCKLAND RC, G4TTF.** Meets at the Stanley Village Hall, Rear High Road, Stanley, Crook, Co. Durham. Details from Mark Hill G0GGF. Tel: (01388) 745353.

**DERWENTSIDE ARC, G4PFO.** Meets at the Steel Club, 36 Mordenstone Road, Consett, Co. Durham. Details from Mr G. Darby G7GUJ. Tel: 0191-370 2032.

**GREAT LUMLEY AR & ES, G4ELZ.** Meets at the Community Centre, Great Lumley, Chester-le-Street, Co. Durham. Details from Nancy Bone G7UUR. Tel: 0191-477 0036, mobile (07990) 760920.

**PETERLEE RADIO CLUB, G0KVJ.** Details from Andrew Penneill G0NSK.

### HUMBERSIDE

**EAST YORKSHIRE ARS, G0EGR.** Meets at the Northern Foods Sports & Social Club, Millhouse Woods Lane, Cottingham, E. Yorks. Details from David Taylor G4EBT. Tel: (01482) 876702.

**GOOLE R & ES, G0OLE.** Meets at the West Park Pavilion, Goole, South Humberside.

**GRIMSBY ARS, G30NK.** Meets at Cromwell Social Club, Cromwell Road, Grimsby, South Humberside. Details from Mr G.J. Smith G4EBK. Tel: (01472) 887720.

**HORNSEA ARS, G4EKT.** Meets at The Mill, Alwick Road, Hornsea, North Humberside. Details from Jeff Southwell G4GYV. Tel: (01964) 533331.

**HULL & DARS, G3ANW.** Meets at the SWL Centre, Club Room, Goathland Close, Walton Street, Hull. Details from Mr R. Hatton.

**RAYWELL PARK SCOUTS ARS, G4CMT.** Details from Mr A.D. Russell M0AXU.

**SOUTHORPE STEEL ARC, G4FJH.** Details from Alistair Butler M1ECF.

### NORTH YORKSHIRE

**DARLEY ARC, G0FOS.**

**HAMBLETON ARS, G0JQA.** Meets at the Mincap Centre, Northallerton, N. Yorks. Details from Ian Blackburn G0JQA. Tel: (01809) 775568.

**QUEEN MARY ARS, G6QM.** Meets at Blazefield, Pateley Bridge, Hamrogate, North Yorks HG3 5DR. Details from Frank Hams G4IEY. Tel: (01242) 236715.

**RIPON & DARS, G4SJM.** Meets at The Bunker, rear of Ripon Town Hall, North Yorkshire. Details from Nigel Drumm M1BDZ. Tel: (01423) 884733.

**ROYAL SIGNALS SCARBOROUGH ARC, G0RCS.** Details from Mr A.W.W. Timme G3CWW. Tel: (01484) 842330.

**SCARBOROUGH ARS, G4BP.** Meets at the Scarborough Cricket Club, Pavilion, North Marine Road, Scarborough, North Yorks YO12 2TJ. Details from Bill Peak G4VDH. Tel: (01723) 366285.

**SCARBOROUGH SE GRP, G0000.** Details from Roy Clayton G4SSH. Tel: (01723) 862924.

**THE VINTAGE & MILITARY ARS, RS183536.** Details from H.A. Aspinall.

**YORK ARS, G3HWW.** Meets at the Guppy's Enterprise Club, 17 Nunney Lane, York. Details from Keith Cass G3WVO. Tel: (01904) 422064.

**YORK RADIO CLUB (AMATEUR) G4YRC.** Meets at the Bishopthorpe Social Club, Bishopthorpe Main Street, York. Details from Gareth Foster G1DRG. Tel: (01904) 421392.

### NORTHUMBERLAND

**NORTHUMBRIA ARC, G4AAX.** Meets at the Old Telephone Exchange, Cresswell Road, Ellington, Morpeth, Northumberland. Details from Charles Quininn G0EQC. Tel: (079747) 99881.

### SOUTH YORKSHIRE

**FINNINGLEY ARS, G7HAH.** Details from John Fennell G4HOY. Tel: (01427) 872522.

**MALTBY & DARS, G4SHM.** Meets at the Centenary Hall, Clifford Road, Hellaby, Rotherham. Details from Keith Johnson G1PQW. Tel: (01709) 798098.

**MEDBOROUGH & DARS, G4BTS.** Meets at the Herod Hall, Mexborough, South Yorks. Details from Mr R.T. Sheppard G0SKS. Tel: (01709) 586329.

**SHEFFIELD ARC, G0INF.** NRAE/RAE tuition provided. Meets at the Sheffield University Staff Club, 197 Brook Hill,

Sheffield. Details from Mrs Irene Glossop G0SPH.

### TYNE & WEAR

**HOUGHTON-LE-SPRING ARC, G3NMD.** Meets at the Dumrie Royal British Legion, Dumrie, Fencehouses, Tyne & Wear DH4 6LJ. Details from Foster Aungles G0ABF. Tel: 0191-584 4763.

**SOUTH TYNDSIDE ARS, G10WKQ.** Meets at the Boldon Scout Hut, Grey Horse Car Park, Front Street, Boldon. Details from William Wilson M0BWI. Tel: 0191-421 9921.

**TYNEMOUTH ARC G0NWM.** Meets at the Linskill Centre, Linskill Terrace, North Shields, Tyne & Wear. Details from Mr G.N. Thompson G0SBN.

**TYNESIDE ARS, G3ZQM.** Meets at the St Teresa's Club, 200b Heaton Road, Newcastle-upon-Tyne NE6 5HP. Details from Mr J. Pickersgill G0DZG. Tel: 0191-265 1718.

### WEST YORKSHIRE

**DENBY DALE & DARS, G4CDD, G8MKK.** Meets at the Pie Hall, Denby Dale, West Yorkshire. Details from Mr J.P. Morley G4FSQ.

**HALIFAX & DARS, G2UG.** Details from Mr S.P. Ortmayer G4RAW. Tel: (01422) 203062.

**KEIGHLEY ARS, G0KRS.** Meets at the Cricket Club, Ingrow, Keighley, West Yorkshire. Details from Mr I. Townson M1BGY. Tel: (01274) 723951.

**LEEDS & DARS, G4LAD.** Meets at The Radio Shack, Yarnbury (Horsforth), RUFJ Grounds, Brownburn Lane, Horsforth, Leeds LS18 5HB. Details from Mr E. Howden G0BUJ.

**NORTH WAKEFIELD RC, G4NOK.** Meets at the East Ardley Cricket Club, Nr. Wakefield. Details from Mrs Olga Parker 2E1ASV. Tel: 0113-253 9067.

**OTLEY ARS, G3XNO.** Meets at The RAOB Club, Westgate, Otley, West Yorkshire. Details from Jack Worsnop G0SNV. Tel: (01274) 836197.

**PONTEFRAC & DARC, G3FYQ.** Meets at the Carleton Community Centre, Pontefract, West Yorkshire. Details from Colin Wilkinson G0NQE. Tel: (01977) 677006.

**SPEN VALLEY ARS, G3SVC.** Meets at the Old Bank WMC, Mirfield, West Yorkshire. Details from Mr J.R. Wilde G0FOI. Tel: (01274) 875038.

**WAKEFIELD & DARS, G3WRs.** Meets at the Ossett Community Centre, Prospect Road, Ossett, W. Yorks. Details from Ian Roberts. Tel: (01924) 216502.

**WAKEFIELD RPTD GP, G0KNR.** Details from Mike Charlton G60Z.

**WHITE ROSE ARS, G3KEP.** Meets at the Moortown RUFC, Moss Valley, Kings Lane, Leeds LS17 7NT. Details from Mr M. Wilson G7SDW. Tel: 0113-273 6039.

### MOLANDS

#### BEDFORDSHIRE

**DUNSTABLE DOWNS RC, G4DDC.** Meets at the Chevs House, 77 High Street South, Dunstable, Beds LU6 3SF. Details from Phil Seaford G8XTW. Tel: (01525) 384419.

**SHEFFORD & DARS, G3FJE.** Meets at the Church Hall, Amphill, Shefford, Beds. Details from John West. Tel: (01462) 812739.

**ST. SWITHUN'S ARC, M0AVU.** Meets at St. Swithun's Church, Rectory Rooms, Sandy, Beds. Details from Kelvin Derton G0W0D. Tel: (01767) 683179.

#### CAMBRIDGESHIRE

**CAMBRIDGE & DARC, G2GV.** Meets at the Coleridge Community College, Redegund Road, Cambridge. Details from Ron Huntsman G3KBR. Tel: (01223) 501712.

**DUXFORD ARS, G2BWM.** Meets at Building 177, Imperial War Museum, Duxford Airfield, Cambs. Details from Mrs B.I. Pope. Tel: (01279) 656149.

**GTR PETERBOROUGH ARC, G4EHM.** Meets at the 6th Form Building, Stanground College, Farset Road, Fletton, Peterborough. Details from Alan D. Ralph G8XLH.

**HUNTINGDONSHIRE ARS, G0HSR.** Meets at the Medway Centre, Medway Road, Huntingdon. Details from David Leach G7DUJ. Tel: (01480) 431333.

**MARCH & DRAS, G3PMH.** Meets at the British Legion Club, Rookwood Road, March, Cambs PE15 8DP. Details from Mr J. Braithwaite G3PWK. Tel: (01353) 698885.

**PETERBOROUGH R & ES, G3DQW.** Details from Mr V. Edwards G8NGZ.

**WISBECH AR & ELEC. CLUB, M5ARC, G4POL, G8NED.** Meets at RAFA Club, Old Market, Wisbech. Details from Alan Briggeland M0DQU. [www.warec.org.uk](http://www.warec.org.uk)

#### DERBYSHIRE

**BOLSOVER ARS, G4RSB.** Meets at the Blue Bell, High Street, Bolsover, Derbys. Details from Colin Morris G0RXT. Tel: (01246) 822856.

**BUXTON RA, G4SPA.** Meets at the Leewood Hotel, Buxton. Details from Derek Carson G4IH0. Tel: (01298) 25506.

**DERBY & DARS, G2DJI.** Meets at Carlton Road United Reform Church, Carlton Road, Littleover, Derby. Details from Martin Shardlow G3SZJ. Tel: (01332) 556875.

**EREWHAM VALLEY ARC, G0PCK.** Meets at The Sitwell Arms Public House (between Horsley Woodhouse and Woodside). Details from Peter Russell M0AQI.

**MOUNT ST. MARY'S ARC, G4MSM.** Meets at the College, Spinkhill, Sheffield. Details from Rev. P. McArdie G0DAC. Tel: (01246) 812230.

**NOTTS & DERBY BORDER ARC, G4NID.** Meets at Marplot United Reform Church, Chapel Street, Marplot, Ilkeston. Details from Graham Bromley G4UTN. Tel: (01773) 834308.

**NUNSFIELD HOUSE ARC, G3EED.** Meets at the Nunsfield House, Boulton Lane, Avstons, Derby. Details from William F. Smith G7PJJ.

**STH DERBYS & ASHBY W ARC, G0SRC.** Meets at the Moira Replan Centre, 17 Ashby Road, Moira, Swadincote, Derbyshire DE12 6DJ. Details from Mrs B. Watley. Tel: (01283) 708622.

**STH NORTHAMPTON, ALFRETON & DARC, G0CPO.** Meets at the New St. Community Centre, New Street, South Northampton, Derbyshire. Details from Peter Gething M0CQL.

Tel: 0115-955 5766.

### GLOUCESTERSHIRE

**CHELTENHAM AR ASSN, G5BK.** Meets at the Prestbury Library, Prestbury, Cheltenham. Details from Ivan Wilson G4BGW. Tel: (01452) 731956.

**CHELTENHAM CLUSTER SUPP GP, G8TDK.** Details from Mr A.M. Davies G0HDB. Tel: (01684) 72178.

**GLOUCESTER AR & ES, G4AYM.** Meets at the Churchdown School, Churchdown. Details from Mr A.J. Martin. Tel: (01452) 618930.

**SMITHS INDUSTRIES RS, G4MEN.** Meets at the Sports & Social Club, Evesham Road, Bishops Cleeve, Cheltenham GL52 4SF. Details from A.J. Hooper G1JMF.

**STROUD RS, G4SRS.** Meets at the Minchampton Youth Centre, Nr. Stroud. Details from Mr S.G. Spencer G3ILO.

**WHITE NOISE LISTENING G0WNL.** Details from Adrian Deane G7KCG.

### HEREFORD & WORCESTER

**BROMSGROVE & DARC, G3VGQ.** Meets at the Avoncroft Arts Centre, Bromsgrove, Worcs. Details from Mr J.F. Burford G4OAZ.

**BROMSGROVE ARS, G4TUI.** Meets at the Liley End WMC, Bromsgrove, Worcs. Details from Barry Taylor G0TGP. Tel: (01527) 542266.

**DROTWICH ARC, G4PVO.** Meets in the Community Hall, Drotwich Spa, Worcs. Details from Hector Wrags M1BUV. Tel: (01905) 794399.

**HEREFORD ARS, G3YDD.** Meets at the Civil Defence HQ, Messengers Court, Gaol Street, Hereford. Details from Tim Bridgland-Taylor G0JWJ. Tel: (01432) 279435.

**KIDDERMINSTER & DARS, G0KRC.** Meets at The Chairwife Club, Zortech Avenue, Kidderminster. Details from Mr A.W. Saunders G00ZB. Tel: (01299) 400172.

**MALVERN HILLS ARC, G4MHC.** Meets on the second Tuesday of the month at the Town Club, Great Malvern. Details from Mike G3TGD. Tel: (01905) 830752, E-mail: [mike@alsonson.fsnet.co.uk](mailto:mike@alsonson.fsnet.co.uk)

**REDDITCH RC, G4ACZ.** Meets at the WRVS Centre, Ludlow Road, Redditch, Worcs. Details from Mr R.J. Mutton G3EVT. Tel: (01789) 762041.

**VALE OF EVESHAM RAC, G0ERA.** Meets at the BBC Club, High Street, Evesham, Worcs. Details from Mr A.C. Lindsay G4NRD. Tel: (01386) 41508.

### LEICESTERSHIRE

**1F ATC, G7MCD.** Details from Sqn. Cmdr. Adrian Utting G1WZQ.

**BEAUMONOR ARC, G3BMR**

**DEWONTPORT UNIVERSITY, G3SDC.** Open to past & present students. Details from Mr R.G. Titterton. Tel: 0116-257 7059.

**HINCKLEY AR & ES, G3VLE.** Meets at the United Services Club, St. Mary's Road, Hinckley. Details from Mr R.A. Bennett G8BFF. Tel: (01455) 846483.

**LEICESTER RS, G3LRS.** Meets at Giresco Cottage, Groby Road, Leicester LE3 9QJ. Details from Mr S.P. Hay G3HYH. Tel: 0116-224 2598.

**LOUGHBOROUGH & DARC, G3RAL.** Meets at Hind Leys College, Shephed, Loughborough, Leics. Details from Chns Walker G1ETZ. Tel: (01509) 504319.

**MELTON MOWBRAY ARS, G4FOX.** Meets at the St. John Ambulance Hall, Astorby Hill, Melton Mowbray, Leics. Details from Mr R. Winters G3NWK. Tel: (01664) 63369.

**NATIONAL SPACE CENTRE ARS, M1NSC.** Details from Mr J. Heath G7HIA.

**TAMWORTH ARS, G8TRS.** Details from Mr A.I. Dyson G0NPF. Tel: (01827) 830437.

**WELLAND VALLEY ARS, G4WVR.** Meets at The Village Hall, The Green, Great Bowden, Leics. Details from

## NOTTINGHAMSHIRE

**ARC OF NOTTINGHAM, G3EWH.** Meets at the Hayward Road Community Association, Hayward Road, Mapperley Road, Nottingham NG3 6AD. Details from Ron Hague G4XOU. Tel: 0115-919 9177.

**DUKES ARS, G4XTL.** Meets at Ambleside Community Centre, Ambleside, New Olerton, Notts. Details from Colin Foster G7DBX.

**HUCKNALL ROLLS ROYCE ARC, G5RR.** Meets at the Hucknall Rolls Royce Sports & Social Club, Wetwell Road, Hucknall, Nottingham. Details from Mr P. Hart G4JSM.

**MANSFIELD ARS, G3GQC.** Meets at the Debdale Park Sports & Recreation Club, Debdale Lane, Mansfield Woodhouse, Notts. Details from David Peat GORDP. Tel: (01623) 631931.

**NORTH NOTTS DATA GROUP, G0WNN.** Details from Tony Jenkins G8TBF.

**SIEMENS ARC, G8ZK, G8GQC.** Meets at the GPT Sports Ground, Beeston, Nottinghamshire. Details from Chris Archer G4VFK. Tel: 0115-943 3387.

**SOUTH NOTTS ARC, G0GAL.** Meets at the Fairham Community College, Farnborough Road, Clifton, Nottingham NG11 9AE. Details from Gary Bishop GOWUG. Tel: (01509) 672846.

**WORKSOP ARS, G3RCW.** Meets at the Club House, 59-61 West Street, Worksop, Nottingham S80 1JP. Details from Terry Calvert G4GBS. Tel: (01302) 743130.

## SHROPSHIRE

**SALOP ARS, G3SRT.** Meets at the Telespot Club, Railway Lane, Abbey Forgeate, Shrewsbury. Details from John Bumford G0G1N. Tel: (01743) 249943. E-mail: john.bumford@virgin.net

**TELFORD & DARS, G3ZME.** Meets at the Dewey Bank Community Centre, Dewey, Telford, Shropshire. Details from Mr M. Vincent G3UKV. Tel: (01952) 255416.

## STAFFORDSHIRE

**BURTON-ON-TRENT & DARS, G3NFC.** Meets at the Stapehill Institute, Main Street, Stapehill, Burton-on-Trent, Staffs. Details from Mr M.W. Cotton G4HBY.

**CANNOCK CHASE ARS, G6SW.** Meets at the Four Crosses Inn, Watling Street, Hatherton, Cannock. Details from Arnold Matthews G3FZW. Tel: (01543) 262495.

**CHAD RC, G4CAR.** Meets at the Swinfen Officer's Club, Swinfen, Lichfield, Staffs. Details from Bernard Jayne G8FL. Tel: (01543) 268569.

**LICHFIELD ARS, G3WAS.** Meets at the Queens Head, Sandford Street, Lichfield. Details from Roger Smethers G3NLY. Tel: (01543) 672762.

**MOORLANDS & DARS, G4NHT, G1MAD.** Meets at the Crede Works, Blythe Bridge, Stoke-on-Trent, Staffs ST11 9LJ. Details from Mr B.J. Butcher G4HKG. Tel: (01782) 395793.

**NEWCASTLE-U-LYME SCOUT ARS COM GR, G7UQG**

**STOKE-ON-TRENT ARS, G3GBU.** Meets at the '45' Club, 92 Lancaster Road, Newcastle-under-Lyme, Staffs. Details from Albert Allen G4DHO. Tel: (01782) 638801.

**SUTTON COLDFIELD RS, G3RSC.** Meets at the Rugby Club, Walkney Road, Sutton Coldfield, West Midlands. Details from Paul G. Turner G7MWD. Tel: 0121-350 4263.

## WARWICKSHIRE

**AVON VALLEY ARA, MORAD.** Details from Mr Peter Bradham GOWU. Tel: (01905) 724531.

**MID WARWICKSHIRE ARS, G3UDN.** Meets at the St. John Ambulance HQ, 61 Emmscot Road, Warwick. Details from Bernard Pitzwey. Tel: (01926) 420913.

**RUGBY ARS, GAAPD.** Details from Tony Humphreys G0OLS. Tel: (01455) 552683.

**STRATFORD-UPON-AVON & DRS, G0SDA.** Meets at the Home Guard Club, Tiddington, Stratford-upon-Avon, Warks. Details from Ron Horsley G0MRH. Tel: (07970) 148204.

## WEST MIDLANDS

**ALDRIDGE & BARR BEACON ARC, G0NEQ.** Meets at the Aldridge Central Hall Community Centre, Middlemore Lane, Aldridge WS9 8AN. Details from Mr C.J. Baker G0NOL. Tel: (01922) 631612.

**COVENTRY ARS, G2ASF.** Meets at the Birley Church Hall, Brinklow Road, Coventry. Details from John Beech G8SEQ. Tel: (01203) 673999.

**DUDLEY ARC, G4DAR.** Meets at the Community Centre, Seagley, Central Library, St. James Road, Dudley. Details from Tony Lucas G4LVA. Tel: (01384) 277925.

**HILLCREST ARS, G0SPM.** Meets at the College, Simms Lane, Netherton, Dudley, West Midlands. Details from Stuart Viney. Tel: (01384) 232457.

**KYNOCH R & TYS, G3HPF.** Meets at the Club Workshop, IMI Ltd., Sportsfield, Perry Bar, Birmingham. Details from Mr G. Nicholls. Tel: (01922) 635376.

**MIDLAND ARS, G3MAR.** Meets at Unit 22, 60 Regent Place, Hockley, Birmingham (jewelry quarter). Details from John A. Crane G0LAL. Tel: 0121-628 7632.

**SANDWELL AMATEUR RADIO CLUB, G0CWC.** Meets at Sandwell ARC, Broadway, Oldbury, Walsley, West Midlands B69 9DP. Details from Stuart Collins M0BTO. Tel: 0121-561 4863.

**SIERRA HOTEL ARCS, G00BS.** Details from Warwick M. Hall G4WHM.

**SOLIHULL ARS, G3GEI.** Meets at The Shirley Centre, 274 Stratford Road, Shirley, Solihull, West Midlands. Details from Paul Gaskin G8AYT. Tel: 0121-783 2996.

**SOUTH BIRMINGHAM RS, G3OHM.** Meets at Hampstead House, Fairfax Road, West Heath, Birmingham. Details from The SBRSS Secretary.

**STOURBRIDGE & DRS, G6OI, G6SR.** Meets at the Old Swinford Hospital School, Stourbridge, West Midlands. Details from Tom Edwards.

**WEST BROMWICH CENTRAL RC, G4WBC.** Meets at the Sandwell Public House, High Street, West Bromwich, West Midlands. Details from Ian Letch G0PAI. Tel: 0121-561 2884.

**WEST MIDLANDS POLICE ARC, G0COP, G1WMP.** Details from Steven Jones G6LRL.

**WILLENHALL & DARS, G4ETW.** Meets at The Liberal Club, Villiers Street, Willenhall, West Midlands. Details from Dave Bradbury. Tel: (01902) 411252.

**WOLVERHAMPTON ARS, G8TA.** Meets at the Electricity

Board Sports Club, St. Marks Road, Chapel Ash, Wolverhampton. Details from Mrs J. Smith. Tel: (01902) 751936.

**WORTSLEY RC, G4WRA.** Meets at the Brick Maker's Arms, Mount Pleasant, Brierley Hill, West Midlands. Details from Andy Evans G1PKZ.

## LONDON & CENTRAL

### Berkshire

**ARGONFIELD ARC, G3IHH.** Details from Mrs E.W. Harding 2E1AUQ.

**BRACKNELL AEC, G4BRA.** Meets at the Coopers Hill Community Centre, Bagshot Road, Bracknell, Berks. Details from John Elerton G3NCN.

**BURNHAM BEECHES RC, G3WVR.** Meets at the Farnham Common Village Hall, Victoria Road, Farnham Common, Bucks. Details from Mrs Eileen Chislett G6EIL. Tel: (01628) 625720.

**MAIDENHEAD & DARC, G3WVK.** Meets at the Red Cross Hall, The Crescent, Maidenhead, Berkshire. Details from Neil Savin G0SVN. Tel: (01628) 626210.

**NEWBURY & DARS, G5XV.** Meets at the Rugby Club, Monk's Lane, Newbury. Details from Max Maxwell G7DXC. Tel: (01635) 253233.

**READING ARC, G3ULT.** Meets at the Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Reading. Details from Mamoch Standen G0JMS. Tel: 0118-972 3504.

### Buckinghamshire

**AYLESBURY VALE RS, G4VRS.** Meets on the 2nd Wednesday of each month at the home of Roger Piper G3VHE in Wassington, near Tring, Hertfordshire HP23 8EN. Details from Roger Piper G3MCH. Tel: (01442) 826651. E-mail: roger\_g3meh@hotmail.com www.avs.mandarin-solutions.co.uk

**CHESHAM & DARS, G3MDG, G1MDG.** Meets at the White Hill Centre, Chesham, Bucks. Details from Mr T.J. Thirwell G0JNF. Tel: (01442) 832189.

**CHILTERN ARC, G3CAR.** Details from Roy Page G4YAN. Tel: (01494) 534216.

**MILTON KEYNES ARS, G3HUU.** Meets at Bletchley Park Museum (The Green Room, B Block Annex), Milton Avenue, Bletchley, Milton Keynes. Details from Malcolm Bay M0MBO on (01525) 874075.

**MILTON KEYNES SCOUT ARS, G0SMK.** Meets at The Quarries, M.K. Scout Campsite, Osogrove, Details from Mr P.A. Orchard G0RYZ. Tel: (01908) 648186.

### GREATER LONDON

**ADDISCOMBE ARC, G4ALE.** Meets at the Lion Inn, Pawnsons Road, Croydon. Details from Mr Q.G. Collier G3WRR. Tel: 0208-653 8948.

**BARKING R & ES, G3XBF.** Meets at the Parkside Community Centre. Details from Bill Chewter G0JKK. Tel: (01708) 474443.

**BROMLEY & DARS, RS80930.** Meets at the Victory Social Club, Kechill Gardens, Hayes, Bromley. Details from Alan G. Messenger G0TLK.

**CLIFTON ARS, G3GHH.** Meets at the Kidbrooke House, Community Centre, 90 Mycenae Road, London SE3 7SE. Details from Mr J. Vesney G7BKH.

**CRYSTAL PALACE & DRC, G3VCP.** Meets at the All Saints Church, Parish Rooms, Beulah Hill, London. Details from Bob Burns G30OU. Tel: (01373) 552170.

**DARENTH VALLEY RADIO, G0KDV.** Meets at the Crookenhill Village Hall, Swanley, Kent. Details from Mr K.W. Halls G8VJG. Tel: (01322) 663022.

**ECHENFORD ARS, G3UES.** Meets at The Community Centre, St. Martin's Court, Kingston Crescent, Ashford, Middlesex. Details from Robin Hewes G3TDR. Tel: (01784) 456513.

**EDGWARE & DRS, G3ASR.** Meets at the Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware, Middlesex. Details from Stephen Slater G0PQB. Tel: 0208-953 2164.

**HAVERING & DARS, G4HRC.** Meets at the Fairlytes Arts Centre, 51 Billet Lane, Hornchurch, Essex.

**RS OF HARROW, G3EFX.** Meets at the Harrow Arts Centre, Uxbridge Road, Hatch End, Middlesex. Details from Mr C. Friel G4AUF. Tel: (01895) 621310.

**SILVERTHORNE RC, G3SRA, G2HR, G8CSA.** Meets at the Chingford Adult Education and Community Centre, Frilby Hill House, Simmons Lane, Chingford, London E4 6JH. Details from Dave Christy G0KHC. Tel: 0208-504 2831.

**MITCHAM & DISTRICT ARS.** Meets at the ATC Hut, Commside West, Mitcham, Surrey CR4 4HB. Details from Mr M. Knott G0WCR.

**SOUTHGATE RC, G3SFG.** Meets at the Winchmore Hill Cricket Club, Firs Lane, London N21 3ER. Details from Mr D.F. Berry G4DFB.

**ST. DUNSTONS COLLEGE ARS, G4SDC.** Details from Sam Kennard G40HX. Tel: 0181-690 1274.

**SURREY RADIO CONTACT CLUB, G3RC.** Meets at the T.S. Terra Nova, 34 The Waldrons, Croydon, Surrey. Details from Maurice Fagg G4DDY. Tel: 0208-669 1480.

**WEST LONDON ARS, RS95599.** Details from Robin Clay G0VJL.

**WHITTON ARC, G0MIN.** Meets at the Whitton Community Centre, Percy Road, Whitton. Details from Ian Clabon G0OFN. Tel: 0208-894 9131.

### Hertfordshire

**BISHOPS STORTFORD ARS, G6ZG.** Meets at the Royal British Legion Club, Winchill, Bishop's Stortford, Herts. Details from Tony Judge G0PQF. Tel: (01279) 506933.

**DACORUM ARTS, G7RIH, G0WHH.** Meets at the Guide Meeting Rooms (next to the Royal British Legion), Queensway, Hemel Hempstead. Details from Ian Hamilton G0TDC. Tel: (01442) 211925.

**HODDESDON RADIO CLUB, G0TSN.** Meets at the Rye Park Conservative Club, Rye Road, Hoddeston, Herts. Details from Don Platt G3JNU. Tel: 0208-292 3678.

**MIAMRAM CONTEST GP, M0ABC.** Details from Alan Holdsworth G80Q. Tel: (01707) 392950.

**RADIO SCOUTING TEAM, G8ZRT.** Meets at Tolmers Scout Camp, Tolmers Road, Outley, Herts EN6 4JS. Details from Mill Ivens G2CKB. Tel: (01992) 558493.

**STEVENAGE & DARS, G3SAD.** Meets at the Stevenage Day Centre, Chells Way, Stevenage, Herts SG2 0LT. Details from Don Bacche M0XJP. E-mail: d.bacche1@ntworld.com

**VERULM (ST. ALBANS) RADIO CLUB.** Meets at the RAFA, New Kent Road, off Marlborough Road, St. Albans, Herts. Details from Ralph J.B.SZ. Tel: (01923) 265572.

**WELWYN & HATFIELD ARC, G3WGC.** Meets at the Royal Naval Association, Black Fan Road, Welwyn Garden City, Herts. Details from Dean Jackson G7PKF. Tel: (07973) 560649.

## SURREY

**BENTLEY ARC, G0VZS.** Details from Derek Gilbert G0NFA.

**CATERHAM RC, G0SCR.** Details from Mr P.N. Lewis G4APL.

**COULSDON AMATEUR TRANS. SOC., G4FUR.** Meets at St. Swithuns Church Hall, Grovelands Road, Purley, Surrey. Details from Andy Briers G0KZT. Tel: (01737) 552139.

**DORKING & DRS, G3CZU, G7DOR.** Details from John Greenwell G3AEZ. Tel: (01306) 631236.

**FARNBOROUGH & DRS, G4FRS.** Meets at The Community Centre, Meudon Avenue, Farnborough, Hants. Details from Mr Steve Austen-Jones M0CFY. Tel: (07759) 215842. E-mail: scaj@btopenworld.com

**GUILDFORD & DRS, G6GS.** Meets at the Guildford Model Engineers HQ, Stoke Park, Guildford, Surrey. Details from Stella Whitbourn G0SWE.

**HINGSTON & DARS, G3KIN.** Details from Mrs Mary Ashdown G0BQV.

**REIGATE ATS, G5LX, G7RAT.** Details from Mr A.C. Embling G1JNT. Tel: (01883) 344723.

**SUTTON & CHEAM RS, G2XP, G7SAC.** Meets at the Sutton United Football Club, Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Details from John Puttock G0BWW. Tel: 0208-644 9945.

**THAMES VALLEY ARS, G3TVS.** Meets at the Thames Ditton Library, Wicks Road, Giggles Hill, Thames Ditton, Surrey. Details from Cdr. J. Pegler G3EVI. Tel: (01483) 284279.

**WIMBLEDON & DARS, G3WIM.** Meets at St. Andrews Church Hall, Herbert Road, Wimbledon, London. Details from Jim Bell. Tel: 0208-874 7458 or E-mail: james@bell0144.fsnet.co.uk

## SOUTH & SOUTH EAST

### EAST SUSSEX

**BRIGHTON RADIO CLUB, G4GQR.** Meets at Vallance Community Centre, Sackville Road, junction of Connaught Road, Hove. Details from Hon. Sec G0RNS. Tel: (01273) 699104.

**CROWBOROUGH DARS, G0CRR.** Meets at the Plough & Horses, Walshe Road, Jarvis Brook. Details from Mrs M. Clark. Tel: (01892) 363666.

**EAST SUSSEX AMATEUR TV GROUP, RS178475 was G8VXV.** Details from Keith Ellis G8GHM. Tel: (01323) 720220.

**HASTINGS ELEC. & RC, G6HH, G1JHH, G8LL.** Meets at the William Parker School, Parkstone Road, Hastings, East Sussex. Details from Peter Firmin G0FUU. E-mail: peter.firmin@virgin.net or visit www.g4cus.freemove.co.uk

**SOUTHDOWN ARS, G3WQK.** Details from Jim Hams G4DRV. Tel: (01323) 728479.

**THE ORZ ARG OF SUSSEX, G8VXV.** Meets at the Coach Station, Warring Road, Eastbourne. Details from Stuart Constable M0CWH. Tel: (01435) 863020.

## HAMPSHIRE

**ANDOVER RAC, G0ARF.** Meets at the Village Hall, Wildern, Andover, Hants. Details from Mr R.S. Coleman G0WYD.

**BASINGSTOKE ARC, G3TCR, G8JYN.** Meets at the GEMS South Club, Lister Road, Basingstoke, Hants. Details from Bob Brown M0CJJ.

**FAREHAM & DARC, G3VEF.** Meets at the Portchester Community Centre, Westlands Grove, Portchester, Hants. Details from Andrew Sinclair G0AMS. Tel: (01329) 235397.

**HIGHFIELD PARK RC, G4WD.** Meets at Highfield Park RC, National Air Traffic Service, Highfield Park, Heckfield, Hants RG27 0LD. Tel: (01374) 225019.

**HORDEAN & DARC, G4FBS.** Meets at Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. Details from Stuart Swan G0FYX. Tel: (01705) 472846.

**ITCHEN VALLEY ARC, G0VVR.** Meets at the Scout Hut, Brickfield Lane, Chandlers Ford, Eastleigh, Hants. Details from Sheila Williams G0VNI. Tel: (01703) 813827.

**SOUTH BROADCAST ARC, G4SZZ.** Accredited C&G RAE centre. Meets at Sony Sports & Social Club, Priestley Road, Basingstoke. Details from Stephen Harding G4JGS. Tel: (01256) 550111.

**SOUTH HAMPSHIRE INT. TELE SOC., G3DIT.** Meets at G3JZY's QTH, space is limited. Details from Rev. T.R. Mortimer G3JZY. Tel: (02392) 649254.

**SUBMARINE ARC, G3BZU.** Meets at HMS Collingwood, Newgate Lane, Fareham, Hants PO14 1AS. Details from Mr W.S. Blyth G0PPH. Tel: (01329) 232386.

**THREE COUNTRIES ARC, G4WNR.** Meets at the Bramshot Parish Inst. & Club, Headley Road, Liphook, Hants. Details from Damian Kamm G7FRV. Tel: (01428) 724456.

**WATERSIDE ARS, G4JYN.** Meets at the Applemore Scout HQ, Applemore, Hythe, Southampton. Details from Tony Horton G0UKG. Tel: (01703) 841794.

## ISLE OF WIGHT

**BRIKFIELD ARS, G0BAR.** Meets at Brickfields Horse Country Centre, Newnham Road, Binstead, Isle of Wight. Details from Mr P. Pebody.

**ISLE OF WIGHT RS, G3SKY.** Meets at The Old Cafe, Whiteciff Bay, Holiday Park, Bembridge. Details from Alan Reeves G4ZTQ. Tel: (01983) 294309.

## OXFORDSHIRE

**BANBURY ARS, G0BRA.** Meets at St. John's Church Social Club, South Bar, Banbury, Oxon. Details from Mr R.S. Marsden G1Y5Y. Tel/FAX: (01295) 253509.

**HARWELL ARS, G3PIA.** Meets at the Social Club, Harwell Laboratory, Didcot, Oxon. Tel: (01235) 223250.

**OXFORD & DARS, G5LO.** Meets at the Grove House Club, George Street, Southampton, Oxford. Details from Mr D. Walker G3BLS. Tel: (01865) 247311.

**VALE OF WHITE HORSE ARS, G5RP, G4VWH, G6VWH.** Meets at The Fox, Stevenston. Details from Ian White G3SEK. Tel: (01235) 531559.

## WEST SUSSEX

**CHICHESTER ARC, G2NM.** Meets at the St. Pancras Hall,

Chichester. Details from Graham Swann G0WSD.

**CRAWLEY ARC, G3WSC.** Meets at the Tilgate Forest Rec. Centre, Hut 18, Tilgate Forest, Crawley, West Sussex. Details from Keith Farrow G8ZTC. E-mail: keith.farrow@btinternet.com

**HORSHAM ARC, G4HRS.** Meets at the Guide Hall, Denne Road, Horsham, West Sussex. Details from Alistair Watt G3ZBU. Tel: (01403) 253432.

**MID SUSSEX ARS, G3ZMS.** Meets at Marie Place, Laylands Road, Burgess Hill, West Sussex. Details from Mr C. Chicks 2E1DCP. Tel: (01444) 244689.

**T.S.: VINDICATRIX ASN, G0W6W.** Details from Don Stull G000C.

**WORTHING & DARC, G3WOR.** Meets at the Lancing Parish Hall, South Street, Lancing, West Sussex.

**WORTHING & DISTRICT VIDEO RG, G83VR.** Details from the Treasurer. Tel: (01903) 211919 (w).

## WILTSHIRE

**CHIPPENHAM & DARS, G3VRE.** Meets at the Sea Cadet HQ, Chippenhamp. Details from Jon Alinge G4LZG. Tel: (01249) 426210.

**SWINDON & DARC, G3FCF.** Meets at the Eastcott Community Centre, Savenake St., Swindon. Details from Den Forest M0ACM.

**TROWBRIDGE & DARC, G2BOY.** Meets at the Southwick Village Hall, Southwick, Trowbridge, Wills. Details from Ian Carter G0GRJ. Tel: (01215) 864688.

## SOUTH WEST & CHANNEL ISLANDS

### AVON

**BRISTOL ARC, G3TAD.** Meets at the Lodgeside Club, Lodge Road, Kingswood, Bristol. Details from Dave Brendry G7BYN.

**GORDANO ARG, G6GRG.** Meets at The Ship, Redcliffe Bay, Portishead, Avon. Details from Mr R.T. White G8SPC. Tel: (01275) 874001.

**NORTH BRISTOL ARC, G4GCT.** Meets at the Self Help Enterprise, 7 Braemar Close, Northville, Bristol. Details from David Coxon G0GHM. Tel: (01275) 790448.

**SEVERNSIDE TV GROUP, G83ZZ.** Meets at NBARC, Filton, Bristol. Details from Paul Stevenson G8YWM. Tel: 0117-965 5386.

**SHIREHAMPTON ARC, G4AHH.** Meets at the TS Enterprise Sea Cadet Unit, Station Road, Shirehampton. Details from Mr R.G. Ford G4GTD. Tel: 0117-985 6263.

**SOUTH BRISTOL ARC, G4VAV.** Meets at the Whitechurch Folk House, East Dundry Road, Bristol. Details from Mr L.F. Baker. Tel: (01275) 834282.

**THORNBURY & SOUTH GLOS ARC, G4ABC.** Meets at the United Reform Church Hall, Rock Street, Thornbury, Bristol. Details from Stan Greenhill G0YWM. Tel: (01454) 413177.

**WESTON-SUPER-MARE RS, G4VMM.** Meets at the Woodspring Hotel, High Street, Weston-Super-Mare. Details from Stephen Cole G3VOL. Tel: (01934) 843144.

## CORNWALL & SCILLY IS

**CORNISH RAC, G4CRC.** Meets at the Penryn-AR-Worthing Village Hall, Penryn, Cornwall. Details from Mrs Cheryl Hammett 2E1ADQ. Tel: (01726) 882758.

**NEWQUAY & DARS, G4ADV.** Meets at the Treviglas School, Newquay. Details from Mrs Maggie Reed G0KEM. Tel: (01726) 882758.

**POLDHU ARC, G8ZGM.** Meets at the Club House, Poldhu Cove, Mullion, Cornwall TR12 7JB. Details from Mrs Carolyn Rule M0ADA. Tel: (01326) 240144.

**FLIGHT REFUELLING ARS, G4FRF.** Meets at the Flight Refuelling Social Club, Merley, Wimborne, Dorset. Details from Tony Baker G3PFF. Tel: (01202) 622262, website: www.frans.org.uk

**POOLE RS, G4PRS.** Meets at the Bourne-mouth & Poole CFE, Constitution Hill Site, Poole, Dorset. Details from Phil Mayer G0MUK. Tel: (01202) 700903.

**PORTLAND ARC, G0V09G7V0P.** Meets at Clifton Hotel, Grove Road, Portland. Details from Kerry Morris G1MVK. Tel: (01305) 788591.

**SOUTH DORSET RS, G3SDS.** Meets at the Church Hall, Chickwell, Weymouth, Dorset. Details from John Rose M0BQQ. Tel: (01305) 832057.

**SWANAGE & PURBECK ARC, M0BLJ.** Meets at Kings Arms, Langton Mevres, Dorset. Details from Peter Wakefield M1WCHM3WCH. Tel: (01929) 424413.

**WESSEX AMATEUR WIRELESS CLUB, G1WAW.** Details from Ken Powell G1NQG. Tel: (01202) 549376.

## JERSEY

**JERSEY ARS, G3DVC.** Meets at the German Signal Station, Rue Baal, La Moye, St. Brelade. Details from Mrs Anne Mourant M0JBUJ. Tel: (01534) 734948.

## SOMERSET

**PRESTON COMMUNITY SCHOOL ARC, G0PCS.** Details from Craig Douglas G0HJD. Tel: (01935) 71131.

**TAUNTON & DARS, G3KZW.** Meets at The Memorial Hall, Trull, Taunton. Details from David Rosewam M0CFF.

**WEST SOMERSET ARC, G00WK.** Meets at the West Somerset Community College, Minehead, Somerset. Details from Robert Bonar G1ONM/M3ONV. Tel: (01643) 863462.

**WINCANTON ARC, G0HRA.** Meets at King Arthur's Community School, West Hill, Wincanton. Details from Mr G.A. Fingshut G0EWN. Tel: (01983) 370506.

**YEovil & DARC, G3OMH, G8YED.** Meets at the British Red Cross HQ, 72 Grove Avenue, Yeovil, Somerset. Details from George Davs G3UO. Tel: (01935) 425669.

## ESSEX

**BARING RADIO & ELECTRONIC SOCIETY, G3BIF.** Meets 1930-2200 on Thursday evenings at Parkside Community Centre, Goodmayes Lane, Ilford, Essex. Details from Bill Chevter G0LQK. Tel: 0208-478 4758, E-mail: bilchevter@lineone.net Website: http://www.baringradio.org.uk/

**BRAINTREE AND DISTRICT ARS, G3GIX.** Meets 2000 on 1st and 3rd Mondays in the month at the Braintree Hockey Club, Church Street, Braintree. Details from John Button M5AUB. Tel: (01376) 325587, E-mail: club@badars.org.uk Website: http://www.badars.org.uk/

**CHELMSFORD ARS, G0MWT.** Meets 1915 for 1930 start on the 1st Tuesday in the month at Mercon Social Club, Beehive Lane, Chelmsford, Essex. Details from Marilyn Medcalf G1EFL. Tel: (01245) 469008, E-mail: info2005@g0mwt.org.uk Website: http://www.g0mwt.org.uk/

**CHELMSFORD SCARF, M5CDS.** Scout Amateur Radio Fellowship. Details from the Secretary, E-mail: info@chelmsford-scarf.co.uk Website: http://www.chelmsford-scarf.co.uk/

**CLACTON RADIO CLUB, G3CRC.** Meets at 2000 on the 1st Wednesday of month at the Clacton-on-Sea Sailing Club, Holland Haven, Holland-on-Sea. Details from Geoff Axford G4AQZ. Tel: (01265) 429117.

**COLCHESTER RADIO AMATEURS, G3CO.** Meets 1930 on alternate Thursdays at the Colchester Institute or St Helena's School, Sheepen Road, Colchester, Essex. Details from Frank R. Howe G3FU. Tel: (01206) 851189, E-mail: cra@mcgcity.net Website: http://www.g3co.com.co.uk/

**DENGIE HUNDRED ARS, G0UTT, G7SDH.** Meets at 1930 on 2nd and 4th Mondays in the month at the Henry Samuel Hall, Mayland, Essex. Details from Mark Barmby 2E0DQJ. Tel: (01621) 829548, Mobile: (07985) 401993, E-mail: 2e0dqj@chars.org.uk Website: http://www.dhars.org.uk/

**ESSEX REPEATER GROUP, G83DA.** Details from Murray Niman G6YB. Tel: (01245) 242617, E-mail: cive.ward@btinternet.com Website: http://www.essexrepeatergroup.org.uk/

**ESSEX RAYNET GROUP, G6ZW.** Details from Nigel Hull G6ZV. Tel: (07850) 243459, E-mail: nigel@essexraynet.co.uk Website: http://www.essexraynet.co.uk/

**BaeSYSTEMS BASILDON RADIO CLUB G0GEC.** Meets at BaeSystems Social Club, Gardiners Lane, Basildon, Essex. Details from Peter Shepherd. Tel: (01268) 887402, E-mail: peter.shepherd@baesystems.com

**HARLOW & DARS, G6UT.** Meets 2000 on Tuesdays at the Mark Hall Barn, First Avenue, Harlow, Essex. Details from Len Brackstone G7UFF. Tel: (01279) 864973, Mobile: (07931) 207184, E-mail: g6ut@qsl.net Website: http://www.qsl.net/g6ut

**HARWICH AMATEUR RADIO INTEREST GROUP, G0RHL.** Meets 2nd Wednesday in the month at the Park Pavilion, Barrack Lane, Harwich, Essex. Details from Tony Free G4EYE. Tel: (01255) 886065, E-mail: g0rhl@amsat.org Website: http://members.lycos.co.uk/harwh

**HAVERING & DARC, G4HRG.** Meets 2000 on Wednesdays at the Fairfayes Arts Centre 51 Bilet Lane Homchurch, Essex. Details from Oliver Tlett G3TPI. Tel: (01708) 746677, E-mail: g4hr@btinternet.com Website: http://www.haveringradioclub.co.uk/

**LOUGHTON & EPPING FOREST ARS, G4ONP.** Meets 1945 on alternate Fridays at the Saints House, Romford Road, Chigwell Row, Essex. Details from Marc Litchman G0TCC. Tel: 0208-502 1645, Mobile: (07743) 456058, E-mail: info@lefers.org.uk Website: http://www.lefers.org.uk/

**SOUTHEND & DISTRICT RADIO CLUB, G5QK.** Meets 1945 on Wednesdays at the Alexandra Yacht Club, Clifton Parade, Southend-on-Sea, Essex. Details from Alan Radley G0TTH. Tel: (01268) 741229, E-mail: alanradley@0800dial.com

**STANFORD-LE-HOPE & DARS, G4SH.** Details from Ken Thompson G4PAD. Tel: (01375) 671238.

**SOUTH ESSEX ARS, G4RSE.** Meets 2000 on 1st and 3rd Wednesdays in the month at the Peddocks, Long Road, Canvey Island, Essex. Details from Betty Maynard G6LUO. Tel: (01268) 695474, E-mail: southessex.ars@btinternet.com Website: http://www.southessex.ars.btinternet.co.uk/

**VANGE ARS, G3YCW.** Meets 2000 on Thursdays at the Barstable Community Centre, Basildon, Essex. Details from Norman Thompson. Tel: (01268) 552606, E-mail: info@vars.freewire.co.uk Website:

http://www.vars.freewire.co.uk/

## KENT

**BREDHURST RX & TX SOC., G0BRC.** Meets at Rock Avenue Working Mens Club, Rock Avenue, Gillingham, Kent. Details from Mr T.M. Wheeler G7MM.

**CRAY VALLEY RS, G3RCY, G1RCY.** Meets at the Progress Hall, Admiral Seymour Road, Eltham, London SE9. Details from Bob Treacher BRS32525 via www.cvs.org

**DOVER RADIO CLUB, G3YMD.** Meets at the Dover Grammar School for Boys, Astor Avenue, Dover. Jm Caines M1BKH. Tel: (01304) 852773.

**EAST KENT RADIO SOCIETY, G0EKR.** Meets at St. Bartholomew's Church Hall, Heme Bay. Details from Paul Nicholson G3VJF. Tel: (01227) 743070, FAX: (01227) 742288.

**HILDERSTONE ARS, G0HRS.** Meets at Hilderstone A.E.C., Broadstairs, Kent. Details from Mr G. Shaw M0AQA.

**HOME COUNTIES ATV GRP, G6HCT.** Meets at the Binfield Club, Binfield (near M4/J10). Details from Mr A. Brooker G4WZG.

**MAIDSTONE YMCA ARS, G3TRF.** Meets at YMCA Sports Centre, Melrose Close, Maidstone, Kent. Details from Colin Wilson G0VAR. Tel: (01622) 736636.

**MEDWAY ARTS, G5MAY, G8MNA.** Meets at Tunbury Hall, Catlin Close, Tunbury Avenue, Walderslade, Chatham. Details from Mr J. Hale G3FTH.

**NORTH KENT RS, G4CWF.** Meets at The Pop-in-Parlour, Graham Road, Bexleyheath, Kent. Details from Mr A.V. Friobens G8MLQ. Tel: (01474) 365694.

**SWALE ARX, G4SRC, G6SRC.** Meets at the Ivy Leaf Club, Dover Street, Sittingbourne, Kent. Details from Gordon Powell M0AKA. Tel: (01795) 685559.

**THE MORSE CLUB, G000K.** Meets at The Five Wents Memorial Hall, Swanley/Hertable Road. Details from Ken M3CZA. Tel: 0208-306 3544.

**WEST KENT ARS, G3WKS.** Meets at the St. Marks School Hall, Tunbridge Wells, Kent. Details from Malcolm Sheppard G4FWG. Tel: (01892) 652272.

## NORFOLK

**ANGLIA TELEVISION ARS, G0TV.** Meets at Anglia TV, Norwich NR1 3JG. Details from Jim Bacon G3YLA. Tel: (01603) 615151.

**GREAT YARMOUTH RS, G3YRC.** Meets at the Bradwell Community Centre, Bradwell, Great Yarmouth, Norfolk. Details from Mr A.D. Bestford G3NHU.

**GRESHAM'S SCHOOL ARC, G3PXD.** Details from Rev. R.N. Myerscough G3PXO.

**KINGS LYNN ARC, G3KYZ.** Details from Derek Franklin G0WQL.

**NORFOLK ARS, G4ARN.** Meets at Norwich Aviation Centre, Norwich Airport. Details from John Wadman G0VZD. Tel: (01953) 604769.

**NORTH NORFOLK ARC, G8ZMC.** Details from Tony Smith G4FAI. E-mail: g4fa@connectfree.co.uk

## SUFFOLK

**BURY ST. EDMUNDS ARS, G2TO.** Meets at the Culford School, Culford, Bury St. Edmunds, Suffolk. Details from George Woods G3UPT.

**FELIXSTOWE & DARS, G4ZFR.** Meets at the Orwell Park School, Nacton, near Ipswich. Details from Paul Whiting G4YQC. Tel: (01473) 642595.

**FRAMLINGHAM COLLEGE ARC, M0CBB.** Tel: (01728) 272232.

**IPSWICH RADIO CLUB, G4IRC.** Meets at the Golden Hind, Nacton Road (3rd Wednesdays at The Hollies, Bucklesham Straight Road), Ipswich. Details from Keith Gaunt G7CY. Tel: (01394) 420226.

**LEISTON ARC, G0XFS.** Meets at Leiston Town Athletic Assn., Victory Road, Leiston, Suffolk. Details from Paul Cattlemole M3MIG. Tel: (01728) 746044.

**LOWESTOFT DFS, G3JRM.** Meets at The George Barrow Hotel, Oulton Road, Lowestoft. Details from Phil Holden G0JSG. Tel: (01502) 585448.

**MARTLESHAM RS, G4MRS.** Meets at the BT Laboratories, Martlesham Heath, Ipswich, Suffolk. Details from Daman Hatcher. Tel: (01473) 644475.

**SUDBURY & DRA, G0SWI, G7SPA.** Meets at the Old School, Wells Hall Road, Great Cornard, Sudbury, Suffolk. Details from Bryan Parton G1TWF.

**SUFFOLK DATA GROUP, G87MDM.** Details from Peter Nyke G8HUE. Tel: (01473) 631313.

## NORTH WALES

### CLWYO

**CORWYH VALLEY ARC, G6WST.** Meets at the Studio, Penrhos Road, Colwyn Bay, Clwyd. Details from Mr R.W. Evans G6WPMC. Tel: (01745) 855068.

**MOLD & DRC, G6WHRG.** Meets at the Mold Rugby Club, Mold, Flintshire. Details from Las Chesters M0EOL. Tel: (01244) 545369, E-mail: mw1bc@thersg.net or Eddie Hewins G6WGSJ. Tel: (01352) 780334.

**NORTH WALES RS, G6WNR.** Meets at the Old YMCA, Queen's Drive, Colwyn Bay, Clwyd. Details from Ted Snipton G6WDSJ. Tel: (01745) 336939.

**WREXHAM ARS, G4W0M.** Meets at the Community Centre, Maesgwyn Road, Wrexham. Details from Mr P. Moran G6W0WR.

### GWYNEDD

**MEIRION ARS, G4W4ZP.** Meets at the Royal Ship Hotel, Dolgellau, Gwynedd. Details from Gervase Chavasse G4URU. Tel: (01341) 421028.

**PORTHMADOG & DARS, G0WMI.** Meets at The Yacht Club, The Harbour, Porthmadog, Gwynedd. Details from Mr G. Cadwaladr M0WDFN.

**THE DRAGON ARC, G4W4TA.** Meets at the Ebenezer Church Hall, Lon Fael Graig, Llanfyllip, Isle of Anglesey. Details from Stewart Rolfe G6W0EFT. Tel: (01248) 362229.

### POWYS

**POWYS ARC, G4W4YN.** Meets at the ATC HQ, Park Lane, Newtown, Powys. Details from Mrs Jean Brown 2W1CEZ. Tel: (01686) 640814.

## SOUTH WALES

### DYFED

**ABERPORTH YMCA, G4W4ZV.** Meets at the Hut B17, The Airfield, Aberporth. Details from Mr G. Carruther G4W4GJ. Tel: (01239) 811205.

**ABERSYSTWYTH & DARS, G6W0AA.** Meets at the Scout Hut, Plasruncrug Avenue, Abersystwyth. Details from John Woodward G6W4DK. Tel: (01970) 890657.

**CARMARTHEN ARS, G4W4YCT.** Meets at The Aelwyd Care Home, Carmarthenshire County Council, Tregynwr Road, Ungunrann, Carmarthen SA31 3BS. Details from Mr W.D. Hughes G4W4ZL. Tel: (01267) 231359.

**CLEDDAU ARS, G6W6YG.** Details from Trevor Perry G4W4QK. Tel: (01650) 600725.

**LLANELLI ARS, G6W0EJ.** Meets at the Furnace Community Hall, Furnace Square, Llanelli. Details from Roy Jones G6W0JK. Tel: (01554) 820207.

**PEMBROKESHORE RS, G6W0EJ.** Meets at Furzy Park Community Centre, Furzy Park, Haverfordwest, Pembrokeshire. Details from Ian M. Jones M6W0CAB. Tel: (01437) 763028.

### GWENT

**ABERGAVENNY RS, G4W4FL.** Meets at the Hill Residential College, Pen-y-Pound, Abergavenny, Gwent. Details from Glyn Hughes G6W0DQY. Tel: (01633) 483186.

**BLACKWOOD & DARS, G6W6GW.** Meets at the Oakdale Comprehensive School, Oakdale, Blackwood, Gwent. Details from John Evans G6W6TI. Tel: (01495) 225178.

**EBBW VALE COLLEGE RS, G6W0IIV.** Meets at the Gwent Tertiary College, Ebbw Vale Campus, College Road, Ebbw Vale, Gwent. Details from Mr T. Hayden G6W0HCN. Tel: (01495) 305192.

**NEWPORT ARS, G6W4EZW.** Meets at the Brynllas Community Centre, Brynllas Road, Newport, Gwent. Details from Paul Nicholls.

**PONTYPOOL ARS, G6W3RNH.** Meets at the Settlement, Rockhill Road, Pontypool, Gwent. Details from Graham Smith G6W00LZ.

### MID-GLAMORGAN

**BRIDGEND & DARC, G6W4LNP.** Meets at the Club Brynmryn, Brynmryn, Bridgend. Details from Alan Hulmes. Tel: (01656) 721574.

**HOOVER (MERTHYR) ARC, G6W3RDB.** Meets at the Hoover Sports Pavilion, Hoover Ltd., Pentrebach, Merthyr Tydfil, Mid Glamorgan. Details Robert Cummings G6W0RVG.

**MID GLAMORGAN ARS, M6W0CNA.** Meets at Aberkenfig Sports & Social Club. Details from Mervyn Carey G6W4VE. Tel: (01656) 734668.

### SOUTH GLAMORGAN

**BARRY ARS, G6W3VWL.** Meets at Sully Sports & Leisure Club, South Road, Sully, S. Glamorgan. Details from Richard Mortimore G6W4BVJ. Tel: (01446) 738756.

**HIGHFIELDS ARC, G6W4LFO.** Meets at the Highfields Physically Handicapped Centre, Allensbank Road, Cardiff. Tel: (01222) 561542.

### WEST GLAMORGAN

**PORT TALBOT (BS PLC) ARS, G6W3EOP.** Meets at the British Steel PLC Sports & Social Club, Margam, Port Talbot, West Glamorgan. Details from Mr J. Chinnock M0W0AQE.

**SWANSEA ARS, G6W4CC.** Meets at the Applied Sciences Building, Swansea University. Details from Frank Burrow G6W8ME. Tel: (01792) 390233.

## SCOTLAND WEST & WESTERN ISLES

**CENTRAL REGION**  
**FALKIRK & DARS, G6M0FRG.** Meets in the 62nd Forth Valley Scouts Hall, Denny Road, Larbert, N. Falkirk. Details from Brian J. Waddell G6M4XQJ, QTHR or E-mail: jn4kq@btinternet.net

**STIRLING & DARS, G6M0NX.** Meets at Banded Industrial Estate, Throek, N. Stirling. Details from John Shery G6M0AZC. Tel: (01324) 624709.

### GUMFRIES & GALLOWAY

**WOSTONSHIRE ARC, G6M4RIV.** Meets at the Aird Unit, Stranraer Academy, Stranraer, (entrance from Cairnport Road), Details from Ellis Gaston. Tel: (01776) 820413, website: www.gm4rv.co.uk

### STRATHCLYDE

**AYR ARC, G6M0AYR.** Meets at the University of Paisley, University Campus, Beech Grove, Ayr KA8 0HN. Details from John Shankland MM1JAS. Tel: (01292) 445599.

**CENTRAL SCOTLAND FM GROUP, RS3872B.** Details from Thomas Stalker G6M7TJZ. Tel: (01698) 816793.

**DALRY ARC, M6M0ARG.** Meets at The Turf, In Dalry Court, Hill Street, Dalry. Details from Alex McKeeman M6M0ABM. Tel: (01294) 823295.

**DUNOON & DARS, G6M0CDD.** Meets at the Edward Street Community Centre, Edward Street, Dunoon. Details from A.B. Horton G6M0BUL. Tel: (01369) 840217.

**HELENSBURGH ARC, G6M4HEL.** Details from G. Capstick G6W0AF. Tel: (01436) 675922.

**INVERCLYDE ARC, G6M0GNK.** Meets at the Cardwell Bar, Cardwell Road, Gourcock, Strathclyde. Details from Andrew Givens G6M3YOR. Tel: (01475) 638226.

**KILMARNOCK & LOUDOUN ARC, G6M0ADX.** Meets at the Hurford Community Centre, Cessnock Road, Hurford. Details from Steve Campbell G6M40SS. Tel: (01560) 483800.

**LARGS & DARS, G6M0VNG.** Details from Mr J. Clough G6M0MDD. Tel: (01475) 529843.

**LORN ARS, G6M0LRS.** Details from T. Olsen G6M0EQW. Tel: (01866) 2580.

**MID LANARK ARS, G6M3PKK.** Meets at the Newarthill Community Centre, High Street, Newarthill, Motherwell, Lanarkshire ML1 5GU. Details from John Neary G6M0XFK. Tel: (01698) 822860.

**MILTON OF CAMPSIE ARS, G6M0MOC.** Meets at The Red Cross Hall, Kirkintilloch. Details from John MacKenzie G6M0JU. Tel: (01360) 312954.

**PAISLEY ARC, G6M0PYM.** Meets at the Paisley YMCA Hall, 5 New Street, Paisley PA1 1JU. Details from John Quigley G6M0TQA. Tel: 0141-889 6860.

**SCOTTISH DIGITAL COMMS. GRP, G6M7VSR.** Details from Stuart Clark G6M1VBE. Tel: (01698) 884803.

**WEST OF SCOTLAND ARS, G6AAGG.** Meets at the Multi Cultural Centre, 21 Rose Street, Glasgow. Details from Hon. Sec.

## SCOTLAND EAST & HIGHLANDS

### BORDER

**BORDER ARS, G6M0BRS.** Meets at the St. John Ambulance Hall, Benwick-upon-Tweed. Details from A.M. McCree G6M0BPT. Tel: (01890) 504929.

**GALASHIELS & DARS, G6M4YEQ.** Meets at the Focus Centre, Galashiels. Details from Jim Keeble G6M7LUN.

**KELSO ARS, G6M4KHS.** Meets at the Abbey Row Community Centre, Kelso. Details from Margaret Chalmers G6M0ALX. Tel: (01573) 226372.

### FIFE

**GLENROTHES & DARC, G6M4GRC.** Meets at the Football Pavilion, Station Road, Thornton, Fife. Details from Alexander Adam G6M0FVD. Tel: (01592) 874374.

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**ABERDEEN ARS, G6M3BSQ.** Meets at the Red Cross HQ, 22 Queens Road, Aberdeen. Details from Robert Duncan. Tel: (01224) 896142.

**BANFF & DARC, G6M0PYC.** Meets at the Princess Royal Park Football Ground, Conference Room (Deveronvale F.C.), Banff. Details from Steve Roberts G6M4HWS. Tel: (01888) 551377.

**MORAY FIRTH ARS, G6M3TKV.** Meets at the Grant Arms Club, Fochabers. Details from Geoff Crowley G6M7SJC. Tel: (01542) 882818.

### HIGHLAND REGION

**FORT WILLIAM ARC, G6M0FRG.** Details from R. Johnstone G6M1YGV. Tel: (01397) 703046.

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### LOTHIAN

**COCKENZIE & PORT SETON ARC, RS177035.** Meets at the Thorne Inn, Lounge Bar, Old Cockenzie High Street, Cockenzie, E. Lothian. Details from Mr Bob Glasgow G6M4UZY. Tel: (01875) 811723.

**LOTHIANS RS, G6M3HAM.** Meets at the Holyrood Room, Royal Ettrick Hotel, Ettrick Road, Edinburgh. Details from Toby Sigoun M6M0TSS on (07739) 742367.

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**ORKNEY ARS, RS181749.** Details from Mrs Terry Penna. Tel: (01856) 741233.

### SHETLAND ISLANDS

**LERWICK ARC, G6M3ZET.** Meets at the Islesburgh Community Centre, King Herard Street, Lerwick, Shetland. Details from Ian C. Millar G6M7RRD. Tel: (01950) 460306.

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**DUNDEE ARC, G6M4AAF.** Meets at the Dundee College, Graham Street Annex, Dundee. Details from Martin Higgins M6M0DUN, c/o Dundee ARC, 60 Duns Crescent, Dundee DD4 0RZ.

**PERTH & DARG, G6M4EAF.** Meets at the Perth Sports & Social Club, 18 Leonard Street, Perth. Details from Ron Harkness G6M3THI. Tel: (01738) 643435.

**STRATHMORE & DARC, G6M3GBZ.** Meets at 2231 Sqdn ATC, 1 Lochside Road, Forfar. Details from Graham Scattergood M6M0BSX. Tel: (01307) 468824.

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### CO. ANTRIM

**ANTRIM & DARS.** Meets at the Greystone Community Centre on the Ballyragh Road in the town of Antrim. Details from David Hutchinson G14FUM or visit www.gn4sw.co.uk

# International Radio Clubs

## AMSAT-UK (G0AUK)

Information from Jim Heck G3WGM, Badgers, Letton Close, Blandford, Dorset BH11 7SS. E-mail: g3wgm@amsat.org or visit [www.uk.amsat.org](http://www.uk.amsat.org)

## British Amateur Radio Teledata Group (BARTG - G4ATG, GB2ATG)

Contact Membership Secretary Andrew Thomas G8GNI, M5AEX, Dame School House, 103 High Street, Stony Stratford, Buckinghamshire MK11 1AT, E-mail: members@bartg.demon.co.uk or visit [www.bartg.demon.co.uk](http://www.bartg.demon.co.uk)

## British Amateur Television Club (BATC - RS3B114)

Enquiries to Dave Lawton G0ANO, 'Grenehurst', Pinewood Road, High Wymcombe, Bucks HP12 4DD. Tel: (01494) 528899. E-mail: memsec@batc.org.uk or visit [www.batc.org.uk](http://www.batc.org.uk)

## British DX Club (BDXC-UK)

Enquiries to Club Secretary Colin Wright, 126 Bargery Road, London SE6 2LR. E-mail: secretary@bdxc.org.uk or visit [www.bdxc.org.uk](http://www.bdxc.org.uk)

## Danish Shortwave Club

Information from Treasurer Bent Nielsen, Egekrogen 14, DK-3500 Vaerloese, Denmark or visit [www.dswci.org](http://www.dswci.org)

## Group for Earth Observation

Information pack from GEO Info S, 34 Ellerton Road, Surbiton, Surrey KT6 7TX or via [info@geo-web.org.uk](mailto:info@geo-web.org.uk) or visit the GEO website at [www.geo-web.org.uk](http://www.geo-web.org.uk)

## International Short Wave League (ISWL - G4BJC)

Information from Honorary Secretary Bill Mackie G-9137/G4AIE, 23 College Park, Horncastle, Lincs LN9 6RE. E-mail: bill.mackie@zetnet.co.uk or visit [www.iswl.org.uk](http://www.iswl.org.uk)

## Military Wireless Amateur Radio Society (G0PTZ)

Further details from John Taylor-Cram, 7 Hart Plain Avenue, Cowplain, Waterlooville, Hampshire PO8 8RP. Tel: 0239-225 0463.

## Radio Amateurs Invalid and Blind Club (RAIBC - G4IBC, GBOIBC, GB1IBC)



Enquiries to Honorary Treasurer/Membership Secretary Mrs Shelagh Chambers, 78 Durley Avenue, Pinner, Middlesex HA5 1JH. Tel: 0208-868 2516.

## Radio Amateur Old Timers' Association

Enquiries to Membership Secretary Ted Rule, G3FEW, 15 Norwich Road, Lenwade, Norwich NR9 5SH. Tel: (01603) 872309, E-mail: edit@raota.fsnet.co.uk or visit [www.raota.org](http://www.raota.org)

## Remote Imaging Group (RSBBB03)

Further details from the Membership Secretary John Din, 59 Woodend Road, Coalpit Heath, Bristol BS36 2LH. FAX: (01454) 887880. E-mail: membership@rig.org.uk

## Royal Air Force Amateur Radio Society (RAFARS - GBFC, GBRAF)

Details from the Administrator, HQ RAFARS, RAF Cosford, Wolverhampton WV7 3EX. Tel: (01902) 372722, E-mail: administrator@rafars.org

## Royal Navy Amateur Radio Society (RNARS - GB3RN, G3CRS, G1BZU)

Enquiries to Secretary Philip Manning G1LKJ/M3LKJ, 1 Waverley Gardens, Ash Vale, Surrey GU12 5JP. Tel: (01252) 334929, E-mail: g1lkj@amsat.org or visit [www.rnars.org.uk](http://www.rnars.org.uk)



## Royal Signals Amateur Radio Society (RSARS - G4RS)

More information from General Secretary, HQ RSARS, Cole Block, Blandford Camp, Dorset DT1 8RH. Tel: (01258) 482814, E-mail: gensec@rsars.org.uk or visit [www.rsars.org.uk](http://www.rsars.org.uk)



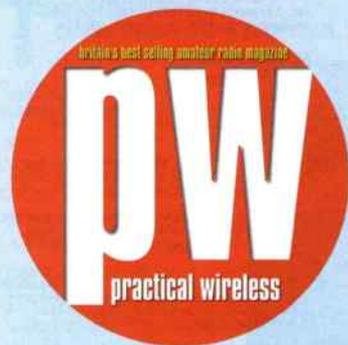
## The Medium Wave Circle

Details from c/o C. Rooms, 59 Moat Lane, Luton LU3 1UU. E-mail: contact@mwcircle.org

## World Association of Christian Radio Amateurs & Listeners M1CRA

Details from Membership Secretary Derek Chivers G3XNX, 51 Alma Road, Brixham, South Devon TQ5 8QR. Tel: (01803) 854504 or visit [www.wacral.org](http://www.wacral.org)

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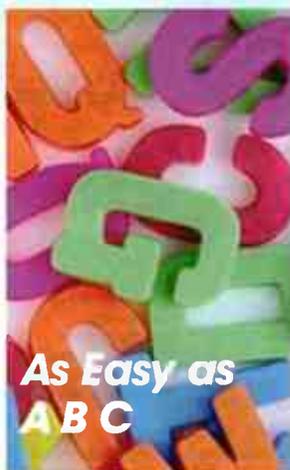
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